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AAAS, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The American Association for the Advancement of Science (AAAS) was founded in Philadelphia in 1848, making it one of the oldest professional societies in the United States. AAAS is a nonprofit society dedicated to the advancement of scientific and technological quality across all fields of science, and to increasing the general public's understanding of science and technology. The mission of the organization, according to its Constitution, is to "further the work of scientists, facilitate cooperation among them, foster scientific freedom and responsibility, improve the effectiveness of science in the promotion of human welfare, advance education in science, and increase the public's understanding and appreciation of the promise of scientific methods in human progress" (AAAS, 2011).

Today AAAS's membership is international, and is composed of over 143,000 scientists, science educators, engineers, and interested others; membership is open to anyone interested in scientific and technological progress. There are 285 scientific and engineering societies that have chosen to affiliate themselves with the AAAS, and they include 238 other societies, 44 state and regional academies of science, and 3 city academies. AAAS is thus the world's largest federation of professional scientific organizations. The association is organized into 24 sections which represent the various fields of interest of members, and four regional divisions. Programs fall into one of three directorates: Education and Human Resources, International, and Science and Policy.

The Association publishes many science books and reference works, the most prestigious being the weekly *Science*, a highly respected publication which disseminates state-of-the-art scientific research.

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AMERICAN ASSOCIATION OF INTELLECTUAL AND DEVELOPMENTAL DISABILITIES

The American Association of Intellectual and Developmental Disabilities (AAIDD), formerly American Association on Mental Retardation (AAMR), was founded in 1876, and claims over 5,000 members in the United States and 55 countries. Its membership is composed of professionals from a large variety of academic disciplines who are interested in the field of what is now known as intellectual disabilities, as well as nonprofessionals who are involved in and care of same. The primary goals of the AAIDD are to enhance the capacity of professionals who work with individuals with intellectual and developmental disabilities, participate in the development of a society that fully includes individuals with intellectual and developmental disabilities, and build an effective, responsive, well-managed, responsibly governed, and sustainable organization.

The AAIDD offers strong support to research in ID in the service of increasing the knowledge and skills of all who are involved in the field of ID, through the publication of two professional journals and the Association's newspaper *News and Notes*. The *American Journal on Intellectual and Developmental Disabilities* or *AJIDD*, reports current and critical research in biological, behavioral, and educational sciences, it is also a resource in the causes, treatment, and prevention of intellectual disability. The *Intellectual and Developmental Disabilities* (*IDD*) is a clinical and applied journal that ranks consistently among the top journals in special education and rehabilitation. *IDD* is a journal of policy, practices, and perspectives for professionals, clinicians, and other support staff interested in intellectual disabilities and related developmental disabilities. The AAIDD also provides an Early Career Professional page which allows students and professionals alike to connect through web-based trainings, blog entries, and future events.

The AAIDD is organized into 10 regions that cover the United States, Canada, and parts of the Pacific, and contains over 85 local, state, or provincial chapters. There are different areas you can choose to be affiliated with when becoming a member. These groups are divided into categories called divisions, special interest groups (SIGS), and action groups. There are many topics available within these groups; some examples are administrative division,

communication disorder division, community service division, creative arts therapy SIG, criminal justice action group, direct support professionals division, education division, families SIG, genetics (SIG), gerontology division, health and wellness action network, humanism action network, hurricane disaster preparedness for persons with ID, and legal process and advocacy division. Membership in the AAIDD is open to anyone concerned about intellectual and developmental disabilities.

AAIDD plays a critical role in setting policy and priorities by working closely with federal agencies such as the Office of Special Education and Rehabilitative Services, the Administration on Developmental Disabilities, and the Division of Maternal and Child Health. AAIDD has taken a stand in recent U.S. Supreme Court cases on everything from medical decisions affecting newborns, school exclusion, and exclusionary zoning of group homes to the rights of defendants charged in criminal cases.

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AAIDD (AMERICAN ASSOCIATION ON INTELLECTUAL DEVELOPMENTAL DISABILITIES) CLASSIFICATION SYSTEMS

Founded in 1876 as the American Association on Mental Retardation (AAMR) and now called the AAIDD, this organization is the world's oldest and largest interdisciplinary organization of professionals concerned about Intellectual Development Disabilities. With headquarters in Washington, DC, the AAIDD has a constituency of more than 50,000 people and an active core membership in the United States and in 55 other countries. The mission is to promote progressive policies, sound research, effective practices, and universal rights for people with intellectual disabilities. The AAIDD has led the field of developmental disabilities by officially defining the condition known as *Intellectual Developmental Disabilities*. A diagnostic and classification system remains important in today's society because it is used to determine who can access publicly funded services and supports.

The AAIDD has updated the definition of *Mental Retardation* 10 times since 1908. Changes in the definition have occurred when there is new information, or there are changes in clinical practice or breakthroughs in scientific research. The 11th edition of *Mental Retardation: Definition, Classification, and Systems of Supports* (AAIDD, 2010) contains a comprehensive update to the landmark 1992 system and provides important new information, tools, and strategies for the field and for anyone concerned about people with intellectual and developmental disabilities. The 11th edition discusses the 2010 AAIDD definition and classification system in great detail. It presents the latest thinking about Intellectual Disabilities and includes important tools and strategies to determine if an individual has IDD along with detailed information about developing a personal plan of individualized supports. It is available from the AAIDD through their website at http://www.AAIDD.org/bookstore/ or by calling (301) 604-1340.

The overall AAIDD definition of *Intellectual Developmental Disablities* is that it is a disability characterized by significant limitations both in intellectual functioning and in adaptive behavior as expressed in conceptual, social, and practical adaptive skills. This disability originates before the age of 18. The AAIDD considers five assumptions that are essential to the application of this definition:

1. Limitations in present functioning must be considered within the context of community environments typical of the individual's age peers and culture.
2. Valid assessment considers cultural and linguistic diversity as well as differences in communication, sensory, motor, and behavioral factors.
3. Within an individual, limitations often coexist with strengths.
4. An important purpose of describing limitations is to develop a profile of needed supports.
5. With appropriate personalized supports over a sustained period, the life functioning of the person with Intellectual Developmental Disabilities generally will improve (AAIDD, 2010).

A complete and accurate understanding of AAIDD involves realizing that *Intellectual Developmental Disabilities* refers to a particular state of functioning that begins in childhood, has many dimensions, and is affected positively by individualized supports. As a model of functioning, it includes the contexts and environment within which the person functions and interacts and requires a multidimensional and ecological approach that reflects the interaction of the individual with the environment and the outcomes of that interaction with regards to independence, relationships, societal contributions, participation in school and community, and personal well-being.

Table A.1.

Botswana	700,000
Ethiopia	15,600,000
Eritrea	1,600,000
Kenya	12,100,000
Lesotho	600,000
Malawi	3,200,000
Namibia	700,000
Tanzania	8,700,000
Uganda	10,500,000
Zambia	2,900,000
Zimbabwe	3,200,000

Adaptive behavior is the collection of conceptual, social, and practical skills people use to function in their everyday lives. Significant limitations in adaptive behavior impact a person's daily life and affect the ability to respond to a particular situation or to the environment. Limitations in adaptive behavior can be determined by using standardized tests that are normed on the general population, including people with disabilities and people without disabilities. On these standardized measures, significant limitations in adaptive behavior are operationally defined as performance that is at least two standard deviations below the mean of either (1) one of the following three types of adaptive behavior: conceptual, social, or practical, or (2) an overall score on a standardized measure of conceptual, social, and practical skills (AAIDD, 2010). Table A.1 includes some specific examples of adaptive behavior skills.

The concept of supports originated in the 1970s with the AAIDD, and it has revolutionized the way habilitation and education services are provided to persons with Intellectual Developmental Disabilities. Rather than mold individuals into preexisting diagnostic categories and force them into existing models of service, the supports approach evaluates the specific needs of the individual and then suggests strategies, services, and supports that will optimize individual functioning. The supports approach also recognizes that individual needs and circumstances will change over time. Supports were an innovative aspect of the 1992 AAMR manual, and they remain critical in the present system. *Supports* are defined as the resources and individual strategies necessary to promote the development, education, interests, and personal well-being of a person with Intellectual Disabilities. Supports can be provided by a parent, friend, teacher, psychologist, or doctor or by any appropriate person or agency. Providing individualized supports can improve personal functioning, promote self-determination and societal inclusion, and improve personal well-being of a person with Intellectual Developmental Disabilities. Focusing on supports as the way to improve education, employment, recreation, and living environments is an important part of person-centered approaches to providing supports to people with Intellectual Developmental Disabilities.

Table A.2.

WORD TYPE	EXAMPLE
CVC words that begin with a continuous phoneme	mat, sat, fat, hat
CVC words that begin with a stop phoneme	big, top, dip
CVCC words that end with a consonant blend or double consonants	sand, bend, toss
CCVC words beginning with a consonant blend	trip, slam, drop
CCVCC, CCCVC, CCCVCC	still, drink, truck
Compound words with CVC word or CVC variants	catnip

The AAIDD recommends that an individual's need for supports be analyzed in at least nine key areas: human development, teaching and education, home living, community living, employment, health and safety, behavioral, social, and protection and advocacy. Some specific examples of supports areas and support activities can be found in Table A.2.

The AAIDD publishes the Supports Intensity Scale (SIS), a planning tool that assesses the practical supports requirements of a person with an intellectual disability. The SIS is directly related to the 2002 classification system and therefore allows seamless transition from assessment to intervention (AAIDD, 2005). Contact information for the AAIDD is as follows: American Association on Intellectual Developmental Disabilities, 501 3rd St. NW, Ste. 200, Washington, DC 20001-1512. Tel.: (202) 387-1968 or (800) 424-3688, fax: (202) 387-2193, website: http://www.AAIDD.org

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***See also* AAIDD, American Association on Intellectual Developmental Disabilities**

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ABILITY TRAINING, EARLY EFFORTS IN

Many educators believe that most academic and social learning is based on factors such as student aptitudes or abilities, instructional environment, and teaching methodology. While these three variables do not form a complete structure capable of containing all those factors contributing to learning, they certainly account for many of the variables educators would agree are important to success in school.

Learner aptitudes or abilities are those personological variables that frequently are called intelligence(s), traits, gifts, and characteristics. Frequently, educators will talk about a child's potential to learn, using the term ability as if it were a predetermined factor waiting to be drawn on at some point. The logic, then, is that if learning is a result of the presence and development of certain mental abilities, school failure (both academic and social) may be the result of disabilities, with disability implying an academic or social handicap.

If regular (elementary and secondary) educators teach to the abilities of students to learn, then special educators may direct more of their instruction to the disabilities that inhibit learning, hence the term and concept of ability training. How valid is this construct of ability training? A short response to that question is impossible. Any field involving relatively newly defined services to persons, especially children, in particular children with disabilities, will generate professional controversy. Any field struggling with the pressures associated with economic, political, social, legislative, litigative, and basic human rights and values will face diversity. Any field that requires its many disciplines to unite in purpose will experience communicative stress. But, few professionals will purposely question their field's major methodology to the degree special and remedial educators have, for the period of time they have done so, and in the face of such a degree of controversy.

Some special educators believe avidly in ability training of all types; some reject it totally; but almost all, no matter what they believe, practice ability training. The truth in that observation is displayed when we recognize that the value of ability training to individuals with disabilities has been questioned repeatedly for over the past 100 years. What then is in ability training that has caused the field of special education to tenaciously and steadfastly support its methods? Ability training is routed in the historic search for the structure and function of the mind. Educators, in particular special educators, seek to diagnose specific abilities and provide remediation to those abilities, or disabilities as the case may be.

Mental ability (aptitude), concerns those components that are assumed to constitute the mind, and therefore explain learning. Mental-ability structures, in more scientific parlance, may be referred to as information-processing behaviors. Mental processes or information processes are those theoretical or conceptual acts (processes) by which information is transmitted from the peripheral (to the central nervous system) sensory organs (i.e., eyes, ears, fingers [tactile], muscles [kinesthetic]) perceived, labeled, stored, provided mediated meaning, conceptually associated, and expressed as language or motoric responses. It is not unusual for practitioners to reference most psychological functions synonymously with mental abilities. Hence, the very definition of learning disabilities refers to "basic psychological processes."

The history of man, at least those aspects related to the structures of the mind, how it works, and therefore how these processes can be measured, begins with the early Greek philosophers. Pythagoras placed the "mind" in the brain in the sixth century B.C.E. Most of the processes described then were hypotheoretical, related to this assumed function. Therefore, the names given these processes sometimes sound as if they had been isolated neurologically or psychoneurologically. The truth is that the majority of the commonly referenced mental processes, that is, perception and language, are not simple, easily explained constructs. They are complex concepts that may contain hundreds of component subparts. The major issues relating to ability training have been the long-standing arguments regarding the mind, its disabilities, and the habilitation or rehabilitation needed. A case in point is that while simple tests are designed to ascertain visual perceptual-motor development, visual perception is not a simple discriminate function. In a general sense, perception requires the discrimination of distinctive features, wherein a specific symbolic meaning can be assigned each distinct stimuli. Logically then, once perceptual information has been discriminated, it may be stored for some short-term reference, or it may be assigned a permanent symbolism, then converted to a language concept. Logically then, too, there may be both visual and auditory perception. These two processes may need to be coordinated when auditory and visual information is presented in an integrated manner. Perception, however, is not logically complex in contrast to the explanations of the structure and function of language.

A mental ability may also be referred to as a faculty. Mann (1979) credits Aristotle for establishing the basis for modern faculty psychology. The Romans further refined and added descriptors such as intellect, attention, and language. St. Thomas Aquinas, during the Middle Ages, although poorly credited, began to amplify and extend faculty psychology by dividing it into two parts: the *intellectus*, which carries out abstractions and functions of the possible intellect; and the *ratio*, which is directed toward understanding, judgment, and reasoning. The intellect is active and creative, the ratio is passive and receptive—that is, sensory stimuli must be perceptually assigned symbolic meaning/value before they have intellectual meaning.

Faculty psychology, the theoretical basis for mental process, was soundly criticized by many of the 17th-, 18th-,

and 19th-century scholars. Hobbes (1588–1679) displaced it with his theories of automotion in the brain set off by sensory stimulation. Locke (1632–1704) was a sensationalist, and an arch antifaculist. Hume (1715–1776), also a sensationalist in the British tradition, condemned faculties, basing mental response solely in sensory stimulation. By the mid 19th century, the psychologist and educator Herbart attempted to destroy for all time the residual of faculty psychology.

One of the predominate figures in mental measurement, Spearman, writing in 1927, notes that faculty psychology seems to persist, no matter what the criticism.

One curious feature about these formal faculties has yet to be mentioned. The doctrine loses every battle—so to speak—but always wins the war. It will bend to the slightest breath of criticism; but not the most violent storm can break it. The attacks made long ago by the Herbartians appeared to be irresistible; no serious defense was even attempted. Yet the sole permanent effect of these attacks was only to banish the word "faculty," leaving the doctrine represented by this word to escape scot-free (pp. 38–39). However, other early individuals in the field such as Thorndike continued to be critical. As a quote from Mann (1979) notes,

> The science of education should at once rid itself of its conception of the mind as a sort of machine, different parts of which sense, perceive, discriminate, imagine, remember, conceive, associate, reason about, desire, choose, form habits, attend to.... There is no power of sense discrimination to be delicate or coarse.... There are only the connections between separate sense stimuli and our separate senses and human judgments thereof.... There is no memory to hold in a uniformly tight and loose grip the experiences of the past. There are only the particular connections between particular mental events and others. (Klein, 1970, p. 662)

Though an out-and-out antifaculist, Thorndike, interestingly enough, could not shake the ingrained habit of his times of speaking about "faculties." Thus, he described his bonds as faculties in the 1903 edition of *Education Psychology* (p. 30): "the mind is a host of highly particularized and independent faculties" (Spearman, 1927, p. 36).

Yet, it is faculty psychology that provided the definition for 20th-century mental measurement. On the basis of his inquiries, Galton described what, in essence, is a superfaculty, which he called "general ability," assigning to this faculty the name intelligence (a term popularized by Spencer). Galton distinguished this superfaculty from special aptitudes. He was more interested in the first, since he believed that general ability inevitably set a limit to accomplishment of any kind. He complained that most writers emphasized specific aptitudes or skill, that they

> lay too much stress upon apparent specialties, thinking that because a man is devoted to some particular pursuit, he could not have succeeded in anything else; they might as well say that, because a youth has fallen in love with a brunette, he could not possibly have fallen in love with a blonde. He may or may not have had any more natural liking for the former type of beauty than for the latter; but it is as probable as not that the affair was mainly or wholly due to a general amorousness. It is just the same with intellectual pursuits. (Burt, 1955, p. 85)

Galton most certainly did not deny the existence of special capacities or their potential importance. He cited instances in which memory, musical ability, and artistic and literary talent ran within several members of the same family. Home environment or family tradition could not explain all such cases, for example, "prodigies of memory." However, his studies in the main had convinced him "in how small a degree intellectual eminence can be considered as due to purely special powers" (Burt, 1955, p. 85).

As to the measurement of both general and special abilities, Galton suggested that individual differences in both are distributed in accordance with the normal curve, much as other human characteristics such as size or height are distributed. He printed a tabular classification of frequencies which he held "may apply to special just as truly as to general ability" (Burt, 1955, p. 85). Thus we see the beginnings of psychometric assessment of both general ability and specific abilities.

About 1880, the German psychiatrist Kraeplin, one of Wundt's students, began to use different tests to describe higher cognitive functions (Guilford, 1967). His testing interests were directed to such processes as general memory, specific memory, attention, and task-directed behaviors. However, it was James McKeen Cattell who first formulated the term "mental tests." Cattell's extension of Galton's simple tests began the modern practice of psychometrics as we know it today. Others such as DeSanctis attacked the realms of higher cognitive functioning. DeSanctis published a series of six tests including (1) memory for colors, (2) recognition of forms, (3) sustained attention, (4) reasoning involving relations, (5) following instructions, and (6) thinking.

At the turn of the 20th century, the French Minister of Public Instruction was still wrestling with an age-old problem: how to consistently identify the individuals with disabilities. Having agreed on the terminology to be used (idiot for the lowest level; imbecile for the intermediate level; and moron for the mildly mentally retarded), a psychologist, Alfred Binet, and physician, Theodore Simon, were commissioned to develop a consistent means of classifying children. Binet and Simon (1905, 1908) produced, through a standardized procedure of observation, a psychological classification of quantifiable differences in children's intellectual characteristics (traits). By 1905 Binet and Simon had developed 29 such tests designed to measure specific traits; by 1908 they had developed a classification of tests beginning at age three

and continuing through age 13. Thus, the work preceding 1905 established human intelligence as a comprehensive integration of several traits including memory, attention, comprehension, muscular coordination, spatial relations, judgment, initiative, and ability to adapt. Further, the criteria for measurement of these traits were standardized at various chronological age levels. From this procedure the measurement of human performance took a great leap forward.

Binet carried his interest in higher processes into his work of developing mental tests for use in Paris schools. He and his associates criticized tests of the Galton type as being too simple, too sensory-motor, and too dependent on associationistic dogma. They expressed their own preference for the complex cognitive functions, proposing that 10 categories be explored by mental tests: (1) memory, (2) imagery, (3) imagination, (4) attention, (5) comprehension, (6) suggestibility, (7) aesthetic appreciation, (8) moral sentiment, (9) muscular force, force of will, and motor skill, and (10) judgment of visual space.

Modern psychoeducational assessment and remedial practices, indeed the very content of most perceptual, motor, language, vocational, and academic remedial curricula, are based on Binet's work. Two of the major issues are the specificity with which mental ability processes can reliably be ascertained and the desirability of remediating the specific perceptual or language processes in terms of their transferability and ultimate academic and social learning transfer.

But, it is clear that abilities had been identified by tests and that ability training was to become a crucial issue facing the 20th century. The main philosophic question is, do mental abilities really exist in nature? The second question is, do they respond to specific training once they are described, measured, observed, and, in short, isolated as specific mental abilities? These two questions constitute the major issues facing special educators today. Since mental abilities are developmentally linked to chronological growth, culture, and experience, they may be encouraged by structured educational experiences. Conversely, when developmentally delayed, culturally neglected, or separated from sequenced experiential practice, ability may degenerate. Mental ability deficiencies may then be the principal characteristics associated with disabling conditions such as learning and emotional or behavioral disorders. The entire nervous system develops only successfully decoding information or perceiving symbolic features providing a language construct and a mechanism to communicate. Therefore, specific reference is made in the definition of intellectual disability and learning disabilities, two of the largest categories of special education service categories, to dysfunction of perceptual, perceptual-motor, or language abilities.

Philosophically, then, it appears that a leap in logic is *not* required to assume that if a disability exists, and interferes with functioning, it should be corrected. That is exactly what ability training implies. It would appear that it was incorrectly named to begin with. The history of ability training parallels that of the field of special education. The pioneers in ability training were the pioneers of the field. Itard, Howe, Sequin, Montessori, Binet, Wepman, Kirk, Strauss, Fernald, Frostig, and Cruickshank were all advocates of special education as it grew, and responsible for advancing ability training simultaneously. Tests used to describe a disability were followed by commercially prepared curricula to minimize the disability by improving ability. The logic is obvious. The problem is in the scientific validation, or lack of it.

The early 1960s brought with it a concern for neurological impairment with children. The mid 1960s added the term learning disabled as a category of disabling conditions. Both of these conditions required an increased emphasis on psychoneurological and psychoeducational assessment. Those that developed psychoeducational and psychoneurological tests to diagnose these conditions fueled the fire for ability training by describing conditions which, by their description, must exist.

Curricula designed to modify and treat patterns of disability were soon commercially available. Whole classes of children were exposed to Montessori, Frostig, and Fernald techniques, and administered Frostig, Kephart, and Delaccato assessment procedures. Tests such as the Illinois Test of Psycholinguistic Abilities became commonplace, much as the Woodcock-Johnson test batteries of today. The prevailing belief was that specific mental processes must be diagnosed in order for modification of a specific disability to result in quantum jumps in academic remedial achievement and potential normalization. Thus, the so-called diagnostic-prescriptive process is one aspect of ability training.

What then is the difficulty with visual and auditory perceptual training, perceptual motor training, language training, and the other forms of sensory, motor, perceptual, and language ability training? The problem is that data arrived at through quasi-scientific means lead to controversial results. There are data to support ability training, if the objective to be achieved is a change in an ability, and that ability alone. There are few data to support that training of a perceptual or cognitive ability will transfer to an academic achievement skill, for instance reading.

The overall interaction among these abilities includes the stimulus provided during physical or auditory training and how the information is interpreted and organized (Hammill, 2004). Language training seemingly has the greatest transference to academic remediation. But even the search for generalities would produce only controversy. The fact is, ability training makes sense logically but has not been sufficiently researched devoid of other educational practices with school-age children to permit definitive statements. And yet, the practice does not only continue, it continues to thrive.

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See also **Diagnostic Prescriptive Teaching; Fernald Method; Illinois Test of Psycholinguistic Abilities; Intelligence; Remediation, Deficit-Centered Models of**

ABNORMALITIES, NEUROPHYSIOLOGICAL

The human nervous system consists of the brain, the spinal cord, and an intricate network of nerve fibers projecting from the brain and spinal cord. Structurally, the brain is differentiated into the two cerebral hemispheres, the brain stem, and the cerebellum. The brain, together with the spinal cord, traditionally has been conceptualized as the central nervous system (CNS). The entire network of nerve fibers is then referred to as the peripheral nervous system (PNS). The brief discussion regarding normal neurological structure and function that follows is meant as an aid in the appreciation of neurophysiological disorders. The intent here is to offer an overview; for a more detailed account of the nervous system, the reader is referred to one of a number of neurophysiological texts (e.g., Bickerstaff, 1978; Lindsley & Holmes, 1984; Swaiman & Ashwal, 2006).

Peripheral nerves are referred to by the direction the impulses flow and the site of their termination. Specifically, the direction of the impulses carried in relation to the CNS, the originating structure, or final destination of the impulse, and the nature of the impulse itself, are used to classify peripheral nerves. For instance, the PNS contains sensory nerves that carry impulses from the sense organs (eyes, ears, nose, etc.) to the CNS. By way of contrast, the motor nerves travel from the CNS to the periphery, exciting both skeletal (voluntary) and smooth (involuntary) muscle into movement. Included in PNS, the cranial nerves arise from or travel to the brain stem (connecting structure between spinal cord and cerebrum). Similarly, the spinal nerves travel to or from the spinal cord. The group of peripheral nerves that carry impulses to smooth muscle (causing involuntary movements of the intestines, heartbeat, constriction of the pupils, etc.) and those that incite the secretion of glands cause automatic changes in the body. These peripheral nerves are sometimes referred to collectively as the autonomic nervous system.

Functionally, the fundamental building block of the nervous system is the neuronal circuit. The simplest neuronal circuit contains only two interconnected nerve cells, involving an input and an output cell (e.g., simple kneejerk reflex). Local circuits exist at all levels of the nervous system and, in fact, such circuits in the spinal cord connect the cerebral cortex, brain stem, and cerebellum. These connections can function as modules in more complex circuits. Indeed, these integrated networks are capable of sustaining complex behavior (Gaddes, 1985; Kandel, Schwartz, & Jessell, 1991).

As an example, sensory impulses traveling from the various sense organs to the brain are integrated, recorded, recognized, stored, or remembered, as interpreted by the cerebral cortex. Moreover, skeletal movement may be affected by motor nerves traveling by way of the spinal cord. Generally, the entire system works to regulate and coordinate bodily responses to both internal and external changes in the environment (Taber, 1970). A malfunctioning neurological system results in an impaired capacity for responding adaptively to a changing environment.

Neurophysiological abnormality may occur by means of many agents and during various stages of the life process; some stages offer more vulnerability than others. Antenatal agents (occurring before birth) described by Nelson (1969) include genetic factors, chromosomal aberrations, placental disease, maternal complications, number of previous pregnancies, age of both mother and father, intrauterine infection, toxic agents (including certain drugs and alcohol), and radiation. Various organ systems begin and end their prenatal development at different times, therefore their sensitivity to agents varies with maturity of the fetus. The most vulnerable period for the brain is from 15 to 25 days of gestation but, clearly, damage can occur at any time during the development of the nervous system (Hetherington & Parke, 1979).

Perinatal (occurring just before or after birth) vulnerability to neurological insult is accentuated by premature birth. Inadequate oxygen during this stage, hemorrhage, trauma, and infection are the principal offenders (Nelson, 1969). Postnatal (occurring after birth) damage to the neurological system may include damage incurred after birth, during childhood, or throughout the various

stages of adulthood. Infections, principally meningitis and encephalitis, injuries, and degenerative neurological disease have also been implicated (Nelson, 1969).

Weller, Swash, McLellan, and Scholtz (1983) estimated that 40% of developmental malformations of the CNS arise from genetic abnormality. The most common genetic abnormality is Down syndrome. This disorder is associated with a group of chromosomal aberrations involving the 21st chromosome pair. In the great majority of cases, a failure to join occurs during the meiosis process, resulting in a trisomy (additional chromosome) of the 21st chromosome pair. Translocation and mosaician represent less frequently occurring aberrations of the 21st chromosome pair, also associated with Down syndrome (Kopp & Parmelee, 1979).

The incidence of Down syndrome is between one and two per thousand live births for all races and ethnic groups (Gillberg, 1995; Norman, 1963). Although there is some variability in incidence, most researchers cite an increase in relation to maternal age (Benda, 1960; Lawrence, 1981; Weller et al., 1983). A gradual increase begins with maternal age of 35 and escalates drastically after 40. Metabolic or environmental factors in the mothers' ovaries have been suggested as causes for the syndrome (Benda, 1960; Lawrence, 1981; Nelson, 1969; Norman, 1963; Weller, Swash, McLellan, & Scholtz, 1983). Structural inspection of the Down syndrome brain suggests impairment of both growth and differentiation (Benda, 1960). The brain is generally low in weight and the normal convolutional pattern of the brain is simplified. The density of the nerve cells in the cerebral cortex is reduced (Weller et al., 1983).

Rate of mental development is not only slower than normal but also deteriorates progressively with age in Down syndrome (Cornwell & Birch, 1969; Dicks-Mireaux, 1972; Gillberg, 1995). Many explanations, including neurophysiologic changes, have been offered as an explanation for this progressive deterioration. Weller et al. (1983) noted that the microscopic study of brain tissue of Down syndrome victims during autopsy reveals patterns of neurofibrillary tangles, senile plaques, and granulovacular degeneration such as are found in Alzheimer's disease (deteriorative disease of the elderly involving degeneration of the smaller blood vessels of the brain). Kopp and Parmelee (1979) suggest that the severe limitations in higher level integrative abilities evident in Down syndrome may cause deficits in information processing (e.g., use of language) that could have progressive detrimental effects on the child's intellectual development over time. The child's capacity for responding adaptively to changing stimulus conditions, a necessity for proper intellectual development, may be impaired directly by the nature of the syndrome. However, the nature of the environment in which these children find themselves, whether it is enriched or impoverished, also can affect development.

In contrast to Down syndrome, which is genetically related, spina bifida seems to be more influenced by environmental factors. Although genetic factors are suggested by the higher incidence in infants born to parents with a family history of such lesions, it seems that racial, geographical, and even seasonal factors also may be implicated (Kopp & Parmelee, 1979; Weller et al., 1983). Clearly, the interaction of genetic and environmental factors has recently been given prominence. Genetic predisposition combined with certain environmental factors may be the causal condition for spina bifida occurrence (Carter, 1974).

Spina bifida is a birth defect that involves the incomplete development of the spinal cord or its coverings. Spina bifida occurs at the end of the first month of pregnancy when the two sides of the embryo's spine fail to join together, leaving an open area. In some cases, the spinal cord or other membranes may push through this opening in the back. The condition usually is detected before a baby is born and treated right away. The contents of the spinal column (nerve fibers, meninges, and fluid) may protrude from the lower back in a sac (meningomyelocele). Individual defects vary depending on the extent of damage to the nerve fibers and the existence of other associated conditions (Kleinberg, 1982). The spinal cord is frequently abnormal above and below the level of the spina bifida (Weller et al., 1983). Hydrocephalus, abnormal accumulation of cerebral spinal fluid, frequently is associated with spina bifida. Untreated hydrocephalus creates severe enlargement of the head, increased pressure, and subsequent damage to the brain (Kleinberg, 1982).

Intellectual levels of individuals with spina bifida are variable, ranging from an IQ of 137 to severe subnormality (Gillberg, 1995; Hunt, 1981). More specifically, Spain (1974) associates intellectual disability with protrusion of a portion of the brain (cranial meningocele and cephalocele), whereas infants with other forms are considered to have potentially normal intellect. Many individuals with spina bifida are incontinent, and have weakness of their legs with sensory loss below the level of the lesion (Kleinberg, 1982). Owing to the presence of the typical locomotor problems in spina bifida, it is unclear whether some deficits are due to neurological impairment or environmental influence. Spain's (1974) longitudinal spina bifida studies have revealed significant deficits in spatial and manipulative development. The fact that the disorder limits the individual's experience may, in fact, cause or influence the specific deficits in spatial and manipulative development. Among the educational problems noted are difficulties with arithmetic and perseveration in language, as well as emotionality and poor motivation (Kopp & Parmelee, 1979).

Primary disorders of the CNS, like Down syndrome and spina bifida, represent a relatively small proportion of the neurological problems in infants (Horwitz, 1973). More frequently, the genetic programs for potentially normal neurological development are subverted by adverse prenatal or birthing conditions such as lack of

oxygen (hypoxia). Cerebral hemorrhage often occurs during prolonged hypoxia. The accumulation of stagnate blood that follows circulatory collapse may cause bleeding and ultimate damage to brain tissue (Weller et al., 1983). Premature infants are especially vulnerable to hypoxia. Since the respiratory system is not fully perfected until the last 4 to 6 weeks of gestation, these infants are often born without an optimally functioning respiratory system. Postmortem studies on premature children show that the bleeding usually occurs within one of the cavities of the brain or the space below the arachnoid membrane that contains cerebrospinal fluid (subarachnoid space [Horwitz, 1973]). Later complications of such subarachnoid hemorrhage involve epilepsy, dementia, and hydrocephalus (Weller et al., 1983). Full-term infants are more likely to suffer from hemorrhage in the mid-brain stem (pons) and the posterior portion of the cerebral cortex (hippocampus). The location and size of brain lesions at or soon after birth are the primary determinants of the extent of nervous system impairment. The results may range from a gross alteration of brain organization to more minimal effects such as motor overactivity, shortened attention span, or slight muscle impairment (Pincus & Tucker, 1974; Teberg et al., 1982). Large injuries in infants tend to produce more widespread deficits in intellectual abilities than similar injuries in adults. Dulling of many areas of intellectual functioning, as opposed to having an effect in specific functioning (e.g., language development, visual-spatial relationship comprehension), is also a hallmark effect of the diffuse damage that follows hypoxia (Rapin, 1982).

Neurological deficiencies from early injury are difficult to predict. The nervous system of the newborn infant is extremely immature, functioning largely at brain stem and spinal cord level. The neurologic reflexes such as Moro, grasping, and stepping represent primitive neuronal function that is largely uninhibited by higher cerebral control. Changes in these reflexes are usually not helpful in localizing the lesion, and may occur with either cortical or subcortical dysfunction (Horwitz, 1973). Damage to the cerebral cortex, for instance, may not be evident until the age when behavior dependent on the damaged part makes its developmental appearance. Thus, pathology of fine motor coordination, speech, and cognition is unlikely to be diagnosed in infancy (Rapin, 1982). However, changes in reflexes and disorganized activity of the subcortical structures expressed as a movement disorder or spasticity continue to be used as indicators of neurological damage. In Teberg et al.'s study of low birth weight infants (1982), spastic quadriplegia did, in fact, emerge as the indicative diagnosis of neurological handicap. Churchill, Masland, Naylor, and Ashworth (1974) support this finding.

Turkewitz (1974) contended that the standard methods used for the early identification of neurologic handicaps are insensitive to many forms of neurological involvement. Infants who have had difficulties shortly before or during the birth process frequently appear to recover in a few days. However, abnormalities in motor, language, and intellectual functioning become apparent later in infancy and childhood. Studies using indicators of higher levels of neurological organization (e.g., left/right preference) are being investigated in an effort to identify infants who have experienced neurological damage that is normally not expressed until later in life. However, normative patterns of left/right preference for infants must be established first, before atypical patterns can be interpreted.

The possibilities for neurophysiological dysfunction are limitless; the pathologies presented should not be considered as inclusive by any means. However, it is hoped that an appreciation of the complexity of cerebral neural structure and the corresponding intricacies of impairment resulting from neurophysiological dysfunction will encourage the reader to treat each impaired patient as a unique individual, for heterogeneity of outcome is common (Gaddes, 1985; Goldstein & Reynolds, 1999; Kopp & Parmelee, 1979).

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***See also* Adapted Physical Education; Health Maintenance Procedures; Physical Anomalies**

ABPP (*See* American Board of Professional Psychology)

ABROMS, KIPPY I. (1942–1987)

Kippy I. Abroms received her BA in psychology from the University of New Hampshire in 1962, MEd in reading from Tulane University in 1973, and PhD in special education from the University of South Mississippi in 1977. Abroms also completed postdoctoral training at the University of California, Riverside in 1977 where she worked with Jane Mercer on the System of Multiple Pluralistic Assessment (SOMPA). Abroms worked as an associate professor at Tulane University beginning in 1975. She directed several projects for the Office of Special Education and Rehabilitation Services and the Bureau of Education for the Handicapped.

Abroms conducted research with J. W. Bennett (1981) that dispelled the well-entrenched notion of exclusive maternal etiology in Down syndrome. Abroms and Bennett found that in a significant number of cases the extra 21st chromosome, the immediate cause of Down syndrome, comes from the sperm. Thus there can be a maternal or paternal contribution to the etiology of Trisomy 21.

Her research included a longitudinal study on the social development of preschool gifted children, and, as a member of the craniofacial team at Tulane University Medical Center, she has been involved in investigations of the relationship between cognitive functioning, self-concept, and craniofacial intervention. She has also become interested in how genetic disorders are manifested in children, and especially in facial deformities that are obvious in the classroom (Abroms, 1987).

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***See* Speech, Absence of**

ABSENCE SEIZURES

Absence seizures (previously referred to as *petit mal epilepsy*) are characterized by impaired consciousness that is unaccompanied by large convulsive movements. Individuals with absence seizures describe them as "brief flashes

of blackouts," "like in a daze," or "getting into a trance" (Panayiotopoulos et al., 1992). While absence seizures are nonconvulsive during the seizure, some movement (e.g., eye-blinking, staring) and other minor facial movements (e.g., twitching) may be present. An observer also may notice body limpness and the arrest of activity, such as the dropping of an item.

There is a lack of aura (i.e., a sensation that it is about to occur) prior to the onset of an absence seizure as well as an absence of a postictal period (post-seizure confusion) following the seizure's termination. Absence seizures are characterized by their brevity; although they may last up to 1 minute, they typically last for 5 to 10 seconds. The term *pyknolespy* (*pyknos* refers to overcrowding) is frequently used to describe absence seizures as they have a tendency to occur in rapid succession. Prolonged periods of impaired consciousness due to consecutive absence seizures may lead to considerable dysfunction in school activities and others that require concentration and comprehension. For example, if absence seizures occur while a teacher is discussing novel material, impaired consciousness may cause the child to miss important instructional objectives that may not be addressed again during the academic school year (Leppik, 2000). Therefore, academic deficits are not uncommon in children who experience absence seizures.

Absence seizures are generalized. They involve abnormal activity throughout the brain, and their genesis is not in a discrete (focus) part of the brain. A distinction is made between typical and atypical absence seizures. Electroencephalograms (EEGs) show that typical absence seizures are characterized by an abrupt and synchronous onset and termination of both hemispheres and by a characteristic three-cycle-per-second spike and wave pattern. Structural abnormalities typically are not noted during neurological exams or the use of computerized axial tomographic scans.

Absence seizures occur in 2% to 10% of children with epilepsy. The age of onset typically is between 5 and 15 and is more common in girls. Typical absence seizures are frequently idiopathic (genetic) and remit in 40% of patients (Leppik, 2000). Hyperventilation, and, less commonly, photic stimulation may facilitate the spike discharges associated with absence seizures (Panayiotopoulos et al., 1992).

Atypical absence seizures are more complex than typical absence seizures. During atypical absence seizures, children can retain some ability for purposive movement and speech. Electroencephalogram results show a gradual onset and offset with less symmetrical synchrony between the hemispheres (Nolan, Bergazar, Chu, Cortez, & Snead, 2005). Furthermore, the predominant frequency tends to be less than a three-cycle-per-second wave pattern (Nolan et al., 2005). Like typical absence seizures, atypical absence seizures occur more frequently in females and present prior to adolescence. However, compared to typical absence seizures, atypical absence seizures tend to occur with greater frequency, are more prolonged, and commonly are combined with other seizure types. Children with atypical absence seizures demonstrate significantly higher rates of intellectual disability and tend to have a higher incidence of global cognitive deficits. This seizure type tends to be expressed as a nonspecific symptom of brain injury during development.

Valproate (Depakene) and ethosuximide are the most commonly prescribed drugs for absence seizures. Childhood absence seizures are frequently benign, therefore, ethosuximide usually is recommended first; valproate is reserved for when ethosuximide is insufficient or when the child also has generalized tonic-clonic seizures. Lamotragine formerly was considered a second line drug; however, its use has increased significantly over time (Posner, Mohamed, & Marson, 2005).

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See also **Electroencephalograph; Seizure Disorders**

ABSENTEEISM/ATTENDANCE OF CHILDREN WITH DISABILITIES

Compulsory school attendance laws have been enacted by all states. These laws have been narrowed in most states by the introduction of exemption clauses excusing students with significant physical or mental disabilities from school

attendance if an alternate environment is a better fit for the student; however, the laws also ensure students with disabilities do have the right to attend school regardless of the severity or type of disability if able.

Legal challenges concerning children with disabilities for extension and protection of the right established under state law of equal access to educational opportunity was ensued during the early 1970s. Federal and state laws mandating a free appropriate public education (FAPE) to children with disabilities followed these cases. Under IDEA and Section 504 of the Rehabilitation Act of 1973, a child with a disability must be educated in the most least restrictive environment (LRE) that his or her needs allow. Federal law recognizes that there are instances when, because of the nature or severity of a child's disability, the child must be educated in a setting other than the regular classroom. However, the least restrictive environment provisions prohibit placement of a child on homebound instruction or other exclusion from the regular educational environment solely because the child has disabilities.

Children with serious, often chronic, health impairments who require special education and related services may receive instruction in hospitals or in the home. Schools use various approaches, including home visitations, school-to-home telephone communication, and interactive television to connect a homebound or hospitalized student with the classroom.

There have been a few studies of program and school attendance as a factor in the achievement of students with disabilities. The National Center for Education Statistics established that some risk factors for attendance difficulties might include students of English Language Learner status, eligibility for free and reduced lunch, and the receipt of special education services (2006). There is some evidence suggesting that students with disabilities who are attending regular, public schools are no more likely to be absent from school than students without disabilities students (Sullivan & McDaniel, 1983). High rates of school attendance do not necessarily ensure high rates of program attendance or achievement. Sullivan and McDaniel concluded that children served in resource rooms may be receiving up to one-quarter less schooling time than is prescribed in their individualized education programs because of competing school activities and absences of either the resource room teacher or the student during a scheduled period (1983). In various studies involving children with and without disabilities investigators in the area of academic learning time as it relates to academic achievement have found a positive correlation between the learning of basic skills and the number of minutes students spend on academically relevant tasks (Ivarie, Hogue, & Brulle, 1984; Rosenshine, 1979). Another study reported that 15.6% of the school day was spent on academic instruction while the rest of the day was consumed with tasks such as paperwork, personal time, supervision and planning (Vannest & Hagan-Burke, 2010). Researchers are continuing their study of increased active learning time as a powerful intervention technique for all students. In addition the reduction of absenteeism is present in policy such as the Elementary and Secondary Education Act of 1965 and the more recent No Child Left Behind Act of 2001 (Redmond & Hosp, 2008).

Under the IDEA and Section 504, mandatory procedural safeguards exist that allow parents to challenge school disciplinary actions that would interrupt the education of a student with disabilities. Expulsions, suspensions, and transfers to settings outside a regular classroom or school are considered placement changes because such measures remove students from their current school program or curtail attendance (Simon, 1984). A series of court decisions on this sensitive area have provided important guidelines for determining when and for what length of time the student with disabilities may be expelled or suspended under federal law (Reschly & Bersoff, 1999; Simon, 1984).

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ABSTRACTION, CAPACITY FOR

Abstract reasoning refers to the ability to identify common features of two or more concepts, and has been considered an essential component of intelligence (e.g., Thorndike, 1927). Abstract reasoning ability can be assessed through at least three types of tasks: those that require a person to identify a general concept common to several exemplars, for example, sorting objects according to categories; to state common features among different concepts, for example, the Similarities subtest of the Wechsler Intelligence Scale for Children–IV, or to state examples or features of a given concept (Burger, Blackman, Clark, & Reis, 1982).

While general abstraction ability varies across persons, ability to reason abstractly in specific tasks appears to vary with subject area expertise. For example, in studying the superior memory of chess masters for the configuration of briefly presented game arrangements, Chi, Glaser, and Rees (1981) suggest that experts form abstract, organized representations of the field of play, while novices retain only the surface features of the problem. Adelson (1984) found that novice computer programming students actually had better recall for the details of a briefly presented program than did expert programmers, but that the experts had better recall for what the programs were designed to do. Ability to make abstractions about information seems to improve with experience; as one gains more experience with an area of knowledge, one becomes familiar with the organization of it, and is able to integrate new information with greater success.

Burger et al. (1982) found that adolescents with intellectual disabilities could be trained to improve their abstract reasoning abilities. Context and instructional support also influence the application of abstract thinking skills (Alexander & Murphy, 1999; Chiesi, Primi, & Morsanyi, 2011; Gopnik, Glymour, Sobel, Schulz, Kushnir, & Danks, 2004).

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***See also* Intelligence Testing; Mental Retardation**

ABSTRACT THINKING, IMPAIRMENT IN

A theory of abstract reasoning hinges on the notion that human thinking is a process of conceptualization. Concept formation is the organization of data into categories. To know a concept is to know the characteristics of an entity that either include it or exclude it from a category. To know the concept of "dog" is to know that animals with four legs, hair, and the ability to bark belong together in a category. Some argue that forming a concept is a process of abstracting. To learn the concept of dog requires noticing common characteristics of different dogs, as well as noticing that cats have some characteristics that eliminate them from that category. However, not all concepts are created equally. Some are based on immediate, sensory experience or represent the concrete. For example, a child may form a category of "doggy" by directly experiencing dogs and pictures of dogs. This is considered to be a concrete concept. On the other hand, there are concepts that are built from other concepts, for example, the notion of "mammal." A concept even further removed from direct experience is "democracy." The more removed the concept from the concrete, the more abstract it is. The term *abstract*, then, is used in two different ways. On the one hand, it is used to mean the process by which the salient characteristics of entities are identified in order to form concepts. On the other hand, it is used in contrast with the term *concrete* to indicate the role of direct experience.

Another factor related to abstract reasoning is the role of symbolization. Luria (1961) stated that the development of more abstract concepts was dependent on symbolization—more specifically the use of language. In fact, he felt that higher-level concept formation was probably dependent on the mediation of language. For example, Luria would contend that a concept such as democracy more than likely requires language for acquisition.

Teachers with children with learning problems are interested in the role of conceptualization and

symbolization in the development of abstract reasoning. Johnson and Myklebust (1967) asserted that some children have difficulties in the process of concept formation itself. They argued that any deficit in the processes of perception, imagery, symbolization, or abstracting could interfere with conceptualization. Others have difficulty not so much in the process of conceptualization as in dealing with the more abstract concepts. As Johnson and Myklebust point out, an individual with disturbances in the processes of abstracting or conceptualizing may be identified as a concrete thinker.

Myers and Hammill (1982) note that children who cannot form abstract concepts often have learning impairments that require repetitive instruction. Children with learning disabilities are often described as having "concrete behavior characterized by a dependence upon immediate experience as opposed to abstract behavior that transcends any given immediate experience and results in the formation of conceptual categories" (p. 39). Many would argue that the difficulty exhibited by children with a learning disability is caused by a developmental lag and is not a permanent problem. In the case of children with intellectual developmental delays, however, the conceptualization problem may be permanent. Further, a body of research has been dedicated to trying to determine whether the conceptual behavior of children with intellectual developmental delays represents simply a delay or difference (Zigler & Balla, 1982; Robinson, Zigler, & Gallagher, 2000). To understand this problem researchers may, for example, look at how children with intellectual developmental delays use the role of language as a mediation device for concept formation (Field, 1977).

It is not uncommon for those working with hearing-impaired children to describe their cognitive behavior as concrete (Johnson & Myklebust, 1967). There are several difficulties with this notion, however children with hearing impairments may simply not have had a sufficient experiential base to adequately form concepts that would be expected of children with hearing. Another problem in understanding children with hearing impairments conceptualization is that these children live in a visual linguistic world. What may appear to be concrete behavior on the part of the child may simply be an artifact of one of the underlying rules of natural sign language systems. The rule is that the structure of an utterance cannot violate the visual world. For example, the word order of the structure "I finished my work, then watched television" is directly translatable into American Sign Language. "I watched television after I finished my work" is not, because it violates the visual sequence of events. Difficulties that children with hearing impairments have with the latter structure, when encountering it in English, are sometimes interpreted as evidence that the child is a concrete thinker. In truth, it may be simply that the child is having difficulty in dealing with a structure that violates the child's linguistic rules (also see Braden, 1994).

It is important to note that the relationship between sensory information, concept formation, and symbolization is not well understood. Research gives us only the most sketchy idea of what the relationship among the three might be. One field of philosophy, epistemology, has been dedicated to trying to understand these relationships. Introspection and logical reasoning remain the most powerful tools available to both psychology and philosophy for describing concept development and abstract reasoning.

In summary, the notion of abstract reasoning is used in two different ways. It can mean the process by which one identifies the salient characteristics in entities for purposes of categorization. Abstract reasoning can also be the process by which individuals deal with concepts that are based on other concepts, rather than concepts that are based on direct experience. Children with learning problems can have difficulties with either type of abstract reasoning. When difficulties are exhibited, the question arises as to whether the difference is simply developmental delay or a difference in cognitive processing. Some people working with learning-disabled children contend that they eventually outgrow problems in these areas. Children with intellectual disability may not necessarily do so. Children who are hearing impaired have also been described as "concrete" learners. However, their difficulties may be a result of too little experience and their use of visually based linguistic rules.

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***See also* Concrete Operations; Deaf; Learning Disabilities**

ABUSED CHILDREN, PSYCHOTHERAPY WITH

Today abused children are typically regarded as suffering from a primary illness (Quirk, 1980). A primary illness refers to the notion that living with a certain circumstance for a prolonged period of time creates a situation in the victim requiring primary treatment. The primary illness of child abuse has identifiable symptoms and etiology along with an official diagnosis and prescribed treatments.

Systematic comprehensive treatment for abused children, and adults who were abused as children, involves the ability of the clinician to identify and diagnose properly the dilemma and its ramifications and to facilitate the natural healing process from trauma. Thus the first step in treatment is the proper identification of child abuse as the problem to be treated.

Children who have been abused relive their abuse over and over in clear or symbolic ways. They dream abusive dreams, remember abusive situations, and in adulthood go so far as to recreate abusive relationships. The abuse manifests negative effects in interpersonal relationships, dissociative symptoms, problems with intimacy, and express difficulty in trusting others (Herman, 1981; Thomas, 2005). They are depressed and have difficulty in developing meaningful relationships or experiences in their lives. Adults who were abused children are often defensive, suspicious, nervous, and overly alert. They may be preoccupied with their bodily functions and may be labeled hypochondriacs. Insomnia is another frequently reported symptom, even in the absence of distressing nightmares. Abused children are also guilt-ridden, and experience much shame and self-hatred. Concentrating and following a task through to its completion is another problem area for this population (American Psychiatric Association, 1994; Mrazek & Kempe, 1981; Williams & Money, 1980).

Acting out the abuse in self-destructive ways such as drug abuse is frequently observed in this population, which is disproportionately represented in chemical and other addiction dependency treatment facilities. As teenagers, abused children often become runaways and act out their rage in criminal behavior. Abused children are also disproportionately represented in facilities for delinquents. A disproportionately large group in this population may attempt suicide, hallucinate, manifest seizures, and ultimately be placed in psychiatric hospitals. While these obvious problematic behaviors will occur at high rates, another observed phenomena of this population is the frequency with which they become quiet, good children who then marry an abusive partner. Other compulsive behaviors are frequently manifested by these children and subsequently they will be found as adults in Al-Anon, Alcoholics Anonymous, Narcotics Anonymous, Overeaters Anonymous, Gamblers Anonymous, and other self-help treatment programs.

Abused children as adults have difficulty with parenting. Appropriate discipline is difficult for them because it is too restimulating. Consequently, they will abdicate their parenting until the children eventually become abusive toward them (Justice & Justice, 1976). This promotes another likely place for adult abused children to reflect inadequacies—as parents of children in trouble. On the other hand, adult abused children may become abusive parents themselves. The inordinate numbers of child abusers that were themselves abused has been widely documented.

Because young and abused children live and grow with a wounded and fragmented personality, they often need intensive treatment efforts. The client who clings or annoys the clinician, reporting that something is missing from treatment, will often be a person who was abused. This person will often complain about the deficiencies of treatment and report that he or she has not been responded to reasonably. This type of reporting should be expected in view of the fact that abused children are wounded people who will have difficulty objectifying their relations: after all, their primary objects, Mom or Dad, abused them.

Treatment programs and clinicians should routinely be sensitive in recognizing and treating child abuse. When working with clients the following questions should be a routine part of the interview. What was your childhood like? How did your parents treat you? How were you disciplined? What were the punishments employed by your parents? Were you ever raped or seduced? Those who report having difficulty recalling all or crucial parts of their childhood should definitely be regarded as potentially having been abused. This self-induced amnesia, or dissociation, is a primitive form of defense against the pain and discomfort resulting from recall of an abusive situation. Naturally, this needs to be dealt with in a sensitive manner by the clinician, and the client should not be prematurely pushed into acknowledging information or feelings they are not prepared to confront.

Abused children often feel at fault for their experience of child abuse. They live with much guilt, shame, self-blame, and self-loathing. Often their abusers told them it was their fault. Child molesters use guilt as a tool with their victims in order to keep the secret, while parents who physically beat their children do so in the name of discipline. Yet, abused children mentally make their parents correct and good. Generally, therapists should enjoy relationships with people, but it is even more important for therapists of abused children to like their clients: While one might think that all therapists would like their clients, fragile clients often find themselves disliked by their therapists. Since they do not grow as the therapist expects, they experience rejection in the context of the therapeutic relationship.

Adults who were abused in childhood have unusual difficulty in establishing trust with the therapist, identifying and discussing feelings, and cooperating with the therapeutic process. Because their tormentors were often people they trusted (e.g., parents), abused children may recoil at

the need to trust the therapist. Therefore, an unusually long working-through process is frequently required. This is often difficult for the novice therapist, educator, or other professional lacking information about child abuse and its symptoms.

Most children learn to cope by making decisions separate from the influence of their parents. Abused children have more to cope with, and fewer skills to do so. Reparenting applies here also. Regardless of age, abused children need to learn to live and cope in the real world, and come to recognize that not all people are as threatening as their abusive parents. Therefore, learning coping skills is essential to any successful treatment program. The following are examples of important coping skills to be addressed: learning to trust one's own instincts; learning to identify one's own needs; and learning to proceed to satisfy those needs. Another essential component to treatment is the development of an ability to identify and avoid close contact with abusive people.

Because abuse occurs in the context of an interpersonal relationship, the environment of a therapeutic group has proven itself a particularly helpful treatment modality. In view of the characteristics of this population, the following are important considerations for the leader of a group of abused children. The group should be initially supportive, gentle, homogeneous, and closed to new members after the group has begun. These elements are necessary to address the difficulty in trusting manifested by this population. The group needs to project an image of safety and members must be monitored from inappropriately expressing the rage some may possess. Confrontation must be kept well managed to further reduce regression that may be promoted by some of the more fragmented members. The group leader must monitor the development of any situation that may resemble the childhood abuse of any member in the group. A primary goal of the group is to develop understanding of the personal dynamics of abuse and coping skills that may prevent the development of similar abusive situations in the future.

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See also **Acting Out; Child Abuse; Etiology**

ACADEMIC ASSESSMENT

The global function of achievement testing is to assess a student's attainment of academic content areas. Reading, written language, and mathematical functioning are the major domains under the rubric of academic achievement. Anastasi (1982) notes that traditionally academic assessment has been differentiated from aptitude/ability testing by the degree to which a measure is designed to assess uniform versus diverse antecedent experiences. To be categorized as a measure of academic achievement, a measure is designed to test a fairly uniform previous experience (e.g., first-grade instruction in reading). In contrast, an aptitude test would be designed to assess the impact of multiple or diverse antecedent experiences. Contemporary measurement specialists recognize that both achievement and aptitude tests assess acquired knowledge, but differ on the degree of specificity and abstraction.

Salvia and Ysseldyke (1981) have described four functions that achievement tests fulfill within the schools. They are used for screening students who may need more in-depth assessment to determine whether special services are appropriate; determining whether a child is eligible for placement in a special education class based on local criteria; assessing a child's strengths and weaknesses to facilitate decisions regarding his or her placement in an instructional sequence; and determining the impact of educational intervention on a class or group of students.

Achievement testing may be conceptualized along several lines: norm-referenced versus criterion referenced; individual versus group administered; and informal teacher-constructed versus standardized instruction. Each of these dimensions will be discussed to highlight the multifaceted construct of academic achievement assessment.

Norm-referenced testing (NRT) began to play a prominent role in American education after World War I. Army Alpha and Beta tests were used for the classification of recruits during the war. The Otis Group Intelligence Scale was published in 1918 by the World Book Company. This scale employed such advances as multiple-choice questions, answer sheets, test booklets, and improved normative sampling procedures (Cunningham, 1986). These advances were adapted for the first norm-referenced,

standardized measure of academic achievement, the Stanford Achievement Test, published in 1923.

The most salient characteristic of norm-referenced achievement tests is that an examinee's performance on the test is interpreted by comparing his or her relative standing to a given reference group. The reference group or standardization sample is usually composed of representative peers of the same chronological age, or peers in the same grade placement. Performance on a norm-referenced test is typically expressed in scores based on the normal curve such as stanines, T-scores, and/or standard scores (which usually have a mean of 100 and a standard deviation of 15, or sometimes 16). Performance on a norm-referenced test may also be expressed in percentiles, which tell a student's standing relative to a hypothetical group of 100 children. For instance, a score at the 86th percentile indicates that the examinee scored better than 86 out of 100 of his or her hypothetical same-aged peers.

The major norm-referenced group achievement tests include the California Achievement Test (CTB/McGraw-Hill, 1985); the Comprehensive Test of Basic Skills (CTB/McGraw-Hill, 1981); the Iowa Test of Basic Skills (Hieronymus, Lindquist, & Hoover, 1983); the Metropolitan Achievement Test (Barlow, Farr, Hogan, & Prescott, 1978); and the Standard Achievement Test (Gardner, Rudman, Karlsen, & Merwin, 1982).

These group-administered tests have multiple levels, each designated for a specified grade range. For instance, the Stanford Achievement Test series has six levels: Primary Level 1 for grades 1.5–2.9; Primary Level 2 for 2.5–3.9; Primary Level 3 for 3.5–4.9; Intermediate Level 1 for 4.5–5.9; Intermediate Level 2 for 5.5–7.9; and Intermediate Level 3 for 7.0–9.9. Generally, these tests have gone through several revisions. The Stanford Achievement Test, for example, is in its seventh revision and has been in use in the public schools for over 60 years.

A primary difference between norm-referenced and criterion-referenced tests lies in the way they are interpreted. As noted, the norm-referenced achievement test is designed to give information on a given student's performance relative to a representative group of same-aged peers. In contrast, the criterion-referenced achievement test is designed to give information on a given student's performance in terms of whether he or she has learned a given concept or skill. Thus, the criterion-referenced measure is designed to tell what the student can and cannot do. For instance, the student can add single digit numerals with sums less than 10, but has not learned to regroup or perform simple subtraction problems. Since discrimination among students is not the purpose of a criterion-referenced test, the difficulty level of items and the power of items to separate students are not as important as they are in norm-referenced measures. The major issue in criterion-referenced measurement is whether items reflect a specified instructional domain. Most of the major group-administered achievement tests have been adapted to yield criterion-referenced information. The problem with adapting norm-referenced tests is that there are a multiplicity of instructional objectives (Cunningham, 1986). Since each objective requires several test items to achieve an adequate level of reliability, the length of the test becomes unmanageable.

Up to this point group-administered measures have been used to illustrate the norm- versus criterion-referenced dimensions of academic assessment. Academic achievement testing may also be examined from the viewpoint of the administration format, either individual or group. While group achievement tests are usually given to a whole class by the regular education teacher, individual achievement measures are administered by specially trained personnel (special education teachers, educational diagnosticians, and school psychologists) to a child on a one-to-one basis. Typically, the child has been referred for testing because of academic or behavioral problems manifested in the regular classroom. A general distinction between group and individual measures relates to their use in the decision-making process. Group measures are designed to make decisions about groups, while individual tests are more appropriate for decisions concerning an individual. Therefore, caution must be exercised when attempting to interpret the results of a single child's performance on a group-administered measure. There are many variables that may influence a child's performance on a group-administered measure and result in an inaccurate portrayal of that child's academic skills. Misunderstanding instructions, fatigue, random guessing, class distractions, looking on a neighbor's response sheet, and so on, may invalidate a child's scores. When a child is being considered for placement in a special education program, a poor performance on a group-administered measure should be followed up with an individual assessment.

Finally, the academic achievement test may be approached by examining the degree to which the directions to students are standardized. The standardized test is one where the instructions and test questions are presented in the same manner to all examinees. On the other hand, in the teacher-constructed test, there is unlimited latitude in the construction and administration of test items. Both standardized and informal teacher-made tests have advantages and disadvantages. However, they should share certain attributes, that is, clear directions to students, careful development of items based on a table of specifications, and the type or format of test items.

Whether the directions to an achievement test are standardized or constructed by the teacher, building a table of specifications represents the first step in test construction. A table of specifications contains a listing of instructional objects as well as the relative emphasis to be assigned to each objective. For standardized measures of achievement, the table of specification is based on an examination of major textbook series used across the country. For instance, when reading subtests are constructed, the most

widely used basal reading series are reviewed by the test developer. Note is taken at what point in the curricula various concepts are introduced. Invariably, decisions and compromises have to be made regarding content, because all basal reading series are not identical. As such, the consumer of both individual and group standardized achievement tests must examine the available measures, not just in terms of quality of standardization and reliability, but also with respect to the match between the concepts assessed by the test and those taught within the framework of the local curriculum.

A major difference between standardized and informal, teacher-developed tests is that the former usually represents many more hours of item development, refinement, empirical trials, and final selection of test items. In developing standardized achievement tests, considerable weight is placed on both content validity (the representativeness of the items to the domain being tested, and the appropriateness of the format and wording of items relative to the age level of the prospective examinees), and the empirical tryout of the items in terms of reliability. The advantage of the standardized test lies in its documented reliability (presented in an accompanying technical manual), and its ability to compare a student's performance with that of a reference group or specified criterion. Whereas standardized tests measure content that is common to reading and mathematics programs from around the country, the teacher-constructed tests can be specifically targeted to the content of the local curriculum, or to a specific teacher's class.

In addition to defining informal assessment as the administration of a teacher-constructed measure, the term may also be applied to diagnostic processes. These include error analysis, behavioral observation, and the learner's relations to various instructional strategies (Sedlak, Sedlak, & Steppe-Jones, 1982). This last process is flexible and dynamic. A psychoeducational examiner presents tasks to the student in a branching manner similar to the operation of a branching computer-assisted instructional program. Information about the student's mastery of various skills is gleaned from analysis of his or her errors. Error analysis has been applied to reading, writing, mathematics, second language learning, and spelling (Bejar, 1984). The analysis is usually conducted within a "content" framework, such as an educational taxonomy.

Mathematical functioning is a key area where error analysis has been profitably employed (Brown & VanLehn, 1982). Ashlock (1976) offers useful exercises in a semiprogrammed text to help detect common error patterns in computation. Lankford (1974) demonstrated the value of having a student think aloud while solving arithmetic problems. Thus, when an error is made, the computation strategy used by the student becomes apparent. Roberts (1968) has noted four common error categories for arithmetic computation: selecting the wrong operation; erring in recalling a specific arithmetic fact; attempting the correct operation but using an inappropriate algorithm; and random responding that has no apparent relationship to the problem.

Another strategy that has a long history of success for assessment of academic skills is curriculum-based assessment (CBA; Fuchs, Fuchs, Prentice, Hamlett, Finelli, & Courey, 2004). CBA attempts to link assessment more directly to classroom instruction and to provide a more direct assessment of a student's instructional needs (Shapiro & Elliott, 1999). Although touted as an alternative to traditional norm-referenced testing, CBA and NRT are seen best as complementary models, and not as competitive ones as alternatives implies.

In summary, academic achievement assessment is used to make decisions about students. These decisions may be made from a normative perspective or in terms of students' mastery of a specified skill. Depending on the administration, format decisions can be made for an individual student or for groups of students. Norm-referenced achievement tests provide information about a student's relative standing compared with that of a reference group, while criterion-referenced tests and informal assessments may be used to make informed decisions about a student's future instructional needs. Specific achievement tests are described throughout this work.

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See also **Achievement Tests; Criterion-Referenced Testing; Curriculum-Based Assessment; Norm-Referenced Testing; specific test names**

ACADEMIC LANGUAGE

Academic language (instructional discourse, cognitive-academic language, or school language) is the way teachers and students organize their communication interactions within educational environments. The purpose is to transmit knowledge and skills related to academics. In contrast, everyday discourse (conversation, social discourse, or basic interpersonal communication) has as its general purpose the regulation of social interaction or interpersonal functions (Chamot & O'Malley, 1994; Wallach & Butler, 1994; Wallach & Miller, 1988; Westby, 1985).

Comprehending and producing academic language requires more cognitive and linguistic complexity than using social language. The transition from oral communication to literate communication marks the need for increased cognitive and linguistic complexity in the teaching-learning process (Cummins, 1983; Larson & McKinley, 1995; Merritt & Culatta, 1998; Naremore, Densmore, & Harman, 1995; Nelson, 1998; Ripich & Creaghead, 1994; Westby, 1997, 1998). Major cognitive, linguistic, and contextual characteristics of academic language include:

Cognitive: abstract concepts; cognitively demanding tasks (critical thinking [analytical and creative], problem solving, decision making); language-thinking and executive functions that are stabilizing (Nelson, 1998; Wallach & Butler, 1994; Wallach & Miller, 1988; Westby, 1998).

Linguistic: complex morphological markers, syntactic transformations, and semantic relationships and networks with explicit vocabulary, resulting in increased oral and text cohesion and coherence; the ability to project, predict, and infer; increased demand for oral and text *form* (pronunciation, spelling, punctuation, organization), *content* (accuracy, synthesis cohesion, and coherence), and *style* (advanced narrative levels and expository genres) (Hedberg & Westby, 1993; Hughes, McGillivray, & Schmidek, 1997; Naremore et al., 1995; Nelson, 1998; Tough, 1979; Wallach & Butler, 1994; Wallach & Miller, 1988).

Contextual: reduced contextual clues; indeterminate audience diffuse in time and space; often physical and temporal separation between sender (writer, speaker) and receiver (listener, reader) (Merritt & Culatta, 1998; Nelson, 1998; Wallach & Butler, 1994; Wallach & Miller, 1988).

Academic communication-learning problems are associated with many developmental and acquired disorders. Academic language use and rules vary from culture to culture (Solomon & Rhodes, 1996) and are now also influenced by technology (Cummins, 2000). However, the consensus is that to succeed in mainstream educational settings in the course of life students must be able to understand and use the cognitive, linguistic, and contextual conventions associated with academic language.

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See also **Discourse; Language Assessment**

ACADEMIC SKILLS

While to some individuals the definition of academic skills conjures up the three Rs, to others the delineation of the academic skills most important to the process of special education is a task that poses an awesome definitional problem. To the preschool special educator, for example, certain fine motor skills may be defined as important academic skills. On the other hand, for the special educator working at the secondary level, the ability to accept positive and negative feedback (social skills), driving skills, or home economics may be considered important academic skills that warrant inclusion in the secondary special education curriculum.

A comprehensive sourcebook on research on teaching presents detailed analyses of seven academic skill areas: written composition, reading, mathematics, natural sciences, arts and aesthetics, moral and values education, and social studies (Wittrock, 1986). At least a few of these areas would be considered by most individuals to be core or basic academic skills. The fact that these academic skill areas have entire chapters devoted to them also indicates that there is enough research, theory, or perhaps controversy regarding them as to allow them to be studied and discussed extensively.

Beyond the issue of defining academic skills are the related issues of the rise and fall of skills across generations (which is constantly addressed by the popular media), and equally important, the procedures by which these skills are taught and acquired by students in special education. Cartwright, Cartwright, and Ward (1981) list several approaches used by special education teachers to impart academic skills; these include the diagnostic teaching model, remedial and compensatory education models, direct instruction, task analysis, perceptual-motor training, inquiry, modeling, media-based instruction, education games, and computer-assisted and computer-managed instruction. Two additional instructional approaches that were popularized in the 1970s include mastery learning and cooperative learning (Stallings & Stipek, 1986). In any case, current instructional methodology requires evidence-based instruction for any academic skill and in any setting (Lerman, Vorndran, Addison, & Contrucci, 2004; Odom, Brantlinger, Gersten, Horner, & Thompson, 2005).

With regard to learner characteristics that affect the acquisition of academic skills, Wittrock (1986) suggests the following broad categories for consideration: students' perceptions and expectations, attention, motivation, learning and memory, comprehension and knowledge acquisition, learning strategies, and metacognitive processes. In summary, special educators must first define the academic skills that their students must acquire and then consider instructional, student, and other variables in planning for the optimal acquisition of academic skills.

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***See also* Achievement Tests; Memory Disorders; Metacognition**

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Academic Therapy was the first journal designed for specialists (special education teachers, educational diagnosticians, psychologists, resource room specialists, practitioners in speech, language, communication, vision, and hearing) who are in direct contact with children manifesting learning, language, and communication difficulties. Since 1965, it has established a reputation for easy-to-read and practical articles that focus on "what works" in the special clinical, therapeutic, or classroom setting. Contributors are teachers, professors, and specialists. Articles are short and are selected on the basis of their usefulness and ability to be put into immediate use by the journal reader. Each issue includes listings of new materials, current news on the national level, and ideas for home management. *Academic Therapy* is published five times during the year: September, November, January, March, and May.

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ACADEMIC THERAPY PUBLICATIONS

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ACALCULIA

The ability to complete calculations often is impaired in individuals with traumatic brain injury (TBI) or other focal brain damage (Ardila & Rosselli, 1994) and represents a loss in function rather than a failure to develop. For example, consider a fourth grader who has already mastered basic operations and basic facts, can do grade-appropriate calculation, and is meeting expectancy in the classroom. An accident occurs, and there is brain damage, and one of the residual problems from the brain damage is that the child can no longer recall basic facts or complete basic computational problems. Originally referred to in this way by Henschen in 1925 (Ardila & Rosselli, 2002),

this loss of ability attributed to brain injury or damage is called *acalculia* (Loring, 1999).

Although calculation abilities are routinely included as part of psychoeducational and neuropsychological assessments, there is limited research specific to acalculia. Ardila and Rosselli (2002) reviewed the existing research and offered a conceptualization of acalculia that is dissociated from language disorders. They concluded that arithmetic skills are associated with a range of other ability domains, including verbal memory, visuospatial ability, visual perception, constructional abilities, as well as language. Each of these is associated, in turn, with differing structures of the brain, as such the location(s) of the injury or damage result(s) in a variety of calculation disorders. Most often indicated in calculation are the left prefrontal areas and posterior superior temporal gyrus (Burbaud et al., 1995; Sakurai, Momose, Iwata, Sasaki, & Kanazawa, 1996). Further, calculation ability is highly related to overall intellectual functioning and the ability to manipulate acquired knowledge (Mandell, Knoefel, & Albert, 1994); functional magnetic resonance imaging (MRI) and positron emission tomography (PET) reveal a complex pattern of brain activity to be involved in completing arithmetic operations (Burbaud et al., 1995; Sakurai et al., 1996).

There are different forms of acalculia (e.g., Ardila & Rosselli, 1990; Grafman, 1988). *Primary acalculia* is said to occur when the primary deficit is in arithmetic skills. In contrast, acalculia that is secondary to some other disorder, such as a language disorder, is referred to as *secondary acalculia* (Ardila & Rosselli, 1990). Individuals with primary acalculia have difficulty with numerical concepts, with the concept of quantity, with numerical signs, with magnitude estimation, and with syntactic operations (e.g., regrouping, borrowing). For primary acalculia, the deficits are evident regardless of modality of presentation of the math task or output. Abilities such as counting and rote fact learning may not be impaired (Ardila & Rosselli, 1994). Primary acalculia is associated with damage to the left angular gyrus (e.g., Gerstmann, 1940; Levin et al., 1993) or the left parietal area (Rosselli & Ardila, 1989). Acalculia frequently co-occurs with acquired language disorder or aphasia. In particular, individuals with acalculia also may evidence difficulty in anomia, word-finding difficulties, and language comprehension problems. This is not surprising in that numbers are encoded verbally, and some mathematical tasks (e.g., word problems) require language.

Assessment for acalculia is intended to determine (a) if the individual is experiencing significant difficulty in calculation following brain injury or damage, (b) to determine the pattern of difficulties (i.e., through error analysis) the individual is evidencing, (c) to identify any collateral or related deficits, and (d) to develop a rehabilitation program (Ardila & Rosselli, 2002). Available measures for such assessment are limited to specific subtests of broad measures of cognitive ability and achievement tests. Curriculum-based measures of mathematical skills also may be helpful in identifying subtle deficits. In all, assessment for acalculia should include a variety of tasks such as counting, enumeration, reading numbers, writing numbers, reading and writing arithmetical signs, rote learning, magnitude comparison (i.e., which is greater?), arithmetic operations, aligning numbers in columns, mental calculation, and so on (Ardila & Rosselli, 2002). Determination of the types of errors (e.g., errors in signs, errors in algorithms, errors in borrowing or carrying over) can be useful in determining the intervention plan. Multiple techniques have been used successfully to address acalculia (see Ardila & Rosselli, 2002).

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See also **Arithmetic Remediation; Dyscalculiad; Traumatic Brain Injury; Traumatic Brain Injury in Children**

ACCELERATION OF GIFTED CHILDREN

Acceleration has been defined as "progress through an educational program at rates faster or at ages younger than conventional" (Pressey, 1949, p. 2). Acceleration of gifted children is employed to allow students to engage in academics at the appropriate individual pace and level of complexity. Acceleration is a broad term that encompasses multiple programs and service delivery models for gifted students (Southern & Jones, 2004), but is typically conceptualized in one of two ways. In the first, within-class methods or beyond class methods are considered (VanTassell-Baska & Sher, 2011).

Within-class methods include:

- Diagnostic assessment
- Cluster grouping (aggregating students with similar interests and abilities within the same curricular activity)
- Follow-up curricular intervention

Beyond-class methods include:

- Early admission to postsecondary coursework
- Content acceleration
- Grade advancement

In the second model, acceleration is conceptualized as either grade-based or subject-based. While grade-based acceleration shortens the progression through traditional schooling, subject-based acceleration involves exposure to more advanced content and skills within a specific subject. Grade-based acceleration can be performed in a variety of ways, including the following options:

- Early admission to kindergarten or first grade
- Grade advancement (e.g., "grade skipping") of 2 or more years
- Grade telescoping, which involves the compression of academic content into atypically small time frames (e.g., 4 years of high school into 2 years)

Various methods of subject-based acceleration may include the following:

- Use of a self-paced curriculum (*compacted curriculum*) in which progress is determined by content mastery rather than a predetermined pace.
- Concurrent enrollment, in which students enroll in classes across grade levels.
- Mentorship by a content area expert (Siegle, McCoach, & Wilson, 2009).
- Credit by examination to show readiness for more advanced curricula.
- Delivery of content via distance learning, which allows for a wide array of learning opportunities for gifted students, particularly as asynchronous delivery has advanced to allow coursework to be completed at irregular times.

Acceleration is a practice that has been considered to be controversial due to common belief that the practice is detrimental for social development despite little supportive evidence. In fact, multiple longitudinal studies have supported multiple forms of acceleration (e.g., early college entrance, early school entrance, grade skipping) as being positive for social development, self-esteem, and motivation (Kulik, 2004; Neihart, 2007; Rogers, 2002; Sayler & Brookshire, 1993; Shepard, Nicpon, & Doobay, 2009; Wai, Lubinski, Benbow, & Steiger, 2010).

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***See also* Gifted and Talented Children; Gifted Children**

ACCESS BOARD

The Access Board (formerly the Federal Architectural and Transportation Barriers Compliance Board) is a federal commission responsible for accessibility issues of federal facilities. According to their statement of purpose, the Access Board is an independent federal agency devoted to accessibility for people with disabilities. Created in 1973 to ensure access to federally funded facilities, the Board is now a leading source of information on accessible design. The Board develops and maintains design criteria for the built environment, transit vehicles, telecommunications equipment, and for electronic and information technology. It also provides technical assistance and training on these requirements and on accessible design and continues to enforce accessibility standards that cover federally funded facilities (United States Access Board, 2007).

The Access Board was instituted as a result of an increasing need for federal coordination of access issues in communication, architecture, and transportation settings. In recent years, many of its efforts have focused on information, specifically communications accessibility. In 2007, the Access Board published a set of communication guidelines that covered the accessibility of software applications and operating systems, web-based intranet and Internet information and applications, telecommunications products, video and multimedia products, self-contained or closed products, and desktop and portable computers. Of particular interest are the web-based accessibility guidelines.

In 2010, the Board's vision is to "achieve a fully accessible America for all" and "lead to the development, advancement, and implementation of accessibility requirements." Four goals create the foundation for the work implemented by the Access Board: (1) develop and maintain accessibility requirements, (2) educate stakeholders about accessibility, (3) enforce compliance with the ABA, and (4) anticipate opportunities for accessibility in our changing environment.

In addition to ensuring Americans with Disabilities have access to public areas, transportation, and housing, the Access Board also raises awareness for the public to engage in topics or issue of concern. Awareness campaigns were established to implement projects and programs to improve infrastructures, transportation, energy efficiency, education, and healthcare. All information was retrieved from: http://www.access-board.gov/about/par.htm (August 1, 2011).

For additional information on the Access Board, please contact: *ADA Accessibility Guidelines* Access Board, tel.: (800) 872-2253 (voice), (800) 993-2822 (TTY), website: http://www.access-board.gov/contact.htm

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***See also* Accessibility of Programs; Americans With Disabilities Act**

ACCESSIBILITY

Accessibility refers to the qualities of a product that support, or inhibit, its use by people with disabilities. Accessibility is related to, but different from, usability, which is the evaluation of user's efficiency and effectiveness with a product. Accessibility is a core construct in the field of assistive technology because of the limitations inherently associated with disabilities. The very nature of a disability frequently interferes with how a task is completed. However, awareness of the impact of disabilities is not always common knowledge as product designers make assumptions about the characteristics of the intended user.

The transition from inaccessible design to universally accessible design will involve awareness training,

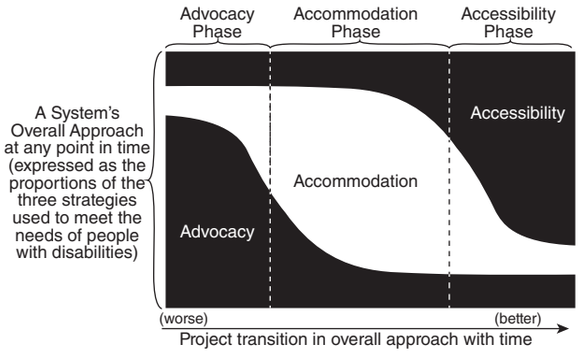

Figure A.1. Model and transition of approach.
The A3 Model illustrates the dynamic nature of advocacy, accommodations, and accessibility in three developmental phases. The differential impact of the three components in terms of time, effort, and focus are illustrated by the waves across phases.
Source: Copyright © 2000, 2001 by Schwanke, Smith, and Edyburn.

new technical development, and time. The A3 Model (Schwanke, Smith, & Edyburn, 2001) illustrates the ebb and flow of concurrent interactions between advocacy, accommodation, and accessibility across a three-phase developmental cycle required to achieve universal accessibility (see Figure A.1).

Advocacy efforts raise awareness of inequity and highlight the need for system change to respond to the needs of individuals with disabilities. *Accommodations* are the typical response to advocacy. Inaccessible environments and materials are modified and made available. In most cases, accommodations are provided upon request (i.e., reactive). While this represents a significant improvement over situations found in the earlier phase, accommodations tend to maintain inequality since there may be a delay (i.e., time needed to convert a handout from print to braille), it may require special effort to obtain (i.e., call ahead to schedule), or it may require going to a special location (i.e., the only computer with text enlargement software is in the library). *Accessibility* describes an environment where access is equitably provided to everyone at the same time. Often this is accomplished through outstanding design (i.e., ergonomic furniture, software with accessibility, and performance supports built-in). All three factors are present in each phase. However, the differential impact of the three components in terms of time, effort, and focus are illustrated by the waves across phases that reflect a change in how time, effort, and resources are allocated. The A3 Model is believed to be relevant for describing the change process experienced by both individuals and organizations as they work toward achieving universal accessibility.

The issue of accessibility manifests itself in three ways in special education: (1) advocating for accessible design, (2) providing assistive technology and accommodations to compensate for an impairment, and (3) developing technical standards for making products accessible. The goal of universal accessibility involves the design of products that can be used by the widest possible array of people (Vanderheiden & Henry, 2003).

Advocating for Accessible Design

Accessible design does not happen naturally. In fact, researchers have hypothesized that the default model of design is known as "ego design," that is, designing a product with assumptions that everyone is like me (Molenbroek & de Bruin, 2006). This is a powerful explanation for why there are inherent barriers found in mass-market products such as digital textbooks (Wiazowski, 2010), ebook readers (Parry, 2010), online learning systems (Brunvand & Abadeh, 2010; Burgstahler, 2006; Erath & Larkin, 2004), and software (Golden, 2002), that are discovered to be inaccessible to some individuals with disabilities after the product has been commercially released.

A powerful approach for advocating for accessible design involves helping others understand the special needs of individuals with disabilities, and how the interventions that will help not only this subgroup of the population, can also be made available to others for their benefit (such as senior citizens who are experiencing limitations as a result of the aging process). Indeed, this tactic was first successfully used in the mid-1990s in helping the computer industry understand the benefit of building accessibility features into computer operating systems (Atkinson, Neal, & Grechus, 2003; Niemeijer, 2005) rather than require accessibility interventions to be provided as an after-market add-on.

Advocating for accessible design involves raising awareness of the need for equal access (i.e., access to all the same information, at the same time, as nonhandicapped peers). There is considerable technical knowledge on how to design information and products so they are universally accessible (discussed below). However, such knowledge is not always readily available to nonspecialists. As a result, the literature provides a number of advocacy strategies, including: Assistive technology self-advocacy (Arizona Center for Disability Law, 2008), the use of an advocate (Edyburn, 2009), and training all stakeholders to be committed to accessible design (Thompson, 2003). Advocacy has also occurred in the context of arguments for digital equity (Norris, Sullivan, Poirot, & Soloway, 2003; Solomon, 2002).

Providing Assistive Technology and Accommodations to Compensate for an Impairment

In describing barriers to access associated with augmentative communication interventions, Beukelman and Mirenda (1998) developed a framework that is useful for understanding the nature of barriers. They suggest there are two types of barriers. Access barriers result from an individual's impairments. Assistive technology can be used to overcome and workaround access barriers. However, they identified five types of opportunity barriers:

Policy barriers, practice barriers, attitude barriers, knowledge barriers, and skill barriers that are more formidable to overcome.

The need for accommodations and modifications emerges when there is a mismatch between the abilities of the user and the requirements of a product or device. For example, when an instructional designer creates an audio file, and fails to understand that a deaf individual would like to have access to the information, a barrier is created. Or, when a designer assumes that everyone can use a standard computer keyboard, access barriers are created that prevent individuals with physical or cognitive limitations from interacting with the computer. Similarly, when curriculum developers assume that all students can read at grade level, the language, vocabulary, and sophistication of argument that they use, can create barriers for some struggling students that prevents them from accessing the general curriculum.

Assistive technologies generally focus on overcoming barriers related to mobility, sensory perception and processing, and cognitive functioning by providing individuals with an alternative means of completing a task. In this context, access to computer hardware, both alternative input (alternatives to the keyboard and mouse such as switch access, touch access) and alternative output (alternatives to text, audio, video, and multimedia). Generally, it is desirable to provide information in multiple formats so that the user may select their preferred format.

The concept of accessibility has also been applied to the K-12 curriculum. Beginning with the reauthorization of *the Individuals with Disabilities Act* (IDEA) in 1997 (Public Law 105-17), access to the curriculum has been a predominant theme. The research has examined a number of issues, including: access to the curriculum for individuals with intellectual disabilities (Agran, Alper, & Wehmeyer, 2002; Soukup, Wehmeyer, Bashinski, & Bovaird, 2007) and for individuals with high incidence disabilities (Edyburn, 2000; Maccini, Strickland, Gagnon, & Malmgren, 2008; Schumaker, Deshler, Bulgren, Davis, Lenz, & Grossen, 2002). Recently, the issue of accessible assessment has taken center stage in the context of creating a new generation of accessible high-stakes tests (Ketterlin-Geller & Tindal, 2007; Russell, Hoffman, & Higgins, 2009; Salend, 2009).

Developing Technical Standards for Accessible Design

The disability community has recognized that while advocacy is an important strategy for change, efforts to develop technical standards may have greater impact on the development of accessible products. As a result, technical experts have convened work groups to create standardized protocols for ensuring that technologies are universally accessible.

Federal law has been used to mandate accessibility (Skylar, 2007) (see also Assistive Technology Legislation). Technical standards cover a wide array of technologies such as lifts (Balmer, 2010), kiosks (Vasiliadis & Angelidis, 2005), mobile devices (Baker & Moon, 2008), and of course the World Wide Web (Gunderson, 1999). Interested readers are encouraged to learn more by visiting a web page maintained by the federal government (http://standards.gov/assistiveTechnology.cfm).

Research on accessibility policy is becoming more common (Baker & Moon, 2008; Blair, Goldman, & Relton, 2004). However, research has consistently documented the failure of K-12 schools, government agencies, and universities to create accessible websites as required by federal law (Flowers, Bray, & Algozzine, 1999; Krach, 2007; Krach & Jelenic, 2009; Opitz, Savenye, & Rowland, 2003; Wells & Barron, 2006).

Standards have been slow to emerge to inform the accessible design of classroom instruction. However, the literature features a number of promising investigations on how to bridge the gap between assistive technology and the universal design of learning materials (Abell, Bauder, & Simmons, 2005; Auchincloss & McIntyre, 2008; Doyle & Giangreco, 2009; Hoffman, Hartley, & Boone, 2005; Pisha & Coyne, 2001).

One relatively new area of accessibility is the concept of accessible instructional materials (AIM). This construct was officially added to IDEA in the 2004 reauthorization. Teachers and administrators must be aware of their responsibilities concerning the provision of accessible instructional materials (Zabala & Carl, 2010). The statute is as follows:

Sec. 300.172 Access to instructional materials.

(a) General. The State must—

(1) Adopt the National Instructional Materials Accessibility Standard (NIMAS), published as appendix C to part 300, for the purposes of providing instructional materials to blind persons or other persons with print disabilities, in a timely manner after publication of the NIMAS in the Federal Register on July 19, 2006 (71 FR 41084); and

(2) Establish a State definition of "timely manner" for purposes of paragraphs (b)(2) and (b)(3) of this section if the State is not coordinating with the National Instructional Materials Access Center (NIMAC) or (b)(3) and (c)(2) of this section if the State is coordinating with the NIMAC.

(b) Rights and responsibilities of SEA.

(1) Nothing in this section shall be construed to require any SEA to coordinate with the NIMAC.

(2) If an SEA chooses not to coordinate with the NIMAC, the SEA must provide an assurance to the Secretary that it will provide instructional

materials to blind persons or other persons with print disabilities in a timely manner.

(3) Nothing in this section relieves an SEA of its responsibility to ensure that children with disabilities who need instructional materials in accessible formats, but are not included under the definition of blind or other persons with print disabilities in Sec. 300.172(e)(1)(i) or who need materials that cannot be produced from NIMAS files, receive those instructional materials in a timely manner.

(4) In order to meet its responsibility under paragraphs (b)(2), (b)(3), and (c) of this section to ensure that children with disabilities who need instructional materials in accessible formats are provided those materials in a timely manner, the SEA must ensure that all public agencies take all reasonable steps to provide instructional materials in accessible formats to children with disabilities who need those instructional materials at the same time as other children receive instructional materials.

(c) Preparation and delivery of files. If an SEA chooses to coordinate with the NIMAC, as of December 3, 2006, the SEA must—

(1) As part of any print instructional materials adoption process, procurement contract, or other practice or instrument used for purchase of print instructional materials, must enter into a written contract with the publisher of the print instructional materials to—

(i) Require the publisher to prepare and, on or before delivery of the print instructional materials, provide to NIMAC electronic files containing the contents of the print instructional materials using the NIMAS; or

(ii) Purchase instructional materials from the publisher that are produced in, or may be rendered in, specialized formats.

(2) Provide instructional materials to blind persons or other persons with print disabilities in a timely manner.

(d) Assistive technology. In carrying out this section, the SEA, to the maximum extent possible, must work collaboratively with the State agency responsible for assistive technology programs.

(e) Definitions.

(1) In this section and Sec. 300.210—

(i) Blind persons or other persons with print disabilities means children served under this part who may qualify to receive books and other publications produced in specialized formats in accordance with the Act entitled "An Act to provide books for adult blind," approved March 3, 1931, 2 U.S.C. 135a;

(ii) National Instructional Materials Access Center or NIMAC means the center established pursuant to section 674(e) of the Act;

(iii) National Instructional Materials Accessibility Standard or NIMAS has the meaning given the term in section 674(e)(3)(B) of the Act;

(iv) Specialized formats has the meaning given the term in section 674(e)(3)(D) of the Act.

(2) The definitions in paragraph (e)(1) of this section apply to each State and LEA, whether or not the State or LEA chooses to coordinate with the NIMAC. (Authority: 20 U.S.C. 1412(a)(23), 1474(e))

Accessibility Trends and Issues

For many years, some types of assistive technology were necessary to work-around input and output barriers intrinsic to some technologies. Increased awareness about accessible design has improved the accessibility and usability of many mainstream devices by people with disabilities (e.g., use of text messaging on cell phones has almost extinguished the market for TTY devices). However, the popularity of other types of media (e.g., video) continues to increase the demand for captioning and text descriptions that have typically been labor-intensive and expensive interventions to provide and have yet to be fully automated. Proponents of accessible design argue that barrier-free design, or mainstream design with the application of universal design, can yield products that benefit everyone. Therefore the costs should be considered across the entire population rather than viewed as expense that benefits only a small number of users.

Recently the U.S. Department of Justice, Office of Civil Rights has become more active in enforcing federal accessibility laws associated with the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act (i.e., the University of Michigan football stadium remodeling, OCR, 2007), the adoption of inaccessible e-book readers by postsecondary institutions (Parry, 2010), and inaccessible web pages (Kincaid, 2009). As of this writing, it is widely expected that recommendations will be made to update the ADA to address web and mobile device accessibility issues.

Finally, only recently have researchers begun to focus on issues of cognitive accessibility (Davies, Stock, & Wehmeyer, 2001; Davies, Stock, King, & Wehmeyer, 2008; Edyburn, 2002, 2006) and accessibility requirements for invisible disabilities (Edyburn, 2000, Yalon-Chamovitz, 2009). These issues are expected to become more predominant in the future and physical and sensory barriers are more routinely addressed.

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ACCESSIBILITY OF WEBSITES (*See* Web Accessibility)

ACCESSIBILITY RESOURCES IN STANDARD COMPUTER SYSTEMS

In addition to being able to incorporate a wide range of special accessibility hardware and software resources, today's major computer operating systems (Windows and Mac OS) contain a number of built-in options to provide accessibility in relation to a variety of disabilities. The two major platforms available in schools have similar assistive features to help empower many students with disabilities without the need for additional expense, hardware, or materials.

Apple OS X Accessibility

Macintosh OS X Snow Leopard provides features for individuals with vision, hearing, and motor skills disabilities. Universal Access provides numerous modification capabilities that work with basic computer functions as well as with many applications. Because OS X allows settings for multiple users, the same computer can be preset to provide personalized interaction for any number of individual students or groups with similar needs.

Vision

Numerous options are provided to help individuals see the screen contents. The screen text, graphics, and even video can be easily magnified up to 40 times without distracting pixilation. As the cursor is moved about, the screen adjusts and follows to automatically display the desired content. The cursor itself is resizable to help the viewer keep oriented. The screen contrast and color range can also be adjusted to any individual preferences.

The Mac is also equipped with speech technologies including talking alerts, a talking calculator, a talking clock, and Text to Speech (TTS) function that reads selected or typed text aloud for students with learning, mobility, or visual disabilities. VoiceOver is an integrated screen reader that narrates any activity on the screen to the user in natural intonation—even at very fast speaking rates—to provide a full verbal description of the actions. The audio narration content can also be displayed simultaneously in a fully configurable, large-print text caption panel. The system also reads the content of documents and provides full keyboard navigation (without requiring mouse) for control of the computer. Improved object navigation and positional cues help students with reduced motor skills or visual disabilities more easily move around the Mac and remember the location of items on the screen.

Hearing

For hearing difficulties, the system can be set to flash the screen to alert the user as an alternative to the audio alerts. Quick-access key commands can also be used to adjust the system volume, choose a custom system beep alert, set the alert beep volume independent of the system volume setting, and play unique sounds that identify various system events. Mac OS X can also help students, who are missing some of the music or audio contained in one of the channels of stereo recordings, by playing play both left and right audio channels in both left and right speakers.

Motor Skills

Students having difficulty with motor skills will often have problems using the mouse. MouseKeys let you adapt the numeric keypad to move the mouse cursor, click, double-click, and drag. The StickyKeys option lets the student create multiple key controls, such as Shift-Option-8, as a sequence of key presses. Key commands can be used to navigate menus, windows, the Dock, and other interface elements using Full Keyboard Access; this feature can also be assigned to work within specific applications. A parallel assistive function uses the built-in speech recognition system to allow the student to speak commands instead of having to type them. Standard features include keyboard control over key repeat and delay rates and control of the mouse tracking and double-click speeds. Individualization of all key shortcuts is also available. Handwriting recognition capability is also built-in using Ink and can be used for text input. Most dialog boxes have buttons that can be selected and activated by keystrokes instead of by the standard mouse click.

Windows 7 Accessibility Features

Windows 7 contains a number of built-in accessibility features and is compatible with more than a dozen assistive technology products by working closely with assistive technology vendors to serve the needs of users with vision, hearing, mobility, and cognitive disabilities. The Ease of Access Center provides a convenient, centralized place to locate and modify these accessibility settings and programs to make it easier to see the computer, use the mouse and keyboard, and use other input devices.

Vision

Windows 7 has Magnifier, a display utility that makes the screen more readable by students with vision problems by magnifying a portion of the screen, the area around the mouse pointer, or full screen. The screen display can be customized by changing features such as position, size, and window color. The magnification level and magnifier tracking options can also be controlled. Narrator is a TTS utility for individuals who are blind or have limited vision. Using its built-in internal driver, TTS engine, it reads the contents of the active window, menu options, or text that has been typed. Narrator has many options that allow the user to customize the way screen elements are read by setting them to announce events on the screen, to read typed characters, to move the mouse pointer to active item, and to adjust voice options. The user can select alternate voices and control the speed, volume, and pitch of the narration.

ToggleKeys provides audio cues when certain keys are pressed. A predefined set of mouse pointers can be chosen to increase visibility of the cursor location. Windows 7 can be set to display pointer trails and change the length of the pointer trail for better visibility of mouse pointer. When working with a document while typing with an enlarged mouse pointer, the user can hide mouse pointer for better visibility. The relative speed of the cursor movement can also be adjusted. A SnapTo feature moves the cursor to the default button and selected by the Enter key.

Hearing

Windows 7 provides a feature, SoundsEntry, to change the settings to generate visual warnings, such as a blinking title bar or screen flash for people who have difficulty hearing computer system sounds. Visual warnings can be chosen for sounds made by windowed programs or full-screen text programs. The Show Sounds feature instructs programs that usually convey information only by sound to also provide all information by displaying text captions or informative icons.

Motor Skills

On-Screen Keyboard, one of the built-in utilities, displays a virtual keyboard on the computer screen that allows students with mobility disabilities to type data by using a pointing device or joystick. Different options can be accessed by resizing the keyboard screen to make it easier to see, enabling text prediction to display a list of words that students might be typing, changing font settings of the keys to make them more legible, using Click Sound to add an audible click, using Clicking Mode to select the on-screen keys to type text, and enabling Hovering Mode to use a mouse or joystick to point to a key image for a predefined period of time to type the character. Such students can also command their computers with their voices including the capability to dictate into almost any application with built-in Speech Recognition function in Windows 7. StickyKeys allows users to press keys one at a time in sequence rather than need to hold them all at once. FilterKeys adjusts the keyboard repeating rate. Also, Windows 7 can be set to display pointer trails and change the length of the pointer trail for better tracking and visibility of the mouse pointer. Additionally, Mouse

Keys can be activated to provide use of the numeric keypad for both navigation and data entry.

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ACCOMMODATION

Accommodation is one of two complementary processes proposed by Jean Piaget to account for an individual's adaptation to the environment; its counterpart is assimilation. Accommodation involves changing or transforming cognitive or sensorimotor schemes according to the demands of the environment; assimilation involves incorporating external elements into existing conceptual schemes.

The difference between accommodation and assimilation can be illustrated by an example of an infant's response to a rattle (Ginsburg & Opper, 1969). When a rattle suspended from an infant's crib begins to shake after the infant's arm movement causes it to move, the infant looks at and listens to the toy rattling, assimilating the event into his or her schemes of looking and listening. To repeat the movement of the rattle, the infant must make the necessary hand and arm movements, accommodating his or her actions according to the demands of the situation.

Assimilation and accommodation were viewed by Piaget as inseparable aspects of a single process of adaptation, separable only for purposes of discussion (Brainerd, 1978). Assimilation and accommodation occur simultaneously; a balance between the two is necessary for adaptation. A scheme must accommodate itself to the specific characteristics of the object or event it is attempting to assimilate; accommodation guides the eventual change in structures (Gelman & Baillargeon, 1983).

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See also **Assimilation; Cognitive Development; Piaget, Jean**

ACCOMMODATIONS VERSUS ACADEMIC ADJUSTMENT

Accommodations change the way instruction is provided or assessment tasks are administered to students with disabilities. These changes reduce the impact of physical, cognitive, or sensory barriers that may prevent students from gaining access to the targeted domain or expressing their knowledge and skills. For example, a student with a hearing impairment may need test directions presented in sign language to understand the information. Without this accommodation, the student would not be able to perform the tasks necessary to demonstrate his or her abilities. As such, accommodations allow students with disabilities to meaningfully interact with curricular materials, thereby increasing their participation in the general education environment.

Changes to the presentation, response, setting, and timing of materials are acceptable accommodations provided they do not change or interfere with the targeted construct. Maintaining the integrity of the construct allows for valid interpretations of student knowledge and skills. If the construct is altered, however, similar interpretations of student ability are not possible.

Presentation accommodations change the format of information that is presented to the student. Such accommodations include, but are not limited to, presenting material in braille, sign language, high or low contrast, and visual magnification of text or response forms. Other presentation accommodations include reading the directions or questions aloud to students, simplifying the language used in the directions or questions, or reducing the amount of text on a page. Testing accommodations must be carefully constructed or written. Accommodations that are made without consideration to the test can alter the reliability and validity of the test.

Response accommodations change the format in which responses are recorded or the method in which the student responds to questions or tasks. Format changes include

allowing students to use additional space on the paper; record answers directly on a test booklet; or use different types of paper, such as graph or lined paper. Examples of changes to the method of response include providing assistive devices such as word processors or braillers. Scribes as well as audio recording responses for transcription are also classified as response accommodations. Allowing students to check spelling or grammar is appropriate as long as these skills are not part of the targeted construct.

Setting accommodations change the environment in which instruction is presented or assessment tasks are administered. Setting accommodations include working with the student in a separate location or in a small group, reducing the distractions in a typical setting, or providing assistive furniture. Finally, timing accommodations change the amount of time allocated to the tasks. Examples include providing additional time to complete tasks, allowing the student to complete work during multiple short sessions within or across days, providing frequent breaks, presenting materials at specific times of the day, or changing the schedule to accommodate special needs. Again, it is important to note that any of these accommodations are appropriate if they do not interfere with the targeted construct. Carefully considering the test construct when accommodations are implemented helps to avoid changes which can alter the reliability and validity of the construct.

Accommodated materials are created by retrofitting existing activities or embedding changes within the design of new materials. Retrofitting materials allows teachers and other educators to use already created instructional activities and assessment tasks, thereby avoiding the costs of designing new forms. However, changing existing materials can be costly and may result in less than ideal conditions, which may compromise the goal of the accommodation. As an example, imagine creating a braille version of an existing science test that included multiple graphical representations. Each image would be redesigned in order to be converted to braille, or the image would be omitted from the braille version. In any case, the student would not receive the same materials as sighted students.

To avoid the drawbacks incurred when retrofitting existing materials, accommodations can be embedded during the design and construction phases of materials development (Ketterlin-Geller, 2003). For example, the science test discussed in the previous example would be created with simple graphic images that display only the necessary information. When a braille version is created, the images are easily converted so that all students receive the same materials. By considering the characteristics of the target population when materials are created, developers can include accommodations from the beginning. This circumvents the costs associated with accommodating existing materials.

Once accommodated materials are created, students with disabilities are assigned accommodations that will reduce the sources of error that are caused by the disability. An individualized educational program (IEP) team is responsible for making decisions about assignment of accommodations for an individual student. Input from a variety of sources including parent preference, teacher's experience and observations, and inferences about student performance is considered when determining the use of accommodations (Fuchs & Fuchs, 1999). Care must be taken to assign appropriate accommodations based on the student's characteristics. For accommodations to be beneficial, format changes must be specific to the individual's characteristics and needs (Helwig & Tindal, 2003). For example, a student with a visual impairment may benefit from information presented in large text or braille. However, this same student may be distracted or confused by materials constructed using simplified language.

Additionally, for accommodations to effectively support students with disabilities and provide meaningful opportunities for these students to participate in the general education curriculum, they must be applied in both instructional and assessment settings. Without the use of accommodations in instruction, students are denied the opportunity to learn the material and are subsequently penalized on assessments. When unfamiliar accommodations are introduced during testing, they may provide additional sources of irrelevant variance in the students' score.

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See also **American Sign Language; Test Anxiety**

ACETYLCHOLINE

Acetylcholine (ACh) is a neurotransmitter, a chemical that is released from one neuron to pass a message to another neuron. Acetylcholine is naturally synthesized in living cells in cholinergic nerve terminals that are

located primarily in the autonomic nervous system. It also is evident at parasympathetic postganglionic synapses, and at neuromuscular junctures (Cooper, Bloom, & Roth, 1982).

The autonomic nervous system is involved in what appears to be functionally reflexive responses directed toward energy conservation or preparation for possible trauma. Thus, with cholinergic stimulation, pupils contract, heart rate slows, and muscular contraction is facilitated (Katzung, 1982). Experimental work by Deutsch (1984) suggests the possibility of an indirect, environmental role for ACh in the development of memories. Results of animal studies indicate that drugs that block cholinergic action tend to increase low rates of response and decrease high rates of response among behaviors that were maintained through food reinforcers (Seiden & Dykstra, 1977). Such findings are consistent with the likelihood that ACh plays a role in creating a chemical environmental context for learning by mediating autonomic responsiveness and attention (Himmelheber, Sarter, & Bruno, 2001). A role in pain perception also has been postulated (Cooper et al., 1982). Myasthenia gravis, a disease characterized by fluctuating muscle weakness, especially in muscles innervated by the motor nuclei of the brain stem (Adams & Victor, 1981), is a model of ACh dysfunction. Observed involvement of cholinergic systems in tardive dyskinesia, Huntington's chorea, and Alzheimer's dementia has led to experimental administration of drugs that facilitate ACh; however, no consistent results have been observed in such studies (Cooper et al., 1982).

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See also **Central Nervous System; Neurological Organizations**

ACHENBACH CHILD BEHAVIOR CHECKLIST

The purpose of the Child Behavior Checklist (CBCL 6–18, 2001) is to quickly (in 15 to 20 minutes) collect standardized ratings on a broad spectrum of competencies and problems for children ages 6 to 18 years as reported by the child's parent or others that are involved with the child within the home environment. For the 120 behavioral, emotional, and social problem statements, the respondent is directed to answer all items as best as possible even if they do not seem applicable to the child. The instructions to the respondent are located on the CBCL booklet and are written on a fifth-grade reading level. If the respondent cannot read, the CBCL can be administered in an alternate format where the examiner reads the items and records responses of the respondent.

The CBCL measures competencies using a Total Competence Score, which represents a parent's perception of their child's performance on an Activities scale, Social scale, and School scale.

Problems are measured on the CBCL's Syndrome Scales. These represent the parents' perception of their child's behavior based on eight statistically derived categories (factors): Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior.

The Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints scales constitute the Internalizing Problems scale score, and the Rule-Breaking Behavior and Aggressive Behavior scales combine to yield the Externalizing Problems scale scores. Adding the Social Problems, Thought Problems, and Attention Problems scales with the Internalizing and Externalizing Problem scales generates a Total Problem scale score.

In addition, problems on the CBCL have been categorized into six DSM-Orientated Scales: Affective Problems, Anxiety Problems, Somatic Problems, Attention Deficit/Hyperactivity Problems, Oppositional Defiant Problems, and Conduct Problems.

Scoring the CBCL is easy and responses are directly recorded from the CBCL booklet. Scoring can be done in one of three ways: hand-scored, computer-scored, or scored by scanner. The hand-scoring method is time consuming and the many calculations leave room for frequent errors. Although the computer-scoring or scanning methods are initially more costly, they reduce time spent scoring and are more accurate.

Males and females have separate norms based on age. The two age ranges used for each gender are 6–11 and 12–18. The 2007 revision of the scales offers a variety of norms based on culture. Normative data is only provided on the hand-scoring profiles. No other printed norm tables are available at this time. The computer generated profile does not provide the examiner with such data.

T-scores and Percentiles are calculated for each scale for comparative purposes. For each scale T-Scores are further categorized as within normal limits, within the Borderline range, or within the Clinical range. The value of T-Scores for each range varies depending on the scale. On the Competence Scales and Total Competence scale, higher T-Scores are associated with normal functioning. On the syndrome scales, Internalizing, Externalizing, Total Problem, and DSM-Orientated scales, lower T-Scores are associated with normal functioning.

The CBCL also allows for multiple respondent comparisons to be made using another CBCL, TRF, or YSR.

The CBCL sample consisted of 1753 children. The demographics in the manual indicate that 914 boys and 839 girls were used. There were 387 boys in the 6–11 age group and 527 boys in the 12–18 age group. There were 390 girls in the 6–11 age group and 449 girls in the 12–18 age group. The number of participants for each year (i.e., number of 6-year-olds, number of 7-year-olds, etc.) was not presented in the manual. For the sample, SES was broken down to three levels with the following results: Upper (33%), Middle (51%), and Lower (16%). In terms of ethnicity, 60% were Non-Latino White, 20% were African American, 9% were Latino, and 12% were Mixed/Other. There were 100 sampling sites in 40 states and the District of Columbia. 17% were from the Northeast, 20% were from the Midwest, 40% were from the South, and 24% were from the West. Overall the sample procedures appear to be adequate and fairly representative.

Internal consistency or "split-half reliability" were moderately high and ranged from .55 to .75. For the empirically based problem scales (syndromes, Internalizing, Externalizing, and Total Problem) reliabilities were high, ranging from .78 to .98. In all cases, Total scores have the highest internal consistency. For the DSM-Orientated Scales, alphas were high as they ranged from .72 to .91. Test-Retest reliability was high for most of the scales with a range of .80 to .94. The test-retest interval was 8–16 days and the sample included children that had been referred for mental health services and those who were not.

The CBCL is very user friendly. It is easy to administer and take. A big drawback for the examiner is related to the time and accuracy of hand-scoring procedures. If the computer-scoring system is used, scoring is also relatively easy.

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Fourth edition

ACHIEVEMENT NEED

Achievement need is also known as achievement motivation, the need for achievement, and *n:Ach*. The concept was first defined by Murray (1938) as the need "to overcome obstacles, to exercise power, to strive to do something difficult as well and as quickly as possible" (pp. 80–81). Murray, however, chose not to attempt to conduct applied research in achievement motivation and the concept did not receive much attention until McClelland (1951) developed a cognitive theory of motivation in which the need for achievement is one element. McClelland's theory states that a person's tendency to approach a task (effort) is a function of the strength of the achievement need, the strength of the need to avoid failure, the person's subjective belief about the probability of success or failure, and the value of the incentives associated with either success or failure. According to McClelland (1951) and Atkinson (1964), achievement need is intrinsic. It is not associated with extrinsic rewards that accrue as a result of achievement. Achievement need is generally measured through the Thematic Apperception Test (TAT), although Hermans (1970) developed a paper and pencil test for this purpose called *n:Ach*.

Many researchers have attempted to determine how achievement need develops. Crandall (1963) discovered that children with high achievement needs had mothers who rewarded achievement and achievement activities at

an early age. These mothers also did not attend to their children's pleas for help when the children faced a difficult problem. Crandall further concluded that middle- and upper-class parents were more likely to engage in behaviors that develop achievement motivation than were parents of lower economic status. Currently, parental involvement to assist achievement need is taking center stage as an educational improvement strategy (Jeynes, 2005; Fan & Chen, 2001).

A number of studies have been conducted to determine the effects of achievement on task performance and personality. Weiner (1970) found that high-need achievement persons persist in the face of failure while low-need achievement persons become more inhibited in their responses. He further found that low-need achievement persons will engage in achievement activity when success and reinforcement rates approach 100%, but high-need achievement persons work best when reinforcement is attained approximately 50% of the time. Weiner and Kukla (1970) related achievement need research to Rotter's (1966) research in locus of control. Using elementary school children, they concluded that high-need achievement children viewed their successes as resulting from their effort. Both high- and low-achievement need children attributed failure to themselves, but high-need achievement children attributed failure to lack of effort while low-achievement children attributed it to lack of ability.

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See also **Learned Helplessness; Motivation; Self-Concept; Self-Control Curriculum**

ACHIEVEMENT TESTS

Achievement tests are individually or group-administered standardized instruments intended to measure the effectiveness of former training. Achievement tests are the dominant form of standardized assessment in education. Measures of achievement have been used to evaluate student performance, school instruction efficacy, candidates for scholarship awards, admission to academic programs, and applicants for industrial and government employment. Group administered achievement tests are more likely to be employed for the evaluation of a scholastic program, whereas individually administered achievement tests are typically used to assist in appropriate grade placement in schools and the identification and diagnosis of learning disabilities.

Traditional achievement tests were based on the principle of comparing examinees to their peers, or normative testing (classical test theory). Some more contemporary achievement tests are based on the premise that a prediction can be made about the performance of a person with a specified ability in regard to that person's probable success or failure on an item of specified difficulty (Anastasi, 1988). In other words, as the level of ability increases, the probability that an examinee will give a correct response increases (Hambleton, Swaminathan, & Rogers, 1991). Given the special characteristics of item response theory (IRT), computer adaptive testing is a desirable method to select different sets of items for each subject.

Some examples of commonly used normative achievement tests and their publishers include: Comprehensive Tests of Basic Skills (CTB/McGraw-Hill), Iowa Tests of Basic Skills (Riverside Publishing Company), Kaufman–Test of Educational Achievement Second Edition (American Guidance Service), Stanford Test of Academic Skills (Psychological Corporation), and Tests of General Educational Development (GED Testing Service of the American Council on Education).

The use of computer aided testing and IRT represents a new era in achievement testing. For example, the ACCU-PLACER (College Board online administration) computerized battery of achievement tests for college level

placement is implemented in the placement of hundreds of thousands of students during each school year (Cole, Muenz, & Bates, 1998).

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See also **Criterion-Referenced Tests; Norm-Referenced Tests**

ACHONDROPLASIA

Achondroplasia, also called chondrodystrophy, refers to a defect in the formation of cartilage in the epiphyses of long bones, such that a type of dwarfism results. This most common form of dwarfism is usually inherited as an autosomal dominant trait, or it may result from spontaneous mutation (Avioli, 1979; Magalini, 1971). Clinical features of achondroplasia include absolute diminution of extremities; normal trunk and head size; a prominent, bulging forehead; and a flattened, saddle nose. Hands and feet typically are short, and fingers tend to be nearly equal in length (trident hands). Adult height generally does not exceed 1.4 meters. Achondroplasia occurs with equal frequency in females and males and affects approximately 1 in 25,000 children in the United States (Toplis, 2003).

The intelligence of affected persons is reported to be normal (Avioli, 1979; Lubs, 1977), although there is evidence of occasional neurologic complications during early adulthood (Magalini, 1971). The fertility of achondroplastic dwarfs or a little person is reported to be 30% of normal. Of offspring of two affected persons, two-thirds will exhibit the syndrome (Lubs, 1977). In educational settings, afflicted children may require adaptive equipment to accommodate their short stature. While there is no evidence to suggest that achondroplasia places individuals at increased risk for learning problems, a multifactored evaluation is appropriate for children who experience difficulty in school.

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See also **Congenital Disorders; Minor Physical Anomalies**

ACNE VULGARIS

Acne vulgaris (AV) is a skin disorder seen primarily in adolescents (Burkhart, Burkhart, & Lehmann, 1999). It is the most common skin disease treated by physicians (Krowchuk, 2000). AV is characterized by a pilosebaceous follicular eruption of the comedo that starts an inflammatory reaction. A pilosebaceous follicle consists of a follicle or pore, the sebaceous gland, and a hair. These specialized follicles are concentrated on the face, chest, and back. Formation of papules, pustules, and cysts can result from the inflammation. AV is a chronic condition that may last for years and may cause emotional distress and permanent facial scarring (Krowchuk, 2000). Clinical characteristics of AV vary with age, stage of puberty attained, gender, and race (White, 1998).

There are four basic reasons that adolescents are at risk for AV: hormonal surges that take place both before and during puberty, bacteria, comedogenesis, and genetic predisposition (Krowchuk, 2000). In adolescents, cycling hormones cause gonadal development and adrenal maturation, which increases androgen production, leading to sebaceous gland enlargement and higher sebum. Higher levels of androgen dehydroepiandrosterone sulfate (DHEAS) cause more sebum to be produced, which leads to the oily face and chin with scattered comedones that are the hallmark of puberty production (White, 1998). Bacteria are also involved with increased acne production. Krowchuk (2000) reports that Propionibacterium acnes (P. acnes) begin to colonize after sebum production increases. This bacteria uses the sebum as a nutrient that allows this normal facial bacteria to multiply so that it increases the inflammatory reaction that causes the pustules, papules, and cysts characteristic of AV. Finally, although it is not possible to predict the severity of AV based on genetic factors, there does appear to be a genetic predisposition for AV (Krowchuk, 2000).

AV affects an estimated 17 million people in the United States, affecting 85% of adolescents and young adults

(Krowchuk, 2000), although a higher percentage of teenage boys than teenage girls are affected by AV (White, 1998). Krowchuk (2000) reports that AV severity correlates with sebum secretion, which is caused by adrenal and gonadal androgens. Therefore, both sebum secretion and AV peaks during adolescence and begins to decline after age 20.

Characteristics

1. Obstructive lesions are blackheads or whiteheads. Blackheads are open comedones, or follicles with a wide, dark opening. Whiteheads are closed comedones, or small, white papules. They are follicles that have become dilated with cellular and lipid debris but have only a microscopic opening into the skin.
2. Some patients with acne will develop scars or cysts when inflammatory lesions have resolved.

The first step in treating AV is conducting a global assessment of acne severity that states the number, size, location, and extent of lesions and scarring (Krowchuk, 2000). Next, the patient should be given information that will help him or her avoid behaviors and factors that worsen AV. This information list should include advice such as do not pick at acne, avoid wearing athletic gear over areas with acne, avoid cosmetics and moisturizers containing oils, use only noncomedogenic or nonacnegenic products, and avoid working in an environment where one comes into contact with grease.

Acne is a chronic condition, and treatment efforts generally take 6–8 weeks before therapeutic benefit is seen (Krowchuk, 2000). Both topical and systemic treatments are recommended for AV. Topical therapies include benzoyl peroxide, topical antibiotics, and azelaic acid, which when used alone or in combination with each other have an antibacterial effect on mild to moderate inflammatory acne. Topical retinoids (Retin-A) and salicylic acid are indicated in the treatment of mild to severe obstructive lesions. Severe inflammatory acne is best treated with oral antibiotics, such as erythromycin or tetracycline. Other treatments include isotretinoin (Accutane), which can help in some severe cases of inflammatory lesions that do not respond to milder treatments, because Accutane can have adverse effects. Oral contraceptives are generally seen as adjunctive therapy and should be utilized in combination with other treatments for AV.

In the classroom, AV can affect student performance because of the emotional distress that generally accompanies active lesions on the face. These adolescents may be distracted from learning because of a preoccupation with their face. In addition, these students may be vulnerable to peer teasing. Therefore, teachers should be sensitive to adolescents who may have severe cases of AV, and a referral to the school counselor may be appropriate.

There are several areas of future research in the area of AV. Certain forms of AV may be resistant to oral and topical antibiotics. According to Krowchuk (2000), researchers in the United Kingdom found that cases of acne resistant to antibiotics rose from 34.5% in 1991 to 60% in 1996. Because multiple factors influence effectiveness of antibiotic treatment, studies clarifying what strains of AV are actually treatment resistant are needed. New treatments or therapies for treatment-resistant AV are also needed. Another area for future research is investigating and clarifying the exact relationship between microbial organisms and the inflammation that creates AV. P. acnes is the predominant microorganism in the pilosebaceous follicle, and although P. acnes is not pathogenic, it is the main target of oral and topical antibiotic treatments. Burkhart et al. (1999) suggest that future research should clarify how P. acnes and other microorganisms are involved in acne inflammation via its interaction with other chemical properties.

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ACROCALLOSAL SYNDROME

Acrocallosal syndrome (ACS) is a genetic disorder that is apparent at birth. The disorder is typically characterized by underdevelopment or absence of the corpus callosum and by intellectual disability. However, other associated symptoms may be variable, even among affected members of the same family.

ACS is believed to be a rare condition, but prevalence is unknown and has not been studied in detail. Considered at first to be sporadic, the syndrome has more recently been ascribed to an autosomal recessive gene, on the basis of its observation in two siblings (Schinzel, 1988) and in two unrelated patients, each born to consanguineous parents (Salgado, Ali, & Castilla, 1989; Temtamy & Meguid, 1989). True and confirmed etiology remains unknown.

There have been no reports of prenatal diagnosis of this syndrome. However, certain manifestations such as polydactyly and cerebral malformations can be detected by ultrasound examination during the second trimester (Hendricks, Brunner, Haagen, & Hamel, 1990). In view of the variability of the major clinical manifestations, prenatal detection of this syndrome may not be possible in all cases.

Characteristics

1. Macrocephaly, large anterior fontanel, epicanthal folds, prominent occiput, and bulging forehead
2. Low-set posteriorly rotated ears
3. Down-slanting palpebral fissures, exotropia, protruding eyeballs, and hypertelorism
4. Broad and short nose and anteverted nostrils
5. Short upper lip and high arched cleft palate
6. Umbilical and inguinal hernia
7. Postaxial polydactyly of the fingers and toes, bifid terminal phalanges of the thumbs, and tapered fingers
8. Hypotonia
9. Hypoplasia or agenesis of corpus callosum, seizures, and hyperreflexia
10. Hypospadias and hypogonadism
11. Mental, motor, and speech impairments

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See also **Acrodysostosis**

ACRODYSOSTOSIS

Acrodysostosis is also called acrodysplasia, Arkless-Graham syndrome, or Maroteaux-Malamut syndrome. It is an extremely rare disease in which bones and skeleton are deformed. The hands and feet are short with stubby fingers and toes (National Organization for Rare Disorders [NORD], 2000; PDR, 2000). The cause of the disease is unknown at this time (Medlineplus, 2000; PDR, 2000).

Both sexes are equally likely to be affected. It tends to occur with older parental age (Medlineplus, 2000).

Characteristics

1. Abnormally short and malformed bones of the hands and feet (peripheral dysostosis).
2. Underdevelopment of the nose (nasal hypoplasia)—short nose with low bridge, broad and dimpled tip, anteverted nostrils, long philtrum, and epicanthal folds.
3. Mild to moderate growth deficiency—short stature and unusual head and facial (craniofacial) features.
4. Characteristic facial features may include a flattened, underdeveloped (hypoplastic) pug nose, an underdeveloped upper jaw bone (maxillary hypoplasia), widely spaced eyes (ocular hypertelorism), and an extra fold of skin on either side of the nose that may cover the eyes' inner corners (epicanthal folds).
5. Mental deficiency in approximately 90% of affected children.
6. Short head, measured front to back (brachycephaly).
7. Other abnormalities of the skin, genitals, teeth, and skeleton.
8. It frequently co-occurs with middle ear infections.

(Medlineplus, 2000; National Library of Medicine [NLM] 1999; NORD, 2000).

There is no treatment or cure for this syndrome. It is recommended that the child be referred to a geneticist (specialist in inherited diseases) and the child should be monitored by a medical professional (NORD, 2000). If the skeletal deformities are severe enough to interfere with academic progress, children with this disorder would receive services under orthopedically impaired. Depending on the extent of the cognitive deficiency, the child may receive services for Learning Disability, Mental Retardation, or both. Services could include resource classes,

physical therapy, and occupational therapy. If the child's cognitive or physical impairment is not severe enough, the 504 modifications with technology to modify the regular curriculum might be sufficient.

The prognosis of the children who have acrodysostosis varies depending on the degree of skeletal involvement and intellectual disability (Medlineplus, 2000). The treatment should be provided according to the child's condition.

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ACROMEGALY

Acromegaly is characterized by excessive growth due to oversecretion of growth hormone, which is produced in the liver and other tissues and is secreted by the anterior pituitary gland. Oversecretion of growth hormone is often caused by the presence of a benign pituitary tumor (adenoma) but can also be caused by lung and pancreas tumors that stimulate the excessive production of substances similar to growth hormone (Berkow, Beers, & Fletcher, 1997).

The prevalence of acromegaly is approximately 50–70 cases per million. Three or four infants who will develop acromegaly are born per million births (Novartis Pharmaceuticals Corporation, 1999). It has been estimated that there are 15,000 cases of acromegaly within the United States. Its onset most commonly occurs between the ages of 30 and 50 years (Berkow et al., 1997), but it is not usually diagnosed until 10 years after increased hormone secretion has begun (Novartis Pharmaceuticals Corporation, 1999). Reasons accounting for this delay of diagnosis include slow development of symptoms, a variety of clinical signs and symptoms, and the need to rule out other medical conditions with similar signs and symptoms (Novartis Pharmaceuticals Corporation, 1999). If excessive growth of the same nature occurs by the age of 10 years, it is referred to as gigantism (accelerated growth). Acromegaly is diagnosed through the presence of elevated blood levels of growth hormone (GH) or insulin-like growth factor I (IGF-I). X rays confirm the thickening of bones. Pituitary tumors are the cause of acromegaly in 90% of cases (Tierny, McPhee, & Papadakis, 2000). A CT scan or magnetic resonance imaging (MRI) examines the site and size of possible tumors. If there is no tumor, these same tests can be used to detect the enlargement of organs or the source of excessive growth hormone excretion.

Additional symptoms associated with acromegaly include carpal tunnel syndrome, sleep apnea, goiter, colon polyps, and hypertension. Weight gain is frequent and largely attributable to muscle and bone growth. Diabetes sometimes occurs due to insulin resistance, and arthritis and joint pain are common. The heart may become enlarged, increasing the chance of heart failure. Headaches are common due to pressure caused by the tumor. As tissues enlarge, they may compress nerves including the optic nerve, sometimes resulting in loss of vision.

Characteristics

1. Enlarged hands, feet, jaw, facial features, and internal organs
2. Coarsening facial features and deeper voice
3. Excessive perspiration
4. Amenorrhea
5. Sweaty handshake

Treatment of acromegaly is primarily medical. Initially, the tumor is either removed through surgery or destroyed through radiation therapy. Medication such as octreotide or bromocriptine slow or block the production of growth hormone (Berkow et al., 1997). When surgical treatment is successful, normal pituitary function returns, resulting in the decrease of soft tissue swelling. Bone enlargement, however, is permanent (Tierney et al., 2000). In children, because excessive growth hormone is secreted before the bones stop growing, the result is abnormal height and excessive bone growth.

Acromegaly, referred to as gigantism when seen in children, is not necessarily accompanied by cognitive deficiencies. Special education issues are most often related to physical accommodations or services such as occupational therapy.

Unlike adults with acromegaly, children who are treated for gigantism do not become deformed. Other symptoms persist, however, such as swollen tissue around bones, delayed puberty, and incomplete development of the genitals (Berkow et al., 1997). One study has shown that the life expectancy of individuals with acromegaly is approximately 10 years lower than that of nonacromegalic individuals (Novartis Pharmaceuticals Corporation, 1999).

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ACROMESOMELIC DYSPLASIA (ACROMESOMELIC DWARFISM)

Acromesomelic dysplasia is a form of dwarfism characterized by premature fusion of the areas of growth (epiphyses) in the long bones of the arms and legs. Affected individuals have severely shortened forearms, lower legs, and short stature (short-limbed dwarfism).

Acromesomelic dysplasia is extremely rare. It is inherited in an autosomal recessive manner. Two distinct clinical forms, distinguished by different X-ray and biochemical findings, have been described. The Maroteaux type is caused by an abnormal gene in Chromosome 9. The Hunter-Thompson type has been traced to Chromosome 20.

Characteristics

1. Prominent forehead, slightly flattened face, and short nose
2. Short limbs, especially the forearms and lower leg below the knee
3. Progressive inward curving of the lower spine (kyphosis) as the child ages
4. Linear growth deficiency that becomes more obvious with increasing age
5. Short, broad hands and feet
6. Mild lag in motor development
7. Normal intelligence

There is no specific treatment or cure for this disorder. In the future, therapy directed toward correcting the defective gene offers some promise.

Children with acromesomelic dysplasia may benefit from modifications in the classroom, such as provision of an appropriately sized desk and chair. Evaluation and treatment by occupational and physical therapists may be needed to address the lag in the motor development. These children should be treated in an age-appropriate manner and not according to their short stature.

Evaluation of a small number of adults with this problem showed that they had normal intelligence. Final heights in these individuals ranged from 38 to 49 inches.

Families may benefit from additional emotional support as they learn coping strategies and problem solving abilities to help integrate their child into society. For more information and support, please contact:

Restricted Growth Association, P.O. Box 8, Countesthorpe, Leicestershire, LE8-5ZS, United Kingdom. Tel. (44) 116-2478913.

Little People of America, Inc.: P.O. Box 745, Lubbock, TX 79408. Tel.: (888) 572-2001, e-mail: lpadatabase@juno.com.

International Center for Skeletal Dysplasia: Saint Joseph's Hospital, 7620 York Road, Towson, MD 21204. Tel.: (410) 337-1250.

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ACROMICRIC DYSPLASIA

Initially described by Spranger (1971), acromicric dysplasia is a rare bone deformity mainly characterized by reduced bone growth; this results in facial anomalies, short limbs, and abnormally limited growth. It is very closely linked to geleophysic dysplasia, sharing many of the same characteristics, and there has been speculation as to whether these two are in fact the same disorder but have different methods of inheritance. It is possible that acromicric dysplasia is inherited through a dominant

gene: There have been a few cases in which the disorder was present in multiple family members; however, these cases were the minority, and the possibility of genetic inheritance is still debated.

Biochemically speaking, acromicric dysplasia is caused by disorganization at the site of bone growth—abnormal cells, isolated clusters of cells, and abnormal levels of collagen forming rims around the cells (Maroteaux, Stanescu, Stanescu, & Rappaport, 1986).

Characteristics

1. Facial deformities
2. Shortened limbs
3. Abnormally short stature
4. Cell disorganization at growth sites

Children with acromicric dysplasia display normal intelligence levels. Accordingly, these children will most likely be placed in inclusive programming if chronic health issues and treatment do not prevent regular school attendance.

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ACTING OUT

Acting out has been defined by Harriman (1975) as the "direct expression of conflicted tensions in annoying or antisocial behavior in fantasies" (p. 30). A child who exhibits acting-out behavior is one who cannot easily accept structural limits and is difficult to manage in the classroom. Acting-out behaviors are similar to conduct disorders or externalizing behaviors, but not necessarily as severe. One reason for the similarity is that acting-out behavior is one of the characteristics clustered under the broader grouping of conduct disorders. Acting-out behaviors usually are of high frequency and of significant duration, and do not include minor daily misbehavior.

Usually, when a behavior is identified as an acting-out behavior, it is operationally defined, observed, and recorded by the classroom teacher in specific and observable terms. Some of the behaviors that can be identified as acting-out behaviors include fighting, lying, temper tantrums, pouting, stealing, hyperactivity, threatening, and bullying (Quay, 1979).

Acting out, or externalizing behaviors are linked to persistent poverty (Eamon, 2000) and observed more frequently in males (Wicks-Nelson & Israel, 2000).

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See also **Applied Behavior Analysis; Conduct Disorder**

ADAPTED PHYSICAL EDUCATION

Adapted physical education is a diversified program of developmental activities, games, sports, and rhythms suited to the interests, capacities, and limitations of students with disabilities who may not safely and successfully engage in unrestricted participation in vigorous activities of the general physical education program (Hurley, 1981, p. 43).

The focus of adapted physical education is on the development of motor and physical fitness and fundamental motor patterns and skills in a sports-like environment (Sherrill, 1985).

Adapted physical education implies the modification of physical activities, rules, and regulations to meet existing limiting factors of specific handicapped populations. By definition, adapted physical education includes activities planned for persons with learning problems owed to mental, motor, or emotional impairment, disability, or dysfunction; planned for the purpose of rehabilitation, habilitation, or remediation; modified so the handicapped can participate; and designed for modifying movement capabilities.

Adapted physical education primarily occurs within a school setting, but it may also occur in clinics, hospitals, residential facilities, daycare centers, or other centers where the primary intent is to influence learning or movement potential through motor activity (AAHPER, 1952).

In the school setting, adapted physical education differs from regular physical education in the following manner. It has a federally mandated base through IDEA 2004. It serves students who are primarily identified as having a handicapping condition but may serve students such as the obese, who are not identified as handicapped but are in need of physical activity modification within a restricted environment. Adapted physical education classes are usually separate and educationally distinct from regular physical education owing to the need to modify the curriculum to suit the individual interests and capabilities of the student.

The basic elements in curriculum planning are individuality, flexibility, and educational accountability. Because of the intra- and intervariability of individual differences within and across handicaps, activities must be designed and programmed to fit each child's motor capabilities. For instance, children within a particular handicapped group may be able to throw a ball, but each within the group, because of motor limitations, may throw the ball differently while still achieving the objective of distance and accuracy. Second, adapted physical education activities are designed to be flexible enough to achieve educational goals. For instance, for basketball, a smaller ball is provided and baskets are lowered so that students may be able to score more baskets in a game, thereby increasing their enjoyment in the sport (Auxter & Pyer, 1985).

Adapted physical education for students classified as handicapped implies accountability via the individualized educational plan (IEP). Objectives stated on an IEP ensure that the student is receiving instruction in activities where there is the greatest physical, motor, and social need. The student is evaluated periodically to assess progress toward the short- and long-term goals stated in the IEP.

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***See also* Motor Learning; Physical Education for Students With Disabilities**

ADAPTIVE BEHAVIOR

Adaptive behavior includes skills used by an individual to meet personal needs, deal with the natural and social demands in one's environment, skills to care for him or herself, and to relate to others (Nihira, Leland, & Lambert, 1993). These skills also include independently caring for one's personal health and safety, the ability to dress, bathe, communicate, display socially appropriate behaviors and academic skills, engagement in recreation, work, and in community life (Ditterline & Oakland, 2010). The American Association on Intellectual and Developmental Disabilities (AAIDD) has developed a model of adaptive behavior that consists of 10 skills: communication, community use, functional academics, home and school living, health and safety, leisure, self-care, self-direction, social, and work (Ditterline, Banner, Oakland, & Becton, 2008). Adaptive behavior is an integral part of the evaluation and planning for individuals with and without disabilities. Increased emphasis is now placed on the use of adaptive behavior concepts in special education and programs for individuals with disabilities (Meyers, Nihira, & Zetlin, 1979).

Edgar Doll was among the first researchers to propose the use of adaptive behavior when diagnosing individuals with intellectual disabilities. It was not until 1959 that the American Association on Mental Deficiency published its official manual and formally included deficits in adaptive behavior, in addition to low intelligence, as an integral part of the definition of intellectual disabilities (Heber, 1961). Subsequent editions of the manual have further emphasized the importance of adaptive behavior. Several issues in the 1960s and 1970s precipitated an upsurge of interest in adaptive behavior and adaptive behavior assessment (Witt & Martens, 1984). A concern arose about "6-hour retarded children" or minority group and low socioeconomic status children who were labeled as "retarded" in the public schools but exhibited adequate adaptive behavior at home and in the community (Mercer, 1973).

This concern eventually led to litigation such as the Guadalupe and Larry P. cases and court decisions that indicated that results of intelligence tests cannot be the primary basis for classifying children as having an intellectual disability and that adaptive behavior must be assessed. The 1960s and 1970s saw a trend toward the normalization of individuals with disabilities and the awareness that effective programs for teaching adaptive skills allow individuals with disabilities to participate as fully as possible in normal environments. A third issue was the need for a nonbiased and multifaceted assessment of all children with disabilities to facilitate the fairness of decisions based on the results of tests and to investigate functioning in all areas related to a particular handicap.

The passage of the Education of All Handicapped Children Act of 1975 (Public Law 94-142) represented the

culmination of the issues of the 1960s and 1970s. Public Law 94-142 and its latest revision, the current Individuals with Disabilities Education Act, commonly known as IDEIA, 2004, have stringent guides for the assessment of children with disability and stipulates that deficits in adaptive behavior must be substantiated before a child is classified as having an intellectual disability. Further, it recognizes the importance of adaptive behavior assessment for children with disabilities other than the intellectual disabilities. Since the passage of the law, most states have developed guidelines for adaptive behavior assessment (Patrick & Reschley, 1982) and many have strict criteria for the types of adaptive behavior instruments and scores to be used.

Traditionally adaptive behavior assessments have been used to identify individuals with intellectual disabilities. Information on adaptive behavior is increasingly being used for comprehensive assessment, treatment planning, intervention, and program evaluation for individuals with various disorders. Research is now being done on the adaptive behavior skills of individuals with disabilities including: Down syndrome, autism spectrum disorders developmental delay, hearing and visual impairments, fragile X syndrome, Williams syndrome, externalizing problems, psychological disturbances, and learning disabilities (Ditterline, Banner, Oakland, & Becton, 2008).

Ditterline, Banner, Oakland, and Becton (2008) researched adaptive behavior profiles of students with disabilities. They found that children with different disabilities display varying adaptive skills. Those diagnosed as emotionally disturbed displayed deficits in socialization, communication, and daily living skills. Children diagnosed with autism spectrum disorders showed deficits in communication and socialization and those diagnosed with learning disabilities displayed deficits in academic skills. Principles from applied behavior analysis guide many adaptive behavior training programs (Neidert, Dozier, Iwata, & Hafen, 2010).

Sparrow, Balla, and Cicchetti (1984, 2005) discuss several characteristics that are inherent in concepts of adaptive behavior. Adaptive behavior is an age-related construct; as normally developing children grow older, adaptive behavior increases and becomes more complex. Adaptive behavior is determined by the standards of other people, those who live, work, play, teach, and interact with an individual. Finally, adaptive behavior is defined as what an individual does day by day, not by an individual's ability or what he or she can do. If a person has the ability to perform a daily task, but does not do it, adaptive behavior is considered to be inadequate. An important issue in the description of adaptive behavior is the distinction between adaptive behavior and intelligence (Meyers, Nihira, & Zetlin, 1979). Adaptive behavior and intelligence have several important differences. First, adaptive behavior focuses on everyday behavior and intelligence on thought processes. Adaptive behavior is based on concrete environmental demands while intelligence focuses on academic demands. Adaptive behavior assessment involves common, typical, and everyday behaviors, whereas intelligence scales attempt to measure a person's potential, or his or her best possible performance. Negative reinforcement has been shown to play a critical role in the development of adaptive behavior (Neidert, Dozier, Iwata, & Hafen, 2010).

Since the passage of Public Law 94-142, a large number of adaptive behavior scales have been published. Most adaptive behavior scales are administered to a respondent such as a parent or teacher who is familiar with the daily activities of the person. Some are administered directly to the person whose adaptive behavior is being assessed. The Vineland Adaptive Behavior Scales (Sparrow, et al., 1984, 2005) measure adaptive behavior in the areas of communication, daily living skills, socialization, motor skills, and maladaptive behavior. The Adaptive Behavior Inventory for Children (Mercer & Lewis, 1977) assessed a child's adaptation to family, community, and peer social systems. The AAIDD Adaptive Behavior Scale (Lambert, Nihira, & Leland, 1993) evaluates personal sufficiency, social sufficiency, responsibility, and personal and social adjustment. The Scales of Independent Behavior revised (Bruininks, Woodcock, Weatherman, & Hill, 1996) include measures of motor skills, social interaction and communication, personal and community independence, and problem behaviors. The Children's Adaptive Behavior Scale (Richmond & Kicklighter, 1980) contains scales for language, independent functioning, family roles, economic vocational activity, and socialization. The Adaptive Behavior Assessment System—Second Edition (Harrison & Oakland, 2003) assesses conceptual social and practical areas of adaptive behavior cited by the AAIDD.

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See also* AIDD Classification Systems; Mental Retardation; *Vineland Adaptive Behavior Scales—Second Edition

ADAPTIVE BEHAVIOR ASSESSMENT SYSTEM—SECOND EDITION

The Adaptive Behavior Assessment System—Second Edition (ABAS-II) evaluates a variety of adaptive skills in individuals from birth to 89 years of age. There are five rating forms which allow for assessment from multiple respondents and settings: The Parent/Primary Caregiver Form (ages 0–5), Parent Form (ages 5–21), the Teacher/Daycare Provider Forms (ages 2–5), the Teacher Form (5–21) and an Adult Form (ages 16–89) which can be completed by another individual or, with adult populations, through self-report. The forms appropriate for infants and preschoolers are new to the Second Edition of the ABAS. The Parent/Primary Caregiver, Parent, and Teacher/Daycare Provider Forms are available in Spanish; however, the manual urges caution when interpreting the Spanish forms due to lack of psychometric information.

The manual contains clear and thorough instructions for administration and scoring. On all ABAS-II Scales, respondents rate the frequency with which individuals correctly perform a behavior on a Likert scale ranging from 0 ("Is Not Able") to 3 ("Always When Needed"). The respondent can also indicate if they guessed on an item. Examiners should interpret scores with caution if the respondent indicated guessing on four or more items in a skill area. Each rating form takes approximately 20 minutes to complete and 5–10 minutes to hand-score. The ABAS is designed to measure skills consistent with how adaptive behavior is defined by the American Association on Mental Retardation (AAMR; 1992, 2002) and the *Diagnostic and Statistical Manual of Mental Disorders*—Fourth Edition—Text Revision (DSM-IV-TR), making it useful in the diagnosis and classification of several disorders, including intellectual disability. Ratings derived from each ABAS-II form are used to generate standard scores for a General Adaptive Composite (GAC) and three domain scores: Conceptual, Social, and Practical. Ratings on each form are also used to generate scaled scores for individual skill areas appropriate for the designated age and setting. For example, the Teacher/Daycare Provider Form includes the following skill areas: Communication, Functional Pre-Academics, School Living, Health and Safety, Leisure, Self-Care, Self-Direction, Social and Motor. Percentile ranks and confidence intervals are available for the standard scores, and the user can easily calculate an individual's strengths and weaknesses. Finally, the ABAS-II manual provides test-age equivalents of raw scores and descriptive classifications. Admirably, the authors describe the strengths and limitations inherent in using various types of scores.

The ABAS-II was normed on a standardization sample which was stratified by sex, race/ethnicity, and educational levels according to U.S. Census data (from 1999 for the school age and adult forms, and from 2000 for the infant/preschool forms). Efforts also were made to gather participants from the four major geographical regions in the United States as defined by the Census. Individuals with a variety of clinical diagnoses were included. Detailed information about the normative sample for each form is provided in the manual.

The manual provides evidence for internal consistency, test-retest reliability, interrater reliability, and cross-form consistency, as well as standard errors of measurement. Reliability coefficients were mostly above .90 and reflected a high degree of internal consistency. The test-retest coefficients were also generally good, ranging from the upper .80s and .90s for the GAC and domains, and the .70s (infant-preschool) to .90s for the skill areas. As young children are in the midst of myriad developmental changes that occur over a short period of time, it is unsurprising the test-retest for infants and toddlers would be somewhat lower than those derived from older populations. The interrater reliability coefficients for the GAC scores on the various forms fell in the .80s or .90s. For domain areas, the interrater coefficients were in the high .70s or .80s. For skill areas, the coefficient averages were generally in the

.70s, but reached .82 for the Adult form. The consistency between two raters of the same individual was more varied, but still higher than some previous adaptive behavior scales. Additionally, difference between respondents could at least be partially explained by the variation of behavior across settings and with raters who may also have different levels of familiarity with the target individual.

The theoretical basis of items as well as results of field testing provide evidence for content validity, and the intercorrelation data support the theoretical structuring of domains. Confirmatory factor analysis also supports the structure of the ABAS-II. Comparisons with several other tests which measure adaptive, behavioral, cognitive, and achievement skills argue for convergent and discriminant validity. Finally, the ABAS-II manual presents several clinical validity studies which indicate the test can adequately discriminate between those with and without adaptive skill deficits.

Overall, the ABAS-II appears to be a theoretically and psychometrically sound instrument. The manual is thorough and user-friendly. Particularly impressive are the guidelines for interpretation, which even include suggestions for intervention planning. Reviews of the instrument are generally positive, with minor reservations including interpreting the individual skill areas with more caution than the domains (Burns, 2005), and some concern about the size of the standardization sample (Meikamp, 2005).

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ADAPTIVE BEHAVIOR SCALE (*See Vineland Adaptive Behavior Scales*—Second Edition)

ADAPTIVE DEVICES (*See* Assistive Devices)

ADAPTIVE TECHNOLOGIES AND PROGRAMS, WEBSITES RELATED TO

American Association of People with Disabilities (AAPD) URL: http://www.aapd.com/

The AAPD is a national organization dedicated to promoting the economic and political empowerment of all people with disabilities. The AAPD is "the largest national nonprofit cross-disability member organization in the United States, dedicated to ensuring economic self-sufficiency and political empowerment for the more than 58 million Americans with disabilities." The AAPD mentoring effort promotes nationwide career development for students and job seekers with disabilities through job shadowing and hands-on career exploration. The Disability Vote Project addresses the fundamental inequalities faced by this nation's voters with disabilities and works in a nonpartisan manner to ensure they are provided full accessibility to all polling places and voting equipment. The AADP promotes bipartisan legislation and policy that will further the ability of people with disabilities to live independently, contribute to society, pursue meaningful careers, and enjoy self-determination and maintains a Listserv dedicated to this purpose.

Apple Computer Accessibility in Education URL: http://www.apple.com/education/special-education/

The Apple site provides resources for educators in relation to a number of accessibility issues. The site provides five sections that focus on specific areas: vision, hearing, physical and motor, literacy and learning, and language and communication. While much of the information is related to features of Apple's hardware and software accessibility resources, links are readily available that lead to related philosophical, research, funding, and general support resources. The main strength of the site is that it organizes the technical information around the various categories of disability solutions. Each area leads to expanded pages that provide detailed information on the resources and solutions related to that topic. In many instances, PDF files are available for download to provide more detailed information. In addition, links to third-party hardware and software are provided to present a full range of resources available in any of the disability areas. Both hardware and software components are presented with brief descriptions and links to the appropriate manufacturer's website. The literacy and learning and language and communication pages provide more academic, skill-building resources. There is also a section that is devoted to web accessibility concerns and features information on a server-based application that automatically converts and renders web pages into text-only pages to make them more accessible and easier to navigate. This section also provides technical information as well as links to general implementation resources.

Assistive Tech Net URL: http://assistivetech.net/

Assistive Tech Net provides "a diverse resource for assistive technology (AT) and disability-related information." Assistivetech.net maintains an online searchable database that helps the user target solutions, determine costs, and find vendors of AT products for people with disabilities, family members, service providers, educators, and employers. The database can be searched by function, activity, or vendor. Searches can also be associated with specific discussion groups or Assistive Technology Act of 1998 projects. The assistivetech.net site is supported by the Center for Assistive Technology and Environmental Access, the National Institute on Disability and Rehabilitation Research, and the Rehabilitation Services Administration.

Center for Applied Special Technology (CAST) URL: http://www.cast.org/

Founded in 1984, CAST "has earned international recognition for its development of innovative, technology-based educational resources and strategies based on the principles of Universal Design for Learning (UDL)." The CAST is a nonprofit organization focused on expanding learning opportunities for all individuals, especially those with disabilities. The CAST's research and development of innovative, technology-based educational resources and strategies is conducted by specialists in education research and policy, neuropsychology, clinical or school psychology, technology, engineering, curriculum development, kindergarten through 12th-grade professional development, and more. The CAST supports universal design for learning, which includes multiple means of representation, multiple means of expression, and multiple means of engagement. The CAST has been involved in the creation or codevelopment of initiatives to develop and promote a National Instructional Materials Accessibility Standard (NIMAS), as well as innovative software such as Thinking Reader, WiggleWorks, and Bobby. Also, NIMAS provides a guide to the production and electronic distribution of curricular materials in accessible, student-ready versions, including braille and digital talking books. The NIMAS Development Center is focused on improving the standard by monitoring relevant research and technological advances. The NIMAS Technical Assistance Center advises educators and publishers on the production and distribution of NIMAS-compliant materials. Teachers and administrators can access support through The CAST UDL Center, which provides access to a professional development network, consultation, publications, and online resources.

Center for Assistive Technology and Environmental Access (CATEA) URL: http://www.catea.org/

The CATEA, a unit of the College of Architecture at the Georgia Institute of Technology, maintains research projects on accessibility and usability through two research foci:

- Development, evaluation, and utilization of assistive technology
- Design and development of accessible environments

The CATEA supports individuals with disabilities of any age through expert services, research, design and technological development, information dissemination, and educational programs.

Council for Exceptional Children (CEC) URL: http://www.cec.sped.org/

The CEC "is the largest international professional organization dedicated to improving educational outcomes for individuals with exceptionalities, students with disabilities, and/or the gifted." In addition to a number of general programs and resources for special education in general, CEC has the Technology and Media Division (TAM; http://www.tamcec.org/) that "addresses the need, availability and effective use of technology and media for individuals with disabilities and/or who are gifted." The TAM hosts a national conference and publishes the *Journal of Special Education Technology* (JSET) and the *TAM Connector* newsletter. The TAM is focused on providing mentoring, technical assistance, and relevant information. Development of technical standards and advocating for funds and policies is also stressed. The site provides access to a number of publications, products, and links to websites providing information on the selection and use of ATs. The JSET is an e-journal: an online publication of the Technology and Media Division of the CEC (http://www.jset.unlv.edu). The JSET is a refereed professional journal presenting information and opinions about issues, research, policy, and practice related to the use of technology in the field of special education. Articles are indexed by publication date and accessed as web pages.

The International Center for Disability Resources on the Internet (ICDRI) URL: http://www.icdri.org/

The ICDRI is a nonprofit center based in the United States that is focused on "the equalization of opportunities for persons with disabilities." The center is organized by and for people with disabilities and seeks to increase opportunities for people with disabilities by "identifying barriers to participation in society and promoting best practices and universal design for the global community." The ICDRI gathers and maintains a collection of disability resources and best-practices. This collection is available on their website to provide education, outreach, and training opportunities. The ICDRI also provides disability rights education and customized programs to the international community for public policy strategic planning.

Job Accommodation Network (JAN) URL: http://www.askjan.org/

The JAN is a free service of the Office of Disability Employment Policy, U.S. Department of Labor, that offers assistance "designed to increase the employability of people with disabilities by: (a) providing individualized worksite accommodations solutions, (b) providing technical assistance regarding the ADA and other disability related legislation, and (c) educating callers about self-employment options." The JAN offers assistance to employers, people with disabilities, rehabilitation professionals, and people affected by disability. The JAN website offers a small business and self-employment service, a searchable online accommodation resource, a library of presentations on specific topics, and an online newsletter and consultant resources. A variety of downloadable resources and publications are available that provide information or materials related to accommodation needs and services. Links to several employment and informational websites are also provided. In addition, links related to specific disability legislation, specific disability resources, and all levels of government resources are presented.

National Association for State Directors of Special Education, Inc. (NASDSE) URL: http://www.nasdse.org/

The NASDSE is "dedicated to, and focused on, continuously improving educational services and outcomes while ensuring a balance of procedural guarantees for our children and youth with disabilities and their families." The NASDSE provides support in the delivery of quality education to children and youth with disabilities through training, technical assistance, research, policy development, and powerful collaborative relationships with other organizations. The NASDSE markets a number of publications and assistive technology instruction to professionals through either distance (online) education or face-to-face (on-site) instruction. Its website describes these products in detail and also provides links to a wide range of related organizations and resources.

National Center to Improve Practice (NCIP) URL: http://www2.edc.org/NCIP/

The NCIP was funded by the U.S. Department of Education, Office of Special Education Programs from 1992 to 1998. Its goal is to "promote the effective use of technology to enhance educational outcomes for students with sensory, cognitive, physical and social/emotional disabilities."

To support this goal, the NCIP has worked to facilitate the exchange of information and build knowledge through collaborative dialogue, particularly through a series of facilitated discussion forums and online workshops. The NCIP has gathered, synthesized, and disseminated information about technology, disabilities, practice, and implementation through a variety of efforts:

- *NCIP Library.* A collection of resources about technology and special education
- *Video Profiles.* Short videos with supporting print materials that illustrate students using assistive and instructional technologies to improve their learning
- *NCIP Guided Tours: Early Childhood.* Presents tours of two exemplary early childhood classrooms
- *Spotlight on Voice Recognition.* Demonstrates the use of voice recognition technology to address writing difficulties
- *Online Workshops and Events.* Contains archives of NCIP's online workshops and events held from 1996 to 1998

The NCIP site provides links to other special education and technology resources with a focus on relevant organizations and technology companies. Links to sites for special education and universities with special education resources are also provided. The disability resources highlighted include those for sensory, physical, and speech impairments as well as learning disabilities, cognitive or developmental disabilities, Asperger Syndrome, ayperlexia, autism, Attention Deficit Disorder, and Attention Deficit/Hyperactivity Disorder. Family and parent support resources are also identified.

National Institute on Disability and Rehabilitation Research (NIDRR) URL: http://www.ed.gov/about/offices/list/osers/nidrr/

The NIDRR is a national leader in sponsoring research and is intended to generate, disseminate, and promote new knowledge to improve the options available to persons with disabilities. The NIDRR is a component of the United States Department of Education Office of Special Education and Rehabilitative Services (OSERS). The NIDRR conducts programs of research and related activities for the benefit of individuals of all ages with disabilities. Their goal is to maximize their full inclusion, social integration, employment, and independent living. The NIDRR's focus includes research in areas such as employment, health, and function as well as technology for access and function, independent living, and community integration. The NIDRR attempts to support the scientific community in relation to rehabilitation medicine, engineering, psychosocial rehabilitation, integration, vocational outcomes, and the virtual and built environments. The NIDRR's consumer support is based in its efforts to integrate disability research into national policies.

Quality Indicators for Assistive Technology (QIAT) URL: http://natri.uky.edu/assoc_projects/qiat/

The QIAT Consortium is a "nationwide grassroots group that includes hundreds of individuals who provide input into the ongoing process of identifying, disseminating, and implementing a set of widely-applicable Quality Indicators for Assistive Technology Services in School Settings." The resources are intended for use by school districts to provide quality AT services, AT service providers to evaluate and improve their services, consumers of AT services to find adequate AT services, universities and professional developers to develop AT service competencies, and policy makers. The QIAT Consortium provides quality indicators for AT services in school settings and forums for professional involvement, sharing, and discussion.

Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) URL: http://www.resna.org/

The RESNA is an "interdisciplinary association of people with a common interest in technology and disability" dedicated to the use of technology for the improvement of the potential of people with disabilities so they may achieve their goals. The RESNA promotes research, development, education, advocacy, and provision of technology and also supports the people who are engaged in such activities.

The RESNA publishes the *Assistive Technology Journal*, hosts annual conferences, and maintains active international affiliations. To ensure consumer safeguards and increase consumer satisfaction, the RESNA maintains a credentialing program for professionals in three applied areas:

1. *Assistive Technology Practitioner (ATP)*. For service providers who are involved in analysis of a consumer's needs and training in the use of a particular AT device
2. *Assistive Technology Supplier (ATS)*. For service providers who are involved with the sale, including determination of consumer needs and service of rehabilitation equipment, of AT and commercially available products and devices
3. *Rehabilitation Engineering Technologist (RET)*. For service providers who apply engineering principles to the design, modification, customization or fabrication of AT for persons with disabilities

AbleData URL: http://www.abledata.com/

AbleData serves the nation's disability, rehabilitation, and senior communities by providing objective information on AT and rehabilitation equipment available from domestic and international sources. The most significant resource offered by AbleData is the database of AT, which contains objective information on almost 40,000 assistive products. For each product, a detailed description of the product's functions and features, price information, and contact information for the product's manufacturer and/or distributors are provided. Several other types of resources on the AbleData site are: (a) links to web resources that provide information on AT and other disability-related issues (b) the AT Library, a searchable list of books, articles, papers, and other paper and electronic publications that deal with AT (c) AbleData's own publications that aid in selecting assistive products; (d) product reviews and classified ads in the Consumer Forum; (e) conferences and other events on AT and disability; and (f) news items on AT and disability issues.

Rehabilitation Services Administration (RSA) URL: http://www.ed.gov/about/offices/list/osers/rsa/

The RSA is a component of the U.S. Department of Education of Special Education and Rehabilitative Services (OSERS). The RSA "oversees formula and discretionary grant programs that help individuals with physical or mental disabilities to obtain employment and live more independently through the provision of such supports as counseling, medical, and psychological services, job training, and other individualized services." One of the RSA's major goals is enhancing the connection between vocational rehabilitation agencies and employers.

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with a variety of drugs used in the treatment of depression and with drugs used to treat psychotic symptoms. Certain foods, especially those at extremes of acidity or alkalinity, may also alter dosage effects of Adderall.

Adderall may be habit-forming and has a high potential for abuse (Konopasek, 2003). Monitoring of dose response, side effects, and polypharmacy by a physician is crucial to safe use of Adderall and other drugs in its class. Additional information is available in Arky (1998) and Cahill (1997).

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***See also* Stimulant Drugs; Attention Deficit/Hyperactivity Disorder**

ADDERALL

Adderall is a stimulant medication that is a different mixture of amphetamine isomers than the common stimulants such as dexedrine, benzedrine, methamphetamine, methylphenidate, and magnesium pemoline. It is available in 5, 10, 20, and 30 mg tablets. Adderall is used primarily in the treatment of attention-deficit hyperactivity disorder (ADHD) and narcolepsy. It has also been used in the treatment of obesity (Konopasek, 2003). Adderall has been shown in clinical trials to increase alertness, improve attention span, decrease distractibility, and increase the ability to follow directions among children ages 3 years and up.

Adderall is popular among many children and families because it may need to be taken only once or twice a day, eliminating the need for dosing at school. Since it is a different chemical preparation, Adderall has been found to be effective with patients who do not respond to more popular stimulant treatments, such as Ritalin. However, Adderall may take as long as 3 to 4 weeks to become effective, while other stimulants tend to take effect more immediately. Adderall has a similar side-effect profile to other common stimulants, the most common of those being appetite suppression, growth retardation, insomnia, and headache. Less frequent side effects of this drug class include tics, dry mouth, irritability, cardiovascular acceleration, and, at high dosages, hallucinations and a disorder characterized as amphetamine psychosis. Adderall also interacts

ADDISON'S DISEASE

First described by Dr. Thomas Addison in the mid-1800s, Addison's disease (adrenocortical insufficiency, hypocortisolism) is an endocrine disorder characterized by a lack of production of the hormones cortisol and aldosterone, both of which are produced by the adrenal cortex. Each individual has two adrenal glands, one above each kidney. Each adrenal gland has two parts. The inner part is called the medulla, and the outer part is called the cortex. Thus, the outer part of the adrenal gland is responsible for producing the hormones cortisol and aldosterone. Cortisol has many effects on the body, including maintaining blood pressure, maintaining cardiovascular functions, and slowing the immune system's inflammatory response. In addition, cortisol balances the effects of insulin in breaking down sugar for energy and regulating the metabolism of proteins, carbohydrates, and fats. Aldosterone helps the body maintain blood pressure, water, and salt balance. Together these two hormones have a role in the proper functioning of our major organs. Thus, Addison's disease has a significant impact on the body's functions.

Although there are no exact statistics on the incidence of Addison's disease, most studies report that this disease effects between 1 and 4 individuals per 100,000 (Merck Research Laboratories, 1992). Addison's disease occurs in all age groups and occurs slightly more frequently in females than in males (Marguiles, 1998). In approximately

70% of the cases, onset is due to the gradual destruction of the adrenal cortex by the body's own immune system. Tuberculosis is the second leading cause, accounting for another 20% of the cases. The remainder of cases are caused by chronic infections (especially fungal and cytomegalovirus infection in association with AIDS), cancer metastasis, and surgical removal of the adrenal glands.

Characteristics

1. Fatigue that may steadily worsen
2. Loss of appetite
3. Weight loss
4. Low blood pressure
5. Lightheadedness, especially upon standing
6. Nausea
7. Vomiting
8. Diarrhea
9. Muscles that are weak and spasm
10. Irritability
11. Depression
12. Craving for salty foods
13. Darkening of the skin in exposed and unexposed areas of the body

Treatment of Addison's disease consists of hormone replacement therapy. Cortisol is replaced orally in the form of hydrocortisone tablets divided into morning and afternoon doses. Aldosterone is replaced by fludrocortisone (a synthetic steroid) tablets taken daily. The doses of each of these hormones are adjusted for the individual's size and any coexisting medical conditions. Because the disease is chronic, replacement hormones must be taken for life.

Children with this disorder may be classified under Other Health Impairment. They may need a school schedule that includes rest periods, a shortened school day, or both. Peer helpers may be needed to assist students during the day. Also, easy access to restrooms and the health or nurse's office should be available to the student. In addition, psychological services may be needed to deal with chronic health concerns and other mental health issues. Parents should consult with the school psychologist in their district to discuss any academic needs with respect to chronic illness.

The prognosis for Addison's disease is good, and patients can lead a normal, crisis-free life as long as replacement hormones are taken properly and absorbed. Individuals with Addison's disease should wear an identification bracelet or necklace to ensure proper treatment in an emergency because additional doses of hydrocortisone may be needed so the body can effectively deal with the additional stress associated with trauma.

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ADDITIVE-FREE DIETS

Feingold (1976), a pediatrician and allergist, reported an observed decrease in hyperactivity in many of the adults and children who adhered to his strict additive-free Kaiser-Permanente diet. The Kaiser-Permanente diet was designed to eliminate salicylates (which are related to compounds in aspirin) and synthetic, and thus nonnutritive, food dyes and flavors from the diets of people who showed adverse somatic reactions to the additives (e.g., rashes). Feingold inferred that some nonnutritional food dyes and flavors, as well as the salicylates, may have an effect similar to pharmacological compounds and alter the brain's chemistry of those that ingest them. He suggested these alterations in neurological functioning may result in behavioral changes, including increases in hyperactive behavior. Thus, Feingold believed that an additive-free diet, in which children avoid all foods with artificial dyes, flavors, and salicylates (i.e., features that characterize the Feingold diet), may be an appropriate intervention for children that demonstrate hyperactive behavior.

The Feingold diet recommends that parents with concerns about their children's hyperactive behavior should eliminate all artificial colors, flavors, sweeteners, and preservatives as well as salicylates that can be found in many fruits and vegetables (e.g., raisins and berries) from their diet. Recommendations include avoiding the use of products (e.g., toothpastes, vitamins, medications, food and beverage items) that contain any of the nonnutritive additives or salicylates. After a child has strictly adhered to the diet for 4 to 6 weeks and demonstrates improvements in behavior, food items containing salicylates can be added slowly back into the diet.

Studies that have examined the effectiveness of the Feingold diet on hyperactive behavior in children have produced mixed results. For instance, many studies have produced results that suggest that the Feingold diet is an effective intervention for children with hyperactive

behavior. Feingold (1976) found that children that adhered to an additive-free diet demonstrated marked decrease in hyperactive behavior and improvement in scholastic achievement, according to teacher report, within 3 weeks of beginning the diet. Bateman and colleagues (2004) found that a diet that eliminated artificial food coloring and preservatives significantly reduced hyperactive behavior in 3-year-old children, regardless of whether they met criteria for a diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD).

In contrast, Holborow, Elkins, and Berry (1981) found that when the diet was administered to children with and without hyperactive behavior, children with hyperactive behavior did not show significant levels of decreased hyperactivity. However, children who ingested the highest levels of synthetic food colors and flavors before beginning the diet showed greater improvements in behavior than their peers, regardless of whether they demonstrated significant levels of hyperactivity before the diet.

However, many researchers have been unable to produce findings in support of the Feingold diet. Mattes (1983) conducted multiple studies and did not find the diet significantly improved behavior in hyperactive children. Thus, he concluded that, while the diet may be effective for a small percentage of children, it is not an effective intervention to treat the majority of hyperactive children.

Critics of the Feingold diet argue that Feingold and other researchers who found support of the additive-free diet did not utilize rigorous scientific methods to measure changes in behavior and instead relied on anecdotal observations from parents and teachers. Furthermore, they attribute the reported decreases in hyperactivity to the increased attention parents focused on their children during the implementation phase, instead of the direct effects of the diet. Some scholars attribute the lack of consistent findings to support the Feingold diet to the methods implemented in the research studies.

Thus, these findings suggest that the Feingold diet may be an effective treatment for a small proportion of children who demonstrate hyperactive behavior, perhaps 10% to 15%, but is not an effective intervention for the majority of children with hyperactive behavior (Schnoll, Burshteyn, & Cea-Aravena, 2003). Additionally, the diet seemingly is more effective for children in early childhood rather than during the elementary years and older.

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See also **Attention-Deficit/Hyperactivity Disorder; Feingold Diet; Hyperactivity**

ADJUSTMENT OF INDIVIDUALS WITH DISABILITIES

Individuals with disabilities and their families lead as fulfilling and satisfying lives as the families without disabilities. Adjustment to disability is typically related to adjustment before disability. A part of adjustment may be involved with seeking and obtaining appropriate care and services.

Another necessary adjustment requires recognizing and dealing with influences of a disability on all aspects of the individual's development. For example, a physical disability affects social development and interactions in ways that have only recently been addressed scientifically and professionally, but have long been sources of confusion and frustration.

It has become fashionable among educators and developmental psychologists to refer to the "whole child" in nurturing and/or describing the development of "normal," that is, nondisabled, children. Some (e.g., Shontz, 1980) have advocated this integrated approach in understanding the development of children and adolescents. However, two factors make it especially difficult to grasp specific implications of particular handicapping conditions for domains not directly affected by the conditions. One difficulty is that the interrelationships among the various developmental domains are subtle and complex; another is that the exceptional child's development is affected by special social and internal forces. Therefore, our ability to recommend theoretically based prescriptions for professional and parenting practices that will promote maximal development in indirectly affected domains is limited by the lack

of empirical evidence comparing particular approaches to raising, treating, and educating the "whole" child.

The development of the child with a disability occurs along the same lines as that of the child without a disability. However, an individual child's development will exhibit qualitative variations from the norm. The specific deviations from typical development depend both on the nature and severity of the condition and on the level of adjustment achieved by the child and his or her family and teachers.

Normal personal-social development includes the emergence of the individual's self-concept and self-esteem. These beliefs about one's characteristics, relative worth, and competence are acquired by internalizing an image of one's self as it is reflected by important adults and peers. Bartel and Guskin (1980) emphasize that the feedback one receives from the social environment is a crucial factor in the development of a positive self-concept and high self-esteem, for it creates an expectation and interpretive schema for self-evaluation of one's abilities and efforts. The self-concept of a child with disabilities is at risk because society's negative evaluations of individuals who are different from the norm are systematically, if unconsciously, transmitted to him or her (Gliedman & Roth, 1980). Because the development of high self-esteem is based on what an individual *can* do, a handicapping condition may endanger a child's self-esteem by focusing attention on what the child cannot do.

A disability may limit a child's or adolescent's physical activities. The handicap may impose restrictions owing to physical limitations or medical complications that limit freedom to get about in the environment. Physical and/or medical limitations may reduce opportunities for interaction and exploration in both the physical and social realms and thus curtail experiences that stimulate and promote cognitive growth and personal-social development. Children with disabilities must be encouraged not to retreat from any activities that are accessible, although inconvenient, because of physical restrictions. Professionals and others can help them to participate in an adapted way, if necessary, in order not to deprive them of beneficial experiences.

Children with disabilities may have to adjust medical interventions or therapies such as drugs, braces, physical therapy, surgical procedures, hearing appliances, and so on. The child's adjustment to the medical aspect of his or her program is absolutely essential because the child must cooperate in order to achieve the maximum benefits of the prescribed treatment(s).

An exceptional child is very likely to have to make an adjustment involving his or her educational programs. The adjustment may range from simply modifying his or her study habits or methods to full-time participation in a special self-contained program. Professionals who work with the child should strive to minimize whatever educational disadvantage(s) may be imposed by the handicap. The goals of the child's educational program should emphasize activities to compensate for and/or overcome his or her disability.

The effectiveness of the child's program will be amplified by the active involvement of parents in consistently following through on behavioral and educational interventions in the home environment. Concrete benefits are derived from the parents' participation. Parents are able to provide additional reinforcement and practice for skills learned during the school day, helping their child consolidate gains more rapidly. In addition, their involvement is a signal to the child of their commitment to his or her development and the high value they place on educational achievement. These attitudes are highly motivating and will help see the child through difficult periods.

Parents who do not accept and adjust to the child's handicap escalate their child's difficulties. Maladaptive behavior patterns that emerge in the relationship between parents and their handicapped child can arise from either of two opposite, but equally harmful, reactions. Parents may either overestimate or underestimate their child's abilities and potential. Overestimates may be due to parents' denial of their child's problems. Such parents are prone to establish unreasonably high standards for their child's behavior or development. Because the child wants to please the parents but is not capable of fulfilling their expectations, he or she continually faces feelings of frustration, inadequacy, and other negative emotions such as guilt, disappointment, and uncertainty as to his or her place in the affections of the parents. On the other hand, some parents seem to overcompensate for their handicapped child. Some typical behaviors of these parents include setting goals that are too easily attained, praising or rewarding the child for work that is below his or her level of functioning, and intervening unnecessarily when the child is working on difficult tasks. Such behaviors convey the message, albeit indirectly, that the parents do not recognize or appreciate the child's actual abilities. These signals undermine the development of high self-esteem and a positive self-concept. Of course professionals helping parents of children with disabilities need to make sure that support programs are culturally sensitive (Lian & Fantanez-Phelan, 2001).

Adjusting to the child's disability is difficult, but Kogan (1980) has shown that parents can learn and use techniques for interacting with their child in ways that promote an adaptive relationship. General guidelines for parents in nurturing optimum development include realistically accepting the child, including abilities and disabilities. Parents should be sympathetic, but must encourage independence in order to enhance the child's self-esteem and promote his or her success in the "real" world.

Parents also have a crucial role in setting the stage for good sibling relationships. They must not show favoritism toward any of their children. Although they may enjoy different activities with their individual children, they

should not give their attention preferentially to any single child. In particular, parents must avoid making comparisons among their children, and instead emphasize each child's individual strengths. All children will benefit when parents provide experiences and delegate responsibilities in accordance with each child's developmental level and needs.

Due to increasing recognition of social and emotional problems that may be secondary to other disabilities, the IDEIA requires a behavioral assessment of all children with a disability, regardless of their handicapping condition. It has become commonplace to use objective behavior rating scales and personality assessments during the initial referral and evaluation process (e.g., Reynolds & Kamphaus, 2004). Also, as a direct result of recognition of behavioral and emotional concomitants of various disabilities, IDEIA now requires a behavioral assessment prior to disciplining a child with a disability, so that it can be determined whether the behavior of concern is a result of the child's disability. When behavioral problems are disability-related, children must be treated, not punished. Teachers will have the primary role to play in such interventions at school.

Over and above the special methods and materials teachers use in working with the handicapped child, perhaps the most important element of the handicapped child's educational experience is a positive social climate. Teachers can provide a model for accepting individual differences in general and specifically valuing each child's, including the child with disabilities, abilities, and contributions. The child's classmates will imitate the teacher and assimilate the underlying nondiscriminatory attitudes (Hunt, Doering, Hirose-Hatae, Maier, & Goetz, 2001). Being accepted by one's teachers and classmates nourishes the handicapped child's self-concept and self-esteem, thereby promoting not only social development, but also cognitive growth and educational achievement.

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See also **Adaptive Behavior; Behavior Assessment System for Children; Family Counseling; Family Response to a Child with Disabilities; Handicapism; Individuals With Disabilities Education Improvement Act of 2004 (IDEIA); Teacher Expectancies**

ADLER, ALFRED (1870–1937)

Alfred Adler, an Austrian psychiatrist, severed an early connection with Freudian psychoanalysis to develop his more socially oriented Individual Psychology, which was a powerful influence in the development of the field of social psychology. Adler's work in education and child guidance is less well known, but it contributed greatly to the development of school services in Austria and it had worldwide significance for the education and treatment of children.

At the Pedagogical Institute of the City of Vienna, he helped to train thousands of teachers and established the first child guidance clinics in the Vienna school system. In 1935, with the coming of a fascist regime in Austria, Adler left Vienna for the United States, where he established a private practice and served as professor of medical psychology at the Long Island College of Medicine.

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ADMINISTRATION OF SPECIAL EDUCATION

Prior to the advent of public school programs for individuals with disabilities in the late 19th and early 20th centuries, administration of special education programs was usually executed by persons who were not administrators. Because many of the early programs were provided by religious organizations (Hewett & Forness, 1977), the earliest administrators were probably monks, nuns, or other religious figures (e.g., Pedro Ponce deLeon, a Spanish monk who worked with the deaf in the 16th century). During the late 18th and early 19th centuries, philosophical changes and a new attention to science changed attitudes toward individuals with disabilities and their treatment. These changes, evidenced in the French and American revolutions, created a reverence for the individual and a belief that the lives of individuals with disabilities could be significantly improved through the application of science. Thus a new wave of administrators arose. These administrators were not interested primarily in running a program, but in teaching, scientific inquiry, and having an impact on contemporary thought through their writings. Thus a time was born in which most programs were managed by scientists, physicians, and philosophers such as Edouard Sequin, Valentin Hauy, and Samuel Gridley Howe. During the 19th century a great number of public and private residential schools/institutions were developed. For the most part, these institutions (which remained the dominant force in special education until the middle of the 20th century) were administered by physicians. This was especially true for institutions for the intellectually and developmentally delayed, the emotionally disturbed, and the physically disabled.

Public school services for exceptional children began early in the 19th century largely because of the efforts of Elizabeth Farrell in New York Public Schools and the common school movement in the New York area. By the middle of the 20th century, public school classes became the primary mode of education for exceptional children. With this change, the administration of special education programs fell to educators and school psychologists. Although special education programs were held in public school buildings, frequently they included immigrant populations for purposes of culturation and they were usually separated from the general population. Writers of the time advocated separate administration and supervision systems (Ayer & Barr, 1928).

The rise of special education administration as a discipline occurred simultaneously with the rise of segregated public school programs. Special education administrators during the first quarter of the 20th century were not trained generally as administrators; it was not until 1938 that any professional identity was established. In that year, the National Association of State Directors of Special Education was founded (Burrello & Sage, 1979). In 1951 the Council of Administrators of Special Education (CASE) convened as a special interest group within the Council for Exceptional Children (Burrello & Sage, 1979).

During the 1950s, 1960s, and 1970s, special education administration grew as a result of the increase in public special-education programs brought about by the increased federal role in programs for the handicapped individuals with disabilities. In the 1950s, the U.S. Office of Education conducted several large-scale studies of special education and special-education administration (Mackie & Engel, 1956; Mackie & Snyder, 1957). These studies helped to establish the roles of administrators of programs for exceptional children and the need for professional training. Many more studies were conducted during the 1960s and 1970s (e.g., Kohl & Marro, 1971; Sage, 1968; Wisland & Vaughan, 1964). It was, however, the passage of PL 94-142, The Education of All Handicapped Children Act of 1975, that brought special education administration to its current state. This legislation, and others that followed, together with numerous lawsuits, created a demand for administrators who were specifically trained to manage special-education programs, a demand that has grown with subsequent programs (e.g., IDEA).

Although special education administration has developed a uniqueness and identity, there is considerable variety within the discipline. This variety is expressed across governmental levels and organizational arrangements. There are three governmental levels in special education administration: federal, state, and local. Within each level the tasks of the administrator may vary considerably depending on the specific role of the administrator, the organization of the agency for which the administrator works, and the ways in which the agency delivers services.

Presently, the federal role in special education administration is executed primarily by the Office of Special Education and Rehabilitation of the U.S. Department of Education. The administrative roles of this office include monitoring state compliance with IDEIA; generating research; providing public information; formulating regulations; promoting personnel development; and drafting legislation. As a result of PL 94-142, IDEA, and IDEIA the federal role in administration of special education has grown substantially. Nearly every administrative decision in special education must be made with consideration for the regulations propagated by IDEIA. Because of this, the majority of the administrators at the federal level are

involved in activities related to providing services to the states in order that they may carry out the provisions of IDEIA, or in evaluating/monitoring the state's efforts.

Administration of special education programs at the state level occurs in three places: at the state education agency (SEA); at state-operated schools; and at state-operated regional centers. At the SEA, the roles of administration are to develop legislation; to develop state plans; to obtain and administer financial resources; to develop personnel preparation systems and standards; to develop plans for improving instruction; to enforce and monitor regulations; and to develop public relations (Podemski, Price, Smith, & Marsh, 1984). The SEAs also directly administer programs such as state schools for the deaf or blind (e.g., Pennsylvania). These programs are usually for low-incidence populations. In Georgia, the SEA administers both state schools and regional centers that provide direct service to low-incidence populations, especially in rural areas. Regional centers also serve as resource centers for local education agencies (LEAs).

Some state-operated programs in special education are not administered by the SEA. These programs usually serve persons with intellectual disability or emotional disturbance and may be managed by state agencies such as a department of mental health, and juvenile services. Such programs are generally subject to the same regulations as programs operated by the SEA. In many instances, however, the programs are not managed by educators. The practice of employing physicians, psychologists, or social workers to manage state residential programs is a vestige of a tradition in state institutions and is justifiable for programs that are not chiefly educational.

At the local level, there are a number of different administrative arrangements and even more varied service delivery arrangements (Burrello & Sage, 1979). The simplest administrative arrangement is the LEA. The LEA, also known as the local school district, provides direct services to exceptional children through various delivery systems. Administration at the local level may be centralized or decentralized. In a centralized system, persons (i.e., teachers) who provide services to exceptional children are managed by a district-wide special education director (coordinator). The special education director in a centralized system exercises a great amount of control over special education personnel and programs. In a decentralized system, the special education administrator serves in a coordinating/supporting/advising role. This administrator may have some authority over personnel but it is generally a building administrator (principal) who oversees daily operations.

More complex local administrative arrangements include intermediate educational units (IEU) and cooperative programs. Intermediate units exist in approximately 35 states (Podemski et al., 1984). In some states (e.g., Georgia) these units may be state-operated regional programs. In other states (e.g., New York, Texas, Wisconsin, Pennsylvania) the intermediate units are administered as a separate level of education agency. Intermediate units may be known by several names (e.g., Board of Cooperative Educational Services in New York, Regional Education Service Centers in Texas). According to Podemski et al. (1984), intermediate units were developed to pool resources and to share costs. In some states (e.g., Pennsylvania) intermediate units provide more than special education services and were developed for political as well as educational reasons during a time of district consolidation. Intermediate units have been criticized as arrangements that violate the principle of least restrictive environment because their services often require removing a child from his or her home school. Among the problems facing administrators of intermediate units are competition with LEAs for funds and students, potential conflict in lines of authority, communication gaps with the LEA, and salary variations that influence competition with LEAs for teachers.

Many rural school systems and suburban systems enter into cooperative agreements in order to provide more cost-effective programs, especially for low-incidence populations (Howe, 1981). Cooperative programs engender the same problems as do IEUs. Additionally, they must often contend with long distances for busing students.

The competencies of LEA and IEU special education administrators are similar. The differences are probably in terms of the amount of time devoted to different tasks rather than the tasks themselves. This may be true also for administrators of state-operated direct service programs (e.g., state schools). The competency areas for such administrators include organization theory and behavior, budget development, curriculum development, supervision, personnel administration, community relations, community resources, change processes, physical plant management, research, professional standards, and policy development.

Specialized graduate training for administrators of programs for exceptional children began in 1965. The impetus for such training was provided by a journal article by Milazzo and Blessing (1964). Subsequent to the publishing of that article, the U.S. Office of Education awarded grants to universities for the purpose of developing training programs (Burrello & Sage, 1979). Although most states do have certification requirements for special education leadership positions, requirements can be met with a general administrative certificate or a collection of courses and experience.

Special education administrators now have organized to promote and shape special education policies. The Council of Administration of Special Education (CASE) promotes leadership and provides special education administrators with opportunities for personal and professional advancement. CASE is a special interest division of the Council for Exceptional Children (CEC; 2005). The website for CASE has extensive resources for administrators and reflects an international presence.

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See also **Individuals With Disabilities Education Improvement Act of 2004 (IDEIA); Politics and Special Education; Special Education Programs; Supervision in Special Education; Child Guidance Clinic**

ADOPTEES

The practice of adoption is centuries old, but our understanding of the impact of this form of child care continues to be without definitive answers. At the theoretical level, adoption has often been associated with increased risk for psychological maladjustment. Psychoanalytic theory, for example, suggests that the experience of adoption sets the stage for disturbances in personality and identity development. This is especially true because of doubt surrounding the true circumstances of the child's origins, and because the child has two sets of parents instead of one with whom to identify. Bowlby's work (1969) suggests that adopted children are at risk for emotional problems, but only in cases where there is disruption in the development and continuity of primary attachment relationships. Consequently, infants adopted soon after birth and cared for continually by affectionate and competent parents would not be viewed as being at risk in terms of possible maladjustment. However, individuals raised by multiple caregivers, or separated from caregivers after a secure attachment has developed, would be perceived as being at risk.

In contrast to the theoretical literature, the results of empirical research have produced an inconsistent picture of the effects of adoption on an individual's psychological development. After reviewing the social work literature on the success of adoption placements, both Mech (1973) and Kadushin (1974) concluded that the majority of placements were satisfactory and this has been supported in recent studies (Feigelman, 2001) of domestic adoptions but not so much with international adoptions (Tieman, van der Ende, & Verhulst, 2005). However, an examination of the records of mental-health clinics reveals that adopted children are referred to these clinics at disproportionate rates. Mech (1973) reported that while adopted children reared by nonrelatives constitute approximately 1% of the population, they account for over 4% of the children seen in clinics. Researchers have also reported that there are differences in types of problems presented by adopted children versus those who are nonadopted. Adopted children typically manifest more aggressive and acting-out problems, as well as learning-related difficulties (Simmel, Brooks, Barth, & Hinshaw, 2001). Some studies have stated that adopted females are more likely to display symptoms of conduct disorder that those that are not adopted (Nilsson et al., 2011). In fact, a study has even reported an elevated number of pediatric health conditions among adopted children (Dalby, Fox, & Haslam, 1982). Adoption satisfaction has been tied as the cause of many of these displays of aggression, conduct disorder, and so forth and were proven based on calculating Person correlations, the DISC, the level of conduct problems, the MTF survey, and domains of adoption satisfaction (Nilsson et al., 2011). Children who have low levels of adoption satisfaction will manifest unwanted behaviors and aggression, while those with higher adoption acceptance and security will be more successful in integrating with their new family as well as behaviorally (Nilsson et al., 2011). When adoptive family members are content with the contact they have with the adopted child, the child is more likely to thrive positively and manifest less problems in the long run throughout his/her life.

While there are those studies available that validate these findings, there are also those such as Aumend and

Barrett's (1984) that provide a contrary set of findings. In their study of adult adoptees they reported the following: the majority of those in their study scored above the 60th percentile on the Tennessee Self Concept Scale; had positive scores on the Attitude Toward Parents Scales; were happy growing up, with only 12% reporting that they were unhappy; and did not report revelation of their adoptive status as being disruptive or traumatic. These findings were consistent with those of Norvell and Guy (1977), who determined there were no significant differences between self-concepts of an adopted and nonadopted population, aged 18 to 25. They concluded that problems of a negative identity seemed to stem more from problems within the home, rather than an association with adoption.

Because of a lack of definitive empirical information, the issue of open records, or allowing adopted children to learn about their biological parents at a particular point in time, continues to be controversial. There have been recent calls for unconditional release of records (Miall & March, 2005). Grotevant et al. (2010) concluded that there is not a relationship between contact with a child's birth mother, adoptive parent's discussing adoption-related issues, and the manifestation of externalizing behaviors. The largest factor in the success of an adopted child succeeding is the satisfaction the family has with the child and vice versa (Grotevant, et al., 2010). While this is still a topic that needs considerably more research, it is a topic to be considered in the well-being of a child who has been adopted and his/her family. Another issue unique to adoption is when children should be informed of their adoptive status. Currently, most specialists on adoption advocate telling children before they are 5 years of age. The specialists believe this promotes the development of a trusting relationship within the context of a warm and supportive family and eliminates the possibility that the child will hear of his or her unique family status from nonfamily members under less-than-desirable conditions. While many advocate telling the child during the preschool years, recent studies such as that by Brodzinsky, Schechter, Braff, and Singer (1984) suggest that a child's cognitive development during the preschool years may mitigate against his or her understanding of the nature of adoption. Their concern is that parents may relate this information to children and then feel the "job is done," failing to understand that advanced stages of cognitive development call for further explanations and sequential exploration of concerns the child might harbor. Finally, the most sensational adoption issue is currently being debated and that is of gay adoption. At this time, large surveys questioning same-sex adoption indicate approximately half for and half against (Miall & March, 2005).

While the data are not as definitive as might be liked, it certainly seems that adoption is a legitimate way of building families and caring for young children. It is superior to alternatives such as serial placements in a number of homes, or large-scale institutional care. Assuming the family is capable of providing a stable environment that is free of debilitating or otherwise pathological features, and relates the information on adoption in a facilitative fashion, there seems to be little reason to expect greater childhood problems than experienced in biologically created families. In families where psychological attachment between adoptee and parent fails, increased emotional and behavioral problems will occur (Ziegler, 1994).

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See also **Post-Institutionalized Children**

ADRENAL HYPERPLASIA, CONGENITAL

Congenital adrenal hyperplasia is a family of inherited disorders that result from the inability of the adrenal glands to sufficiently synthesize hormones known as corticosteroids. The various types of congenital adrenal hyperplasia are caused by enzyme deficiencies in different stages of hormone production. The most common enzyme deficiency is 21-hydroxylase, which is necessary for the production of two adrenal steroid hormones, cortisol and aldosterone. Cortisol is responsible for maintaining the body's energy supply, blood sugar level, and reaction to stress. Aldosterone is a salt-retaining hormone, which maintains the balance of salt and water in the body. In response to the low cortisol levels, the anterior pituitary gland produces high amounts of adrenocorticotropin hormone (ACTH) to activate the adrenal glands to produce cortisol. The high levels of ACTH result in the overproduction of cortisol precursors, which are used to produce an excessive amount of androgens. Excess androgens cause abnormal sexual development, such as masculinized external genitalia in female newborns. An additional defect in aldosterone synthesis may be present, resulting in the inability to conserve urinary sodium. Deficient aldosterone in addition to insufficient cortisol production is labeled the salt-wasting form of the disorder. Individuals with only deficient cortisol production have the non-salt-wasting form of congenital adrenal hyperplasia. The third type of congenital adrenal hyperplasia is the milder, nonclassic form, which has a later onset between early childhood and puberty (McKusick, 1994; Plum & Cecil, 1996).

About 95% of cases of congenital adrenal hyperplasia are caused by 21-hydroxylase deficiency, affecting one in 13,000–15,000 births in the general population. About half the cases have the salt-wasting form of the disorder (McKusick, 1994). Nonclassical adrenal hyperplasia affects approximately 1 in 20 Ashkenazi Jews, 1 in 40 Hispanic persons, 1 in 50 Yugoslavians, and 1 in 300 Italians. Congenital adrenal hyperplasia is an autosomal recessive disorder. The defective gene that causes 21-hydroxylase deficiency is located on the short arm of Chromosome 6 (Carlson, Obeid, Kanellopoulou, Wilson, & New, 1999).

Characteristics

1. Symptoms include muscle weakness, nausea, vomiting, anorexia, irritability, depression, hyperpigmentations of the skin, hypotension, lack of tolerance to cold temperatures, and the inability of the body to effectively respond to stress (Pang, 2000).
2. A child will grow rapidly and develop pubic hair during early childhood.
3. Female newborns may have an abnormally enlarged clitoris and joining labial folds, resulting in ambiguous external genitalia. In rare cases females are raised as males.
4. Male newborns do not exhibit physical signs except for pigmentation around the genitalia (Wynbrandt & Ludman, 2000).
5. An infant with the salt-wasting form may experience vomiting, poor weight gain, poor feeding, drowsiness, diarrhea, dehydration, and circulatory collapse. Without treatment the infant will go into shock and die (Plum & Cecil, 1996).
6. During puberty girls with the mild form of the disorder will develop excess body hair, acne, menstrual irregularity, and in some cases infertility and polycystic ovaries.

Early diagnosis and treatment of congenital adrenal hyperplasia is extremely important, especially for the salt-wasting form of the disorder, which is life threatening. Treatment is aimed at providing the body with the ability to maintain energy, normal growth, and a balance between salt and water. In the non-salt-wasting form of the disease, only cortisol replacement is needed. In the salt-wasting form, it is necessary to replace cortisol, aldosterone, and salt with synthetic hormones such as hydrocortisone and fludrocortisone (Florinef), a salt-retaining hormone. Extra doses of hydrocortisone are important when the child experiences injury, infection, or surgery because the body cannot respond to stress without cortisol (Pang, 2000).

With treatment, children with congenital adrenal hyperplasia can have normal growth and development. However, they must continue receiving cortisol therapy. Without treatment, the child may experience dehydration, electrolyte imbalance, and adrenal crisis. Children under stress such as high fever, serious injury, or vomiting usually need additional cortisol treatment and possibly emergency care (Pang, 2000). Thus, medication may need to be managed at school. Special education services may be available to children with congenital adrenal hyperplasia under Other Health Impairment. A health care plan should be implemented in the child's individual educational plan so that school personnel understand

the necessary actions during an emergency (Plumridge, Bennett, Dinno, & Branson, 1993).

If congenital adrenal hyperplasia continues to be treated and monitored throughout life, an individual with the disorder is expected to have a normal life expectancy and live a healthy, productive life. Many individuals do not reach the height potential indicated by family height because they have premature growth spurts and bone aging. The effectiveness and safety of certain drug treatments continue to be investigated. Female fetuses affected with the 21-hydroxylase deficiency form of congenital adrenal hyperplasia may be treated with dexamethasone, a long-acting corticosteroid, early in the pregnancy until birth. As a result, the adrenal glands are suppressed and the external genitalia develop normally (Carlson et al., 1999). In the future researchers will investigate whether enzyme replacement by gene therapy is possible.

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ADRENOCORTICOTROPIC HORMONE (ACTH) DEFICIENCY

Adrenocorticotropic hormone (ACTH) deficiency, sometimes referred to as secondary adrenal insufficiency, is a rare (affecting fewer than 1 in 100,000) and potentially life-threatening form of adrenocortical failure in which there is partial or complete lack of ACTH production and secretion by the anterior pituitary gland (Schmidli, Donald, & Espiner, 1989). ACTH acts to stimulate release of cortisol from the adrenal cortex during both the diurnal rhythm and exposure to stressors. Onset may occur throughout the life span.

Characteristic signs and symptoms of ACTH deficiency include weight loss, anorexia (lack of appetite), vomiting, hyponatremia (sodium deficiency), hypoglycemia, postural hypotension, muscular fatigue or stiffness, hypotonia (loss of muscle tone), muscle weakness, lethargy, general fatigue, and subtle attentional or memory deficits (Brown, 1994). In contrast to Addison's disease, abnormal skin pigmentation and aldosterone hyposecretion are not present (Schmidli et al., 1989). More easily diagnosed in conjunction with various other conditions (see later discussion), ACTH deficiency is more difficult to diagnose when isolated; across a number of studies, a sizable minority of cases display an idiopathic etiology. Additionally, clinician awareness may not be high, and some complex diagnostic work may require referral to specialists (Schmidli et al., 1989).

A number of tests may be administered to diagnose ACTH deficiency. The insulin-induced hypoglycemia test is sometimes considered the gold standard, but it requires close supervision and may not be as safe for children as the metyrapone test (Erturk, Jaffe, & Barkan, 1998). The metyrapone test is very effective, but it may induce adrenal crisis, it requires overnight hospitalization, and metyrapone is at times difficult to obtain for diagnostic use. See Rose et al. (1999) for an outstanding comparison of the metyrapone, high-dose ACTH, and low-dose ACTH tests. Hypothyroidism may mask ACTH deficiency, and it may not be revealed by the aforementioned tests until L-thyroxine therapy has been initiated (Nanao, Miyamoto, Anzo, Tsukuda, & Hasegawa, 1999). The cause of ACTH deficiency may be of hypothalamic (rather than pituitary) origin, and a corticotropin-releasing hormone (CRH) test may be indicated. CT scans or other imaging procedures are often employed as a check for tumors, lesions, or trauma.

There are many likely causes of ACTH deficiency. It has been observed in association with familial history of ACTH deficiency, hypopituitarism (and short stature), pituitary or brain tumor, head trauma, benign intracranial hypertension, cranial radiation therapy, long-term pharmacologic steroid therapy, intermittent high-dose steroid therapy, autoimmune disorders, diabetes mellitus, a likely cleavage enzyme defect, hypothalamic and pituitary lesions, birth injury, infection, and neurosurgery (Rose et al., 1999).

Characteristics

1. Weight loss, anorexia, or vomiting
2. Hypocortisolism, hypoglycemia, or hyponatremia
3. Postural hypotension
4. Muscular fatigue or stiffness, hypotonia, or muscle weakness
5. Lethargy and general fatigue
6. Subtle attentional or memory deficits.

Treatment of ACTH deficiency involves replacing cortisol that the adrenal cortex is not being stimulated to produce; this is most often done with daily oral administration of hydrocortisone and additional "stress dosing" as required (Rose et al., 1999). In partial ACTH deficiency, only stress dosing may be needed. In severe cases, intravenous injections of hydrocortisone may be needed during high stress or other crises.

Although treatment is quite effective and many treated children will require no special education support, the period during which ACTH deficiency was untreated may have generated some conditions requiring such services and support (Rose et al., 1999; Schmidli et al., 1989). Being of short stature, underweight, and physically weaker, as well as experiencing delayed growth and development, may require both educational and psychological support. Cognitive (attentional and memory) deficits in the past or present may generate some special educational considerations. Finally, educators should be somewhat knowledgeable about daily and stress dosing requirements, should crises arise in the educational setting. All of these concerns can be exacerbated by the presence of other diseases or conditions with which ACTH deficiency is often associated.

Further research continues on ACTH deficiency and hypothalamic-pituitary-adrenal function across the fields of psychology, psychiatry, neurology, endocrinology, and immunology. The greatest promise of such research is further insight into the etiology and prompt, precise diagnosis of the condition, especially in cases of isolated ACTH deficiency.

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ADRENOLEUKODYSTROPHY

Adrenoleukodystrophy (ALD) is an inherited, serious, progressive neurological disorder affecting the adrenal gland and white matter of the nervous system. The defective gene is located within the Xq28 region (Moser, 1997) and is inherited in an X-linked, recessive fashion; only males demonstrate the classic disease. The biochemical defect, an abnormal accumulation of very long chain fatty acids (VLCFA) is common to all forms of the disease, although there are multiple presentations (phenotypes) of the disorder.

Estimates of the incidence of ALD vary, with a range of 1.1 to 1.6 per 100,000 live births (Bezman & Moser, 1998). There is not complete agreement regarding the relative frequency of the different phenotypes of ALD (also discussed in this section), although the childhood cerebral phenotype and adrenomyeloneuropathy (AMN) are consistently found to be the most frequently occurring (Bezman & Moser, 1998). It is reported that up to two thirds of those who have the genetic abnormality escape the most severe phenotype, childhood cerebral form of ALD (CCALD) (Moser, 1997) The rate of occurrence appears to be the same worldwide. ALD has been identified in many ethnic groups, and there appears to be no racial predilection.

Characteristics

1. Childhood cerebral form of andrenoleukodystrophy (CCALD):
   Most common (40% of all cases) and severe form (Melhem, Barker, Raymond, & Moser, 1999).
   Male child, normal until 4–8 years of age when he presents with attentional and behavioral difficulties and school failure. Poor coordination may be noted.
   Symptoms rapidly progress, with evidence of increasing motor deficits (progressive ataxia and spasticity, including loss of ambulation), swallowing problems, visual loss (cortical blindness), personality changes, seizures, and dementia. Ongoing deterioration results in a vegetative state, generally within 2 to 3 years of the emergence of initial symptoms.
2. Adolescent cerebral form of adrenoleukodystrophy:
   Signs and symptoms of cerebral involvement, as in the childhood cerebral form, but are evident between 10 and 21 years.
3. Adult cerebral form of adrenoleukodystrophy:
   Rapid regression of neurological status presenting after 21 years of age, including dementia, psychiatric disturbances, and spasticity (more in

the lower extremities than in the upper extremities (Garside, Rosebush, Levinson, & Mazurek, 1999).

Often present with symptoms that are similar to multiple sclerosis; differentiation is important for identification of at-risk family members.

4. Adrenomyeloneuropathy:
   This is a more indolent form of the disorder, with later age of onset, generally between 20 and 30 years of age.

   Neurological changes are generally preceded by symptoms of adrenal insufficiency (inability to tolerate mild illnesses, hyperpigmentation; Brett & Lake, 1998)

   Primary pathology is the white matter of the spinal cord (Sakkubai, Theda, & Moser, 1999). Patients present with progressive spastic paraplegia, sphincter disturbances, peripheral neuropathy, and ataxia (Melhem et al., 1999).

   Progression is slower than in CCALD; the interval from onset to vegetative state or death is more than 13 years (Brett & Lake, 1998).
5. ADL with Addison's disease only, asymptomatic patients with the biochemical defect of ADL, symptomatic heterozygotes

Five of eight patients followed for Addison's disease only have the biochemical marker for ADL but do not have neurological deterioration (Sakkubai et al., 1999). Identification is important for counseling purposes. Asymptomatic children with ALD (identified biochemically because of their genetic relationship to a known patient) may have evidence of neuropsychological deficits and have MRI changes prior to disease progression (Riva, Mova, & Brussone, 2000). Women who are carriers of the gene may have neurological symptoms (20%, Melhem et al., 1999)—generally motor involvement—late in life (Sakkubai et al., 1999), and up to 50% have abnormalities on neurobehavioral testing (Melhem et al., 1999). The results of treatment of ADL have been disappointing. The adrenal insufficiency is readily responsive to treatment with oral corticosteroids (Melhem et al., 1999). The neurological manifestations of the disease have not been responsive. Documentation of raised VLCFAs in patients with ALD raised hopes that neurological deterioration could be altered via dietary restriction. Dietary restriction of VLCFAs were unsuccessful in decreasing serum levels of VLCFAs or in halting disease progression (Moser, 1997). Use of Lorenzo's oil, a mixture of glyceryl trioleate (GTO) and glyceryl trierucate (GTE), proved successful in lowering plasma levels of VCLA but has no efficacy upon the neurological progression of the disease in individuals already demonstrating neurological progression (Moser, 1997). There are ongoing attempts to evaluate the efficacy of preventative treatment via Lorenzo's oil in presymptomatic effected individuals. Given the variability of the progression of the disease (e.g., the multiple phenotypes that occur both within and among families), this research is difficult and requires long term follow-up. Initial results indicate that the treatment is not an absolute preventative (Moser, 1997). Bone marrow transplantation (BMT) has been utilized in treating patients with overt, rapid deterioration secondary to ALD. Initial attempts revealed that transplantation was contraindicated in these individuals, with yet more rapid progression of the disease subsequent to transplantation (Moser, 1997). More recent reports of improved neurological outcome in ALD patients' post-BMT has renewed hope that this treatment can be successful for individuals who show early evidence of cerebral involvement (Moser, 1997). Immunosuppression, as a treatment for ALD, has been attempted to reduce the inflammatory brain response that is thought to be a major pathogenic factor in cerebral ALD. This treatment has been unsuccessful to this point (Moser, 1997).

It is difficult to know how best to provide education to children with a severe degenerative neurological disease. Identification is currently important for genetic purposes and presumably will ultimately be important for treatment. Overt, persistent deterioration (loss) in skills and behavior requires medical evaluation. It is important to remember that after the genetic abnormality associated with ALD is identified, the outcome is not clear or predictable.

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ADULT ASPERGER ASSESSMENT

The Adult Asperger Assessment (AAA) is an electronic data-based instrument, designed to aid in diagnosing Asperger syndrome (AS) or autism in adults who are high functioning (Baron-Cohen, Wheelwright, Robinson, & Woodbury-Smith, 2005). The assessment consists of four sections designed to identify the presence of diagnostic criteria found in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV): deficits in social interaction, the presence of stereotyped and repetitive behaviors, and delays in language, as well as impairment in imagination. Adults that do not exhibit language delays in childhood and meet all other criteria are diagnosed with AS. Adults that meet the criteria and do exhibit language delays, or reportedly did in childhood, are diagnosed with autism (Baron-Cohen et al., 2005). Adults suspected to have AS or autism are asked to complete the Autism Spectrum Quotient (AQ) questionnaire (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001) and the Empathy Quotient (EQ) questionnaire (Baron-Cohen & Wheelwright, 2004). The results from these questionnaires are then used as components within the AAA (Baron-Cohen et al., 2005). During the interview process, an informant (i.e,. someone who can attest to the client's developmental history), must contribute to the information gathered. Data gathered from the AQ, the EQ, the informant, and the patient themselves, are used in the AAA. A validity study on the AAA found that diagnosed individuals scored significantly higher than nondiagnosed individuals on the AQ ($t = 3.1$, $p = .004$) and significantly lower than nondiagnosed individuals on the EQ ($t = -2.5$, $p = .015$), as expected (Baron-Cohen et al., 2005).

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ADULT PROGRAMS FOR INDIVIDUALS WITH DISABILITIES

There are numerous programs of several types that serve adults with disabilities. Many such programs are financed by federal, state, and local governments; many others are funded by private business, private nonprofit organizations, and charities. The following is a summary of major programs organized by function and financing source. It will not capture the complexity and breadth of these programs, especially at the state and local level.

The Social Security Act authorizes several major programs providing cash payments and health insurance to adults on the basis of disability. The disability insurance (DI) program replaces in part income lost when a person with a work history can no longer work because of a physical or mental impairment. Many individuals, of course, have separate commercial disability insurance policies provided by an employer or purchased on their own. After receiving Social Security DI benefits for 24 months, regardless of age, an individual becomes eligible for government-provided health insurance under the Medicare program, which normally covers persons 65 and over. The Social Security Act also contains the Supplemental Security Income (SSI) program, which provides cash income support payments to needy individuals who are aged, blind, or disabled. Income is provided regardless of work history to those who meet means and asset requirements. In most states, with SSI eligibility comes eligibility for the Medicaid program (federal-state matching required), which provides health insurance for low-income individuals. Included in Medicaid is support for intermediate care facilities for the intellectually disabled (ICFs/MR), which provide residential care and service programs. Many disabled individuals benefit from programs for which they may be eligible without regard to their disability, for example, Social Security Old Age and Survivors insurance payments and Medicare (persons 65 and older).

Finally, there are four other major federal programs of this type for special groups of disabled individuals. Veterans with service-connected disabilities are eligible for

special cash payments under the Veterans Compensation program. Veterans of wartime service with nonservice-connected disabilities are eligible for a special pension program. Coal miners disabled by black lung or other lung disease are eligible for one of two separate special payment programs (one administered by the Social Security Administration, the other by the Labor Department), depending on circumstances.

Special programs of postsecondary education for the deaf and hearing impaired, supported with significant federal funding, are provided at Gallaudet University, the National Technical Institute for the Deaf, and four special regional postsecondary institutions. In addition, educational programs that are recipients of federal financial assistance at public and private colleges and universities must be accessible to and usable by individuals with disabilities of all types. Some schools are making adaptations and providing support services that go beyond legal requirements.

Rehabilitation and job training services are available from a number of sources. Under Title I of the Rehabilitation Act, the federal government and the states provide vocational rehabilitation services such as physical restoration, job training, and placement to persons with mental and physical disabilities, regardless of prior work history. Physical rehabilitation is covered by most accident and health insurance policies; vocational rehabilitation is sometimes covered. Rehabilitation is available and in fact required under some state workers' compensation laws. Rehabilitation services financed by various forms of insurance are provided by private, for-profit companies and facilities, private nonprofit agencies, and state agencies. Provision of rehabilitation services by private, profit-making (proprietary) firms has been a growing phenomenon (Taylor et al., 1985) for many years now.

Private nonprofit entities play a significant role in providing job training, rehabilitation, and other skill development to adults with disabilities. Included in this group are organizations such as the ARC (formerly the Association for Retarded Citizens), Easter Seals, Goodwill Industries, and United Cerebral Palsy. Some activities of these organizations are financed by the government; others are funded by contracts with businesses for work performed.

Major employers, faced with rising costs of disability, will find it in their interest to pay greater attention to management, rehabilitation, and disability prevention (Schwartz, 1984). Many are increasing efforts in these areas, including rehabilitation, job, and work-site modification efforts to facilitate entry or return to jobs by individuals with disabilities. Contracts with the federal government of more than $2,500 must operate with an affirmative action program to employ and advance individuals with disabilities.

Self-help, referral, and training services are available to people with very severe disabilities to improve their capacity for independent living. These services are available through a network of community-based nonprofit centers and from state rehabilitation agencies. In addition, supported employment is an important new program for individuals with disabilities so severe they were previously thought incapable of working. These individuals (especially those with mental impairments) are likely to need continual support, but they are able to work on regular jobs in integrated settings if given a highly structured training program and some support on the job site (Mank, 1986).

Special housing and transportation programs are available for individuals with disabilities, financed by both the federal government and states and localities. The same is true for special recreation programs for the disabled, in which local governments, service organizations, charities, and private businesses play a large role. Therapeutic recreation is also part of some rehabilitation programs. In addition, many local recreation facilities and organizations, including those involved with the arts, are adapting programs so that people with disabilities can participate or attend with the general public.

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See also **Accessibility of Programs; Americans With Disabilities Act; Habilitation of Individuals With Disabilities; Rehabilitation**

ADVANCED PLACEMENT PROGRAM

The Advanced Placement Program was established in 1955 as a program of college-level courses and examinations

for secondary school students. It is administered by the College Board, a nonprofit membership organization composed of public and private secondary schools, colleges, and universities. This program gives high school students the opportunity to receive advanced placement and/or credit on entering college.

The essential premise of the Advanced Placement Program provides college-level courses on high school campuses to provide curriculum to students who wish to acquire college credits before leaving high school (College Entrance Examination Board, 2010). Descriptions and examinations on 34 introductory college courses in 19 fields are disseminated. These fields include art, biology, chemistry, computer science, English, French, German, government and politics, history, Latin, mathematics, music, physics, and Spanish. Course descriptions are prepared, with the help of the Educational Testing Service, by working committees of school and college teachers appointed by the College Board. Exams are administered by the Educational Testing Service.

Most participating high schools, offering one or more advanced placement courses (called AP courses) are larger schools with enough students to qualify for a class. Smaller schools usually provide independent study for those students wishing to take advanced placement exams. The AP course teachers are provided with course descriptions and teachers' guides that state curricular goals and suggest strategies to achieve them. Teachers are not required to follow a detailed plan of assignments and classroom activities; however, seven Advanced Placement Regional Offices and Advanced Placement Program conferences are available to assist teachers.

The 7th Annual AP Report to the Nation indicates minority students who successfully completed AP programs have doubled over the past decade, while numbers of significantly increased in the number students who successfully completed AP math and science placement tests. Taking tests and courses in areas such as math and science often lead to higher education degrees in these specific areas. For more information, please contact: The College Board, 45 Columbus Ave, New York, NY 10023–8052. Website: www.collegeboard.org/

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See also **Acceleration of Gifted Children; Gifted and Talented Children**

ADVANCE ORGANIZERS

Advance organizers are general overviews or conceptual models of new information presented to learners immediately prior to receiving new information. Ausubel (1960) originally proposed the concept of the advance organizer for use with reading material. The principle of advance organizers is that learning is enhanced when information is linked to learners' existing cognitive structures, thereby enabling the learner to organize and interpret new information (Mayer, 1979). Thus advance organizers prepare the learner for the meaningful reception of new learning. They can either present salient prerequisite knowledge not known to the learner (known as expository organizers), or help the learner establish connections between relevant dimensions of existing knowledge and the new information (known as comparative organizers; Ausubel, Novak, & Hanesian, 1979).

Expository organizers draw the learner's attention to the internal organization of the body of new information by means of a rough overview that briefly presents general topics and concepts and how they are related. Outlines, models, and introductory paragraphs may serve this purpose. With comparative organizers, students' previous experiences or prior learning is tapped in such a way as to identify major points or dimensions of similarity between the new information and existing understandings. By providing external organization, or demonstrating how new information is related to what students already know, comparative organizers establish a meaningful learning set.

Advance organizers may be either verbal or graphic, and can take a variety of formats, including overviews, outlines, analogies, examples, thought-provoking questions, concrete models, and figures such as cognitive maps (Alexander, Frankiewicz, & Williams, 1979; Mayer, 1984; Zook, 1991). Although originally conceptualized as abstract introductions, advance organizers tend to be more effective if they are concrete and if they are both familiar to the learner and well-learned. In this way, advance organizers provide frameworks or cognitive maps for new content. Corkill (1992) also emphasizes the importance of using examples that enable learners to identify the relationship between ideas in the organizer and the new information.

Eggen and Kauchak (1996) use the following example of an advance organizer from an elementary social studies lesson on governments.

> The organization of a government is like a family. Different people in the government have different responsibilities and roles. When all the people work together, both families and governments operate efficiently. (p. 214)

Current schema theory provides a theoretical basis for advance organizers, whose function can be viewed as both

activating relevant schemata for to-be-learned material and revising the activated schemata to promote assimilation of the new material (Derry, 1984; Glover, Ronning, & Bruning, 1990). Advance organizers will benefit learners most when students lack the prerequisite knowledge for understanding, and when the transfer of learning to new problems is the desired outcome. To be maximally effective, they should be easy to acquire, as concrete as possible, integrated with technology, and offer an integrated overview or model of the new material (Jordan School District, 2005; Mayer, 1987).

Advance organizers are commonly found in the KU learning challenges material at the University of Kansas and free examples are readily available in a variety of online sources at www.kucrl.org/about/research-focus/

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See also **Diagnostic Prescriptive Teaching; Direct Instruction**

ADVENTITIOUS DISABILITIES

Disabilities may present themselves at birth or be acquired through disease or accident. Those acquired later in life are known as adventitious disabilities. Among these is brain damage produced by extremely high and consistent temperatures or a lack of needed oxygen to the brain. Adventitious disabilities may also be a consequence of trauma to the brain or injury to other parts of the body. A major cause of adventitious disabilities is child abuse (Gilles, 1999). Child abuse is emotionally or physically damaging and can cause durable learning problems. An area of childhood exceptionality often associated with an adventitious disability is hearing impairment or deafness (Rapin, 1999). Hearing losses may be present at birth or adventitiously acquired later on in life through disease or accident. Adventitious disabilities and congenital disabilities that appear similar (but are obviously of different etiologies) may well have different outcomes.

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See also **Brain Damage/Injury; Child Abuse; Post-Institutionalized Children**

ADVOCACY FOR CHILDREN WITH DISABILITIES

Advocacy for children with disabilities has become a strong force in today's world due to concern regarding the legal rights of those with disabilities. Advocacy is vital to sustaining and improving the lives of children with disabilities (The Arc of the United States, 2010). The term advocacy has a variety of meanings, but at the most fundamental level it is the role that is assumed by anyone who cares (Lippman & Goldberg, 1973). In its essence, advocacy refers to the attempts made to guarantee the rights of children with disabilities by persons with disabilities, friends and family of people with disabilities, as well as numerous professionals including educators, lawyers, and social workers. According to The Arc of the United States (2010), advocacy must occur at both the individual and

systems levels to be successful. The origins of the advocacy movement can be traced back to the 1920s and the early 1930s when parents of children with disabilities began to band together to combat the inappropriate and neglectful actions by professionals who claimed to be helping the children and their families. Frustrated with the professionals' responses, parents turned to each other for help.

Founded in 1921, the National Society for Crippled Children was the first national parent group in the United States. Shortly thereafter, in 1933, parents in Ohio founded the Cuyahoga County Council for the Retarded Child, establishing the first parent-supported community classes for the "gravely" retarded (Winzer, 2009). At the same time, grassroots organizations began to spring up in different communities across the country. In 1950 the various parent organizations joined together to form the National Association for Retarded Children, which was renamed in 1992 to the Arc of the United States (Arc of the United States, 2010). The Arc of the United States was the first organization to fund research on intellectual and developmental disabilities and played a key role in the enactment of laws that increased the rights of people with disabilities (Arc of the United States, 2010). In addition, the Arc of the United States provided emotional support to families with disabled children, developed preschool, school-age, and adult programs that became the models for voluntary agencies and public education, and helped reduce the stigma of having a disabled child by bringing the issues of intellectual disabilities, into the public view (Lippman & Goldberg, 1973). Therefore, once united, the early parent movements formed a base on which later societal, judicial, and governmental action would be built.

In recent years, the breadth of advocacy groups has expanded beyond the Arc of the United States to include groups advocating the interests of children with learning disabilities, children who are deaf or blind, and children with autism, as well as children with a variety of medical and physical disabilities. As a result, the role of the Arc of the United States, as a direct service provider has significantly declined since its inception in the 1950s. The Arc of the United States now places greater emphasis on providing information and public education services, advocacy, legislation, and funding (Arc of the United States, 2010). Subsequently, professionals and volunteers have joined with parents to change the makeup of many groups formerly consisting of exclusively of parents with disabled children. Various advocacy groups and professional associations have formed coalitions to increase their political and public influence, with many organizations maintaining full-time or part-time offices in Washington, DC, as well as in state capitals (Consortium for Citizens with Disabilities, 2010). These groups are often closely linked with legal advocacy agencies and are represented by members of the state and national advisory panels, accrediting boards, and monitoring bodies, due in large part to federal and state regulations along with court orders. Furthermore, advocacy groups have been instrumental in the initiation of legislation, often through the use of class-action suits to guarantee the existing rights of disabled persons are safeguarded, to obtain new rights and services, or to enhance currently available programming (Consortium for Citizens with Disabilities, 2010; Arc of the United States, 2010).

Today, advocacy for people with disabilities is a spreading force in the United States and abroad (Herr, 1983). Moreover, as long as having a disability leads to exclusion and disregard for a person's human dignity and legal rights, advocating forces such as the Arc and other coalitions will not fade away (Herr, 1983). Therefore, advocacy continues to be the place "... for crusader and technician, linking professional skills to the aspirations of self-advocates, volunteers, family members, and other activists. By one means or another they will animate advocacy models and develop the networks to implement hard-won rights" (Herr, 1983).

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See also **AAIDD, American Association on Intellectual Developmental Disabilities; Consortium for Citizens With Disabilities**

ADVOCACY GROUPS, CITIZEN

A citizen advocacy group is defined, in general, as any organization that focuses on increasing the quality of life for a specific handicapped population. Two examples of citizen advocacy groups containing both parents and professionals include the Association for Children With Learning Disorders (ACLD) and the American Association on Mental

Deficiency. These two groups have national headquarters organized state by state, having local chapters at county, city, or regional levels. Although grass-roots advocacy groups relate to citizen advocacy groups, their classifications are different.

An example of an informal organization is Youth Advocacy, centralized in the Washington, DC area. This organization consists of a group of citizens (nonparents), with paid professional leadership, that provide services for adjudicated youths. These individuals offer an alternative to incarceration, providing community-based rehabilitation and supporting school, work, and living arrangements for youths in the area. Another example of a grassroots nationally organized group is the Association for Autistic Children. Important features of this type of group include that the organization of these local support groups is informal and consists mostly of parents, while the leadership has national consolidation. There are formal and informal advocacy groups at national, regional, and local levels serving handicapped students and providing representation for a variety of disability groups. The purposes for each group may differ considerably, depending on the perceived needs of the group.

The work of advocacy groups includes seeking federal or state legislation, developing ordinances at the community level, supporting parental work, and intervening directly for the benefit of the students. One example of a community-based advocacy group is the Lions Club, which supports the visually handicapped. Other social clubs support the hearing impaired (Rotary), the intellectually disabled (Civitan), or orthopedically impaired (Shriners) by paying for services, prostheses, or therapy. Another example is the Junior Chamber of Commerce, which is a group that promotes the support of group homes, sheltered employment centers, and day schools for the emotionally disturbed.

Two of the major purposes of advocacy organizations include providing funds toward services and the development of a community-support base. The objective of a community-support base varies depending on the particular advocacy group and needs of the community. In addition, it is imperative to provide emotional support to the parents. Obtaining legislation for the handicapped is another primary function because parents, as opposed to professionals, provide it. Advocacy groups may purchase or provide direct services to those with disabilities and their families. Although this has not been their major role in the past, it is becoming increasingly prominent and represents a trend toward advocacy in the United States.

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ADVOCACY ORGANIZATIONS

Advocacy organizations are groups (generally nonprofit) whose efforts are devoted to influencing public policy (Boris & Mosher-Williams, 1998) and who may advocate on behalf of marginalized groups. An advocacy organization represents a particular group (e.g., ethnic minorities, people with disabilities) and engages in educational and service activities related to that particular group and its issues (Andrews & Edwards, 2004). Advocacy organizations strive to improve the welfare of individuals who share similar needs and who are unable to effectively advocate for themselves (Sage & Burrello, 1986). The need for advocacy organizations on behalf of people with disabilities began in the early 20th century as a reaction to the inequalities that people with disabilities faced (Pfeiffer, 1993). Several of the services currently available to children and adolescents with disabilities can be credited to the efforts put forth by advocacy organizations. Advocacy organizations may include groups such as churches, parents, educational, health, and/or charitable organizations. Some advocacy organizations include the American Association of People with Disabilities (AAPD) and the American Foundation for the Blind (AFB). The AAPD formed as a national voice in advocating and implementing the goals of the Americans with Disabilities Act (American Association of People with Disabilities, n.d.), while the AFB focuses on ensuring that the rights and interests of individuals with vision loss are represented in public policy. The AFB also focuses on broadening access to technology along with promoting independent and healthy living among individuals with vision loss by providing them and their family with resources (American Foundation for the Blind, n.d.). Yet another advocacy organization is the World Institute on Disability (WID). The WID is internationally recognized and its public policy issues focus on issues related to individuals' abilities to live full and independent lives. They do so by creating programs and tools, conducting research, public education, training and advocacy campaigns, and providing technical assistance, all in an effort to eliminate barriers regarding social integration, employment, economic security, and health care for persons with disabilities (World Institute on Disability, n.d.).

Advocacy organizations engage in activities that advance the well-being of the people they serve through various services such as advocacy, research, public policy, professional development, and general educational information and support. Advocacy organizations vary greatly in the areas in which they specialize, including housing; employment; assuring equal access and opportunity to services; education; transportation; accessibility; and legal services; and general human rights for people with disabilities. Furthermore, advocacy organizations vary in the populations that they serve, including persons who are deaf, blind, or visually impaired; persons with physical disabilities, and veterans, among others.

The number of advocacy organizations is vast. In general, each organization composes a mission statement that gives direction to the services and advocacy that they provide. Advocacy organizations will also discuss their philosophy, provide a brief history of how the organization developed, and provide a means to contact the organization and become involved. For a complete list of additional advocacy organizations on disabilities, see http://www.access-board.gov/links/disability.htm

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AFFECTIVE DISORDERS

Affect is the externally observable, immediately expressed component of human emotion (e.g., facial expression, tone of voice). Mood is considered to be a sustained emotion that pervades an individual's perception of the world. Affective disorders, as defined by the American Psychiatric Association (2002) are the class of mental disorders where the essential feature is a disturbance of mood.

Emotions and their expression are an integral part of human experience. It is only under certain conditions that the expression of emotion is considered maladaptive; in some instances, in fact, a lack of affect might be viewed as abnormal. It is only when an emotional reaction is disproportionate to the event, when the duration of the reaction is atypical, or when it interferes with a person's psychological, social, or occupational functioning that an emotional response may be labeled symptomatic of an affective disorder.

Affective disorders are comprised of two basic elements, depression and mania, which can be conceptualized as opposite ends of a continuum paralleling the normal happiness/sadness continuum. Both depression and mania have their counterparts in everyday life: The parallels for depression are grief and dejection; the experience corresponding to mania is less clear-cut, but probably could be described as the feverish activity with which people sometimes respond to stress.

Formally, both mania and depression can be characterized by symptoms at the emotional, cognitive, and somatic/motivational levels. The major emotional components of depression are sadness and melancholy, often accompanied by feelings of guilt and worthlessness. These emotions permeate the individual's total experience of life. Cognitively, depressed persons are characterized by a negatively distorted view of themselves, the world, and the future. Their outlook is generally one of unrealistic hopelessness. In terms of their physical functioning, depressed persons frequently suffer appetite and sleep disturbances, fatigue, apathy, and a general loss of energy.

In certain aspects, the symptoms of mania could be viewed as opposite to those of depression. For instance, people suffering a manic episode often are in a highly elevated mood, seeming to experience life with an intense euphoria. However, it generally takes little frustration to shift this elated enthusiasm to irritability or tears, which suggests that mania may be closer to depression than initially seems apparent. In fact, it has been suggested by a number of theorists that mania is a defense against depression, that it is an attempt to ward off depressive feelings through feverish activity.

Cognitively manic individuals characteristically show wildly inflated self-esteem, believing themselves to be capable of great accomplishments or possessed of exceptional talent. Manic individuals act on their high opinion of themselves. They behave recklessly, involving themselves in unwise business deals or sexual liaisons, wasting large sums of money on shopping sprees or gambling. When experiencing a manic episode, individuals often have a decreased need for sleep, sometimes going for days without rest.

Within the affective disorders, there are two major syndromes: major depression (or unipolar depression as it has traditionally been called) and bipolar disorder (formerly manic-depressive disorder). In unipolar depression, an individual experiences one or more episodes of depression without ever experiencing an episode of mania. Approximately half of the people who suffer major depression will undergo only one episode of depression: Their first episode

will be their last. In general, even without intervention, most people will recover from an occurrence of unipolar depression within 3 to 6 months.

In bipolar disorder, an individual experiences both manic and depressive episodes. In rare cases, an individual vacillates between manic and depressive episodes without an intervening period of normal functioning. More often, there are periods of normality interspersed between the manic and/or depressive episodes. There is no separate diagnostic category for persons who experience only manic episodes; this occurs only rarely. In such instances, an assumption is made that the person will ultimately experience a depressive episode, and a diagnosis of bipolar disorder will be made.

Of the two disorders, bipolar disorder is typically, but not always, the more serious and debilitating. People with bipolar disorder, in comparison with those with unipolar disorder, experience more episodes, and their interepisode functioning is worse. Further, such people are more likely to have serious alcohol abuse problems and attempt and commit suicide at a higher rate than persons with unipolar disorder.

Mood disorders have long been the most common of mental illnesses, but they are on the increase in modern society (Johannessen et al., 2001; Keller & Baker, 1992). Depression has been referred to as the common cold of mental illness. Around 10% of the males and perhaps 22% of the females living in the United States will at some point in their lives experience an episode of major depression. This one-to-two ratio has been found in many different cultures, in Europe and Africa as well as North America. (There are, however, a few notable exceptions such as the Amish in Pennsylvania.) It has been hypothesized that more women experience depression than men because it is more socially acceptable for women to respond to negative life experiences with passive, depressive symptoms. Men may be less likely to experience or express depressive symptoms because they may receive more social rejection (or less social reinforcement) than women for acting depressed. Instead, men may respond to stressful events more actively, with substance abuse (e.g., alcoholism) or antisocial behavior.

Bipolar disorder is much less common than unipolar disorder; slightly less than 1% of the U.S. population will experience bipolar disorder at some point in their lives. Unlike unipolar disorder, bipolar disorder occurs with approximately the same frequency in men as in women. Both unipolar and bipolar disorder tend to run in families, though bipolar disorder probably has a significantly larger genetic component than unipolar disorder. At present, the nature of the genetic mechanisms underlying the affective disorders is not clear. It is known, however, that in both mania and depression there are abnormalities in the level of neurotransmitters in the brain.

Beyond the possibility noted that mania is a defense against depression, there has been relatively little psychological theorizing about the causes of mania and bipolar disorder. This is not the case with unipolar depression, for which a number of etiological theories have been developed. From a Freudian perspective, depression is viewed as the punishment an overly punitive superego inflicts on the ego for the ego's failure to properly treat a lost love. The superego's harshness is seen also as a means of preventing the ego's feelings of anger and aggression from being expressed (Freud, 1917).

From a more behavioral perspective, Lewinsohn (1974) has hypothesized that depression is the result of a low rate of response-contingent reinforcement, caused by either a lack of social skills or a deficient environment, which results in the person experiencing behavioral extinction. Rather than being a function of the rate of reinforcement, Seligman and colleagues (Abramson, Seligman, & Teasdale, 1978) believe that it is the individual's lack of control over his or her environment and the attributions that this person makes about this lack of control that result in depression. Seligman believes that a lack of control that is attributed to causes that are internal (the self), global (some general quality), and stable (not likely to change) will result in depression.

Most theorists believe that the cognitions that depressed persons experience are a consequence of depression. Beck (1967), however, believes that negative cognitions and thought patterns are the cause of unipolar depression rather than a consequence of depression. He has proposed that individuals prone to depression have negative schema that are activated by stress. Once activated, the individual tends to interpret his or her experience in the worst possible light, using errors of logic (e.g., drawing sweeping conclusions based on one or two events) to do so. This negative interpretation occurs even when more plausible explanations for experiences are available; the person chooses his or her explanation on the basis of its negativity rather than its validity.

From the viewpoint of the individual working with children, what may be most important regarding affective disorders is an awareness of and ability to recognize signs of childhood affective disorders. It should be noted first that it is rare for children, particularly prior to puberty, to experience manic episodes. When a young child exhibits overactive behavior that appears manic, it is probably more appropriately considered a symptom of hyperactivity. (It is also possible for overactive behavior to result from an endocrine dysfunction.) Depressivelike syndromes, on the other hand, have been reported in children 3 years of age and younger. The symptoms of these syndromes vary in part as a function of age; the older a depressed child, the more closely his or her symptoms will parallel those of adults. Consequently, this discussion will focus on the symptoms of younger school-aged children (i.e., approximately ages 6 to 14).

A major distinction between depressed children and adults is that children, in contrast to adults, seldom seek

help or complain about feelings of depression. Instead, they may become apathetic regarding school or socially withdrawn, sometimes preferring to remain in their rooms at home rather than playing with friends. They may make vague physical complaints about head or stomach pains, seem overly self-conscious, and cry inexplicably. Older children may see themselves as bad kids—incompetent in school and unworthy of the love of adults or the friendship of other children. Some, but not all, depressed children may simply look sad, particularly in their facial expressions, for extended periods of time with little apparent fluctuation in mood. Overall, a child will usually exhibit only some of the symptoms noted, and the symptom pattern may vary across a period of weeks.

Such symptoms are expressed in what is essentially a passive manner. Though there is far from universal agreement on the issue, certain professionals believe that in some instances children may express depression through aggressive misbehavior. While it is usually difficult to distinguish between genuine misbehavior and misbehavior that is an expression of so-called masked depression, children who are acting out as a symptom of depression often are more responsive to firm (but not overly authoritarian) limit-setting than children who are misbehaving for other reasons.

A technique that is sometimes useful in determining if a child is feeling depressed is to ask the child where he or she stands on a scale of 1 to 10, with 10 being children who are very happy, and 1 being children who are very sad. (This technique presupposes a certain level of cognitive development in the child.) On an informal level, there are several things a teacher can do for a depressed child. With children who appear apathetic and low in self-esteem, it may be useful to set lower standards for praising their accomplishments in school, or to praise them for their efforts in addition to their finished products. It is important, however, to strike a balance between setting criteria that allow an increase in praise and avoiding reinforcement of the child's symptoms. The latter may lead to the child using the symptoms as an excuse to perform at a level significantly below his or her ability level. Children may also respond to messages from the teacher that suggest that the child is an important, valued person. Overall, it is important to make sure that such interactions with the child are honest and nonpatronizing; if it is not possible to do something in this manner, it is probably better not to do it. Psychologists use a variety of objective testing methods to assess the presence, absence, and degree of depression. Objective testing is necessary for accurate diagnosis.

If a teacher feels that a child needs more assistance than the teacher has the training or experience to render, there is a wide range of professional treatments for depression, many with proven efficacy (though the majority of treatment research has focused on adults rather than children). These treatments range from medication to psychotherapy and behavior therapy. Antidepressants are often prescribed in the treatment of unipolar depression, and they tend to be quite effective. Lithium carbonate is usually prescribed for bipolar disorder in adults; it has an effect on both the depressive and manic symptoms, and is probably the treatment of choice for bipolar disorder. The exact mechanism for lithium's action is unknown. In a few instances, lithium may be used to successfully treat adult unipolar depression.

The variety of psychological and behavioral therapies used in the treatment of depression is vast. Techniques such as social skills training, modification of negative cognitions through cognitive restructuring and reality testing, and the teaching of self-control strategies (to name just a few) have been used. Treatment may occur individually or in groups and many of the therapies have been empirically tested, often with results supporting their value as treatments for depression. Cognitive-behavioral therapies have the greatest support in the scientific literature (e.g., Knell, 1998).

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See also **Childhood Neurosis; Childhood Psychosis; Depression, Childhood and Adolescent; Psychoneurotic Disorders**

AFFECTIVE EDUCATION

Affective education promotes emotional development by educating students about attitudes, thoughts, values, feelings, beliefs, and interpersonal relationships (Morse, Ardizzone, Macdonald, & Pasick, 1980; Saarni, 2000). Through it, students are provided experiences in which cognitive, motor, social, and emotional elements are interrelated and balanced (Morse et al., 1980), leading to the enhancement of self-concept (what one is) and self-esteem (how one feels about what one is) and the development of social skills essential to meeting basic needs in a satisfying and socially responsible way (Wood, 1982). Affective education helps youngsters to establish value systems, morals, independence, a sense of responsibility, and self-direction (Morse et al., 1980; Wood, 1982). In addition, affective education focuses on promoting emotional competency which includes a set of emotional skills such as emotional awareness, emotion expressions, empathy, understanding other's emotions based on context and cues, use of emotional regulation strategies, and emotional self-efficacy (Saarni, 2000). Although the need for affective education is not limited to students in special education programs, it is especially relevant for them because social skills are essential for success in mainstream placements.

Although most educators agree on the importance of affective education and understand its general purpose, there is less agreement among them on the specific objectives or how best to realize them. In part, this ambiguity derives from the persistent difficulty of defining such terms as self-concept, self-esteem, affect, and attitude. The general lack of systematic programming should not, however, be an indication that affective goals are unimportant (Francescani, 1982). Affective education is commonplace in regular education classrooms and is routinely addressed in teacher education programs (e.g., Woolfolk, 1995). Morse et al. (1980) have argued that affective education represents serious obligation and is an essential component of special education. Essentially, all children deserve the right to more "systematic assistance with their affective growth" (Morse et al., 1980, p. 6).

Recently, affective education has been transformed into school programming with the concept of social and emotional learning (SEL). According to Collaborative for Academic, Social, and Emotional Learning (CASEL), an organization founded in 1994 by the author of *Emotional Intelligence*, Daniel Goleman, social and emotional learning is a process for helping children and even adults develop the fundamental skills for life effectiveness. SEL skills include "recognizing and managing our emotions, developing caring and concern for others, establishing positive relationships, making responsible decisions, and handling challenging situations constructively and ethically" (CASEL, 2005). They are the skills that allow children to calm themselves when angry, make friends, resolve conflicts respectfully, and make ethical and safe choices.

With the federal support (HR 4223: The Academic, Social, and Emotional Learning Act) authorized in 2009, National Technical Assistance and Training Center for Social and Emotional Learning was established to provide technical assistance and training to states, local educational agencies, and community-based organizations to identify, promote, and support evidence-based SEL standards and programming in elementary and secondary schools. Interventions or programs to promote SEL have been widely accepted and implemented in many states (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). For example, Illinois became the first state to mandate every school district to develop a plan for the implementation of SEL programming in their schools. The New York State Department of Education has also developed Social/Emotional Development and Learning (SEDL) standards.

Nonetheless, affective goals are often subordinated to academic objectives, as the following example (Reinert, 1982) illustrates. Ann, age 10, was known by her teacher to display many different types of inappropriate behavior in the classroom. She talked out loud, pushed and shoved other children, would not share, and cried for no apparent reason. During evaluation, it was discovered that Ann was reading and spelling on a kindergarten level and her arithmetic skills were 2 years below grade level. In addition, Ann's parents were divorced and she was often absent from school because she had to babysit for her younger sister while her mother worked. She seldom came to school appropriately groomed or attired. Ann was either unwilling or unable to speak to adults or peers in a normal, conversational tone of voice; she had a poor self-concept and relatively few friends. Upon staffing, her Individual Education Plan (IEP) prescribed 60 minutes in a resource room for remedial help in arithmetic and reading skills, but no emphasis on affective problems. Although affective needs should be a part of an IEP, they are seldom systematically delineated.

Systematic instruction in the affective domain is especially important for emotionally handicapped students like Ann. Emotionally handicapped students include those who have not learned essential skills for social and emotional growth, or how to control their behavior in times of stress, how to communicate their feelings and needs in a socially acceptable manner, how to bring interpersonal problems to a satisfying solution, or how to encounter others without conflict (Francescani, 1982). It is difficult to imagine how a student with deficits as pervasive as these can survive in an environment for which he or she is so poorly equipped. Yet it is in the highly socialized classroom world in which affective education must occur, and most proponents recognize the need to integrate affective learning into everyday classroom life.

Integrated affective learning lies at one end of the intrinsic/extrinsic dimension of affective education. Morse et al. (1980) defined this dimension as the extent "to which

(affective education) grows naturally out of what is going on in the educational life space versus how much is added as a special function" (p. 16). Ideally, affective lessons should derive naturally from school activities, using materials already in the curriculum in harmony with the philosophy of the program (Morse et al., 1980; Schlindler, 1982). Teachers should capitalize on naturally occurring opportunities spending time motivating the uninvolved student, resolving peer conflicts, encouraging a reluctant student to join in group activity, or trying to enliven a depressed student. A teacher should not rely on an added-on or extrinsic curriculum to accomplish affective goals.

Affective educators stress the need for developing empathetic relationships between teachers and students in order to convey fundamental human relationships where the "sense of relationship dominates authoritarianism" (Morse et al., 1980, p. 15). Teachers and students share responsibilities, goals, and rules for living together (Morse et al., 1980; Reinert, 1982; Sarason, 1971). Positive teacher-student relationships support student growth both in social and cognitive development (Davis, 2003; Davis & Lease, 2007). Moreover, teachers serve as a socializing role. They help children to acquire emotion display rules and opportunities to practice regulating their emotions (Thompson, 1991). Even as they age, the task of helping children to regulate their emotion experiences and emotion displays becomes no less complex for teachers of preadolescents and adolescents. In the teacher-student relationships, teachers may be engaged in productive emotional labor such as making their genuine attempts to get to know their students and systematically reflecting on their relationships/emotions (Chang & Davis, 2009). Moreover, teachers can help students to develop an understanding of emotions and teach them self-regulatory strategies like learning to label their emotions and to re-evaluate what happened in daily encounters.

However, to expect all teachers to act at all times with the spontaneity, sensitivity, and astuteness that the ideal intrinsic approach requires is unrealistic. This expectation belies the human limitations of teachers and assumes a degree of training that is rare if not unknown in teacher preparation programs. The lack of training on emotional understanding or emotional regulation in teacher preparation programs or in-service teacher education places teachers at high risk for emotional exhaustion. Teachers who work with children of special needs have experienced higher emotional exhaustion among the teacher workforce (Chang, 2009). Teachers often feel emotionally drained or burned out from teacher-student relationships if they do not regulate their own emotions appropriately (Chang, 2009; Chang & Davis, 2009; Carson, 2007). Intervention programs such as Cultivating Awareness and Resilience in Education (CARE; Jennings, Snowberg, Coccia, & Greenberg, 2011) have shown significant improvements promoting teachers' well-being.

Affective education has grown out of the school mental health movement, and gradually it has evolved to promoting SEL for all students. In early years, one of the most popular and widely used curricula for affective education is DUSO (Developing Understanding of Self and Others). It is designed to be used by teachers or counselors as an add-on to the academic curriculum. Throughout the school year, eight themes (e.g., Developing Self-Concept, Understanding Peers) are explored through listening, modeling, discussion, and role-playing activities. Everyday problems of classroom life are described through pictures, stories, and puppetry, and solutions are discussed, modeled, and role-played. The elements of the lessons are carefully prescribed and the materials are attractive and engaging to a primary-aged audience. Although the curriculum is extrinsic, it does provide a structure through which problems may be simulated and the values of alternative solutions weighed.

Recently, more intervention programs to promoting social and emotional learning have been implemented in recent decade. Durlak et al. (2011) conducted a meta-analysis of 213 school-based, universal social and emotional learning (SEL) programs involving 270,034 kindergarten through high school students. The research team documented that SEL participants demonstrated significantly improved social and emotional skills, attitudes, behavior, and academic performance.

Affective education has grown out of the school mental health movement, and it has gradually evolved into well-formulated programs such as SEL. However, it is not intrinsic to the ongoing school process (Morse, 1980). Instead it tends to be relegated to the periphery of the basic curriculum. If affective education is to realize its potential, deliberate efforts must replace the haphazard, casual, and indirect approaches currently in operation.

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AFIBRINOGENEMIA, CONGENITAL

Congenital afibrinogenemia is a rare blood disorder that causes improper clotting of the blood. It is also referred to as hypofibrinogenemia. Afibrinogenemia is an inherited condition that is caused by an autosomal recessive gene. It is found in both males and females.

Congenital afibrinogenemia is characterized by problems with the functionality of fibrinogen, a protein in the body that is necessary for the clotting of blood. This condition can be due to a lack of fibrinogen or to a defect in existing fibrinogen.

Diagnosis at birth is common because uncontrollable bleeding from the umbilical cord is often found. Later in life, bleeding in the cerebrum and spleen areas is also found to be common (Neerman-Arbez, Honsberger, Antonarakis, & Morris, 1999).

Patients diagnosed with congenital abrinogenemia show no major mutations or deletions in the vicinity of the gene responsible for the production of fibrinogen (Duga et al., 2000). It is most likely that this disorder is caused by missense mutations in the gene and the corresponding problems with fibrinogen secretion. It is also likely that there are multiple mutations causing the condition. Affected people tend to respond well to fibrinogen replacement techniques, and the breakdown times of this substance in the body are normal.

Characteristics

1. Failure of blood to clot
2. Absence or malfunction of fibrinogen
3. Possible uncontrolled bleeding from umbilical cord at birth
4. Possible spontaneous bleeding in areas of the cranium, spleen, or both

Treatment for congenital afibrinogenemia is usually preventive. Patients may be transfused with plasma (the liquid portion of the blood) or cryoprecipitate (a blood product containing concentrated fibrinogen) to treat bleeding episodes or in preparation for surgery needed to treat other conditions. Children with this condition should be immunized with the hepatitis B vaccine because of the increased risk of developing hepatitis due to transfusion. Because this disorder is genetic, children born with the condition will most likely be born into families in which multiple people have the disorder; from a psychological standpoint, this may be much better for the child's mental outlook. Seeing others who are affected could help normalize the situation for someone with a disorder this rare and this unusual. Children who are in school must of course take many precautions against routine cuts and scrapes that could begin

to bleed excessively. Additionally, teachers, nurses, and other responsible adults in the school system should be made aware of the situation. However, much worry can be eliminated with preventive care and the administration of fibrinogen on a regular basis so that there is always some present in the patient's system. However, some patients may develop antibodies (inhibitors) to fibrinogen with treatment, or they may develop other complications such as gastrointestinal bleeding, cranial bleeding, or bleeding from the mucous membranes. Therefore, the prognosis for children with this condition is dependent on consistent and appropriate medical management. Genetic counseling may be helpful for families and the child when he or she reaches childbearing age.

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AFRICA: EAST AND SOUTHERN SPECIAL EDUCATION

A brief history, statements on current status, and the future prospects of special education in 12 East and Southern African countries are presented here. The countries discussed include Botswana, Ethiopia, Eritrea, Kenya, Lesotho, Malawi, Namibia, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe. The availability of information on the aforementioned topics and between these countries differs widely. Thus, some countries are discussed in greater detail (Tanzania, Uganda, and Zimbabwe) than others (Eritrea, Malawi, and Swaziland).

Incidence of Handicapping Conditions Within This Region

Reliable data on the incidence of childhood disorders within this region are unavailable. Various problems associated with incidence surveys preclude obtaining accurate data. Parents may need to register their disabled children in special centers, and they often are reluctant to admit their children display handicapping conditions (Kisanji, 1997; Whyte & Ingstad, 1995). Also, community attitudes toward the handicapped often are negative (Devlieger, 1995; Jackson & Mupedziswa, 1989). These and other qualities are believed to contribute to grossly underestimated incidence figures for handicapping conditions.

This large region in East and Southern Africa is home to an estimated 59,800,000 children. Population details for children ages 5 to 16 years for the year 1996 are provided in the the table below (UNICEF, 1996):

Population Details for African Children Aged 5 to 16 Years, 1996 Data

Botswana	700,000
Ethiopia	15,600,000
Eritrea	1,600,000
Kenya	12,100,000
Lesotho	600,000
Malawi	3,200,000
Namibia	700,000
Tanzania	8,700,000
Uganda	10,500,000
Zambia	2,900,000
Zimbabwe	3,200,000

If we accept the World Health Organization's general incidence estimate that 10% of a country's population is likely to be handicapped, almost 6 million children in this region can be expected to have one or more handicapping conditions. We believe this estimate substantially underestimates the number of handicapped children, given the region's substandard medical, health, and early childhood education facilities. Among children with handicaps, less than 1% attend formal school (Kann, Mapolelo, & Nleya, 1989; Tungaraza, 1994).

General History of Educational Services for Handicapped Children

The availability of special education services and other resources for children with physical, sensory, and cognitive disabilities occurred recently. Historically, native African societies integrated learning and other developmental activities within their everyday home and community activities (Kisanji, 1997). Home- and community-based activities provide various advantages: a favorable ratio between the young and elders, accommodations to match the child's developmental levels, and utilization of the child's natural milieu within which to promote development and transfer of training. The extent to which homes and communities provide appropriate adaptations to accommodate children with disabilities is unknown. The beneficial effects that professional services can have on children with disabilities are well-established.

The introduction and evolution of professional services for these children in East and Southern Africa closely follows a pattern found in other developing areas:

first, national or regional institutions, often residential in nature and initiated by religious, humanitarian, and philanthropic agencies, are established. Professional services for middle-class children then develop in metropolitan centers. The widespread provision of services to children with disabilities in public schools occurs only after general education services, at least through the elementary level, are well-developed and nationally available. Children with handicapping conditions who reside in rural areas are least likely to receive professional services. Stronger special education services generally are found in countries with stronger and well-established regular education programs (Saigh & Oakland, 1989).

The majority of countries in this region have inadequate basic education programs (UNICEF, 1991, 1994), lack formal special education policies, and experience school dropout rates in the range of 15% to 60% involving disadvantaged children, which includes those with disabilities (Kann et al., 1989; Stubbs, 1997; UNICEF, 1994).

The Role of Missionaries

Christian missionaries, often from Western Europe, initiated and provided almost all formal education within African communities during the colonial period. The development of special education services in this region is closely associated with their work. Trends in the development of special education facilities within individual countries generally followed a consistent pattern: Services were provided first for those with visual handicaps, and then for those with auditory, physical, and mental handicaps. This trend probably reflected the missionaries' beliefs as to the resources (like teaching expertise and materials) needed to serve each of these groups, as well as the family's willingness to admit one or more members have a disability. Because of their normal hearing ability, persons with visual impairments may have been thought to respond more favorably to the use of conventional instructional methods.

In Botswana, German missionaries opened special schools for the visually handicapped at Linchwe (in Mochudi) and the hearing impaired at Ramotswa (in Ramotswa) in the 1950s. A German couple opened residential centers named Rankoromane based on the Waldorf School model to educate children with mental handicaps in a number of towns in the late 1960s (Ingstad, 1995).

In Ethiopia, the Christofeblinden Mission opened a school for the blind and a training program for teachers of the visually handicapped in the early 1950s. Finnish missionaries were involved in developing Ethiopia's special education programs, and they opened a school for the deaf at Keren in the 1950s. The Church of Christ established the Mekanissa School for the Deaf in 1964. The Baptist Mission created the Alpha School for the Deaf in Addis Ababa in 1967. The Ethiopian Evangelical Mekaneyesus Church started the Hossana School for the Deaf in 1981.

In Eritrea, French Catholic, Swedish Lutheran, and Italian Catholic churches provided school education to the natives since 1890 (Miran, 1998). The role of these organizations in founding schools for persons with disabilities could not be established. Eritrea, now an independent nation, was once a province of Ethiopia.

The first school in Kenya for the visually impaired, the Thika School, was opened by the Salvation Army in 1946 (Kristensen, 1987). Kenya's first full-time program to prepare teachers of students with visual handicaps and a school for deaf-blind children were founded by the Christofeblinden Mission in the 1980s.

In Malawi, education for the blind was started during the early 1940s when two primary residential special schools were established by missionaries at Kasungu and Lulwe. The Catholic Order of the Immaculate Conception (of the Netherlands) developed a program in 1964 that integrated students with and without visual impairments into regular classrooms within ordinary schools; resource rooms provided supportive services to the visually impaired. Fourteen resource rooms serving about 100 blind students were in operation by 1983 (Ross, 1988). The program at Montfort College, organized by the Catholic teaching brothers of the Order of the Immaculate Conception, prepared teachers for students with auditory and visual impairments for Malawi and some neighboring countries (namely, Lesotho, Swaziland, Tanzania, Zimbabwe, and Zambia) in the 1970s.

Tanzania established its first special education facility in 1950 when the Anglican Church opened a school for the blind, the Buigiri School. Two additional schools for the blind followed this school, one opened by the Swedish Free Mission, the Furaha, in 1962, and another by the Lutheran Church, the Irente School, in Lushoto in 1963. The first Tanzanian school for the hearing impaired, the Tabora Deaf-Mute Institute, was opened by the Roman Catholic Church in 1963. The Salvation Army opened the first school in Tanzania for the physically handicapped in 1967.

In Zambia, missionaries again pioneered special education services in the region (Csapo, 1987a). The Dutch Reformed Church established the first school for the deaf (Sichula, 1990) and one for the blind (Csapo, 1987a) at Magwero Mission in 1955. The Christian Mission of Zambia opened another school for the blind at Mambiling soon after. Other special schools were opened by missionaries and continue to exist today.

In Zimbabwe, the Dutch Reformed Church opened the Margaret Hugo School for The Blind, at Masvingo in 1927 (Peresuh, Adenigba, & Ogonda, 1997). Two schools for the hearing impaired opened in 1947, one in Loreto and another in Pamushana, founded by the Catholic Dominican Sisters and the Dutch Reformed Church respectively (Chimedza, 1994).

Information on missionary work and the opening of special education facilities in Lesotho, Namibia,

Swaziland, and Uganda could not be located. However, the Dutch Reformed Church appears to have been involved in Namibia, and the Roman Catholic Church and Church of Uganda may have been involved in Uganda. Margaret Brown of the Church Missionary Society initiated Uganda's in-service teacher education for children with hearing impairment in 1962. Although Islam has a substantial following in some East African countries (namely, Tanzania, Uganda, Kenya, and Ethiopia), its role in establishing special education facilities in these countries could not be ascertained.

The Role of International Nongovernmental Organizations and Local Organizations

International nongovernmental organizations and local organizations advocating on behalf of students with disabilities also have had strong roles in developing and providing special education services. Their importance exceeds that of the colonial governments. The Danish International Development Agency (DANIDA), UNESCO Sub-Regional Project for Special Education in Eastern and Southern Africa, Swedish International Development Agency (SIDA), Royal Commonwealth Society for the Blind (now called the Sight Savers), International League for Persons with Mental Handicaps, and the British Red Cross are among the international agencies that have played significant roles in establishing special education programs in East and Southern Africa. DANIDA has been actively involved in promoting special education advising in Kenya, Uganda, and Zimbabwe for at least the past decade. SIDA has been involved in developing special education programs in all 12 Eastern and Southern African countries which comprise the focus of this paper. It helped establish braille printing presses in Tanzania in 1971 (Tungaraza, 1994) and in Zimbabwe in 1994. In the early 1960s the Royal Commonwealth Society for the Blind started a rehabilitation center at Salama (in Uganda) for adults with visual impairments (Onen & Njuki, 1998).

Information on the involvement of local organizations in founding special education facilities in the East and Southern African countries is quite sparse. The Botswana Red Cross, with support from the Norwegian Red Cross, established a vocational training center for persons with physical disabilities in 1981. The Botswana Council for the Disabled has been unable to implement programs that enable children with disabilities to attend school (Ingstad, 1995). In Ethiopia, the Haile Selassie One Foundation established two special schools for blind students. They became government schools in the 1980s.

In Kenya, local voluntary organizations established two special schools for the mentally handicapped at St. Nicholas and Aga Khan in the late 1950s. These schools amalgamated in 1968 to form the Jacaranda School (Ross, 1988). The Kenya Society for the Mentally Handicapped and The Parents and Friends of Handicapped Children were formed by parents of children with disabilities to promote the education of persons with disabilities, improve the preparation for teachers of children with disabilities, and consolidate schools. The Tanzania Society for the Deaf established the first school for the hearing impaired at Buguruni in 1974. In 1955, the first school for children with visual impairment and blindness was started at Madera in Eastern Uganda by the joint effort of the then-local education committee (Teso education committee), the Ministry of Education, and Uganda Foundation for the Blind. The Uganda government later asked the Catholic Church to administer the school.

With the assistance of the Uganda Society for the Deaf, Sherali Bendali Jafer, Peter Ronald, and Mr. Semmpebwa were closely involved in developing awareness throughout Uganda of the need to educate children with hearing impairment (Onen & Njuki, 1998). As a result of their efforts, an integration unit for children with hearing impairment was started at Mengo Primary School. Subsequently, the Uganda School for the Deaf was started on Namirembe Hill in 1968. The following year, Ngora School for the Deaf was established.

Ugandan educational services for children with physical disabilities and mental handicaps both began in 1968, and both were largely the results of efforts of local self-help organizations. For instance, the Uganda Spastic Society was formed in 1968. Its membership consisted mainly of parents of children with spastic conditions and polio, and medical professionals. The society played a key role in the establishment of a school for the physically handicapped at Mengo (Onen & Njuki, 1998). Services for children with mental disabilities were available through the Uganda Association for Mental Health (UAMH). This association, established in 1968 by the Ministry of Health, had a short life due to the political turmoil in the country at the time and in subsequent years. In 1983, the Uganda Association for the Mentally Handicapped was founded, and it has been instrumental in the founding of many resource units for children with mental handicaps.

In Zimbabwe, the Jairos Jiri Association founded the Narran Center School for the Deaf and the Blind in Gweru in 1968, a school for the visually impaired at Kadoma in 1981, and a number of other schools for children with various physical, mental, and multiple handicaps at Bulawayo, Gweru, and Harare in the 1970s (Farquar, 1987). Zimbabwe's Council for the Blind has been involved in providing structural facilities and equipment to school-based integration units for children with visual disabilities since about 1980. Its Zimcare Trust has been actively involved in providing education for Zimbabwean children with mental handicaps since the 1980s.

Zambia's Council for the Handicapped has conferred with teachers and the Zambian government to promote effective ways of teaching children with disabilities since the 1970s. However, its role in the establishment of special education facilities in that country is unclear.

Information on the involvement of international nongovernmental agencies and local organizations advocating for those with disabilities and the establishment of special education facilities in Eritrea, Malawi, Namibia, and Swaziland could not be located.

The Role of Postcolonial Governments

Support for the development of special education by the postcolonial governments in each of the 12 East and Southern African countries differs widely. Support is strongest when elementary and secondary education is widely available and a commitment to the principle of universal education is widely held. Countries recently ravaged by civil war (Uganda, Eritrea, Ethiopia) currently are attempting to reestablish basic elementary and secondary education programs. Their programs in special education are in initial stages of development and support. In contrast, countries that have enjoyed relative political stability (Kenya, Tanzania, Zimbabwe) tend to have stronger regular education programs, as well as a longer history and stronger support for special education programs.

Although Botswana's National Development Plans (1973–1978; 1991–1997) identify the needs of disabled persons as a national priority (Ingstad, 1995), the government historically has viewed educational support to children with disabilities as a family responsibility rather than a state obligation (Ingstad, 1995; Kann et al., 1989). Children with disabilities are conspicuous in their absence from Botswana schools (Kann et al., 1989). Nonetheless, a special education unit was established within the Botswana Ministry of Education in 1984 with the support of SIDA. The University of Botswana has complemented government efforts by offering a 2-year diploma course for specialist teachers for children with mental, visual, hearing, and learning handicaps, and is expected to launch a bachelor's degree in special education in August, 1998 (C. Abosi, pers. comm., February 2, 1998).

The Kenya government, through the Kenya Institute of Education, launched special needs teacher education programs at Jacaranda and Highridge Teachers Colleges in 1966–1967 (Peresuh et al., 1997). The Kenya Institute of Special Education (KISE), founded by the Kenyan government with the assistance of DANIDA, has assumed responsibility for these programs. More than one thousand teachers have graduated from the KISE teacher education programs since 1987. KISE also is responsible for the educational placement of children with disabilities, community education, and teacher in-service education programs on disabilities.

Lesotho's government became involved in special education in 1987 when its Ministry of Education, with the financial support from the United States Agency for International Development (USAID), commissioned a comprehensive study of its special education programs and accompanying guidelines for its development (Csapo, 1987b). The report recommended the infusion of special needs components to both pre- and in-service teacher preparation programs, adoption of an integration (resource room) model for educating children with special needs, and full community involvement in establishing and supporting special education facilities. The Lesotho Ministry of Education, Lesotho National Federation of Disabled People, Ministry of Social Welfare and Health, and Save the Children Fund (UK) created 10 integration units. A special education unit was established in the Lesotho Ministry of Education in 1991 to coordinate the opening of integration units. The Lesotho National Teacher Training College assumed responsibility for introducing special education components in its pre-service programs in 1996, and the previously mentioned special education unit within the Ministry of Education assumed responsibility for in-service education programs for teachers (Pholoho, Mariga, Phachaka, & Stubbs, 1995).

Namibia became politically independent in 1990 after a legacy of colonial rule under apartheid from South Africa, which left most of its Blacks with little or no education. Thus, the history of educating children with disabilities in Namibia is recent and short. According to Bruhns et al. (1995), Namibia established its first school for children with disabilities, the Dagbreek Special School, in 1970 as a racially segregated facility for White children. The school opened its doors to disabled students of other races after Namibia become independent. The Eluwa School for blind and deaf students was established at Ongwdiva in 1973 with 20 deaf and 20 blind students. By 1995 the school enrolled 172 deaf, 70 blind, and 8 physically disabled students. The Moreson School for children with severe learning difficulties was established by the Association of the Handicapped in 1976 and became a government school in 1990. It had 60 students along with seven teachers in 1995.

The Tanzania government, with the help of the Royal Commonwealth Society for the Blind, established the country's first integrated education program for children with visual handicaps, Uhuru Co-education School, in 1966, followed by a similar program for children with mental handicaps in 1982 (Tungaraza, 1994). The government also established a diploma-level teacher education program in 1976 and one for teachers of pupils with mental handicaps in 1983 at the Tabora Teacher Training College. In addition, the Mpwapwa Teacher Training College prepares teachers to work with students with visual handicaps. The number of special needs teachers who have graduated from the two Tanzania colleges could not be established.

Uganda's government involvement in special education came earlier than others in the region because of the lobbying efforts of Sr. Andrew Cohen, then-Governor of Uganda, to educate a blind relative (Atim, 1995). Government support to educate the blind was established through an act of Parliament in 1952. The first trial to

integrate children with visual impairment was launched in 1962 at Wanyange Girls School in Eastern Uganda. In July 1973, a department of special education was established at the Uganda Ministry of Education headquarters in Kampala. This department was created to coordinate special education services in the Ministry and to work with other governmental and nongovernmental organizations providing services for persons with disabilities. The head start Uganda enjoyed in developing its special education programs was severely thwarted during two decades of dictatorships and civil war. Special education programs in Uganda began to rebuild after 1991.

The Ugandan government, with the help of DANIDA, founded the Uganda National Institute of Special Education (UNISE) in 1991 and gave it the responsibility for coordinating the country's special education programs and teacher education programs at certificate, diploma, and degree levels. So far, about 255 teachers have received specialist training and attended awareness seminars, which are offered to ordinary primary school teachers in the districts throughout the country. The Special Education/Educational Assessment and Resource Services of Uganda (EARS-U) was formed in 1992. EARS-U, a division within the Uganda Ministry of Education, is responsible for evaluating programs for children with hearing, speech, learning, visual, mental, and physical impairments. EARS-U also is responsible for coordinating educational placements of children with disabilities, counseling services to their parents, community education, and prevention programs.

The Zimbabwe government, with the assistance of SIDA, established a Department of Special Education within the Ministry of Education in 1982, with its primary responsibility being educational placement of children with disabilities, pre-service and in-service training of teachers on special educational needs, and community education programs on disabilities. A teacher education program for teachers of children with visual, mental, hearing, and speech and language impairments was established by the government at the United College of Education in Bulawayo in 1983. About 300 special needs teachers graduated from the United College of Education since the establishment of its special education teacher education program. A 2-year, post-diploma bachelor's degree in special education was launched at the University of Zimbabwe in 1993 and has graduated about 75 teachers of special needs children. The Zimbabwe Ministry of Education also has issued a number of documents to guide special education programs in the schools (Mpofu & Nyanungo, 1998).

Government involvement in special needs programs in Zambia, Ethiopia, Eritrea, Malawi, and Swaziland could not be ascertained. However, respondents to a recent survey of special needs experts in these countries suggested that special education facilities in these countries are quite limited (Mpofu, Zindi, Oakland, & Peresuh, 1997).

Current Status of Special Education in East and Southern Africa

Special education services in East and Southern Africa generally follow a functional integration (resource room) model in which children with disabilities attend class part-time to full-time with their nondisabled peers and receive support of a full-time specialist teacher (Charema & Peresuh, 1997). Specialist teachers maintain the resource room, provide intensive individualized instruction to children with disabilities, and work closely with mainstream teachers in planning and effecting integration strategies for children with disabilities. A functional integration model generally is preferred for children with mild to moderate sensory, physical, and cognitive handicaps. Children with more severe handicaps generally attend special schools and rehabilitation centers, typically those residential in nature, which provide more specialized resources. With few exceptions, most integration units for the visually handicapped and hearing impaired are residential, whereas those for children with moderate to mild physical and cognitive handicaps are nonresidential.

Compared to current needs and potential demand, special education facilities in the 12 East and Southern countries of this survey are severely limited. Botswana has approximately 20 special schools and resource units for children with visual, auditory, mental, and physical handicaps (C. Abosi, pers. comm., February 2, 1998). Current enrollment figures by handicapping condition were unavailable. However, previous enrollment was vision (35 students), hearing (88), mental (176), and physical (18) (Kann et al., 1989). There are no facilities in the country for children with severe disabilities.

Lesotho has twelve special schools (Stubbs, 1997). Enrollment figures by handicapping condition were unavailable. Lesotho's Ministry of Education, with support from international nongovernmental organizations and United Nations agencies, recently opened integration units for children with a variety of handicaps in 8 of the country's 10 districts.

Namibia's school for children with visual impairments has 71 students and its school for the hearing impaired has 185 students (Bruhns et al., 1995). Twenty-four specialist teachers work in these schools. Two schools and 15 specialist teachers serve 125 children with severe learning disabilities. Two additional schools staffed by 67 teachers provide instruction to 733 children with mild learning difficulties. Twelve schools and 16 teachers offer remedial education to 385 children with specific learning disabilities. Namibia also has 28 integration units attended by 507 children with moderate to mild disabilities and taught by 40 teachers.

In Tanzania, services for students with visual impairments are provided in twelve special schools and 23 integrated (18 primary, 5 secondary) schools that offer education to 979 children with visual disabilities (Possi

& Mkaali, 1995; Tungaraza, 1994). Sixty-four specialist teachers and 157 regular education teachers provide education to children with visual handicaps. Services for children with auditory impairments are provided through 14 special schools and three integrated primary (one residential and two nonresidential) schools to approximately 980 pupils and staffed by 100 specialist and 26 regular class teachers. In addition, six schools serve 305 deaf-blind students. About 930 children with physical disabilities attend 61 specialist and integration units staffed by 185 specialist and regular class teachers. The vast majority of children with physical disabilities either attend schools in their communities or do not attend school at all. Tanzania also has four residential special schools for children with moderate mental handicaps and 15 nonresidential integrated units that serve 980 children with moderate to mild mental handicaps. Sixty-seven specialist and 128 regular class teachers teach these children. Twelve children with autism and 14 with cerebral palsy attend four units taught by six specialist teachers. Thousands of children with severe mental handicaps do not receive any schooling. In contrast, more than 90% of Tanzanian children with epileptic conditions attend ordinary schools (Whyte, 1995).

Uganda has at least six special schools and one integration unit which serve about 500 children with visual impairments, two special schools for 150 children with hearing impairments, and one special school for 124 students with physical handicaps (Ross, 1988). An estimated 32,134 children with mild to moderate disabilities are attending ordinary schools (Onei & Njuki, 1998). The Ugandan government's goal was to have the country's estimated 325,000 children with disabilities attend school in 1997 (Kristensen, 1997; Uganda Ministry of Education, 1992). However, the country lacked the resources for meeting this highly ambitious target then, and it still does today (Mpofu et al., 1997).

Zimbabwe's 20 special schools provide educational and rehabilitation services to 5,000 children with visual, hearing, physical, and mental disabilities. The country also has 162 integrated resource units: 69 for those with hearing disabilities, 46 with mental disabilities, and 47 with visual disabilities. A total of 1,315 children with disabilities are served by the integrated resource units: 552 with hearing impairments, 409 with mental impairments, and 354 with visual impairments. Additionally, about 4,300 children with moderate to mild generalized learning difficulties attend 270 part-time special classes in regular education settings. At least 50,000 children with learning difficulties receive part-time remedial education in classes or clinics in general education schools.

The current status of special education programs in Swaziland, Eritrea, Kenya, and Zambia is unknown. However, information from respondents to a survey on school psychology practices in these countries (Mpofu et al., 1997) suggests special education programs may be better established in Kenya than in other East and Southern African countries. Such programs generally are limited to urban areas in Zambia, and may not exist to any significant degree in Swaziland and Eritrea.

Although the need for more special education facilities in all of the East and Southern African countries is quite apparent, a paradox exists in that attendance is below capacity in many existing special education schools and units in some countries, including Tanzania and Lesotho (Kisanji, 1995; Stubbs, 1997). This under-utilization exists because the facilities are not well-known to parents of children with disabilities and parents in some rural communities are suspicious of their intended purposes. In addition, government departments and international aid agencies often established special education schools and units in certain communities in response to requests by local politicians or parochial interest groups, but without adequate consultation with traditional and other community leaders. Thus, resistance to utilizing these facilities often occurs regardless of their need.

Some countries in this region have mounted comprehensive community outreach programs aimed at educating citizens on the nature of disabilities, their prevention, and appropriate educational interventions. In addition, teachers have walked from village to village to locate children with disabilities to attend school (Kisanji, 1995). The teachers' door-to-door, village-to-village approach can effectively reach families and significant community leaders, and it often yielded larger enrollments of children with disabilities in areas that seem to have few if any such children.

Future Prospects of Special Education in East and Southern Africa

Nearly all countries in East and Southern Africa provide some forms of special education programs. The work of Christian missionaries and nongovernmental agencies often resulted in the establishment of special education programs. The continued involvement of missionaries, although desired, is unlikely to match prior levels of involvement. Nongovernmental agencies increasingly are recognized by international agencies (like the United Nations and the World Bank) as effective implementers of needed social programs. Although their involvement is likely to continue for some years, their resources also are limited in time. Thus, special education programs in this large and important region must depend more heavily, if not exclusively, on local and regional resolve and resources.

A government's involvement in special education programs and teacher preparation programs (through policies enacted and funded by its legislature and implemented by its ministries of education) provides demonstrable evidence that they support special education as an essential component of its national education program. Although the degree to which federal governments are involved in

special education programs differs among the 12 countries within this region, all are involved to some degree. However, beneficial policies often are enacted and are either not funded or not implemented by ministries of education. For example, the governments of Uganda and Botswana both established policy underscoring the importance of school attendance among children with disabilities as a national priority. However, this policy remains to be implemented.

The adoption of the principle of universal primary education by these governments implicitly recognizes children with disabilities as having the right to education. This, and other positive trends in educational thinking, eventually can be expected to translate into more favorable policies and practices governing special education programs. Moreover, most governments continue to support the further development of their elementary and secondary regular education programs—conditions prerequisite to the strong support of special education programs. Thus, prospects for the continued growth and availability of special education programs in these countries are somewhat encouraging.

However, one should not underestimate impediments to the further development of sustainable special education programs in East and Southern Africa. These impediments include inadequate personnel and financial resources for the provision of basic and regular education and inadequate leadership from advocacy groups.

Given other pressing responsibilities, federal governments in this region are unlikely to prioritize special education programs without some form of external support. Uncertainty exists as to the willingness and commitment of some governments to fund special education programs at current or higher levels than that currently provided by international development agencies (like DANIDA and SIDA).

The sustainability of donor-supported special education programs in East and Southern Africa will depend on the extent to which donor agencies build into their aid packages policies and practices that cultivate a cadre of local personnel willing to lobby for future programs, to implement genuine partnerships with federal and regional government to establish and maintain special education programs, to employ phased donor-funding withdrawal, and to help developing vibrant self-advocacy organizations at the local and national levels. For example, the Swedish Federation for the Blind has financed an advisory project in Eastern Africa aimed at improving the organization and self-advocacy of persons with disabilities (Ross, 1988).

Greater involvement of parents and community members in founding special education schools and integration units would strengthen a sense of ownership for special education facilities in communities, leading to greater attendance and school retention. In addition, the importance of community education programs on disabilities to the future of special education programs in East and Southern Africa cannot be overemphasized. Most parents of children with disabilities are not involved with any special interest groups or agencies providing special education services (Kisanji, 1995; Ross, 1988).

The significantly limited material and manpower resources within most of these countries constrain the establishment and growth of special education programs (Ross, 1988; Tungaraza, 1994). Most countries are grappling with the provision of basic education and health facilities. The countries have very few personnel specifically prepared to work with children with disabilities in either special or mainstream school settings. The future of special education programs in the region could be considerably enhanced if countries pooled resources to promote professional preparation and research on effective methods to promote basic education of students in special education.

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AFRICA, SPECIAL EDUCATION

Special education is relatively new in most African countries. The need for a major commitment to special education by African countries to provide handicapped learners with a variety of programs and services has been recognized for some time now (Anderson, 1983; Joy, 1979; Shown, 1980; UNESCO, 1979, 1986), though progress toward realization has been slow and halting. The UNESCO definition of special education is one that generally adheres to western European and American expectations. Thus the Nigerian National Policy on Education (1981) has defined special education as "education of children and adults who have learning difficulties as a result of not coping with the normal school organization and methods" (Nigerian Year Book, 1984). In Nigeria's Plateau State (Nigeria), special education is defined as including "the course and content of education, including specially defined classroom, material, and equipment designed to meet the unique needs of a handicapped child" (Shown, 1986).

Despite such broad perspectives, special education in Africa is more likely to be concerned with children who are physically and sensorially handicapped rather than suffering from mild cognitive deficits. Children with more severe cognitive deficits are likely to be cared for in other contexts than those of formal special education. Expressing this fact, Shown observes: "To acquire education in the modern sense one must possess and make full use of all his senses. This is beside being fully mobile" (Shown, 1980). Sambo (1981) has pointed out "when one loses two or more of these senses, then the acquisition of education in the normal sense becomes a problem entirely different from those problems normally encountered in the acquisition of education. For such a person, there is a need for a viable alternative for educating him."

Anderson (1973) observed that the majority of African teachers were not familiar with the special techniques and methods required to assist handicapped students to become educationally competent. Furthermore, as Shown (1986) has pointed out, a lack of clear educational objectives has hampered the delivery of educational services to handicapped learners.

Because most African nations have faced major fiscal difficulties for many years, improvements in special education have been difficult to achieve. Nations like Nigeria have, however, made serious efforts at both federal and local levels to teach the elements of special education in teacher training institutions (Nigeria Federal Ministry, 1977). Nigeria has established training programs at the universities of Jos and Ibadan. These universities provide training and research on scientific education of the handicapped at undergraduate and graduate levels.

In most places in Africa, there are not likely to be clearly defined admission policies for the handicapped or age limits for education of the handicapped as it now exists in Africa. It is not uncommon, therefore, to find a handicapped adult in a special education class with much younger students. Furthermore, the personnel providing special education services are likely to come from the middle or lower ranks of school staffs rather than the higher. The burden of education for handicapped students is thus frequently carried by less well-trained aides and members of the local community, rather than by highly skilled teachers.

Special education teachers working in regular school settings have been reported to be facing emotional and psychological problems (Joy, 1972). They may face neglect and even hostility on the part of other teachers who resent having handicapped students and special education teachers in regular schools. Also, nonspecialist teachers are often resentful of the fact that special education teachers receive extra pay.

Many of the special education services provided in Africa on a noninstitutional basis must be on an itinerant basis because of the scarcity of educational facilities able to serve handicapped students. A dearth of itinerant teachers has limited the extent and effectiveness of such education. Recent efforts have been made in certain African countries to mainstream handicapped students. Thus the Federal Ministry of Information, Lagos, Nigeria (1977) mandates that handicapped school children, where possible, should be mainstreamed along with their nonhandicapped peers. Some African educators have expressed disagreement with this policy (Shown, 1980). There is concern about the dangers that the physical hazards of African terrain may pose for mainstreamed handicapped students who are not carefully supervised, for example, most parts of Nigeria have dangerous structures and hazards such as rocks, forests, and rivers. Also, the application of mainstreaming policies in Africa places an inordinate burden on most handicapped students unless they are able to use the same materials as their nonhandicapped peers or can be assisted to achieve comparable levels of attainment; this is difficult to achieve in light of the current dearth of trained professionals and the lack of proper facilities and materials. As UNESCO has pointed out (1979), mere physical placement in a mainstreamed school environment is not an answer to providing services to handicapped African children. Provisions at African colleges for handicapped students are essentially nonexistent. There are no ramps, suitable steps elevators, or toilet facilities with special accommodations.

Despite efforts to improve the education of the handicapped, the outlook of Africans respecting the needs of handicapped students and adults is not such as to raise hopes for serious concern regarding their transition into productive roles in society. As Shown has observed regarding the largest nation in Africa, "Nigerians are immensely practical people calling something or someone only if it is seen to be economically useful. With this in mind, the outlook for the handicapped would seem to be bleak" (Shown, 1980).

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See also **Nigeria, Special Education in**

AFRICA, SUB-SAHARAN, SPECIAL EDUCATION IN

Special education is a recognized educational service by a majority of the national governments of the 36 countries of sub-Saharan Africa. National governments in sub-Saharan Africa consider special education as the provision of access to the regular educational curriculum through the adaptation or modification of methods, equipment, and physical environment to meet the unique learning needs of students with disabilities (Mpofu, Oakland, & Chimedza, 2000). They also define *special education* to include the provision of special or modified curriculum and appropriate intervention to modify the social structure and emotional climate in which education takes place (Jere, 2005).

Definitions of *special educational needs* by the national governments in sub-Saharan African countries tend to be inclusive of the effects of socioeconomic deprivation experienced by millions of African children who may not necessarily have physical, sensory, or cognitive impairments. For example, the South African Department of Education has adopted barriers to learning and development as a perspective to understanding special educational needs. The barriers to learning perspective focus on person-environment interactions to special needs education. It considers special educational needs to be located in the child (e.g., a disability), within the school (e.g., lack of resources, lack of trained teachers) or within the broader social, economic, and political context (e.g., poverty; Department of Education, 1997; Engelbretcht, 2005; Muthukrishna & Schoeman, 2000).

The governments of Cameroon and Ethiopia consider special needs to include the habilitation and rehabilitation of children in poverty, including street children (Tchombe, 2005; Teferra, 2005). However, regardless of any differences in the definition of *special educational needs* among African countries, students with physical, sensory, or cognitive impairments are more likely to receive special needs education in school and other community settings (Mpofu et al., 2000). Children with emotional-behavioral disorders or giftedness tend to not be recognized by the national governments as having special educational needs and are not well served (Jere, 2005; Mpofu, Mutepfa, Chireshe, & Kasayira, 2007; Mpofu, Peltzer, Shumba, Serpell, & Mogaji, 2005; Tchombe, 2005).

There are no reliable national disability prevalence data in all countries in sub-Saharan Africa (Mpofu et al., 2000). We estimate that less than 1% of students with disabilities in sub-Saharan Africa receive special education services. For example, about 14,000 of 1.5 million children of school-going age receive special education services in Zambia, 70,000 of about 3 million students in Zimbabwe, and 5,000 of 1.2 million students in Cameroon. Sub-Saharan Africa has an estimated total population of 682 million people, about two-thirds (or about 400 million) of which are children under the age of 15 (United Nations Population Division, 2004). The World Health Organization (WHO; 1980) estimates that 10% of the general population or 70 million citizens of sub-Saharan Africans have significant disabilities. At least 42 million of people with disabilities in sub-Saharan are children under the age of 15.

A majority of the national governments in sub-Saharan Africa have adopted policies on special needs education. Variability among the countries in this region in the development of special needs policies is considerable. Countries that have relatively more advanced formal education systems (e.g., Kenya, Nigeria, South Africa, Zimbabwe) tend to have more elaborate special education policies than those with relatively less-developed education systems (e.g., Angola, Democratic Republic of the Congo, Somalia; Mpofu, Zindi, Oakland, & Peresuh, 1997; Mpofu et al., 2005). None of the countries in sub-Saharan Africa has special education or other legislation mandating that students with special educational needs receive the services they need. Thus, despite the fact that national governments in sub-Saharan Africa have adopted special education policies, special education services are not available to the vast majority of children in the region.

Assessment services for special educational needs are barely available to children with special needs in sub-Saharan Africa (Mpofu, 2001, 2004; Mpofu et al., 1997). The few children born at hospitals may have their disability noted by a physician. However, that information may not be available to the teachers at school enrollment, and, often, the physician's diagnosis does not address any education related issues. Traditional midwives in the villages deliver the vast majority of children born in sub-Saharan Africa, and the children's special education needs may go unnoticed or be ascribed by family to metaphysical forces that require spiritual assistance (Mpofu, 2003). A tiny minority of children with disabilities in countries with more-developed special education services (e.g., South Africa, Zambia, Zimbabwe) receive psychoeducational assessment from professionals (Mpofu, 1996, 2004; Mpofu et al., 1997, 2005; Mpofu & Nyanungo, 1998). Parents of students with special education needs are often minimally involved in both the assessment and subsequent education intervention (Mpofu et al., 1997; Oakland, Mpofu, Glasgow, & Jumel, 2003). In many cases, the parents defer to the special education and allied professionals who they accord the same respect as medical doctors or traditional healers (Mpofu, 2000, 2001, 2003).

Where special education services are available, they are offered at special day schools, residential special schools, special classes in regular schools, integrated schools, or other inclusive settings (Mpofu et al., 1997, 2000; Teferra, 2005). The schools and the classes are typically overcrowded, ill equipped, and understaffed (Mutepfa, 2005; Teferra, 2005; Tchombe, 2005). The vast majority of teachers providing education to children with special educational needs in sub-Saharan Africa are not trained in special needs education. Most of the countries in

sub-Saharan Africa have no teacher education programs in special needs education, and those that do (e.g., Ethiopia, Kenya, Nigeria, South Africa, Zambia, and Zimbabwe) qualify a very small number relative to need. A good starting point in making special needs education training available to a majority of teachers in sub-Saharan Africa would be through the infusion of special needs education into all preservice teacher education programs and provision of certificate courses in special education to teachers already in service.

Special education services in sub-Saharan Africa barely exist. The limited services available are likely to be found in the few countries with better-developed educational infrastructures. The fact that most national governments in the region have special education policies suggests that the long-term prospects for the development of special education in sub-Saharan Africa are good.

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AGAMMAGLOBULINEMIAS

Primary agammaglobulinemias are a group of rare immune deficiencies characterized by a lack of antibodies to fight disease and by dysfunction of B lymphocytes (specialized white blood cells that produce antibodies). Other names for this syndrome include antibody deficiency, gammaglobulin deficiency, and immunoglobulin deficiency. There are many subdivisions of primary agammaglobulinemia that describe the specific deficiency in a given patient. Acquired immunodeficiency syndrome (AIDS) is perhaps the most well known of these subdivisions.

Antibodies, which are vital to the body's ability to fight disease, are responsible for killing any foreign cells that enter the body, such as bacteria, viruses, and other toxic substances. Thus, they protect the body from disease and form the basis of the immune system. These antibodies are composed of immunoglobulins—proteins that are produced internally by cells such as B lymphocytes. These B lymphocytes, in addition to T lymphocytes (better known as killer T cells), search out these foreign cells and produce antibodies that are tailored to kill the specific invading cell. When the function of these lymphocytes is suppressed due to an immunoglobulin deficiency such as in the case of primary agammaglobulinemia, the body is increasingly subject to infection.

In some cases, this condition has been linked to genetic inheritance (Smart & Ochs, 1997). It can also be caused by the presence of a secondary condition that impairs the immune system, by an autoimmune disease, or by abnormally excessive cell growth.

Characteristics

1. Weakened immune system
2. Susceptibility to infection and illness
3. Lack of gammaglobulins
4. Inability to produce antibodies

Treatment for primary agammaglobulinemia ranges with the specific subdivision of the disease. The overall goal, however, is to reduce the number and severity of infections—without treatment, a minor infection can become severe and eventually fatal. Patients are usually given gamma globulins to supplement the immune system. These may come in injection form, or in cases in which gamma globulins are needed quickly, they may be given by plasma transfusion directly into a vein, because many antibodies are contained in plasma. In cases in which an infection is already in progress, patients can be given high-titer gamma globulin in high doses and antibiotics in the case of bacterial infections. The lives of many people with primary agammaglobulinemia have been improved with proper treatments.

Schoolchildren with primary agammaglobulinemia will need special care and special precautions. These children may be undergoing regular treatments to receive gamma globulins to boost their immune systems; therefore, they may need to miss abnormally large amounts of school for doctor's appointments, tests, and hospital stays. However, perhaps more important is that the parents and teachers of children with primary agammaglobulinemia will have to be extraordinarily vigilant to minimize the chances of exposure to sickness and infection for the child; this is indeed a very daunting task. Additionally, it requires the child to be aware of his or her condition, to be able to explain it, to have the confidence to refuse contact with peers who may be sick, and to be able to take steps to prevent infections in day-to-day life. Peers of a child with primary agammaglobulinemia may need to be educated about the disorder, and an affected child will most certainly need family support and counseling to aid in attempts to normalize day-to-day life.

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AGE-APPROPRIATE CURRICULUM

An age-appropriate curriculum is the concept of matching educational activities to both a student's chronological age and developmental or skill levels. Teachers sometimes face difficulties when applying this concept to older students with significant intellectual delay and developmental disabilities (IDD). Students with significant IDD often function at preschool ability levels and require training in fine motor, cognitive, and language skills. Acquiring skills that can be used immediately and will transfer to later community and vocational placements (Bruce, Campbell, & Sullivan, 2009; Drew, Logan, & Hardman, 1984) is important for students with signficant intellectual disabilities. Preschool "looking" materials such as cartoons or early childhood references are not always appropriate for older students and may be stigmatizing. Teachers must expose students to environments and settings that promote acquisition of skill deficits while planning and modifying age-appropriate curriculums to meet the student at his or her current functioning level.

The Education for All Handicapped Children Act (P.L. 94-142), and its successors, the Individuals with

Disabilities Education Improvement Act (IDEIA, 2004), both mandate an appropriate education for all students with disabilities, but wide differences remain when defining this term. Students with significant intellectual disabilities are often expected to be educated with nondisabled peers in general education settings (McSheehan, Sonnenmeier, Jorgensen, & Turner, 2006). Many concerns arise when focusing on the rigorous curriculum and peer cultures which both increase at rapid rates causing students with significant disabilities to sometimes get teased or "left out" of social groups (Carter & Kennedy, 2006). Teachers at the secondary level struggle to create a age-appropriate curriculum that equals access to the typical life experiences of the nondisabled peers at home, in the community, and during vocational and recreational pursuits (Carter & Kennedy, 2006). Although it may appear unrealistic to teach age-appropriate behaviors to students with severe developmental delays, Larsen and Jackson (1981) argue that this is the mission of special education: "No, we will not be completely successful (but)... our goals for students will stress skills relevant to the general culture, rather than skills that have a proven value only in special-education classrooms" (p. 1).

Our current knowledge of developmental milestones, task analysis procedures, and behavior modification principles can be used in adopting this approach by examining the age appropriateness of the materials, skills, activities, environments, and reinforcers used during instruction. For example, in learning visual discrimination of shapes, elementary-age students may use form boards and shape sorters, while older students use community signs and mosaic art activities. For other skills, calculators may be used instead of number lines, colored clothing can be sorted rather than colored cubes, and the assembly of vocational products may replace peg boards and beads (Bates, Renzaglia, & Wehman, 1981).

Because certain skills are difficult for older students with intellectual developmental disabilities to acquire (e.g., reading a newspaper or independently buying groceries), curriculum should focus on related abilities that can be learned (e.g., reading survival signs or following directions) to enhance future vocational and community skills. To identify these skills for each group of students, Brown et al. (1979) employs an ecological inventory approach listing the environments and subenvironments where the students currently (or will eventually) function. An inventory of the activities in each environment and a listing of skills needed to participate in those activities provide the framework for selecting curriculum goals. In this approach, for example, the basic skill of matching pictures leads to finding grooming items in a drugstore. Identifying different foods can lead to ordering in a restaurant with picture menus.

Students may experience extremely slow learning rates and much difficulty in generalizing learning skills to new situations. Therefore, the education of students with signficant disabilities must include teaching critical skill clusters and providing opportunities to practice functional skills in natural settings, such as: employment or vocational simulations, supermarkets, and accessing public transportation. For a more-detailed description of curricular approaches to teaching functional skill clusters, see Guess and Noonan (1982).

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See also **Adaptive Behavior; Functional Instruction; Functional Skills Training; Mental Retardation**

AGE AT ONSET

Age at onset refers to the point in an individual's life when a specific condition began. Age at onset can be compared with a child's chronological age to establish the duration of a condition. It is a significant variable in making diagnostic judgments and prognostic statements. Within a school setting, age at onset is typically a consideration in: (1) understanding behavioral disorders; (2) understanding the prognosis for adequate intellectual and learning performance in children with neurologic and chronic medical conditions; and (3) assessing and programming for children with learning disabilities.

In the assessment of behavioral difficulties, it is important to have an adequate history of the disorder, including an estimate of when the child began experiencing difficulties. Knowledge of age at onset allows one to assess the relationship between changes and other significant occurrences in the child's life (e.g., Did difficulties start when a sibling was born? When the child entered school?). Some psychopathologic conditions typically occurring at age of onset, and significance. For example, infrequent nightmares are not pathognomonic, in fact, they are normal in a 3-year-old child (Lowrey, 1978). Infantile autism, by definition, has an age of onset prior to 18 months of age (Barbaro & Dissanayake, 2009). For many disorders, age of onset will influence diagnostic decisions, treatment choices, and prognostications.

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See also **Medical History; Mental Status Exams**

AGENESIS OF THE CORPUS CALLOSUM

Agenesis of the corpus callosum (ACC) is a congenital disorder characterized by partial to complete absence of the corpus callosum. The incidence of the disorder is difficult to estimate because many individuals with ACC are relatively asymptomatic and may never present for evaluation. However, Ashwal (1994) reports that ACC occurs in approximately 1 to 3 births per 1,000.

Characteristics

1. The central diagnostic features on magnetic resonance imaging (MRI) or CT scan are partial to total absence of the corpus callosum. The septum pellucidum is also typically absent. The lateral ventricles are shifted laterally, leaving a large subarachnoid interhemispheric space. The third ventricle is enlarged. The occipital horns of the lateral ventricles are dilated, creating an appearance resembling rabbit ears or teardrops.
2. Commissural fibers that form remain ipsilateral, creating large bundles of Probst.
3. In isolation, ACC is not life threatening and may produce little if any clinically significant symptomatology.
4. ACC is often associated with or the consequence of other congenital anomalies that can result in a wide variety of symptoms ranging from mild cognitive dysfunction to intellectual disability to failure to thrive and death.

Multiple etiologies have been reported for ACC. Sporadic cases may result from vascular or inflammatory lesions; those occurring prior to the 10th to 12th week of gestation result in complete agenesis, whereas later occurring lesions result in partial dysgenesis (Gupta & Lilford, 1995). Sporadic cases have also been found in association with fetal alcohol syndrome, Dandy-Walker syndrome, Leigh's syndrome, Arnold-Chiari II syndrome, maternal toxoplasmosis, maternal rubella, and inborn errors of metabolism (Gupta & Lilford, 1995). Callosal lipoma has been reported to mechanically block the decussation of callosal fibers. Factors affecting neuronal differentiation and migration can affect callosal development as well (Utsunomiya, Ogasawara, Hayashi, Hashimoto, & Okazaki, 1997). ACC can be transmitted as an autosomal dominant or sex-linked trait, or by means of genetic abnormalities of Chromosomes 8, 11, and 13–15. Given these multiple etiologies, ACC can be found to occur (a) in isolation, (b) in combination with other CNS and somatic anomalies, or (c) as a central feature of another syndrome.

When ACC occurs in isolation (Type I), it is relatively asymptomatic. Often, the diagnosis is made as a coincidental finding. However, on very detailed cognitive tasks, subtle difficulties with bimanual coordination and interhemispheric transfer of sensorimotor information have been reported (Klaas, Hannay, Caroselli, &

Fletcher, 1999; Sauerwein & Lassonde, 1994). In keeping with Rourke's theory of white matter dysfunction as a potential cause of nonverbal learning disability (NVLD), an association between ACC and NVLD has been suggested, but thus far, a causal association has not been substantiated (Smith & Rourke, 1995). Several mechanisms have been suggested for the relative lack of symptoms in these individuals, including (a) less hemispheric specialization, leading to bilateral representation of cognitive functions; (b) simple behavioral compensation (e.g., "crossed" self-cueing); (c) greater reliance on ipsilateral pathways; (d) greater reliance on subcortical pathways (e.g., collicular, thalamic, etc.); and (e) greater reliance on the anterior and posterior commissures (Smith & Rourke, 1995).

ACC can also occur in combination with a variety of other congenital anomalies (Type II). Gupta and Lilford (1995) report that up to 85% of postmortem cases of ACC also show other CNS abnormalities. Seizures occur in approximately 42% of Type II cases. Associated neurological problems include hydrocephalus, heterotopias, cortical dysplasia, porencephaly, pachygyria, and micrencephaly (Utsunomiya et al., 1997). ACC is a characteristic feature of Aicardi, Andermann, and Sharpiro syndromes (Ashwal, 1994). In general, the constellation of neurological and neuropsychological findings in the Type II group is more dependent on the comorbid abnormalities than on ACC per se.

ACC and associated anomalies can be identified prenatally by transvaginal sonography and CT scan. After ACC is identified, genetic testing and counseling are recommended. Children identified with ACC in isolation have an excellent prognosis for normal intellectual development and for living a normal and productive life. When severe CNS and somatic abnormalities are identified, difficult questions regarding continuation of pregnancy may arise (Gupta & Lilford, 1995). Often, symptoms of Type II ACC are easily observable at birth and are generally diagnosed by the age of 2 years. Children who manifest developmental delays and seizures should also be screened for metabolic disorders (National Institute of Neurological Disorders and Stroke [NINDS], 2000). Treatment and special education considerations of ACC are largely dependent on the nature and severity of the associated anomalies in a given individual.

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AGE OF MAJORITY

The age of majority is important in special education because the rights to make educational decisions transfers from a parent to their student. The transfer of rights is explained in the Code of Federal Regulations (CFR) under 34 CFR 300.520, the section dealing with Procedural Safeguards and 34 CFR 300.320, the section dealing with individualized education programs (IEPs).

These rights are explained to parents and students in the Procedural Safeguards of each state as directed by 34 CFR 300.520. This section of the Code of Federal Regulations address the fact that both the parent and child should be notified of the transfer of parental rights listed under Part B of IDEA at the age of majority. In addition, this section also explains that regardless of the age of majority set by each state, parental rights transfer to the student if the student is incarcerated in an adult or juvenile, state, or local correctional institute, and the child and parent must be notified of the transfer of parental rights to the child. Finally, this regulation requires each state to detail a process by which a parent or other appropriate individual may acquire the parental rights listed under Part B of IDEA when a student has been judged to be incompetent or not to be able to give informed consent at the age of majority.

The transfer of parental rights at age of majority is also discussed in 34 CFR 300.320, the definition of individualized education programs. This part of the Federal Code adds that the transfer of parental rights at age of majority must be included in an IEP not later than 1 year before the child reaches the age of majority. Furthermore, a statement in the IEP must detail which rights transfer.

The age of majority is not defined in the CFR, however most states set the age of majority at 18 (Kochar-Bryant, Bassett, & Webb, 2009). Alabama, Delaware, and Nebraska set the age of majority at 19, while Arkansas, Nevada, Ohio, Tennessee, Utah, Virginia, and Wisconsin set the age of majority at the later of 18 or graduation from high school (Goldberg, 2010).

Given that students will retain the rights formerly given to the parents, it is incumbent upon both school and parents to involve youth in a meaningful way in IEP transition planning. Research indicates that students of all cognitive levels can be involved in the transition process in meaningful ways but often are not included (Walker & Child, 2008). Students who are included in the transition process become trained in self-determination, which has been shown to lead to better post school outcomes (Whemeyer & Palmer, 2003). One method of planning that may facilitate self-determination is person centered planning, in which a lead role is taken by the student or family and authority is lessened for a teacher or service provider (Holburn, Jacobson, Schwartz, Flory, & Vietze, 2004).

To review, CFR 300.520 and CFR 300.320 define the requirements for all states regarding transfer of rights at the age of majority. States are required to send parents notice of the transfer of rights at least 1 year before the student's age of majority, which varies from state to state. Upon age of majority all rights under Part B of the Individuals with Disabilities Education Act transfer to the student, unless it is determined that the student is incompetent or is determined not to have the ability to give informed consent as determined by a process decided by each state. The transfer of rights before the age of majority can occur if a student is incarcerated in a juvenile or adult facility; the parents must be notified of the transfer of rights. Rights which transfer to the student at the age of majority include placement, evaluation, programming, mediation and due process (Test, Aspel, & Everson, 2006) and must be included in the IEP. Again, for a parent to retain educational rights, a student must either be declared incompetent or determined to not have the ability to give informed consent. It is important for parents to understand that rights transfer regardless of disability.

Parents may retain educational rights by seeking guardianship through legal means. A guardian is empowered to make all decisions for the student, and under limited guardianship, students may retain certain rights (Test, Aspel, & Everson, 2006). Other options to guardianship include: Power of Attorney, Durable Power of Attorney, Durable Power of Attorney over Health Care, Directive to Physician, Management of Community Property, Money Management, Social Security Representative Payment program, Trusts, and Consent to Authorize Advocacy (Guardianship, n.d.). It is important to understand the alternatives to guardianship because some argue that guardianship is disability-based discrimination (Salzman, 2010) and guardianship is diametrically opposed to self-determination (Millar, 2007).

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AGGRESSION

Research investigating aggression offers various overlapping definitions of the word *aggression*. Many accept the definition of aggression to be a form of behavior directed toward the goal of harming or injuring another living being who is motivated to avoid such treatment. (Baron & Richardson, 2004).

Different forms of aggression exist (Kempes, 2011). Direct, overt aggression occurs when both the perpetrator and the victim are present (e.g., acts of physical aggression as when a child physically hits another child). Indirect, covert aggression includes the presence of a third person who acts as a facilitator of the aggressive act (e.g., a child who starts a rumor about another child; Juvonen & Graham, 2001). Physical aggression may be thought of as reactive or proactive aggression. Proactive aggression is defined as behavior that anticipates a reward, while reactive aggression derives from the frustration-aggression model of Berkowitz (Kempes, 2011). Specifically, reactive physical aggression refers to an immediate display of violent behavior in response to another's actions. It does not involve premeditated planning. Proactive physical aggression is planned aggression (Clarke, 2004; Conner, Steingard, Anderson, & Melloni, 2003; Vitaro, Brendgen, & Tremblay, 2002).

Aggression may also be thought of as including physical, relational, or verbal. Physical aggression includes acts completed with physical force (e.g., to hit someone, to throw something, to kick something, or to push someone). Verbal aggression includes acts of saying something harmful directly to someone (e.g., insulting someone or saying "I hate you!"). Relational aggression uses peer relationships as ammunition for the aggressive act (e.g., telling someone that he or she cannot be one's friend; Juvonen & Graham, 2001; Monks, Ruiz, & Val, 2002). Turngay (2009) found verbal aggression to be more common in patients with Oppositional Defiant Disorder (ODD). Many patients with ODD have mild physical aggression but do not meet the criteria for Conduct Disorder (CD). Serious, ongoing physical aggression is more commonly associated with CD (Turgay, 2009).

Those who engage in physical aggression are more likely to be males (Juvonen & Graham, 2001; McEvoy et al., 2003; Monks et al., 2002), older, and physically larger than their victims. However, controversy exists regarding the extent to which victims are physically weaker than their attackers (Juvonen & Graham, 2001; Monks et al., 2002). Some research found that victims of physical aggression are not physically weaker than nonvictims (Monks et al., 2002), while other studies found that victims are physically weaker than nonvictims (Juvonen & Graham, 2001).

Aggressive acts are common among very young children. Childhood aggression is a behavioral characteristic associated with different psychosocial problems. These problems often continue into adulthood and have negative effects on society (White, 2011). Aggressive and violent behavior could lead to a diagnosis of and are characteristic of Disruptive Behavior Disorders (DBD) or juvenile delinquency. During childhood, aggression is more severe within the home. By the time children reach adolescence aggressive behavior can also become severe in school (Turgay, 2009).

ODD behaviors are more severe and frequent than typical childhood disobedience, and CD behaviors are more severe than those associated ODD. The rate of ODD in children and adolescents has been reported to be between 2% and 16% (Turgay, 2009). In early childhood, ODD is characterized by frequent, severe temper tantrums and an intolerance of frustration. Children who have been diagnosed with ODD commonly exhibit severe and frequent aggression (Lumley, McNeil, Herschell, & Bahl, 2002). ODD is more common in males than in females.

Young children engage in physical aggression the most between the ages of 2 and 4 (Burt, 2011.) Young females often exhibit more relational aggression than physical or verbal aggression (e.g., verbal threats). Females are more physically aggressive than verbally aggressive. Likewise, males engage in physical aggression most often and verbal aggression least often (Monks et al., 2002). After age 3, boys are more likely than girls to engage in both aggressive and nonaggressive antisocial behaviors (National Institute of Mental Health, 2006).

Perpetrators and victims of aggression are at risk for negative outcomes. For example, young children who engage in aggressive acts tend to be less socially accepted than their less aggressive peers (Monks et al., 2002). Similarly, according to the National Institute of Mental Health (NIMH), one's peer group influences his or her engagement in youth violence. Home factors also can contribute to youth violence (http://www.nimh.nih.gov).

Aggression is more common among individuals with disabilities than the general population. (Brosnan, 2010). It is also one of the most difficult behaviors to treat (Matson, 2005). Aggression reflects social and personal problems that have the potential for serious negative outcomes. Aggression imposes a grave personal cost to the individual and a great expense to the community and society. Some aggressive children and adolescents with ODD are likely to be associated with low self-esteem, low frustration tolerance, temper outbursts, poor peer relations and, eventually, poor school performance (Turgay, 2009). Aggression can have serious short-term and long-term consequences to the quality of life experienced by the individual exhibiting aggressive behavior. Thus, aggressive behaviors are most likely to be identified for intervention (Brosnan, 2010) since 16% of the school age population are identified with problems in the area of aggression (Reynolds, Kamphause, 2004).

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See also **Behavior Disorder**

AGORAPHOBIA

Agoraphobia (Greek for fear of the market) is fear of being alone in places or situations in which the individual believes that escape might be difficult or embarrassing or in which help may not be available in the event that the individual experiences panic-like symptoms. The fear leads to an avoidance of a variety of situations that could include riding a bus, going into a school building, maintaining attendance for the complete school day, being on a bridge or in an elevator, and riding in cars or attendance at special events like field trips or performances. Children in particular may come up with their own "treatment" for the disorder, in the form of rules—not riding in other people's cars, not waiting in lines, not going to birthday parties, and so on—that are difficult for family members to accommodate.

The 1-year prevalence rate for anxiety disorders in children ages 9–17 is 13% (U.S. Department of Health and Human Services, 2000). In 95% of clinical populations, agoraphobia is frequently diagnosed with a concurrent panic disorder. Two thirds of individuals with agoraphobia are female. Symptoms typically develop in later adolescence (ages 17–18) into midadulthood, so agoraphobia is infrequently diagnosed in young children. The median age for onset of agoraphobia is 27 years of age. The onset may be sudden or gradual in nature. People with agoraphobia often develop the disorder after first experiencing one or more panic attacks without warning; this makes it impossible for them to predict what situation will trigger such a reaction, so the fear is often tied to many possible situations.

Characteristics

1. Focus of anxiety is on being in situations or places from which escape may not be available in the event an individual experiences incapacitating

or extremely embarrassing panic-like symptoms. Fears typically involve clusters of situations.

2. Situations are endured under great duress or with anxiety associated with the fear of experiencing a panic attack. The individual may require the presence of a companion in order to move about normally.
3. Symptoms are not due to the direct physiological effects of medications or other substances or to a medical condition.
4. If an associated medical condition is present (e.g., severe allergy), the fear of being incapacitated or embarrassed by the development of symptoms is clearly in excess of that usually associated with the condition.

(Adapted from American Psychiatric Association, 1994)

The most widely used treatments for phobias consist of behavioral, cognitive-behavioral, and pharmacological interventions. There is relatively little research on the efficacy of traditional psychotherapy in the treatment of agoraphobia (Kendall et al., 1997). The most recent large sample trials of treatments for all anxiety disorders point to the efficacy of behavioral and cognitive-behavioral therapy (CBT). For childhood-onset phobias, contingency management was the only intervention deemed to be well established. Other therapies showing good support in the literature include systematic desensitization, modeling and observational learning, and several cognitive-behavior therapies (CBT). These treatments often incorporate the individual's progressive exposure to fear- or anxiety-provoking stimuli. Graduated exposure, response prevention, and relaxation training have shown consistent positive treatment effects for the disorder. Cognitive therapy, which addresses patterns of cognitive distortions and their relationship to worsening symptoms, has also been effective when the child or adolescent is motivated and able to identify his or her own thoughts and feelings and when extended time is available for treatment. Recently, a parent-training component added to CBT intervention significantly enhanced treatment outcomes when compared with CBT alone (Barrett, Dadds, & Rapee, 1996).

Medical treatments for agoraphobia may involve the use of selective serotonin reuptake inhibitors (SSRIs) such as Prozac, Paxil, Celexa, Zoloft, and Luvox. They generally require 6–8 weeks to achieve effectiveness and need to be periodically monitored for effectiveness. Neither trycyclic antidepressants (Aventyl, Norpramine, and imipramine) nor benzodiazpines have been shown to be more effective than placebo in children, although they may be used to a lesser extent for relief of multiple symptoms.

Special education services may be available to students diagnosed with agoraphobia under specific categories of Other Health Impaired, Severe Emotional Disurbance, or Behavior Disorder if an impact on the child's education can be established; this may be particularly important if the disorder is chronic in nature. Accommodations may also be requested and provided under Section 504 of the Rehabilitation Act of 1973. Due to the nature and scope of the disorder, school attendance may become problematic. Families can benefit from additional counseling and support to effectively implement a treatment plan across both school and home settings.

There is some speculation that early onset of separation anxiety disorder in children is associated with the development of agoraphobia in adolescence and adulthood. Although data on the course of agoraphobia are lacking, retrospective patient accounts indicate that it appears to be a chronic condition that waxes and wanes in severity. Unfortunately, the chronicity of the disorder may be due in part to the lack of appropriate treatment.

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AGRAPHIA

The *Encyclopedia of Education* (1915) defined *agraphia* as a disorder of the associations of speech in which there is a partial or complete inability to express ideas by means of written symbols in an individual who had previously acquired this mode of speech expression. More recent definitions describe agraphia as the loss or impairment of the ability to produce written language and is the result of a central nervous system dysfunction (Acree & Johnson, 2003). Agraphia is often associated with apraxia and with so-called motor aphasia.

Orton (1937) distinguished between motor agraphia and development agraphia, or special writing disability. Orton defined motor agraphia as the loss of ability to write restricted to the motor component of writing. Orton

attributed this problem to dysfunction in relevant motor control areas of the brain without accompanying dysfunction in nearby speech functioning areas. Developmental agraphia was said to manifest itself in one of two ways: the first instance characterized by an unusually slow rate of writing; the second characterized by quality of writing. Orton suggested that "shifted sinistrals," or enforced training of the right hand in left-hand children, may result in slow writing. In other cases, the lack of dominant handedness was said to result in writing problems.

Strauss and Werner (1938) suggested that finger agnosia (inability to recognize one's own fingers) may be related to agraphia. Terms such as agraphia have declined in popularity in recent years, partly as a result of a trend toward the use of more educationally relevant orientations (see Hallahan, Kauffman, & Lloyd, 1985, for a historical overview). Deficits in writing performance are best defined and remediated in terms of task-specific behaviors (Mercer, 1979). Recent and future trends in remediation and adoption include neuroimaging to identify different types of agraphia and technology to assist writing abilities (Acree & Johnson, 2003).

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See also **Dysgraphia; Handwriting**

AICARDI SYNDROME (CALLOSAL DYSGENESIS)

Aicardi syndrome is a rare genetic disorder that was first reported in 1965 by Jean Aicardi (Steinman, 2003). Aicardi Syndrome is the most common of syndromes involving agenesis or dysgenesis of the corpus callosum and is sometimes used interchangeably with the designation *callosal dysgenesis*. The corpus callosum is the largest of the cerebral commissures and is the major communication link between the left and the right hemispheres of the brain.

Depending upon the level of dysgenesis, symptoms may vary considerably in their severity but among the most common are: intellectual disability, autistic syndromes, severe obsessive compulsive disorders, seizure disorder, and macrocephaly (Gillberg, 1995). When limited to the extreme posterior portions of the corpus callosum, ADHD is a more common result. Girls tend to be overrepresented in callosal dysgenesis syndromes and in Aicardi Syndrome proper, only girls occur since it is an X-linked, dominant mutation. AS, among the callosal dysgenesis syndromes, is among the most severe and typically results in moderate to severe intellectual disability and numerous physical abnormalities, especially of the spine and the orofacial area. Diagnosis is by CAT scan or MRI. Neuropsychological testing is recommended due to the possible range of reaction.

Treatment is entirely symptomatic and virtually all such children will require special education services and may qualify under multiple areas of disability. In less severe cases of callosal dysgenesis, asymptomatic presentations have been reported, emphasizing the need for ongoing neuropsychological follow-up and periodic reassessment of intervention plans. Symptoms not appearing by puberty typically do not occur and the disorder is not progressive. In the most severe forms of callosal agenesis, death in infancy is common.

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See also **Neurological Organization**

AIDES TO PSYCHOLINGUISTIC TEACHING

Psycholinguistic training requires the evaluator to determine difficulties in auditory, visual motor reception, integeration, and expressive abilities on the interactions and psychological functions underlying communication.

It attends to the processes by which a speaker or writer emits signals or symbols, and the interpretation of those signals by the receiver (Hammill & Larsen, 1974; Kavale & Forness, 2001).

Language programs and assessment techniques have been derived from these psycholinguistic principles and have been applied to education. A basic tenet of psycholinguistics is that language is made up of discrete components that may be identified and measured; further, it is assumed that if one is deficient in a given component, the deficiency can be remediated. This leads to two more assumptions, that a child's failure to learn stems from his or her own weaknesses, and that strengthening weak areas will result in improved classroom learning (Hammill & Larsen, 1974). If these assumptions are valid, programs aimed at mitigating psycholinguistic weaknesses are both necessary and desirable. If the assumptions are invalid, however, a great deal of time and money is being wasted on the application of these programs in educational settings.

In their review of research, Hammill and Larsen (1974) showed that the efficacy of psycholinguistic training had not been adequately demonstrated. They pointed out that many exceptional children are being provided with training programs aimed at increasing their psycholinguistic competencies. On the basis of their review, the authors claimed that it is essential to determine whether the constructs are trainable by present programs. It is also necessary, they said, to identify the children for whom such training would prove worthwhile.

Arter and Jenkins (1977), in their examination of the benefits and prevalence of modality considerations in special education, concluded that research evidence failed to support the practice of basing instructional plans on modality assessment. Thirteen of the 14 studies they reviewed indicated that students were not differentially assisted by instruction congruent with their modality strengths. Further, they stated that "increased efforts in research and development of test instruments and techniques may be warranted but, as far as the practitioner is concerned, advocacy of the (modality) model cannot be justified" (p. 295).

Kavale and Glass (1982) refer to a meta-analysis performed by Kavale in 1981 that investigated the effectiveness of psycholinguistic training. Kavale's studies yielded 240 effect sizes with an overall ES of 0.39. Kavale and Glass conclude by asserting that there are specific situations where psycholinguistic training is effective and that it should be included within a total remedial program. The findings from this research should be qualified, however, because of the lack of consideration of research methodologies across the different investigations empirical statements of the efficacy of psycholingustic training should be interepreted with caution. Furthermore outcome measures were based on performance of the process tests (i.e., Illinois Test of Psycholinguistic Abilities—ITPA), not on academic tests. Further analyses of studies using achievement outcomes have found negligible effect sizes. It remains open to question whether such improvement on psycholinguistic process tasks would translate into improved performance on academic tasks in the classroom.

More recently Kavale (2001) found psycholinguistic training to have moderate mean effect sizes (.39) through evaluation of effective practices using meta-analytical techniques. Burns and Ysseldyke (2009) investigated evidence-based instructional practices in special education and found psycholingustic training to be one of the least reported approaches being implemented in classrooms. Further examination of a survey of respondents and effectiveness evaluated by Kavale and Forness (2001) revealed that of eight interventions reviewed, psycholingustic training was rated seventh by special education teachers and school psychologists. Data in the more recent study only reported the prevalence of various interventions and did not give information on teacher choice of selection and implementation (Burns & Ysseldyke, 2009). While psycholingustic teaching has been found to demonstrate moderate effects, attention should continue to be devoted to intervention selection and the fidelity of implemention. Concerns still exist within instructional research regarding implementation fidelity and the effects of the intervention when chosen and implemented without empirical evidence (Burns & Ysseldyke, 2009).

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See also **Fernald Method; Orton-Gillingham Method; Psycholinguistics**

AIDS (*See* Pediatric Acquired Immune Deficiency Syndrome)

AIDS DYSMORPHIC SYNDROME

The National Organization for Rare Disorders (2009) describes AIDS dysmorphic syndrome (ADS) as a rare disorder of infancy that can result from a mother's infection with the human immunodeficiency virus (HIV) during pregnancy. HIV is the retrovirus that causes acquired immune deficiency syndrome (AIDS). This syndrome has many synonyms, such as dysmorphic AIDS, fetal AIDS infection, HIV embryopathy, and perinatal AIDS. ADS is caused by the transmission of HIV-1 or HIV-2, both forms of the human immunodeficiency virus. The transmission can occur during fetal development or during the birth of the child. Current data suggest that the most likely time for transmission of HIV between mother and infant occurs late in pregnancy or during delivery (Milosevic, 1998).

Most infants born to HIV-positive mothers have passively acquired maternal antibodies against this virus. An infant with passive antibodies is protected because the antibodies help fight the infection by neutralizing or destroying certain foreign proteins called antigens, thus fighting off HIV. If the antibodies prevent the infant from getting ADS, they will no longer be present in the infant's bloodstream by about 12 to 16 months of age. ADS can be accurately diagnosed when the infant is 18 months of age and the presence or absence of the passive antibodies can be clearly tested (National Organization for Rare Disorders [NORD], 2000). NORD (2009) reports that current estimates suggest that the risk of an infant's contracting HIV from his or her infected mother is approximately 13% to 39% of infants who are born to HIV-positive mothers in developed countries who have not undergone treatment with antiviral medications during pregnancy. Milosevic (1998) reports that the incidence of perinatal transmission of ADS varies from 25% to 48% for developing countries. ADS is believed to affect equal numbers of male and female infants (NORD, 2009). Statistics provided from Centers for Disease Control and Prevention (CDC) show that in the early 1990s, approximately 1,000–2,000 new cases of ADS were contracted each year in the United States. Between 1992 and 1998, these numbers have declined 75% in the United States, largely because of utilized preventive measures unknown prior to the later 1990s. CDC (2009) also reports that HIV transmission from infected mother to infant during pregnancy, during labor, during delivery, or by breastfeeding has accounted for 91% of reported AIDS cases in children in the United States. These children are differentially affected by racial background. CDC (2009) reports that 84% of children with AIDS were African American and Hispanic. This number is particularly concerning because only 31% of the U.S. population of children are African American or Hispanic.

Characteristics

1. Unusually small head (microencephaly with a prominent boxlike forehead)
2. Prominent and widely set eyes (ocular hypertelorism)
3. Flattened nasal bridge and shortened nose
4. An unusual bluish tint to the tough, outermost layer of the eyes (sclerae)
5. An unusually pronounced vertical groove (philtrum) in the center of an abnormally prominent upper lip

The best treatment for ADS is the use of preventive measures (CDC, 2009; Milosevic, 1998; NORD, 2009). These measures would include utilizing or creating programs that would work to prevent infection in women. These programs would dispense knowledge of how to have safe sex and avoid activities such as needle sharing if a woman is an intravenous drug user. After a woman is infected with HIV, education can help her understand the risks of pregnancy and help with birth control methods. If a woman is both infected with HIV and pregnant, the best treatment is early prenatal care, which would include HIV testing, counseling, and treatment with AZT and additional antiviral medications. In addition, delivery by cesarean section may reduce the risk of transmission of HIV to the newborn. The mother would also be told to refrain from breast-feeding her child, and the child would receive AZT during the first 6 weeks of life.

HIV-infected mothers with newborns should consult specialists in infants and children with HIV. Specific drug therapies suggested for the child may include AZT, didanosine (ddI), or lamivudine (3TC; nucleoside analog reverse transcriptase inhibitors) in combination with protease inhibitors. The child will need continued monitoring to assess the effectiveness of the drug therapy.

Teachers working with students affected with ADS will have to be aware of these children's potential for lowered intelligence and problems in psychomotor functioning. Special education teachers should help students with ADS learn skills that will help them with activities requiring a coordination between physical and mental tasks. Children with ADS who are performing below grade level would be good referrals to school psychologists who could assess the child's intellectual, psychomotor, and psychological functioning. The psychological reports can aid teachers in developing a better learning program by utilizing a child's strengths to combat his or her weaknesses.

Children with ADS may look smaller and more immature than their classmates; they may also need a referral

to a school counselor or social worker in order to help them develop better social skills so that they can fit in better with same-age peers. Aside from their potentially small stature, their facial abnormalities may prompt severe teasing from their peers. Teasing can be extremely hurtful, and counseling may help the child build necessary coping skills.

Children with ADS are at chronic risk for developing life-threatening illnesses such as non-Hodgkins B-cell lymphoma, brain lymphoma, and Pneumocystis carinii pneumonia (NORD, 2009). An exact percentage of how many ADS children survive into adulthood and older age is unknown. Survival depends on medication therapy and individual treatment for all infections that are likely to assault the child's immune system. Future research should also focus on exactly how and when transmission occurs and on improving methods for preventing transmission between HIV-positive mothers and their infants. Most beneficially, however, future research should focus on continued efforts to find better treatment medications until a cure or vaccine for HIV is developed.

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AKINETON

Akineton is the proprietary name of *biperiden*, a skeletal muscle relaxant used in the treatment of Parkinson's disease (Modell, 1985). It is available in tablet and ampule form. Akineton is used in the treatment of all forms of parkinsonism, and it helps reduce movement disorders associated with this condition. It also is used in conjunction with antipsychotic drugs such as the phenothiazines to control extrapyramidal disturbances. Safe, effective use in children has not been established. Possible side effects associated with Akineton include dryness of the mouth, drowsiness, blurred vision, and urinary retention. Extreme adverse effects include mental confusion, agitation, and disturbed behavior. Teachers who have students with juvenile Parkinsonism may encounter those side effects in their students.

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***See also* Chorea; Phenothiazine**

AL-ANON

Al-Anon (which includes Alateen for younger members) originally was an adjunct of Alcoholics Anonymous, but in 1954 it incorporated as a separate fellowship. The central headquarters, known as the World Service Office (WSO), serves Al-Anon groups all over the world. The WSO is guided by a voluntary board of trustees, a policy committee, and an executive committee that makes administrative decisions. There is a paid staff with an executive director. Although there is a central headquarters, all local groups operate autonomously. The only requirement for membership is the belief that one's life has been or is being deeply affected by close contact with a problem drinker.

Al-Anon groups help those affected by someone else's drinking to:

- Learn the facts about alcoholism as a family illness
- Benefit from contact with members who have had the same problem
- Improve their own attitudes and personalities by the study and practice of the "twelve steps"
- Reduce tensions and improve the attitudes of the family through attendance at Al-Anon meetings

Al-Anon is primarily a self-help/support group that focuses on assisting family members in dealing with the problems that an alcoholic brings to the family. It is based on anonymity and sharing.

Al-Anon is not allied with any sect denomination, political entity, organization or institution; does not engage in any controversy; and neither endorses nor opposes any cause except to help families of alcoholics (Al-Anon, 2011).

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ALATEEN

Alateen is a self-help, self-support group for young Al-Anon members whose lives have been affected by someone else's drinking. Each Alateen group has an active, adult member of Al-Anon who serves as a sponsor and who is responsible for guiding the group and sharing knowledge of the twelve steps and traditions. The basic purpose of this group is to help Alateens to cope with the turmoil created in their lives by someone else's drinking. Meetings are voluntary and generally are held in community buildings. Alateen members openly discuss their problems, share experiences, learn effective ways to cope with their problems, encourage one another, and help each other to understand the principles of the Al-Anon program.

In a survey conducted by World Service Office it was found that 46% of the Alateens held membership for between 1 and 4 years, 57% were female, most were children of alcoholics, 27% were the brother, sister, or other relative of an alcoholic, and the average age of a member was 14, with 71% between the ages of 13 and 17. Furthermore, 31% of the Alateen members had participated in treatment/counseling before or since coming to Alateen. Fully 94% of the Alateen respondents indicated that personal influences were responsible for their attendance at their first Alateen meeting, with Alcoholics Anonymous members, Al-Anon/Alateen members, or family members being the most frequently identified influence.

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See also **Al-Anon; Alcohol and Drug Abuse; Substance Abuse**

ALBANIA, SPECIAL EDUCATION

Special education in Albania began in 1963 with the opening of an institute for children with visual and auditory disorders in Tirana, the capital of Albania, and remains the only institute that provides services to children with this disability. After 1970, the first schools for children with mental disorders (mainly mild and moderate levels of intellectual disability) were opened in some of the cities where psychiatric hospitals already existed. Special schools for children with intellectual disabilities were opened in Durres in 1974, in Tirana in 1979, in Vlore in 1983, and in Elbasan in 1984. Other schools were opened after 1990. Albania has two national institutions, six special schools, and four day centers. These 12 institutions have 77 classes whose 184 teachers serve 800 students (35% female) with special needs in three categories: visual, auditory, or mental disorders (i.e., only intellectual disabilitiy).

Most (75%) teachers completed a 4-year university teacher education program, while others completed a high school teacher preparation program. None specialized in working with special needs children except for very few professionals who obtained a psychology degree from a university abroad. Years of experience and their desire and will to help these children have guided their work.

In 1996, a law Normative Provisions of Public Education outlined expectations of inclusion services to be offered to children from ages 6 through 19. Children with Intellection Developmental Delays may enroll in public nurseries and kindergartens. However, their numbers are small. Parents generally do not want to publicly admit that their child has a problem and prefer to keep them at home. In addition, teachers of young children are not prepared to work with children with special needs. While the law was implemented to move Albanian schools toward inclusive education, the International Bureau of Education found very few children with significant disabilities were being educated in public schools (Nano, 2007). Many students drop-out by the fourth grade even though pressure is given to parents to enroll children with intellectual developmental disabilities in public schools.

The Ministry of Education and Science is responsible for creating special schools. All special schools are public. Some nongovernmental organizations in the larger cities have opened a few day centers for special needs children and provide community-based services, which include counseling with family members, raising awareness in the community about the needs of these children, educating disabled children, and integrating them in public schools and community. A change in attitudes from teachers and other students toward students with disabilities has been seen in Albania and often does not present a problem for the classes of 35–40 students on average in the cities of Albania (Nano, 2007).

The Institute of Curriculum and Standards continues to improve the National Curriculum in Albania. Curricula changes used for students in special education generally are consistent with those used in the normal schools with some changes and adoptions according to the disability of the child. Individual Educational Plans (PEIs) are developed to assist teachers with selection and appropriate adjustments that should be made to the curriculum for each student identified with a disability (Nano, 2007). Training and curriculum development continues in Albania with the general consensus that children with disabilities are best educated in the public school system. With further training and development of curricula

and PEIs which are effective, the movement toward inclusive education will hopefully continue for students with disabilities in Albania.

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ALBERS-SHÖNBERG DISEASE (OSTEOPETROSIS, MARBLE BONE DISEASE)

Albers-Schönberg disease is one form of osteopetrosis, which is a hereditary disorder affecting bone density and formation. In persons with osteopetrosis, decreased skeletal resorption leads to improper bone formation inside the bone marrow space, which leads to increased bone density (Carolino, Perez, & Popa, 1998). Osteopetrosis can have onset in infancy, childhood, or adulthood, with childhood and infant onset leading to the most serious forms of the disease. Which form of osteopetrosis is technically called Albers-Schönberg disease is not always consistent in the literature (i.e., www.osteopetrosis.org and Bénicho et al., 2001). For this reason, the childhood and infant forms of the disease will be referred to as simply osteopetrosis for this article. The forms affecting children are autosomal recessive, meaning that both parents must carry the gene for osteopetrosis in order for the disease to manifest in the child. In the less serious adult form, the disease is autosomal dominant (Carolino et al., 1998). The location of the gene that causes Albers-Schönberg disease has been mapped to Chromosome 16p.13.3 (Bénicho et al., 2001).

Because osteopetrosis is autosomal recessive, it is a rare disorder. It is estimated that it affects only 1 in 200,000 children (www.stjude.org). There have been no epidemiological studies performed on osteopetrosis (Manusov, Douville, Page, & Trivedi, 1993).

Characteristics

1. Child is usually diagnosed by age 1 year, after having multiple fractures, having multiple infections, or being diagnosed with failure to thrive (Manusov et al., 1993).
2. Child may experience thickening at the base of the skull, which can lead to vision loss, deafness, and hydrocephalus (Carolino et al., 1998). Vision loss is also caused by retinal degeneration (Manusov et al., 1993).
3. Child may have bone marrow failure, leading to more frequent infections and severe anemia. Because other systems are attempting to compensate for the bone marrow failure, a child with osteopetrosis may have an enlarged spleen and liver (Carolino et al., 1998).
4. Other symptoms may include growth retardation, "rugger jersey" spine, brittle bones, delayed dentition, and psychomotor retardation (Manusov et al., 1993).

The only known cure for autosomal recessive osteopetrosis is bone marrow transplant (Carolino et al., 1998). Transplants from siblings are the most successful, and the child must have the transplant early in life to avoid permanent, irreversible effects of osteopetrosis (www.stjude.org). Because bone marrow transplants are expensive and donors can be difficult to find in time, other forms of treatment are being researched.

Special education concerns for children with osteopetrosis will revolve around physical concerns and the physical safety of the child. Because they are prone to bone fractures, children with osteopetrosis may need special supervision in certain situations to help them avoid injury. Special testing situations and classroom setup may need to be considered for children with vision or hearing loss. Children with osteopetrosis may miss many days of school because of their medical problems.

Without successful treatment of the disease, autosomal recessive osteopetrosis is usually fatal within the first 10 years of life. Children with osteopetrosis usually die of severe anemia or infections. Current research is examining the effectiveness of a drug called interferon-gamma on osteopetrosis (www.stjude.org). Some researchers have also tried a nutritional supplement called 1,25 dihydroxy vitamin D, with limited results (Carolino et al., 1998). As research on the location of the gene that causes osteopetrosis continues, gene therapy is also an option that many hope will be available in the future (www.stjude.org).

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***See also* Myelofibrosis, Idiopathic; Osteopetrosis**

ALBINISM

Albinism encompasses a group of disorders that are inherited and characterized by lack of or not enough melanin production. It does not only affect the pigmentation of the skin but also may evidence itself in the skin, hair, and eyes (oculocutaneous albinism) or may affect only the eyes (ocular albinism; Kodsi, Rubin, & Wolf, 2005). Of the variations of albinism, four types are common. In Type I albinism, the body cannot metabolize tyrosine. This deficit blocks the channel for the conversion of tyrosine, an amino acid, to melanin (Barsh, 1996). Type II albinism is an autosomal recessive disorder of pigmentation set apart by a reduced amount of pigmentation in the skin, hair, and eyes. This type of albinism is usually considered less severe than Type I albinism (Brondum-Nielsen et al., 1997). In oculocutaneous albinism, there is a lack of melanin production in the skin, hair, and eyes as stated earlier. People with this type of albinism have an increased sensitivity to ultraviolet light and a predisposition to skin cancer (King & Oetting, 1999). Ocular albinism is when only the eyes are affected by a lack of melanin production. In turn, the lack of melanin in the developing eye contributes to abnormal routing of the optic nerves. This abnormal form of routing is the cause of nystagmus, strabismus, and reduced visual acuity common to all types of albinism (King & Oetting, 1999). The needs of a person with albinism are dependent on their type of albinism. However, the most common special services needed are related to their visual acuity. Some may benefit from counseling if they are experiencing emotional sensitivity or psychological stress due to their phenotypical traits.

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***See also* Congenital Disorders; Visual Acuity; Visual Impairment**

ALBRIGHT'S HEREDITARY OSTEODYSTROPHY (PSEUDOHYPOPARATHYROIDISM)

Albright's hereditary osteodystrophy (AHO) is believed to be an X-linked inherited disorder that results in a low level of calcium and a high level of phosphorus in the blood. Varying degrees of intellectual disability, ranging from slight to severe, are associated with the condition, and hearing and vision problems are found in a number of afflicted children. At times, hyperthyroidism is associated with Albright's, therefore alterations in personality and behavior may be seen (Carter, 1978).

Children with this condition are usually short and stocky with skeletal abnormalities often observed in both upper and lower extremities and prominent foreheads. Calcium deposits may be present in the brain, skin, and organs. Calcification is often found in hands, wrists, and feet. Toes and fingers are short and stubby. There may be impairment in the sense of sour and bitter taste and the sense of smell. Glandular disorders may be seen and sexual glands may be poorly developed (Lemeshaw, 1982).

AHO is a rare disorder and the incidence is unknown at this time. There is a female-to-male sex ratio of 2:1 (Davidson & Mayfield, 2003). Neurological, sensory, and motor problems often accompanying this syndrome will require related attention. Developmental and mental status evaluations will be necessary to measure the degree of disability each child has. Because seizures may be present, drug therapy may be necessary and must be known and monitored.

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See also **Hyperthyroidism; Physical Anomalies**

ALCOHOL AND DRUG ABUSE PATTERNS

Alcohol and drug abuse patterns in contemporary American society should be viewed from multiple perspectives in an effort to understand the multidimensional nature of the problem. Patterns of alcohol and drug use, abuse, and dependence, particularly among adolescents, have changed radically in past years. Rates of use, abuse, and dependence have all increased at an alarming rate, as has the variety of substances indulged in by young and old alike. Satre (2003) states that prevalence increases with age, leveling off in the early 20s. For example, a large national survey conducted in 2000 found that 14% of eighth graders and 30% of 12th graders reported binge drinking in the preceding 2 weeks. Many theories have been developed as social scientists seek to understand and explain the upsurge in adolescent alcohol and drug use.

To explore and explain fully the complex nature of alcohol and drug use among youths, one must look at the theoretical constructs of anthropology, economics, medicine, politics, psychology, and sociology. In a review of the many determinants of alcohol and drug use, Galizio and Maisto (1985) call for a "biopsychosocial" model. Given the alarming rate of acceleration in alcohol and drug use and the complexity of the issue, such a model would allow theorists and scientists from varying disciplines to study and collaborate in an effort to understand and intervene in this escalating social issue.

The fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2000) clearly distinguishes among the terms *use, abuse*, and *dependence*. Although each category of psychoactive drug use (e.g., alcohol, barbiturate, opioid, cocaine, amphetamine, phencyclidine, hallucinogen, cannabis, and tobacco) is separated within the manual, the more general term *substance use* is employed when referencing the disorder as a whole. Substance use is defined as a pattern of consumption of a psychoactive substance (i.e., one that has a mechanism of action in the brain) that does not meet the definitive criteria that follow for abuse or dependence. Substance abuse is a pattern of pathological use (i.e., impairment in social or occupational functioning that is related to the use of the substance) that lasts at least 1 month. Substance dependence is defined by the presence of body tolerance to the drug, or evidence of withdrawal symptoms (e.g., runny nose, goose flesh, fevers and chills, gastrointestinal discomfort, muscle cramping) after cessation of use. Tolerance is defined as a state of use in which larger and larger amounts of the particular substance are required to produce the user's desired outcome. Withdrawal symptoms can be physiological, psychological, or both; several drugs, notably alcohol, heroin, opioids, barbiturates, sedatives, and some types of stimulants, frequently create both. This point is significant regarding the establishment and maintenance of specific patterns of alcohol and drug use. Cessation of use by a chemically dependent person may create such great discomfort that the user feels compelled to return to use for relief.

Patterns of alcohol and drug use among adolescents are strongly linked with delinquent behavior. Indeed, delinquent behavior and substance abuse are consistently correlated (Elliott & Ageton, 1976). At the least, use of alcohol, illicit drugs, or prescription drugs not prescribed for the individual using them is illegal. Further, other unconventional or nonconforming actions such as sexual experiences, attenuated academic performance, and flagrant violations of minor and major laws often precede involvement with illicit substances. Not all youths who experiment with alcohol and other drugs will manifest the problems associated with chronic or continued substance abuse, but current research supports a high correlation between continuing drug and alcohol use and delinquent behavior (Clayton, 1981). Initial, or trial, use of alcohol and drugs is likely to occur in youths who have already participated in other minor deviant activities; those who choose a high level of peer group involvement; and those who have seen both parent and peer use. Huba, Wingard, and Bentler (1980) found that prior behavior is a much stronger predictor of intended drug behavior than is either expressed interest or desire. This factor is significant in understanding the causal relationship between criminal behavior and drug and alcohol use. Initial research suggested that drug use precedes other forms of juvenile delinquent behavior (Single & Kandel, 1978), but more recent studies indicate that delinquent subgroups establish group acceptance of continued alcohol and drug use beyond the level of what could be considered normal adolescent experimentation and curiosity (Clayton, 1981).

Initiation of alcohol and drug use can be seen as either a developmental issue of adolescence (Kandel, 1975; NIAAA,

2011) or as an abnormal adaptation to frustration (Hendin, 1980), among other possibilities. Numerous theories have been posited about the initial or trial stage of drug use. However, consensus has been reached as to the critical role of peer-group pressure and the addictive nature, physically and/or psychologically, of the substances used in maintaining drug use. Thus regardless of the reason for beginning drug use, acceptance and support by peers to continue use, tolerance, and aversive withdrawal symptoms are essential factors in understanding the use, abuse, and dependence continuum. The addictive potential of the substance used, amount used, frequency and duration of use, and route of administration are key factors influencing adolescent's ability to start and stop their alcohol and drug use.

Adolescents seem to follow a predictable pattern in their continued alcohol and drug use. The use of legal drugs usually precedes the use of illegal drugs, irrespective of what age the use of illegal drugs is begun. Similarly, the use of illicit drugs like marijuana rarely takes place without prior experimentation or use. However, no evidence indicates that anything inherent in the pharmacologic properties of any substance necessarily leads from use of one to the use of another (the stepping-stone theory of addition). That is, the use of tobacco leads to alcohol, alcohol to marijuana, marijuana to stronger drugs, and finally addiction and dependency. Factors such as parental role models, peer pressure, and availability and access seem to be more important than anything pharmacological (Kandel, 1975; NIAAA, 2011).

A further complication is that adolescents who use and abuse substances that can produce tolerance may suffer the biomedical consequences of lifelong chemical affinity for continued abuse and dependency (Cohen, 1981). Also, evidence of a biogenetic predisposition to drug dependency can be seen in patterns of use and abuse in the offspring of alcoholics and, to a lesser degree, other substance-addicted parents (Crabbe, McSwigan, & Belknap, 1985). Children of addicted parents may become addicted with fewer episodes of intoxication, smaller amounts of substances, and fewer of the factors noted previously for adolescents. A word of caution is offered by Schuckit (1980), who states that even when a predisposition or affinity for substances is noted in an adolescent, the final picture must involve not only genetics but also the careful consideration of environment, culture, and other social factors.

The range and variation of the adolescent experience is an important final concern in understanding adolescent patterns of alcohol and drug use. The period of chronological growth beginning at age 12 and continuing through age 21 is marked by great physical, emotional, and intellectual development. Early-, middle-, and late-phase adolescents respond differently to issues such as opportunity for first use, continued use, decision making, the ability to make choices, stress and anxiety, and prevalent patterns of communication within a given peer network. Cohen (1983) and Kandel (1975) substantiate concerns about the impact of the age of first use moving downward. Data on age of admission to treatment centers and survey responses both suggest that a large number of adolescents will become dependent at an earlier age. Further research is needed to determine the impact of this trend on the rapidly developing, but fragile, systems of young people. Although some studies suggest a decline in the frequency of adolescent drug and alcohol use in this society (Johnston, Bachman, & O'Malley, 1982), more specific information is needed about high-risk youths from isolated populations that are not routinely surveyed in national studies (e.g., high school dropouts, younger members of the armed forces, and residents of college dorms). Miller (1981) indicates that the "surveillance function of epidemiological research" will best be served by closer attention to special "pockets" of substance-abusing youths who have escaped close scrutiny in the recent past, and research that points to effective prevention (Satre, 2003).

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***See also* Chemically Dependent Youths; Drug Abuse; Substance Abuse**

ALEXANDER GRAHAM BELL ASSOCIATION FOR THE DEAF

The Alexander Graham Bell Association for the Deaf is a nonprofit membership organization established in 1890. The Association's mission is to empower persons who are hearing impaired to function independently by promoting universal rights and optimal opportunities to learn, use, maintain, and improve all aspects of their verbal communications, including their abilities to speak, speechread, use residual hearing, and process both spoken and written language. Toward this end, the association strives to promote (a) better public understanding of hearing loss in children and adults, (b) detection of hearing loss in early infancy, (c) prompt intervention and use of appropriate hearing aids, (d) dissemination of information on hearing loss, including causes and options for treatment, and (e) inservice training for teachers of children who are deaf or hard of hearing. The organization also collaborates on research relating to auditory/verbal communication and with physicians, audiologists, speech/language specialists, and educators to promote educational and social opportunities for individuals of all ages who are hearing impaired.

To accomplish these objectives, a wide variety of member-oriented programs, publications, and financial aid programs are offered, including school-age financial aid awards, scholarships, aid to parents of infants diagnosed with moderate to profound hearing loss, and arts and sciences awards.

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ALEXIA

Alexia is an acquired neuropsychological disorder of reading in which premorbidly literate adults exhibit severe reading impairments in the absence of other obvious language deficits (McKeeff & Behrmann, 2004). This disorder has been characterized as occurring secondary to a lesion in the left occipito-temporal region. The hallmark of this deficit is the word-length effect: the naming latencies of patients increase dramatically with increasing numbers of letters in the word (Montant & Behrmann, 2000). Alexia also may be known by other names, such as *letter-by-letter reading, alexia without agraphia, spelling dyslexia, verbal dyslexia, word blindness*, or *letter-by-letter dyslexia*.

There are several types of alexic disorders, which are characterized by the types of paralexias (incorrect production of words in oral reading) produced and by the properties of words that tend to affect reading performance. These properties include letter length, orthographic regularity,

part of speech, concreteness, and familiarity (Friedman & Lott, 2000). The alexic disorders that have been identified and commonly agreed upon are pure alexia, surface alexia, phonological alexia, and deep alexia.

Pure alexia was first described by Déjerine. Déjerine described pure alexia as a disconnection syndrome that isolates the "center for the optic images of letter," situated in the left angular gyrus, from both visual cortices. Because this language center cannot be accessed through visual stimulation, the patients cannot read (Montant & Behrmann, 2000). Individuals with this condition are able to write (thus no agraphia) but are unable to read anything (alexia). This includes words that they have just finished writing; they almost always have a right homonymous hemianopia as well (Nolte, 1993). Although patients with pure alexia have great difficulty recognizing written words, they are able to identify words that are spelled aloud to them. These individuals retain their ability to speak, write, and understand speech because the lesion, or combination of lesions, affects input from the visual cortex to the left angular gyrus, which itself remains intact. As a result, the language areas (in particular the left angular gyrus) are cut off from all visual input, the destroyed left visual cortex can supply no visual input, but the language areas remain undamaged and still connected to the motor cortex; therefore, verbal and written languages can still be produced (Nolte, 1993). Alexia without agraphia occasionally results following a stroke that involves the left posterior cerebral artery if it causes destruction of the left visual cortex (hence the hemianopia) and of the splenium of the corpus callosum (Nolte, 1993).

Surface alexia has been identified as a variant of alexia. Individuals with surface alexia appear to rely upon the pronunciations of written words in order to ascertain their meanings (Friedman, 2005). Patients with this disorder display an inability to distinguish between homophonic words, such as *threw, through*, and *thru*. The ability to correctly pronounce the words remains intact, but there is an inability to denote which word is on the page.

Phonological alexia is sometimes viewed as the antithesis to surface alexia. While patients with surface alexia tend to depend upon a sounding-out process for reading, patients with phonological alexia are unable to read via this mechanism (Friedman & Lott, 2000). This disorder is characterized by the ability of individuals to recognize and read words that are known well, but unknown words and unpronounceable words cannot be read.

Deep alexia features the production of semantic paralexias when reading aloud. A semantic paralexia is a type of reading error in which the word produced is related in meaning to the written target word (Friedman, 2005). Friedman notes that individuals with deep alexia demonstrate difficulty in reading words with affixes, and derivational paralexias are produced in which word endings are added, deleted, or substituted for one another (Friedman & Glosser, 1998).

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See also **Dyslexia; Traumatic Brain Injury**

ALGOZZINE, BOB (1946–)

After receiving a BS in economics in 1968 from Wagner College in New York, Bob Algozzine earned his MS in educational psychology from the State University of New York, Albany, in 1970 and his PhD in the education of exceptional children from Pennsylvania State University in 1975. He was a professor at the University of Florida where he was involved with training regular class teachers to work with exceptional students. Currently, he is professor at the University of North Carolina Charlotte, in the Department of Educational Leadership and project codirector of the U.S. Department of Education–supported Behavior and Reading Improvement Center.

Algozzine's main interest began in working with students who fail to profit in regular classes. Much of his work was focused on the similarities between learning-disabled (LD) and low-achieving students. Algozzine contended that LD was a sophisticated term for low achievement and that it represented an oversophistication of a concept (Algozzine, Ysseldyke, & Shinn, 1982). He has shown that few differences exist in test profiles of LD and low-achieving students and that performance profiles of many normal students evidence significant discrepancies as well. He believes that schools need to spend less energy trying to identify exceptional students and place more effort on determining what to do with all students who fail to profit

from their current educational placement (Algozzine & Ysseldyke, 1983).

Currently Algozzine's interests include: effective teaching, behavior instruction, positive behavior supports, data-based decision making, and progress monitoring of children with emotional and behavioral problems (Retrieved from http://coedpages.uncc.edu/rfalgozz/MAIN/bavita.pdf on December 16, 2011). Algozzine has written over 250 articles, research reports, monographs, final reports, and books. He has been a member of the Council for Exceptional Children, the American Educational Research Association, and the North Carolina Council for Children with Behavior Disorders.

He currently serves as the Executive Editor for *Multicultural Learning and Teaching* while also coediting journals within the field of special education that include: *Career Development for Exceptional Individuals*, *The Journal of Special Education*, and *Teacher Education and Special Education*. Algozinne previously served as a coeditor of Exceptional Children and as a column editor for *Preventing School Failure*.

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ALLERGIC DISEASES

An allergy is a hypersensitivity to a specific substance (an antigen) that in a similar quantity does not affect other people. The abnormal reactions are usually in the form of asthma, hay fever, eczema, hives, or chronic stuffy nose (allergic rhinitis). Technically, the use of the term should be limited to those conditions in which an immunological mechanism can be demonstrated (Hourmanesh & Clark, 2003). Allergies are common to 10% of the children in the United States and are inherited (NIAID, 2011). The tendency to develop allergies is present at birth but may appear at any age. Food allergies occur in 5% of children under the age of 5 and 4% of children ages 5 to17 (NIAID, 2011).

Allergies can be classified into two types: immediate hypersensitivity (such as allergic rhinitis, asthma, and food allergies) and delayed hypersensitivity (such as reactions to poison ivy). Patients with the former have more of the antibody IgE in their systems. This antibody reacts with whatever patients are allergic to, whether it is something that they breathe, eat, or have skin contact with. This reaction causes certain cells in the body to release chemical mediators such as histamine and serotonin. These chemicals cause the dilation of the small blood vessels, increased secretion from the mucous glands, and smooth muscle contractions that produce the allergy symptoms.

Allergic rhinitis is the commonest cause of nasal congestion in children. Epidemiological data indicate that in the United States alone allergic rhinitis occurs in 59.7 cases per 1,000, accounting for 2 million days lost from school (Shapiro, 1986). An important complication of perennial allergic rhinitis is otitis media with effusion, an accumulation of fluid behind the eardrum in the middle ear. Patients usually have at least an intermittent loss of hearing and may complain of a sensation of fullness or popping and cracking noises.

Allergies often play a role in the etiology of asthma, especially in childhood (Hourmanesh & Clark, 2003). The chemical mediators released upon the allergic reaction cause contraction of the smooth muscles in the walls of the bronchial airways, swelling of the bronchial tubes, and an increase in the rate of secretion of mucus by submucosal glands. This produces obstruction and causes the characteristic wheezing and shortness of breath. Asthma may be mild (one or two mild attacks per year) or severe with intractable wheezing daily. The severe form may greatly restrict physical activity and make school attendance difficult for school-age children. Physical exertion may precipitate wheezing and become a problem in physical education classes.

Skin allergies are common, especially in younger children. Atopic dermatitis (eczema) may occur in 3% to 4% of infants and result in a dry, scaly, itchy rash involving the cheeks and extremities. While most children outgrow the rash, over 50% of them tend to develop respiratory allergies. Another common rash with an allergic origin is urticaria or hives. Possible causes are allergies to drugs like aspirin or penicillin and to foods.

Food allergies are perhaps the most controversial area of allergy study. Some allergists feel that allergic reactions to foods are rare, while others feel they are a common cause

of illness. The frequency of food allergy seems to decrease as children grow older. The most common symptoms of food allergy include gastrointestinal symptoms such as abdominal pain, vomiting and diarrhea, and rashes such as hives. Food may play a role in other allergic conditions such as allergic rhinitis, asthma, and eczema, especially during the first 3 or 4 years of life. The most serious allergic reaction to foods and drugs is an anaphylactic one, in which the person experiences a shocklike reaction that can result in death. Any food can cause an allergic reaction, but the foods most apt to cause one in children include milk, eggs, fish, wheat, corn, peanuts, soy, pork, and chocolate. In December 2010, Guidelines for Diagnosis and Management of Food Allergies in the United States was published to better inform parents and personnel working with children about the signs and reactions to food allergies (NIAID, 2011).

Stinging insect allergies may cause a severe anaphylactic reaction to the sting of a bee, wasp, hornet, or yellow jacket. The reaction may occur within minutes after the sting and allergic persons need immediate medical attention.

A thorough history and physical examination are important components of a diagnosis. Seasonal patterns of symptoms, exposure to animals, and usual diet are useful information in identifying causes. Laboratory analysis of nasal secretions, sputum, and blood may establish the presence of eosinophil cells that appear in increased numbers with allergic reactions. Pulmonary function tests are also helpful. Scratch and intradermal skin tests for the suspected allergens can confirm a diagnosis. Another tool is the radio-allergoabsorbant (RAST) test, which measures the level of IgE in the blood for a particular allergen (Hourmanesh & Clark, 2003). The elimination-challenge diet is used for suspected food allergies; after avoiding a particular food for 2 to 3 weeks, the patient consumes it and is observed for reactions. Awareness of environmental conditions from change of seasons, foliage in different parts of the country, and environmental factors in homes, schools, and the work place also assists the diagnostician.

While there is no cure for allergies, symptoms may be controlled in a variety of ways. First, symptomatic treatment involves using medication. Antihistamines are the most commonly prescribed drugs for the treatment of allergic reactions. They inhibit some of the actions of histamine but frequently have negative side effects such as sedation, excitation, and insomnia. Antihistamines are often combined with decongestant drugs. Asthmatics are usually treated with bronchodilator drugs that cause relaxation of the smooth muscle surrounding the bronchial tubes. Acute asthmatic attacks and anaphylactic reactions are frequently treated with epinephrine. Both drugs may have negative side effects. For severe allergic problems, corticosteroids may be used, but on a limited basis because of adrenal suppression and limitation of physical growth in children.

The second method of treatment is environmental control, that is, removal of troublesome antigens such as pet hair, dust, and pollen. Good housekeeping practices, use of air conditioning at home and in the car, and other careful planning can prevent many allergic problems. A third and related approach is to teach self-regulation strategies to persons with asthma and other types of allergies. They include relaxation training, biofeedback procedures to modify physiological reactions, and general education about the medical condition (Creer, Marion, & Harm, 1988). A fourth treatment is immunotherapy, which involves injecting the patient with small amounts of an antigen that has been processed into a dilute form. These injections stimulate the immune system to produce another type of antibody that inhibits the reaction between the allergic antibody and the antigen. While initially the shots are taken once or twice a week, the regimen is gradually phased out over a 2- to 3-year period (Patterson et al., 1978).

Allergies have been connected with specific learning disabilities through analyses of case studies (Rapaport & Flint, 1976). Allergic children are rated lower in reading, auditory perception, and visual perception (Harvard, 1975). Teacher and parent ratings as well as test scores indicated lower proficiency among allergic students in some areas (Rawls, Rawls, & Harrison, 1971). Learning-disabled students with recurrent otitis media may have more problems with allergies and verbal skills than nondisabled children (Loose, 1984). Geschwind and Behan (1982) associate left-handedness with reports of learning problems and immunological diseases such as thyroid and bowel disorders.

However, McLoughlin et al. (1983) found no differences in parent reports concerning academic achievement, diagnosis for disabilities, and behavioral problems of allergic and nonallergic students. There was a tendency for children with asthma and chronic rhinitis to be rated lower in listening skills. Additionally, a comparison of group achievement scores of allergic and nonallergic students indicated no interaction of exceptional conditions and allergies (McLoughlin, Nall, & Petrosko, 1985). Some lower estimates of allergic children's school performance seem confused with the effects of socioeconomic factors.

Higher rates of school absenteeism are reported for asthmatic children and those with chronic rhinitis (Shapiro, 1986). Asthmatic children may be absent 10% of the time; such absenteeism is a direct cause of school problems. Additionally, the seasonal occurrence of allergic reactions (especially in the fall) and the typical pattern of frequent, brief absences are disruptive to classroom performance, attending skills, and social development. Milder forms of allergies may not cause significant school absenteeism, particularly with improved medical treatment, self-management programs, and parent education (McLoughlin et al., 1985). Furthermore, some previous estimates of higher absenteeism of allergic

children may have been confused with the effects of socioeconomic status.

Hearing difficulties are frequently associated with otitis media resulting from allergies (Northern, 1980). Among allergic students, Szanton and Szanton (1966) found many cases of intermittent hearing loss that had been undetected on screening measures. Articulation and/or vocal quality problems have also been reported among allergic students (Baker & Baker, 1980). Recurrent otitis media among 3-year-olds has been associated with lower speech and language performance (Rapin, 1999; Teele et al., 1984).

Allergy history seems present among cases of behavioral and emotional disorders (Mayron, 1978). King (1981) estimated that 70% of students with such disorders have personal or family allergy histories; cognitive-emotional symptoms were noted after allergic exposure under double-blind conditions. Psychological and personality changes are frequently reported by asthmatic children and their parents (Creer, Marion, & Creer, 1983). However, comparisons of reports and ratings of behavioral problems, placement in services for behavior disorders, and school suspensions between allergic and nonallergic students have not yielded significantly different profiles (McLoughlin et al., 1985).

Allergy medication may have adverse effects on behavior and exacerbate existing behavioral problems (Hourmanesh & Clark, 2003; McLoughlin et al., 1983). Theophylline has been significantly correlated with inattentiveness, hyperactivity, irritability, drowsiness, and withdrawal behavior; the negative side effects increase with length of use. Furakawa and his colleagues (1984) found decreased test performances under the influence of theophylline. Terbutaline created socially inappropriate behavior in a comparison group (Creer, 1979), and corticosteroids negatively affected academic performance (Suess & Chai, 1981). Ladd, Leibold, Lindsey, and Ornby (1980) also reported euphoria, insomnia, and visual disturbances with corticosteroids. Antihistamines may cause sedation, dry mouth, and irritability (Weinberger & Hendeles, 1980). Visual hallucinations occur among some children receiving decongestants (Sankey, Nunn, & Sills, 1984).

Allergic disorders have important implications for the professional assessment and intervention of exceptionalities as well as for parental involvement. Certain types of allergies and/or the side effects of medication may be contributing factors in behaviors of concern and may require special consideration when designing special services. The self-monitoring and management skills taught in special education may be mutually beneficial in coping with this medical condition.

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***See also* Asthma; Chronic Illness in Children**

ALLEY, GORDON R. (1934–1999)

Gordon R. Alley received his BA (1959) from Augustina, Illinois, later earning his MA (1961) in Psychology and his doctorate (1967) in Special Education and School Psychology from the University of Iowa. Alley's contributions to the field of education include his service as teacher of the intellectually disabled, school psychologist, and director of special education. He taught at the University of Utah (1967–1970), and was professor of special education and a lecturer in pediatrics at the University of Kansas from 1970. Alley was invited to present his papers to regional and national gatherings on numerous occasions.

Alley's work emphasized learning strategies associated with the developmental characteristics of adolescents, with his research promoting alternatives to the traditional tutorial and remedial approaches to interventions for students with learning disabilities. As a cofounding member of the Institute for Research in Learning Disabilities at the University of Kansas, Alley published many of his writings pursuant to his interests, including a chapter in *Instructional Planning for Exceptional Children* (1979). Other important publications are his 1979 work, *Teaching the Learning Disabled Adolescent* and *The Effect of Advance Organizers on the Learning and Retention of Learning Disabled Adolescents within the Context of a Cooperative Planning Model*, a study conducted by Alley and Keith Lenz in 1983. Alley's study investigated whether advance organizers would help learning disabled adolescents process information on selected academic tasks more effectively. Results of the research indicated the efficacy of their use in secondary classrooms.

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ALOPECIA AREATA

Alopecia areata is an unpredictable autoimmune skin disease resulting in the loss of hair on the scalp and sometimes elsewhere on the body. The affected hair follicles are mistakenly attacked by the person's own immune system (white blood cells), impeding hair growth. Heredity plays a role in the development of this condition. At least one in five persons with alopecia areata have a family member with the condition. Alopecia areata often occurs in families whose members have asthma, hay fever, atopic eczema, or other autoimmune diseases such as thyroiditis.

Alopecia areata occurs in males and females of all ethnicities and ages. Onset is often in childhood. Approximately 1.7% of the overall population is affected by this condition (more than 4 million U.S. citizens).

Characteristics

1. Alopecia areata usually starts in childhood with one or more small, round, smooth bald patches on the scalp.
2. Progression to total scalp hair loss (alopecia totalis) or complete body hair loss (alopecia universalis) is possible.

3. In some people, the nails develop stippling that looks as if a pin had made rows of tiny dents.
4. The hair can grow back even after years of hair loss. However, it can also fall out again at a later date.

Several treatments are available, and choice of treatment depends upon the individual's age and extent of hair loss. Treatments available for mild hair loss include such things as cortisone injections into the areas of the scalp affected by hair loss. Or solutions (e.g., topical minoxidil or anthralin cream) can be applied to the affected areas. For more severe cases, cortisone pills, topical immunotherapy (which consists of producing an allergic rash to trigger hair growth), or wigs can be used.

Because the general public is still generally unfamiliar with this disorder, students diagnosed with alopecia areata may find that this disease can have a profound impact upon their school life (e.g., Smith, 2001). Due to its sudden onset, recurrent episodes, and unpredictable course, alopecia areata can be life-altering. Therefore, students may require counseling to be able to come to terms with this disorder. School personnel may benefit from information about this disorder to help them understand the condition and support the student. Contact with other individuals with this condition may help to bolster student's self-esteem.

The prognosis for someone with this condition is varied. For some individuals, hair growth can return to normal. For some people, however, recurring hair loss can occur. The National Alopecia Areata Foundation (NAAF) funds research into this disorder and holds research workshops to exchange knowledge and further alopecia areata research in the field. For more information, contact: NAAF, P.O. Box 150760, San Rafael, CA 94915. Tel.: (415) 456–4644; National Organization for Rare Disorders, P.O. Box 8923, New Fairfax, CT 06812–8923

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See also **Monilethrix**

ALPHA-1-ANTITRYPSIN DEFICIENCY

Alpha-1-antitrypsin deficiency (A-1-AD) is caused by an inadequate amount of the enzyme alpha-1-antitrypsin in the blood. Affected individuals have 10–20% of normal levels of this serum protein. As a result, they experience early-onset emphysema (blebs and cysts replacing normal lung tissue), usually in the third or fourth decade. A-1-AD can also cause liver disease in infants and children.

Alpha-1-antitrypsin inactivates protreases, which are substances released from dead bacteria and white blood cells. Accumulation of proteases in the lung leads to destruction of normal architecture and emphysema.

A-1-AD is an hereditary disorder. Symptomatic individuals are homozygous for the abnormal gene. A-1-AD is one of the most common fatal genetic diseases in people of European descent. The incidence in white populations is 1:200–1:4,000.

Characteristics

1. Highly variable course of liver disease in infants. Jaundice and liver enlargement may occur in the first week of life. These findings may resolve completely or progress to chronic liver disease with diffuse scarring (cirrhosis) and liver failure.
2. Lung disease in childhood is rare. A few pediatric patients experience chronic cough, wheezing, or shortness of breath. Passive smoke exposure enhances early development of emphysema.
3. Symptoms of chronic lung disease usually do not begin until the third or fourth decade.

General therapy includes aggressive treatment of lung infections, immunization with pneumococcal and influenza vaccines, inhaled medications for wheezing, and avoidance of smoke exposure as well as other environmental irritants. Intravenous administration of alpha-1-antitrypsin can raise blood levels into the normal range, at least temporarily.

Children with A-1-AD may meet eligibility criteria to receive support services as Other Health Impaired if an educational need is demonstrated. There is no research to indicate cognitive delay as a result of this disease; however, the child's ability to function in the classroom may be impaired by his or her illness. Providing additional emotional support to help the child develop age-appropriate coping mechanisms would be helpful.

A-1-AD patients have a guarded prognosis. Liver transplantation can be curative for young children with cirrhosis and liver failure, but that procedure is no stroll through the park. Older patients with chronic lung disease must deal with their illness every day. They are susceptible to pneumonia and bronchitis, which can cause swift, catastrophic deterioration in their respiratory status. In the future, gene insertion therapy offers the best hope for prolonged survival and improved quality of life.

For more information and support, contact the Alpha 1 National Association at: Tel.: (800) 521-3025, e-mail AIN@alpha1.org.

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As the English language evolved, letter names no longer directly represented speech sounds; therefore, children became more and more confused as they tried to read modern literature by simply reciting the names of the letters. Realizing that this confusion hindered efforts to teach reading effectively, the alphabetic method was gradually replaced by phonetically based methods of reading instruction. By the beginning of the 20th century, the classic alphabetic method was seldom used.

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***See also* Distar; Reading Remediation; Whole Word Teaching**

ALPHABETIC METHOD

The alphabetic method of teaching children to read is historically connected with the development of an alphabet. Once letters and sounds were fixed in a structure (an alphabet), a method to master this structure emerged. The first recorded use of the alphabetic method was in ancient Greek and Roman civilizations. Reading instruction began by teaching children all the letters in their proper alphabetical order. After a complete mastery of the alphabet, children learned to group the letters to form syllables, words, and finally sentences. Reading instruction was considered primarily an oral process; the child recited the spelling of each syllable or word and then pronounced it. This progression of teaching letters, syllables, words, and sentences was the predominant method of teaching reading from Greek and Roman times until the late 1800s (Huey, 1908).

In using this method, 16th- and 17th-century teachers drilled children unmercifully on the names of the letters (Matthews, 1966). Instructional materials that presented lists of letters, syllables, and words to be memorized before advancing to the text were developed. The *New England Primer* was one of the most widely used reading texts in 17th-century America. Each reading selection focused on a moral or religious lesson, and was preceded by an alphabet, lists of the vowels and consonants, and lists of syllables such as *ab*, *eb*, and *ib*. The lists of words for spelling began with one-syllable words and progressed to two- and three-syllable words (Huey, 1980).

ALPHABETIC PRINCIPLE/PHONICS

The National Reading Panel (2000) identified five critical features of an effective reading curriculum. These five features are phonemic awareness, alphabetic principle or phonics, reading fluency, vocabulary development, and comprehension. Alphabetic principle is "the recognition that there are systematic and predictable relationships between written letters and spoken sounds" (Armbruster, Lehr, & Osborn, 2001, p. 11). Not only must this relationship between the written letters (graphemes) and spoken sounds (phonemes) be established, but students must be able to automatically apply this knowledge to decode unfamiliar words while reading. Phonemic awareness is the precursor to developing alphabetic principle or phonics.

Different terminology is often used to describe this relationship between letters and sounds, including grapho-phonemic relationships, letter-sound correspondence, phonics, and sound-symbol correspondence. Systematic and explicit instruction in alphabetic principle/phonics teaches students the relationship between the 26 graphemes (letters of the alphabet) and the 41 to 44 phonemes used in the English language. Systematic alphabetic principle/phonics instruction positively influences spelling skills in kindergarten and first-grade students (NRP).

There is a logical sequence of skills necessary to achieving mastery in alphabetic principle/phonics. Short vowel sounds (phonemes) should be taught first along with selected consonant phonemes. It is critical at this initial

point that the student masters the idea of a phoneme being represented by a grapheme. Once students are able to associate the most common phoneme to the appropriate grapheme then words can be formed. Words are introduced through word "families" where one consonant (C) varies and the vowel (V) and additional consonants (C) remain constant. This instructional sequence is explained in the following table (Bursuck & Damer, 2011).

Word Type	Example
CVC words that begin with a continuous phoneme	mat, sat, fat, hat
CVC words that begin with a stop phoneme	big, top, dip
CVCC words that end with a consonant blend or double consonants	sand, bend, toss
CCVC words beginning with a consonant blend	trip, slam, drop
CCVCC, CCCVC, CCCVCC	still, drink, truck
Compound words with CVC word or CVC variants	catnip

Once students are able to read words and groups of words and apply the alphabetic principle to unknown words, high-frequency irregular words can be introduced. By introducing some high-frequency words students are able to read beginning text. These high-frequency words are also known as Dolch sight words.

More advanced skills used in teaching the alphabetic principle/phonics include the influence of other languages, pattern recognition, affixes, morphology, and the six basic syllable types used in English. The six syllable types are explained in the table below.

Syllable type	Definition	Example
Closed	A syllable with a short vowel (spelled with one letter) and ending with one or more consonants	cat, ho•tel
Open	A syllable that ends with a long vowel sound (spelled with one letter)	fly, re•sign
Vowel-Consonant +e	A syllable with a long vowel sound (spelled with one letter), followed by a consonant, and a final silent e	kite, pre•cede
Vowel team	Syllables were the vowel sound is spelled using a combination of vowel letters	boat, re•peat
Vocalic –r	A syllable with a single vowel letter followed by an -r. The vowel sound changes because of the influence of the -r	for, sup•per
Consonant +le	An unaccented final syllable consisting of a consonant + l + silent e	ap•ple, can•dle

The two main goals of phonics instruction are to provide students with essential knowledge and skills of the relationship between graphemes and phonemes and to ensure they know how to apply these concepts when reading and writing.

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ALPORT SYNDROME

Alport syndrome is an inherited (usually X-linked) disorder. It involves damage to the kidneys, blood in the urine, and loss of hearing in some families—and in some cases, loss of vision. In cases in which there is no family history of kidney disease, Alport syndrome is caused by a mutation in a collagen gene.

This uncommon disorder affects about 2 out of 10,000 people (MEDLINE Plus Health Information, 2000). Although approximately 1 in 50,000 Americans carry the Alport Syndrome gene, twice as many females as males carry the gene. However, a greater percentage of males with the gene have symptoms. Before the age of 50, nearly all of the males carrying the gene show symptoms. They eventually develop chronic renal failure and end-stage renal disease (ESRD), which is the final stage in chronic renal failure. Even though most females with the gene manifest the same symptoms, the progression and severity of the disease is less severe. Only about 20% of the females carrying the gene will develop ESRD, but usually at an older age (National Organization for Rare Disorders [NORD], 2001).

Alport syndrome is classified by mode of inheritance, age, and features other than kidney abnormalities. The age of onset of ESRD determines whether Alport Syndrome is classified as a juvenile form or an adult form of the disease. If ESRD occurs before the age of 31, it is classified as the juvenile form; after the age of 31, it is classified as the adult form (NORD, 2001).

There are six subtypes of Alport syndrome:

1. Type I is a dominantly inherited juvenile form. The symptoms include kidney disease, nerve deafness, and eye abnormalities.
2. Type II is an X-linked dominant juvenile form. Symptoms are the same as in the Type I subtype.
3. Type III is an X-linked dominant adult form. Symptoms include kidney disease and nerve deafness.
4. Type IV is an X-linked dominant adult form. It primarily involves kidney disease. There are no vision or hearing impairments.
5. Type V (Epstein syndrome) is an autosomal dominant form of the disease. Symptoms include nerve deafness and thrombocytopathia (disorders of blood platelets). It is so rare that it has not been classified as either adult or juvenile. The incidence of ESRD in the reported cases seems to be the same for males and females.
6. Type VI is an autosomal juvenile form. Symptoms include kidney disease, nerve deafness, and eye abnormalities (NORD, 2001).

Characteristics

1. Abnormal urine color
2. Blood in the urine
3. Loss of hearing (more common in males)
4. Decrease or loss of vision (more common in males)
5. Cough
6. Ankle, feet, and leg swelling
7. Swelling, overall
8. Swelling around the eyes
9. Upset stomach
10. Peculiar-smelling breath
11. Fatigue and excessive need for sleep
12. Shortness of breath
13. Dry, often itchy skin

Source: MEDLINE Plus Health Information (2000).

Treatment of Alport syndrome includes vigorous treatment of the chronic renal failure. Hemodialysis may be used to treat this problem. This treatment would involve removing blood from the patient's artery, cleaning it of unwanted substances that would be normally excreted in the urine, and returning the cleansed blood to a vein (NORD, 2001). It is also important to aggressively treat urinary tract infections and control blood pressure; this can be done through diet by restricting salt and protein intake. High blood pressure can also be controlled with medication. Cataracts may be surgically repaired (MEDLINE Plus Health Information, 2000). Genetic counseling is also recommended.

Hearing loss may be permanent. It is therefore important to learn new skills such as sign language or lip reading. Hearing aids are helpful, and it is recommended that young men use hearing protection in noisy environments. Counseling and education can help to increase coping skills (MEDLINE Plus Health Information, 2000).

If diagnosed during school age, the child may be eligible for special education services under the classification of Hearing Impaired, Visually Impaired, or Other Health Impaired. They may benefit from services to address these impairments.

Prognosis for females is that they usually have a normal life span with little or no manifestation of the disease. Some complications may arise during pregnancy. Males, however, are likely to develop permanent deafness, a decrease in or total loss of vision, chronic renal failure, and ESRD by the age of 50. Investigational therapies include the use of a new drug, calcium acetate, during ESRD, to treat hyperphosphatemia.

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ALSTRÖM SYNDROME

Alström syndrome is an autosomal recessive genetic disorder characterized primarily by retinitis pigmentosa beginning during infancy and progressive sensorineural hearing loss beginning in early childhood. There is typically infant or childhood obesity that may normalize somewhat later, and individuals with this disorder frequently develop diabetes mellitus by early adulthood. In contrast to Bardet-Biedl syndrome, which shares several symptoms, in Alström syndrome there are normal

intelligence and normal extremities (Online Mendelian Inheritance in Man, 2000).

Characteristics

1. Retinitis pigmentosa from infancy; nystagmus and photosensitivity
2. Mild to moderate sensorineural hearing loss, starting in childhood
3. Cardiomyopathy, in infancy or later
4. Moderate obesity in infancy and childhood, possibly normalizing
5. Insulin resistance syndrome, with associated acanthosis nigricans
6. Diabetes mellitus (non-insulin-dependent diabetes mellitus), typically juvenile onset
7. Renal disease; early signs of urine retention, incontinence, or both
8. Possible hepatic disease
9. Possible short stature, scoliosis, and hypothyroidism
10. Normal intellectual range

Other symptoms of Alström syndrome can include progressive renal disease, hepatic dysfunction, congestive heart failure (appearing at any age), growth retardation, and insulin resistance syndrome along with its related dark pigmentation of skin flexures (acanthosis nigricans). Alström syndrome in childhood is typically difficult to recognize without the presence of infantile cardiomyopathy, and it is often not identified until the development of diabetes in the second or third decade. Homozygotic carriers appear to be asymptomatic.

First described in 1959 by Swedish physician and researcher Carl-Henry Alström, the syndrome is quite rare. To date there have been only about 76 cases of Alström syndrome reported in the medical literature. Current incidence is estimated as about 117 worldwide, including cases in 18 countries (Jackson Laboratory, 2000). The disorder occurs in males and females with equal probability. It has relatively increased frequency in French Acadian or Amish groups in which couples often have common ancestors. The largest numbers of diagnosed cases have been in the United States and the United Kingdom, likely due to increased availability of informed health care.

The degeneration of the retina (retinitis pigmentosa) may be apparent in the first year of life. Nystagmus and photosensitivity (so-called photophobia) can be early indicators. There is early loss of central vision, in contrast to initial loss of peripheral vision as is typically seen with other pigmentary retinopathies. The electroretinogram is absent or attenuated, with better-preserved rod than cone function early on. The retinal dystrophy is progressive, leading to total blindness. Visual acuity is typically 6/60 or less by age 10 and absence of light perception occurs by about age 20. When a patient presents with infantile cone and rod retinal dystrophy—especially if the weight is above the 90th percentile or there is infantile cardiomyopathy—then the diagnosis of Alström syndrome should be considered (Russell-Eggitt et al., 1998).

Because of the syndrome's effects on endocrine functioning, growth can be stunted, leading to short stature, and there may be scoliosis and hypothyroidism (Alter & Moshang, 1993). Renal and hepatic dysfunction can lead to serious complications. Screening for bladder dysfunction signs of urinary retention and/or incontinence has been suggested to help identify renal disease earlier and allow more timely preventive care (Parkinson & Parkinson, 2000).

General intelligence is not affected. Although some studies suggest there may be developmental delays, such effects seem most likely secondary to the visual and aural deficits. Intellectual functioning is typically within the normal range, and the prognosis to lead full productive lives is very good. Special education services may be available to children with Alström syndrome under the classification of Other Health Impaired or Physical Disability. Classroom modifications for visual and hearing deficits should be made (including for the photophobia). Most children can be mainstreamed if accommodations are made successfully and supported with appropriate supplemental programming. It is suggested that braille be learned early to prevent the child from falling behind in school as vision deteriorates. Incorporating regular physical activity is very important in regulating weight and managing diabetes.

Alström syndrome has been linked to Chromosome 2p13, but the gene has not yet been identified (Collin et al., 1999). Study of the Alström gene may contribute to knowledge about the regulation of body weight and blood glucose and about how these processes may be related to maintenance of sight and vision.

At present there is no prenatal screening for Alström syndrome available. Diagnosis is typically made on the basis of presenting features. There is no cure; treatment is focused on ameliorating the symptoms. Interventions include monitoring and controlling metabolism, weight, and diabetes and providing compensatory audiovisual aids.

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ALTERNATING HEMIPLEGIA OF CHILDHOOD

Alternating hemiplegia of childhood (AHC) is a rare but serious neurological disorder. The hallmark of AHC is the onset of frequent, recurrent, transient episodes of hemiplegia (paralysis of a body part). Hemiplegia manifestations run the gamut from numbness to complete loss of movement and feeling. Hemiplegia may affect either side of the body and may occasionally affect both sides simultaneously. These attacks may last a few minutes or may go on for days. In most cases, sleep induces resolution of a hemiplegia episode.

AHC is a relatively new addition to the list of neurological diseases. Fewer than 100 cases have been reported in the United States. Worldwide, there appear to be only about 250 cases. The exact cause of AHC is not known. However, the appearance of more than one in sibling groups suggests that—at least in some situations—there may be an autosomal dominant mode of transmission.

Characteristics

1. Onset of symptoms no later than 18 months of age.
2. Episodic hemiplegia affecting both sides of the body.
3. The existence of other paroxysmal neurological abnormalities not related to hemiplegia. This list includes dystonia (exaggerated muscle contraction), choreoathetosis (sudden, involuntary movement of limb or facial muscles), and temporary paralysis of muscles that control eye movement.
4. Autonomic abnormalities (excessive sweating, changes in skin color, and changes in body temperature).
5. Diminished intellectual function.
6. Exclusion of other causes responsible for recurrent neurological deficits.

AHC has no known cure. Because the frequency and duration of attacks appear to have a cumulative damaging effect on the brain, therapy is directed toward ameliorating their severity. Because sleep usually ends an episode, one strategy is to use sedatives. Seizures, which frequently complicate the clinical picture, respond to anticonvulsants.

A few clinical trials, involving small groups of patients, show that the drug flunarizine may decrease the severity of hemiplegic episodes. However, the results of these studies have been deemed inconclusive.

Children with AHC will require support services from an early age. Because of the delay in development, children will be eligible to receive support services from the early childhood intervention (ECI) program. Therapy services provided through ECI in the areas of occupational, physical, and speech therapy may help the child attain developmental milestones. As the child develops and the deficits become more evident, support services will need to be modified to meet the changing needs of the child. There also may be cognitive deficits as a result of the medication needed to help control the seizure activity. Careful monitoring of the educational strategies will be required to continue to help the child attain his or her academic potential.

AHC is a serious neurological disorder with a rather poor prognosis. There is no evidence that the disease shortens life expectancy, but there are insufficient data from long-term follow-ups of affected children to be confident about that assumption. Symptoms persist into adulthood, but as many of these patients grow older, they tend to handle attacks better. The younger the child is at the time of diagnosis, the more likely he or she is to acquire permanent neurological impairment and arrested intellectual development as he or she approaches maturity.

For more information and support, please contact: International Foundation for Alternating Hemiplegic of Childhood (IFAHC), 239 Nevada Street, Redwood City, CA 94062. E-mail:laegan@aol.com, website: http://www.ahckids.org; NIH/National Institute of Neurological Disorders and Stroke, 31 Center Drive MSC 2540, Building 31, Room 8806, Bethesda, MD 20892. Tel.: (301) 496-5751 or (800) 352-9424, website: http://www.ninds.nih.gov

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***See also* Hemiplegia**

ALTERNATING TREATMENTS DESIGN (*See* Single Case Research Designs)

ALTERNATIVE ASSESSMENTS (*See* Assessments, Alternative)

ALTERNATIVE FORMATS OF INFORMATION

An alternative format is produced when information in one medium is transformed into a different medium while maintaining as much of the original meaning as possible. The form and format of the information may change, but the conservation of the original information is usually the goal of such conversions. For example, a printed textbook (original medium) may be converted into a braille book or audio book (new medium). When applied to special education, alternative formats usually refer to media conversions done to make information available to a student with a disability. Although *alternative formats* have traditionally referred to media used to accommodate students with sensory impairments (e.g., braille, taped texts, tactile graphics, refreshable braille), the term is today being applied to alternative formats used to accommodate students who require differentiation in the formatting of learning materials.

Students with disabilities frequently take advantage of taped text materials, text-to-speech technology, cognitive mapping technology, audio files of text materials, and others. "Enlarged print materials, enlarged screen text, speech synthesizers and braille technologies provide students with visual impairments access to general education. Learning Ally's audiobooks provide print access to educational materials through the human voice." (Retrieved from: http://www.learningally.org/About-Us/The-Community-We-Serve/The-Myths-and-Realities-of-Print-Disabilities/149/ on December 16, 2011). Learning Ally works to provide students with varying disabilities access to reading materials. Accomodations such as audible text help provide students with disabilities equal opportunities to curriculum materials.

Advances in technology such as e-readers and apps for technological devices increases the availability and accessibility of information in alternate formats. Additional information on alternative format materials available to students with disabilities can be found at www.learningally.org. Learning Ally continues to focus on creating an organization which provides alternate formatted media to students with disabilities. Learning Ally publishes a newsletter *The Download* and coordinates annual conferences.

Learning Ally National Headquarters, 20 Roszel Road, Princeton, NJ 08540. Website: www.learningally.org

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***See also* Braille; Recording for the Blind**

ALTERNATIVE SETTINGS, POSITIVE BEHAVIOR SUPPORTS

The success of school-wide positive behavior support (SWPBS) in public school settings across the United States has generated mounting interest in its potential for alternative settings, including those serving youth whose challenging behavior causes them to be excluded from public schools. These settings include alternative education programs, residential schools and treatment programs, and juvenile detention and correctional facilities. In addition to the demonstrated effectiveness of SWPBS in schools, impetus for pursuing an approach

to discipline that is positive, proactive, and instructional in alternative settings is the poor outcomes experienced by youth in these settings, outcomes that include failure to complete a high school education, arrest and incarceration, and recidivism rates for incarcerated youth that average over 50% (Keith & McCray, 2002; Snyder & Sickmund, 2006). In addition to their histories of school failure, substantial proportions of youth in these settings also have educational disabilities, mental health needs, and histories of substance, physical, and emotional abuse (Gagnon & Richards, 2008; Nelson, Sprague, Jolivette, Smith, & Tobin, 2009). The relationship between academic failure, antisocial behavior, and juvenile incarceration is so well established that researchers and advocates refer to this pattern as the "school-to-prison pipeline" (American Civil Liberties Union, 2009; Nelson, Jolivette, Leone, & Mathur, 2010; Southern Poverty Law Center, 2009).

Initial efforts to adapt SWPBS in these settings have been encouraging (Jolivette & Nelson, 2010; Nelson et al., 2009). Farkas et al. (in press) found that grades improved and discipline referrals decreased for students with emotional and behavioral disorders and other health impairments when SWPBS was implemented with fidelity in an alternative education junior-senior high school. Simonsen, Britton, and Young (2010) reported a decrease in serious problem behavior and the use of physical restraint, and an increase in the percentage of students who refrained from physical aggression following the implementation of universal SWPBS in an alternative education program for students with significant problem behavior. Jolivette, Kennedy, Patterson, Houchins, and McDaniel (2010) found that behavioral incidents among students with emotional and behavioral disorders in a residential facility decreased when SWPBS was implemented with fidelity (as measured by the School-wide Evaluation Tool). Implementation in secure juvenile facilities has been reported by a number of authors (e.g., Nelson et al., 2009; Nelson, Scott, Gagnon, Jolivette, & Sprague, 2008; Sidana, 2006), and similar reductions in problem behavior and increases in prosocial behavior and academic performance have been reported. However, to date no scientifically rigorous studies of SWPBS or large-scale evaluations or efficacy studies have been completed in these settings. The absence of a national database on SWPBS in alternative settings also hampers efforts to assess the scope of adoption.

Need for Adaptation

As noted above, the characteristics and needs of youth in alternative settings require adjustments in SWPBS structure and methodology. Youth characteristics include a high prevalence of disabilities, mental health diagnoses, issues involving substance, physical, and sexual abuse, as well as ingrained patterns of antisocial behavior (Gagnon & Barber, 2010; Nelson et al., 2009). The prevalence of youth with mental health disorders in the juvenile justice system is so high that it has been referred to as the *de facto* children's mental health system (Grizzo, 2007).

Characteristics of Alternative Settings

The nature of alternative settings requires modifications to the structure and implementation of SWPBS. These settings tend to be isolated from typical public schools, staffed by professionals and paraprofessionals representing a variety of disciplines, and concerns regarding safety and security may dominate therapeutic programming. Many alternative education programs are designed to serve students who are at-risk of school failure or unable to succeed in regular classrooms because of their behavior; others operate as day treatment programs under the auspices of mental health agencies or as diversion programs sponsored by juvenile courts. In residential facilities, implementation in a 24/7 environment involving multiple shifts of staff constitutes another distinction, and the primacy of security in juvenile justice facilities requires further adaptations in training and implementation.

Staff Attitudes

A relatively common attitude toward youth in these settings is that they are all "red zone" students, meaning that as a group, they are characterized by the highest rates of problem behavior and need for support. This suggests that a greater proportion of youth will require secondary and tertiary level interventions. Staff who already feel overextended by the demands of reacting to behavioral challenges may be resistant to entreaties to redirect their focus to prevention. Related to this is the attitude that because youth are in an alternative setting (especially if it is correctional), punishment should be the primary disciplinary mode. Such attitudes invite the common wisdom that the most difficult part of implementing SWPBS (or any innovation, for that matter) is changing the behavior of adults. That punitive attitudes and behavior patterns are deeply ingrained in the staff of alternative (and especially correctional) settings magnifies the difficulty of changing the culture to teaching and supporting desired behavior.

Use of Data

Another barrier to implementation in alternative settings is that typically, decisions regarding youth behavior are not data-driven. That is, staff do not routinely collect, review, and systematically analyze data regarding youth behavior as a basis for making decisions regarding policies, staff training, or interventions. Whereas a plethora of discipline data typically exists in these settings, seldom are these data used to make programmatic decisions. Furthermore, because of a history of advocates and media using behavior data against secure facilities, administrators are reluctant to have such data available

for potential public scrutiny, and may even restrict dissemination among staff internally. Furthermore, security staff typically manages major behavioral events in these settings, with legislatively or administratively prescribed sanctions for rule violations. Staff may simply ignore minor behavioral incidents until they escalate into major infractions. Redirecting staff to record and respond to minor behavior events not only is a major change in the culture, but also may require additional data entry and management.

Implementation

Fortunately, a steady increase in the number of alternative education programs and residential facilities that are implementing SWPBS is occurring, and the knowledge gained from these implementation efforts has helped to guide subsequent initiatives. One particularly useful observation is that, unless a program or facility is in crisis, youth behavior tends to follow the same proportions as in public schools. As one juvenile corrections education administrator put it, "20% of the kids cause 80% of the problems" (M. Clarida, personal communication, July, 2005). When appropriate and effective universal preventions are in place, the great majority of youth are successful. The proportions of those who need secondary and tertiary support follow the SWPBS percentages, and the same response to intervention (RtI) logic can be used to their needs. Further, when staff no longer spend large amounts of time dealing with fairly minor problem behavior, they are able to respond more constructively (and effectively) to more challenging misbehavior. Staff also are able to focus on doing their jobs (e.g., teaching) as opposed to responding to misbehavior.

Adaptations for Alternative Settings

Five basic implementation steps comprise the SWPBS framework: (1) formation of a PBIS leadership team; (2) getting buy-in by a majority of staff, which generally is considered to be a minimum of 80%; (3) establishing a data-based action plan, consisting of agreed-upon expectations, procedures for teaching and encouraging compliance, and for addressing failure; (4) ensuring implementation with fidelity; and (5) establishing formative data-based monitoring of youth behavior and outcomes (Simonsen, 2010). The implementation of this framework is as important in alternative settings as in public schools; however, some adaptations in methodology are necessary. Because alternative education programs generally function as educational institutions, these adaptations are less marked than in residential treatment or juvenile justice settings. The major considerations tend to be lower teacher to student ratios, the presence of staff from other disciplines, and an increased focus on security. The nature of residential treatment and juvenile justice settings raises a number of considerations for adaptation: whether to implement PBIS within a single program in a facility (e.g., education) or facility-wide; training staff across disciplines and shifts; gaining staff consensus regarding expectations for behavior, teaching and supporting desired behavior, and responding to behavioral errors. Jolivette and Nelson (2010) offer the following suggestions for adapting SWPBS in alternative education and residential settings.

Leadership and Buy-In. In selecting participants for the leadership team, it is important to ensure that key stakeholders are represented. These persons include personnel from disciplines not typically found in regular public schools, such as specialized treatment staff, court workers, security officers, and facility administrators. Even if implementation is planned for only one system in a facility, such as education, staff from other disciplines will be affected to varying degrees and should be familiar with the structure and process. The support and participation of program or facility administration is particularly important. Teams also must secure a commitment by a majority of staff to adopt SWPBS, and to implement it with fidelity. In public schools, a criterion of 80% staff buy-in is the standard; however, staffing configurations and logistics in alternative settings suggest that a higher level of sustained commitment (e.g., 90% to 95%) may be necessary.

Staff Training. When implementing SWPBS in alternative settings, the logistics of staff training are important to consider. Particularly in residential programs, strategies for training staff across shifts and roles must be thought out. These may include arranging for staff to receive compensation for participating in training when they are off duty, providing substitutes to relieve staff for training, or having members of the SWPBS Leadership Team coach staff through the process. Extra coaching and modeling may be required for staff accustomed to using punishment as the primary (or only) tool for addressing behavior. Staff also may access training via Internet linkages, but hands-on coaching and mentoring to ensure fidelity of implementation must supplement such training.

In the majority of states, public school districts may access training in SWPBS through state leadership teams, as well as through the national technical assistance center (www.pbis.org). It is not likely that state or national trainers will be familiar with the idiosyncrasies of alternative settings outside of the education domain. One way to compensate for the shortage of trainers who have knowledge of alternative settings is to use a trainer-of-trainers approach, in which designated local staff receive training from regional or national trainers who have knowledge of SWPBS content and the features of the settings where SWPBS is to be implemented. Ideally, local trainers shadow or co-train with qualified mentors as they gain proficiency, and then move on to train program or facility staff independently. Implementation of SWPBS

with fidelity is much more successful when leadership teams are guided by both external and internal coaches. The former provide an objective frame of reference and the latter first-hand knowledge of the workings of the program or facility. External coaches must be carefully selected and trained. They may be staff from other programs in the system, in which case they must receive released time for working outside their settings. Internal coaches also must have adequate time released from other duties to fulfill this vital function. The Texas Youth Commission is addressing staff SWPBS training by providing centralized training to facility leadership teams and following this with training of facility trainers by external SWPBS coaches (who were recruited from a university SWPBS training program and facilitated teams in the centralized training).

Obviously, the selection of local trainers and coaches is critical. These persons must be highly skilled, readily available, and capable of communicating with staff from various disciplines and with differing philosophies regarding youth behavior. They also must receive adequate support. In addition to providing these personnel with adequate time for these duties, program and facility administrators must give their full and active support.

Action Planning. To maintain focus and function proactively, SWPBS leadership teams should work from data-based action plans. Such plans include strategies for (a) reaching consensus on behavioral expectations; (b) teaching expectations; (c) reinforcing youth for meeting expectations; and (d) responding to behavioral errors. The approach to implementation of SWPBS taken in public schools may be alien to the culture of alternative settings, in that expectations are stated positively, and the emphasis is on rewarding and encouraging youth compliance as opposed to punishing noncompliance. The selection and use of reinforcers also may be problematic, in that items may be deemed contraband by some staff or in some locations.

Phasing In. Residential settings in which PBIS has been implemented (especially those housing a relative large number of youth) generally have opted to begin with one system. Since the vast majority of experience with SWPBS has come from schools, the education program is the logical place to begin. Adding to this logic, education staff should be better prepared to develop lesson plans and instructional procedures for teaching expectations, providing reinforcement, and correcting errors in a way that does not involve institutional punishment, such as seclusion or restraint. Education staff can model and teach implementation procedures to other staff, and data that demonstrate improvements in youth (and staff) behavior can promote implementation in other systems within a facility. Youth also may advocate for SWPBS in other systems; Jolivette et al. (2010) reported that youth in a residential treatment facility persuaded dormitory staff to extend implementation from the facility's education program to housing units.

Conclusion

Implementation of SWPBS in alternative settings may seem a daunting task requiring much thought and adaptation, and it is. However, the benefits of a positive, proactive, and accountable system for addressing and improving the behavior of youth and staff in alternative settings are worth the effort. Because of their histories of school failure, educational disabilities, mental health conditions, and abuse issues, the majority of youth in these settings are substantially more vulnerable to lifelong failure. A milieu where they can succeed and learn more adaptive ways to interact with their environments is a path forward that previously has not been widely available. With increasing implementation of data reports and new research underway to demonstrate the efficacy of SWPBS in alternative settings, the momentum will shift toward a more positive future.

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AMAROUTIC FAMILIAL IDIOCY (*See* Tay-Sachs Syndrome)

AMBLYOPIA

Amblyopia, also called suppression blindness (Harley & Lawrence, 1977), is a visual condition that occurs when an anatomically healthy eye cannot see because of some other defect (Eden, 1978). Amblyopia is commonly called "lazy eye"; however, this is a misnomer (Eden, 1978) because it implies that amblyopia results from a muscular problem. Actually, amblyopia can have a number of causes. For example, strabismus (a condition in which the two eyes are not parallel when viewing an object) can lead to amblyopia. The brain ignores the visual signals of one of the two eyes to reduce the annoyance of double vision. Other factors such as astigmatism can also lead to amblyopia.

The degree of visual impairment associated with amblyopia can vary a great deal from losses that are just below normal to those in which only large objects can be identified. Treatment of amblyopia consists of treating the causal factors. It must be accomplished early in life (before the age of 6) because the child is likely to permanently lose the ability to process a 20/20 image from the affected eye.

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See also **Blind; Cataracts**

AMERICAN ACADEMY FOR CEREBRAL PALSY AND DEVELOPMENTAL MEDICINE

The American Academy for Cerebral Palsy, founded in 1947, changed its name in 1976 to the American Academy for Cerebral Palsy and Developmental Medicine (AACPDM). The Academy expanded their scope of interests from an initial focus on cerebral palsy into related areas of developmental medicine, including spina bifida, neuromuscular disease, traumatic brain injury and other acquired disabilities, genetic disorders, communication problems, and specific learning disabilities. The AACPDM is a professional organization whose membership is open to all who have training and experience in relevant fields.

The AACPDM promotes prevention, diagnosis, care, and quality of life primarily through continuing education, advocacy, and research grants. The Academy provides information, services, and resources via their website, peer-reviewed journal, newsletter, broadcast e-mails, live instructional tutorials, webinar lectures, and annual meeting. Patient and family resources are also available through their website. The office address of AACPDM is 555 East Wells Street, Suite 1100, Milwaukee, WI 53202. Tel.: (414) 918-3014, fax: (414) 276-2146, e-mail:

info@aacpdm.org, website: www.aacpdm.org Office hours: 8:00 a.m.–5:00 p.m. CST.

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AMERICAN ANNALS OF THE DEAF

The *American Annals of the Deaf* is a professional journal dedicated to quality in education and related services for children and adults who are hearing impaired. First published in 1847, the publication is the oldest and most widely read English language journal dealing with deafness and the education of people who are deaf. The *Annals* is the official organ of the Council of American Instructors of the Deaf (CAID) and of the Conference of Educational Administrators of Schools and Programs for the Deaf (CEASD). Members of the executive committees of both organizations form the Joint *Annals* Administrative Committee charged with the direction and administration of the publication.

For over 150 years, the *Annals* has primarily focused on the education of students who are deaf as well as dissemination of information for professionals associated with the educational development of this population. Concurrently, the *Annals* extends its range of topics beyond education, incorporating the broad interests of educators in the general welfare of children and adults who are deaf, and representing the diverse professional readership of the publication. Topics covered include communication methods and strategies, language development, mainstreaming and residential schools, parent-child relationships, and teacher training and teaching skills.

Four literary issues are published by the journal each year in the spring, summer, autumn, and winter. Individuals and institutions can obtain membership to the *Annals* through various levels of monetary support. An annual reference issue, a comprehensive listing of schools and programs in the United States and Canada for students who are deaf or hard of hearing and their teachers, is also published by the *Annals*. In addition to the listings, the reference issue provides demographic, audiological, and educational data regarding students who are deaf and hard of hearing and the schools they attend. The data are compiled annually by the Center for Assessment and Demographic Studies, a component of the Gallaudet Research Institute.

REFERENCE

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AMERICAN ART THERAPY ASSOCIATION

Founded in 1969, The American Art Therapy Association, Inc. (AATA) is an organization that maintains the belief that creating art can be a therapeutic and healing process for individuals of any age who may be experiencing physical, mental, or emotional concerns. The creative process of self-expression can assist in areas such as reducing stress, resolving conflicts, managing behavior, or increasing self-awareness. The association supports over 5,000 members and the general public by providing (a) educational opportunities, (b) public awareness, (c) therapeutic advancement, (d) research development, (e) criteria for training future therapists, (f) opportunities for communication among professionals and the general public, (g) scholarships and research grants, and (h) institutional and private practice settings. The association's mission is to advance art therapy and enhance lives by maintaining standards of professional competence and expanding the art therapy knowledge base. AATA is committed to public service, social justice, and advocacy for self-respect and creative potential in individuals. The association is also committed to diversity, exceptional service, maintaining high ethical standards, and providing financial and educational support.

AATA is composed of 36 statewide chapters. Membership is open to anyone, including practicing art therapists, students, educators, and related practitioners in addition to individuals who present an interest in the process of art therapy around the world. Members receive benefits in career advancement, practical support,

and the latest research by utilizing resources such as the Practice Center, the Career Center, and the ART Clearinghouse. Members also gain access to the association's publication, *Art Therapy: Journal of the American Art Therapy Association*, which provides peer-reviewed, empirical research, theory and practice papers, viewpoints, reviews of cultural literature in art therapy, and best practices. Conferences are held annually around the United States and may include themes such as Weaving a Tapestry. For additional information on AATA, visit www.americanarttherapyassociation.org or contact the association at info@artherapy.org. Association headquarters are located at 225 North Fairfax Street, Alexandria, VA 22314. Tel.: (888) 290-0878.

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AMERICAN ASSOCIATION FOR MARRIAGE AND FAMILY THERAPY (AAMFT)

The American Association for Marriage and Family Therapy (AAMFT), founded in 1942, is the national organization representing marriage and family therapists. The association seeks to (a) advance marriage and family therapy through increased understanding, research, and treatment; (b) establish and maintain standards for the education and training of marriage and family therapists; and (c) promote professional development, ethics, and conduct among marriage and family therapists. The AAMFT has over 24,500 members in the United States, Canada, and abroad. Clinical, Associate, and Student members are mental health therapists or therapists-in-training who have met varying levels of AAMFT credential standards. Affiliate members are individuals in allied mental health professions who are interested in staying informed about developments in marriage and family therapy.

The AAMFT publishes periodicals and directs practitioners to a variety of books, DVDs, brochures, and other resources. The *Journal of Marital and Family Therapy* (the official journal of the association) offers current research findings in marriage and family therapy. *Family Therapy Magazine* provides the latest updates in the field of marriage and family therapy.

Each year the AAMFT sponsors an annual conference in early fall for training in family systems theory, practice, and research. The 2011 Annual Conference held in Fort Worth, Texas, was a four-day event with over 100 available sessions. Also, division conferences and training events are held throughout the United States and Canada for continued learning and professional development in marriage and family therapy. Updated information and resources are available at www.aamft.org. The website also has additional links and directories such as TherapistLocator.net, which allow potential clients to search from a directory of over 15,000 marriage and family therapists who have met training requirements set forth by the AAMFT. The association offices are located at 112 South Alfred Street, Alexandria, VA 22314-3061. Tel.: (703) 838-9808, fax: (703) 838-9805, website: http://www.aamft.org/iMIS15/AAMFT/

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AMERICAN ASSOCIATION FOR THE SEVERELY HANDICAPPED (*See* TASH)

AMERICAN ASSOCIATION OF COLLEGES FOR TEACHER EDUCATION

The American Association of Colleges for Teacher Education (AACTE) is a national, voluntary association of colleges and universities with undergraduate and/or graduate programs committed to the preparation of professional educators, including teachers and other educational personnel. The Association is composed of over 700 member institutions representing both private and public colleges and universities of every size and located in every state, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam. As a group, the AACTE institutions produce more than 85% of new educators each year.

The Association encourages major initiatives and innovations in teacher education, and serves as advocate for the profession on issues of interest to the membership, particularly in areas of certification, accreditation, and assessment. AACTE is a major influence in helping form federal and state educational policy, and is recognized as the primary representative of teacher education interests before Congress, state legislatures, other governmental agencies, and the media. The Association continues to advise the National Council for Accreditation of Teacher Education (NCATE) on issues of institutional standards and accreditation. AACTE publishes the biweekly newsletter *Briefs*, which reports on current happenings in the

education, public policy, and government arenas to the teacher education community.

AACTE offices are located at 1307 New York Ave. N.W., Suite 300, Washington, DC 20005. Tel.: (202) 293-2450. For additional information, please visit the website: http://www.aacte.org

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AMERICAN BOARD OF PROFESSIONAL NEUROPSYCHOLOGY

The American Board of Professional Neuropsychology (ABPN) is a credentialing board that examines doctoral-level psychologists with specialized training in the field of clinical neuropsychology and awards diplomas if examination performance is satisfactory. Examinations consist of an essay exam concerning clinical casework, a work sample examination (wherein examinees submit for scrutiny two actual cases from their practice), and a 3-hour oral examination. Additionally, documentation of appropriate credentials and training is required. Incorporated in 1982, ABPN was the first (and as of this writing, the only) psychology credentialing board that has applied to be approved and certified by the National Commission of Certifying Agencies, the certification arm of the National Organization for Competency Assurance, an organization charged by the federal government with oversight and accreditation of health care certification bodies. The ABPN central office address is Care of the Executive Director, Dr. Michael Raymond, John Heinz Institute of Rehabilitation Medicine, Neuropsychology Services, 150 Mundy Street, Wilkes-Barre, PA 18702.

Cecil R. Reynolds
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AMERICAN BOARD OF PROFESSIONAL PSYCHOLOGY

Originally named the American Board of Examiners in Professional Psychology, this organization was renamed the American Board of Professional Psychology (ABPP) in 1968. Founded in 1947 with the support of the American Psychological Association, it consists of a board of 15 trustees with headquarters in Savannah, Georgia. This certification board conducts oral examinations and awards specialty certification in eleven specialties: behavioral psychology, clinical psychology, clinical neuropsychology, counseling psychology, family psychology, forensic psychology, health psychology, industrial/organizational psychology, psychoanalysis in psychology, rehabilitation psychology, and school psychology. Necessary for certification is 5 years of qualifying experience in psychological practice.

The ABPP annually presents the Distinguished Professional Achievement Award. This and other awards are presented at the annual convention of the American Psychological Association in August. Publications of the ABPP include the *Specialist* newsletter and the *Directory of Diplomats* (biannual).

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AMERICAN CANCER SOCIETY (ACS)

The American Cancer Society (ACS) is a voluntary organization committed to the elimination and control of cancer. This nationwide effort is conducted through 12 chartered geographic Division affiliates throughout the United States, more than 900 local offices nationwide, and a presence in more than 5,100 communities. The ACS effort is accomplished through four major activities: (1) the public education program, which emphasizes regular, preventative care for adults, attention to specific warning signals, and information regarding positive outcomes when prompt diagnosis and preventative measure are adopted; (2) a comprehensive professional education program designed to stimulate health professionals to use the best cancer detection, diagnostic, and patient management techniques available, to exchange knowledge on the latest cancer-fighting techniques, and to disseminate new ideas and developments in the community; (3) a wide range of volunteer-based service and rehabilitation programs to assist cancer patients and their families with the necessary practical and emotional support so vital to coping with the wide-ranging effects of the disease; and (4) research into all aspects of cancer, from direct clinical investigations and training to prospective cancer prevention studies.

The ACS began in 1913, when 15 physicians and business leaders gathered in New York City and founded the American Society for the Control of Cancer (ASCC). The Society's founders were aware that the disease, steeped

in a climate of fear and denial, must be brought to the attention of the people. Articles were written for popular magazines and professional journals, a monthly bulletin providing information about the cancer was published, and physicians were recruited throughout the United States in an attempt to increase public awareness.

In 1936, Marjorie G. Illig, an ASCC field representative and chair of the General Federation of Women's Clubs Committee on Public Health, proposed the creation of a legion of volunteers, with the sole purpose of waging war on cancer. The Women's Field Army, as this organization came to be known, was the driving force behind the agency's move to the forefront of voluntary health organizations.

Today, the core of the organization's effort resides in more than 3 million volunteers who implement the society's public and professional education programs, service programs for patients and families, and raise funds for research programs.

The ASCC was reorganized in 1945, becoming the American Cancer Society (ACS), today's leader in the fight against cancer through its programs in research, patient services, prevention, detection and treatment, and advocacy. The Society strives to achieve this goal by promoting the early detection of cancer through education, intervention, and programs such as the Breast Cancer Network and Man to Man, a prostate cancer education and support group. In conjunction with these efforts, the ACS has increased its effort to protect children through comprehensive school health education and similar programs designed to discourage tobacco and promote healthy living.

Scientists supported by ACS have successfully established the link between cancer and smoking, demonstrated the effectiveness of the Pap smear, developed cancer-fighting drugs and biological response modifiers, dramatically increased the cure rate for leukemia, and proved the safety and effectiveness of mammography. The American Cancer Society has committed almost $3.5 billion to research and funded 44 Nobel Prize winners.

REFERENCE

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AMERICAN COUNCIL ON RURAL EDUCATION (ACRES)

The American Council on Rural Special Education (ACRES) was founded in 1981 by a group of individuals interested in the unique challenges of rural students and individuals needing special services. The five goals of ACRES are to (1) foster quality education and services for individuals with exceptional needs living in rural America; (2) promote cultural diversity and the empowerment of minorities and members of traditionally underrepresented groups in providing services to individuals with exceptional needs, their families, and service providers; (3) promote national recognition for rural special education, health, and human services; (4) promote collaborative partnerships with organizations interested in special education, health, and human services; and (5) disseminate information concerning promising practices and research for improving education and services for individuals with disabilities living in rural communities.

Today, ACRES is the only national organization devoted entirely to special education issues that affect rural America. The geographically diverse membership of ACRES is representative of all regions of the country and comprises special educators, general educators, related service providers, administrators, teacher trainers, researchers, and parents who are committed to the enhancement of services to students and individuals living in rural America. This fact is especially important as rural issues are not only different from urban issues but also may vary among specific rural settings. The members of ACRES strive to provide leadership and support to enhance services for individuals with exceptional needs, their families, the professionals who work with them, and for the rural communities in which they live.

The ACRES publishes the only national scholarly journal solely devoted to rural special education issues, *Rural Special Education Quarterly* (*RSEQ*). The purpose of *RSEQ* is to disseminate information and research concerning rural special education, federal, and other events relevant to rural individuals with disabilities, progressive service delivery systems, reviews of relevant publications, and resources for rural special educators.

Each year, ACRES sponsors an annual conference in March. It is the only national conference devoted entirely to rural special education issues. Topic strands include administration, at-risk issues, collaborative education models, early childhood, gifted and talented, multicultural issues, parents and families, professional development, technology, transition, and related services. Annually, ACRES awards a scholarship to provide a practicing rural teacher an opportunity to pursue education and training that would not otherwise be affordable within his or her district and presents the Exemplary Rural Special Education Program Award to exemplar programs providing services in rural settings. Additional information on the

American Council on Rural Special Education is provided on the website at http://acres-sped.org.

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AMERICAN COUNSELING ASSOCIATION (ACA)

The American Counseling Association (ACA) was begun in 1952 through a collaboration of the National Vocational Guidance Association (NVGA), the Student Personnel Association for Teacher Education (SPATE), the National Association of Guidance and Counselor Trainers (NAGCT), and the American College Personnel Association (ACPA). The ACA, originally known as the American Personnel and Guidance Association (APGA) and then later (1983) reorganized as the American Association of Counseling and Development, is presently composed of 19 divisions and 56 branches, representing multiple interests and practice areas in the United States and in multiple other countries. It functions to "enhance the quality of life in society by promoting the development of professional counselors, advancing the counseling profession, and using the profession and practice of counseling to promote respect for human dignity and diversity" (http://www.counseling.org/aboutus, para. 4).

Counselors work in the bio-psycho-social realm to promote health, growth, and wellness. Presently a comprehensive definition of counseling has been proposed. "Counseling is a professional relationship that empowers diverse individuals, families, and groups to accomplish mental health, wellness, education, and career goals" (http://www.counseling.org/resources, para. 6). Within this definition and within the ACA, school counselors, formerly known as guidance counselors, are most germane to serving the needs of the special education population. These counselors strive to help students develop in personal, social, academic and career areas. Many other ACA members are counselors, who are prepared to work, not only with the students, but also with their families and their communities.

Further information about the ACA, and the multiple journals it publishes, can be obtained from American Counseling Association, 5999 Stevenson Ave., Alexandria, VA 22304, 800-347-6647, or from the website http://www.counseling.org/

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AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

The American Educational Research Association (AERA) was founded in 1916 as the National Association of Directors of Educational Research. AERA is the most prominent international professional organization, with more than 25,000 members. Members include educators; administrators; directors of research; persons working with testing or evaluation in federal, state and local agencies; counselors; evaluators; graduate students; and behavioral scientists.

The objectives of AERA include improving education process by encouraging scholarly inquiry related to education and evaluation and by promoting the dissemination and practical application of research results. There are 12 divisions within AERA. These 12 divisions range from administration and curriculum to teacher education and education policy and politics. AERA also proves Special Interest Groups (SIGs) for the involvement of individuals drawn together by a common interest in a field of study, teaching, or research. The Association provides SIGs program time at the Annual Meeting, publicity, scheduling, staff support, viability, and the prestige of AERA affiliation.

Journals published by the AERA include the *American Educational Research Journal, Educational Evaluation and Policy Analysis, Journal of Educational and Behavioral Statistics, Review of Educational Research, Educational Researcher, Review of Research in Education* (annual), *Qualitative Inquiry*, *Sociological Method & Research*, *Encyclopedia of Educational Research*, and *Handbook of Research on Teaching* (both revised every 10 years).

The AERA holds an annual convention for the presentation of reports, papers, and awards. It also holds research training programs and monitors federal educational research activities.

REFERENCE

American Educational Research Association. *About AERA*. Retrieved July 27, 2011, from http://www.aera.net/

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AMERICAN FOUNDATION FOR THE BLIND

The American Foundation for the Blind (AFB), a nonprofit organization, was founded in 1921 to serve as the national partner of local services for the blind and visually impaired. The organization is a leading national resource for people

who are blind or visually impaired, the organizations that serve them, and the general public. The mission of the organization is to enable people who are blind or visually impaired to achieve equality of access and opportunity in order to ensure freedom of choice in their lives.

AFB traces its origins to a meeting of a group of professionals in Vinton, Iowa, in the summer of 1921 (Koestler, 1976). This meeting primarily included officers of the American Association of Workers for the Blind (AAWB). The meeting resulted in the recognition of the pressing need for a national organization that was not affiliated with special interest groups, professional organizations, or any local, regional, or state organizations currently serving the needs of the blind (Hagerty, 1987).

Helen Keller was closely identified with AFB from the early 1920s until her death. The organization is recognized as her cause in the United States. Working with AFB for over 40 years, Keller represented the organization in their efforts to educate legislators and the public about services needed for people who are blind.

AFB also publishes books, pamphlets, videos, and periodicals about blindness for professionals and consumers. This includes the leading professional journal of its kind, *Journal of Visual Impairment and Blindness*. In addition, the organization is responsible for maintaining and preserving the Helen Keller archives, a collection of personal material donated by her. AFB also houses the M. C. Migel Memorial Library, one of the world's largest collections of print materials on blindness.

Additionally, AFB conducts, evaluates, and publishes policy research that positively affects the quality of life for people who are blind or visually impaired. The organization also serves as an advocate for and evaluator of the development of assistive products and technology. A group of individuals from an organization called the Maintenance of the Careers & Technology Information Bank serve as mentors through AFB. Mentors from this organization consist of blind individuals from all 50 states and Canada who use assistive technology in multiple aspects of their lives.

In the accomplishment of its mission, AFB also strives to educate policymakers and the public in the needs and capabilities of people who are blind or visually impaired. AFB accomplishes this goal by consulting on legislative issues and representing blind and visually impaired persons before Congress and government agencies. AFB also produces books and other audio materials such as duplicated *Talking Books* under contract to the Library of Congress. The organization records and duplicates annual reports and other publications for various corporations and nonprofit organizations, thus making them accessible to print-handicapped employees, clients, and shareholders.

The AFB website (www.afb.org) provides links to reader-friendly blogs and materials for families, career seekers/employers, seniors and other professionals. For example, the senior page provides helpful home repair tips from an AFB retiree. The career connect page offers career advice from mentors such as Erik Weihenmayer, the first blind man ever to reach the summit of Mt. Everest. AFB's family site links families to leading experts through blogs for interactive question-and-answer format dialogues. The family site also lists information about nationwide programs on topics such as braille penpals and early childhood programs for blind children. AFB's site offers a plethora of information on topics relating to all aspects of living with vision loss.

The website also holds information regarding AFB's Blind Center on Vision Loss. The center utilizes unique presentations of information to support and accommodate people with vision loss. Its staple is Esther's Place, a fully furnished 1,800-square-foot model home in Dallas, Texas. The home is fitted with adaptations and products to assist individuals with vision loss in activities of daily living. Visitors can walk through the model apartment, test out the various technologies in Esther's Place and gain ideas and information about modifications they can make in their own homes.

For more information about the American Foundation for the Blind, contact the offices: 2 Penn Plaza, Suite 1102, New York, NY 10121. Tel.: (800) AFB-LINE (232–5463) or (212) 502–7600 (in New York state), e-mail: afbinfo@afb.net

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Koestler, F. A. (1976). *The unseen minority*. New York, NY: McKay.

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AMERICAN GUIDANCE SERVICE

American Guidance Service, Inc. (AGS) is an educational publishing company founded in 1957, and is an employee-owned company that encourages partnership and ongoing dialogue with the professionals that use its products. AGS publishes a wide variety of norm-referenced assessment instruments for the identification of special needs students, focusing primarily on cognitive ability, achievement, behavior, and personal and social adjustment, with

many publications also available in Spanish. Their better-known tests include the Peabody Picture Vocabulary Test (PPVT-III), Vineland adaptive behavior scales—Second Edition (Vineland II), Kaufman Assessment Battery for Children—Second Edition (K-ABC II), Kaufman Test of Educational Achievement—Second Edition (K-TEA II), the Developmental Indicators for the Assessment of Learning, third edition (DIAL III), and the Behavioral Assessment System for Children—Second Edition (BASC 2).

In addition to testing materials, AGS publishes a great many instructional materials, including over 900 textbooks, as well as programs for parenting and family living. Much of their material is focused on children with learning/emotional problems or in special education, though they also publish material geared to all ages. AGS can be reached at 4201 Woodland Road, Circle Pines, MN 55014-1796. Tel.: (800) 328-2560 or (651) 287-7220.

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AMERICAN JOURNAL OF MENTAL RETARDATION

Originally known as the *American Journal of Mental Deficiency, AJMR* then the American Association on Mental Retardation (AAMR) is now the AJIDD Ameican Journal of Intellectual and Developmental Disabilities. The original title reflected the original name of the sponsoring organization, which was changed from the American Organization on Mental Deficiency (AOMD) and then (AAIDD). The primary purpose of the journal is to publish theoretical manuscripts and research in the area of intellectual disability, with an emphasis on material of an objective, scientific, and experimental nature. Book reviews are included. The journal address is P.O. Box 1897, Lawrence, KS 66044. Tel.: (785) 843-1235, e-mail: AJMR@allenpress.com.

Staff

AMERICAN INSTITUTE—THE TRAINING SCHOOL AT VINELAND

The American Institute—The Training School at Vineland is located in Vineland, New Jersey (Main Road and Landis Avenue, Vineland, NJ 08360). The school and training facility were founded in 1887; they are under the supervision and administrative management of Elwyn Institutes. The facility serves children and adults who are intellectually disabled, brain damaged, emotionally disturbed, physically handicapped, and learning disabled (Sargent, 1982).

The school programs are ungraded at the elementary and secondary levels. The school features education and training programs that are designed to train young people to return to the community. The programs serve intellectually disabled. The range of educational programs and vocational training experiences are developed with individualized educational plans and rehabilitation services. The facility is internationally recognized for the pioneering works of Binet and Doll. The Stanford Binet tests were translated and norms were developed at the school. Dr. Edward Doll is recognized as the pioneer in the development of the Vineland Social Maturity Scale.

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Paul C. Richardson
Elwyn Institutes

AMERICAN JOURNAL OF OCCUPATIONAL THERAPY

The *American Journal of Occupational Therapy* (*AJOT*) is an official publication of the American Occupational Therapy Association. *AJOT* is published monthly except for July/August and November/December, when it appears in bimonthly issues. Manuscripts are subjected to anonymous peer review. Accepted articles pertain to occupational therapy and may include reports of research, educational activities, or professional trends; descriptions of new occupational therapy approaches, programs, or services; review papers that survey new information; theoretical papers that discuss or treat theoretical issues critically; descriptions of original therapeutic aids, devices, or techniques; case reports that describe occupational therapy for a specific clinical situation; or opinion essays that discuss timely issues or opinions and are supported by cogent arguments. In addition, the journal contains letters to the editor, publication reviews, and product advertising.

AJOT is abstracted or indexed by Applied Science Index and Abstracts, Behavioral Medicine Abstracts, Cumulative Index to Nursing and Allied Health Literature, Exceptional Child Education Resources, Excerpta Medica, Inc., Hospital Literature Index, Index Medicus, Institute for Scientific Information, MEDLINE, OT BibSys, Psychological Abstracts, and Social Sciences Citation Index. Microfilms of complete volumes can be obtained from University Microfilms, Inc.

Elizabeth Holcomb
American Journal of Occupational Therapy

AMERICAN JOURNAL OF ORTHOPSYCHIATRY

The *American Journal of Orthopsychiatry* (*AJO*), is the quarterly journal of the American Orthopsychiatric Association. The association was founded in 1926 and began publication of *AJO* in 1930. The *AJO* is a quarterly, refereed, scholarly journal written from a multidisciplinary perspective. The *AJO* is dedicated to public policy, professional practice, and information that relates to mental health and human development. Clinical, theoretical, research, review, and expository papers are published in *AJO*. These papers are essentially synergistic and directed at concept and theory development, reconceptualization of major issues, explanation, and interpretation.

The *AJO* concentrates on many topics of concern to special educators. During its lifetime, *AJO*'s articles have centered around the topics of social issues and the handicapped, childhood psychosis, psychopharmacology, school phobia, depression, suicide, child abuse, intellectual disability, and treatment of all of these disorders. The contributors' list and editorial board have, over the years, featured some of the finest scholars from developmental medicine, developmental psychopathology, child development, school psychology, clinical psychology, special education, neurology, psychiatry, and related mental health fields. The *AJO* is an influential journal that publishes top scholars' writing on special education.

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See also **American Orthopsychiatric Association**

AMERICAN JOURNAL OF PSYCHIATRY

The *American Journal of Psychiatry* began publication in 1844 as the *American Journal of Insanity*, changing to its current title in 1921. It is the official journal of the American Psychiatric Association, and is the most widely read psychiatric journal in the world. Published monthly, the *American Journal of Psychiatry* publishes peer-reviewed research studies and articles that focus on developments in the biological aspects of psychiatry, on treatment issues and innovations, and on forensic, ethical, social, and economic topics. Letters to the editor, book reviews, and official American Psychiatric Association reports are also included. Of special interest to many readers are the overview and special lead articles, which address major psychiatric syndromes and issues in depth.

Kay E. Ketzenberger
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AMERICAN OCCUPATIONAL THERAPY FOUNDATION

The American Occupational Therapy Foundation was founded in 1965 as the American Occupational Therapy Association's (AOTA) philanthropic sister organization. The foundation has devoted its energies to raising funds and resources in three program areas—publications, research, and scholarships—associated with the profession of occupational therapy and health-care delivery.

The foundation's publication program aims to increase public knowledge and understanding of the occupational therapy profession. In addition to various reports and documents, it publishes *The Occupational Therapy Journal of Research*, and has produced a major bibliography of completed research in the field. The foundation supports the Occupational Therapy Library, which supplies requested materials through interlibrary loan.

A research program is conducted through the foundation's Office of Professional Research Services. Program services include the Academy of Research, support of researchers through grant awards (in association with the AOTA), and doctoral and postdoctoral fellowship awards to support researchers. The foundation widely disseminates scholarship information for undergraduate and graduate students in occupational therapy publications and through occupational therapy schools.

The American Occupational Therapy Foundation is located at 4720 Montgomery Lane, P.O. Box 31220, Bethesda, MD 20824.

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AMERICAN ORTHOPSYCHIATRIC ASSOCIATION

The American Orthopsychiatric Association (Ortho) was formed at the invitation of Herman Adler and Karl Menninger at the Institute for Juvenile Research in Chicago in 1924 under the name of the Association of American Orthopsychiatrists. The group operated informally, debating its name and purpose and finally founding Ortho a year later. In 1926 Ortho amended its constitution, which limited membership to physicians, to redefine membership to include psychiatrists, psychologists, social workers, and other professional persons "whose work and interests lie

in the study and treatment of conduct disorders." According to Eisenberg and DeMaso (1985), the first published membership roster, published October 1, 1927, included 45 psychiatrists, 12 psychologists, 5 social workers, and several lawyers and penologists. Ortho had as its purpose the centralization of the techniques, objectives, and aspirations of psychiatrists, psychologists, and related mental health workers whose primary interests were in the area of human behavior, providing a common meeting ground for students of behavior problems and for fostering scientific research and its dissemination. The early membership included names familiar to special educators, including such notables as Edgar Doll, Lightner Witmer, and Carl Murchison.

Lightner Witmer, noted among historians of psychology as the man who coined the term clinical psychology, founded school psychology and established the first psychological clinic; he also coined the term orthogenics and established the team approach to children's problems when he invited neurologists to collaborate on case studies (Eisenberg & DeMaso, 1985). Ortho subsequently became a major force in the establishment of the child guidance movement in the early 1900s. In 1930 Ortho established the *American Journal of Orthopsychiatry*, a widely read and respected journal that in its early years vigorously debated the roles and functions of various professionals (e.g., psychiatrists, psychologists, social workers, etc.) in the treatment of childhood mental health disorders.

Presently, many special educators belong to Ortho. It is a large, robust organization of more than 10,000 members. It is involved in social, scientific, and public policy issues, including diagnosis, evaluation, and treatment, relevant to the improvement of the lives of the handicapped. The *American Journal of Orthopsychiatry* is provided as a benefit of membership; it contains many articles of interest to special educators. The association is located at Department of Psychology, Box 871104, Arizona State University, Tempe, AZ 85287. Tel.: (480) 727-7518.

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See also **American Journal of Orthopsychiatry; Witmer, Lightner**

AMERICAN PHYSICAL THERAPY ASSOCIATION

The American Physical Therapy Association (APTA) endeavors to improve physical therapy services and education by accrediting academic programs in physical therapy, assisting states in preparing certification examinations, and offering workshops and continuing education courses for therapists at the national and local levels. There are seven membership types available through APTA: physical therapist/physical therapist assistant, physical therapist postprofessional student, student of physical therapy, foreign-educated physical therapist (living within the United States), international partner (foreign-educated living outside the United States), retired/life membership, and faculty partner.

Benefits for physical therapists and assistants include APTA healthcare advocacy in Washington DC, access to public relations marketing tools, professional resources, and evidence-based practices. Physical therapists also receive networking opportunities, conference discounts, publications, and continuing education opportunities. Benefits for student members include access to educational resources, networking opportunities, and financial assistance such as scholarships, grants, and award opportunities. Benefits for employers sponsoring membership for their staff include attracting clients, decreasing professional development expenses, improving recruitment, and retaining current employees.

Information is available through APTA about careers in physical therapy, accredited preparation programs, sources of student financial aid, and employment opportunities. A variety of pamphlets are available on prevention of injuries and chronic or degenerative conditions. APTA has a published newsletter and journal. Bibliographies have been prepared on topics including resources for stroke victims, quadriplegics, paraplegics, amputees, parents, and educators. Members benefit from information regarding practice and disabilities. The association also serves as a referral source for individuals who require physical therapy services. Association offices are located at 1111 North Fairfax Street, Alexandria, VA 22314-1488. Tel.: (800) 999-2782, website: www.apta.org.

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AMERICAN PRINTING HOUSE FOR THE BLIND

The American Printing House for the Blind (APH), the oldest private, nonprofit institution for the blind in the United States, was founded in Louisville, Kentucky, in 1858. It is the world's largest company devoted solely to creating products and services for people who are visually impaired. The Act to Promote the Education of the Blind, mandated by Congress in 1879, enabled the APH to receive grants for education texts and aids for those with visual impairments from the federal government. Funds appropriated under the Act are used by each state to purchase educational materials from APH for their blind students below the college level (APH, 1998).

The Company's mission is to promote the independence of blind and visually impaired persons by providing special media, tools, and materials needed for education and life. A wide variety of products and services are available through APH, including braille, large type, recorded, computer disk, and tactile graphic publications as well as a wide assortment of educational and daily living products. Various services designed to assist consumers and professionals in the field of vision are also offered, including *Louis*, a database listing materials available from accessible media across North America and *Patterns*, a reading instruction program developed through APH research.

APH's Talking Books on cassette tape, produced in agency recording studios, are a popular reading medium for blind and visually impaired people of all ages. Fiction and nonfiction topics, ranging from romance to cookbooks, are produced by professional narrators who are also teachers, actors, and media personalities. Most Talking Books can be obtained on a free loan basis from the National Library for the Blind and Physically Handicapped, a division of the Library of Congress. Three magazines are offered by APH directly to eligible blind readers. They include *Readers Digest, Newsweek*, and *Weekly Reader*.

In addition to the publications and products provided to those who are visually impaired, APH maintains a national center for research and development, focusing on the creation of products for blind students and adults, and a museum, offering a look at the history of education of blind people.

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AMERICAN PSYCHIATRIC ASSOCIATION

The American Psychiatric Association was founded in 1844 as the Association of Medical Superintendents of American Institutions for the Insane, and changed to its current name in 1921. The Association is a national medical specialty society that had over 35,000 U.S. and international members in 2005; members are physicians who specialize in the diagnosis and treatment of mental, emotional, and substance-abuse disorders. The Association's major focus areas include mental health, psychopharmacology, psychotherapy, and health professions development, and its primary objectives include the advancement and improvement of care for people with mental illnesses through the provision of nationwide education, public information, and awareness programs and materials.

The Association publishes the *American Journal of Psychiatry* (its official monthly journal), *Hospital and Community Psychiatry* (monthly), and *Psychiatric News* (twice monthly). The Association offers many continuing education workshops, seminars, and courses, as well as library services for members. The Association can be contacted at their national offices at 1000 Wilson Boulevard, Suite 1825, Arlington VA 22209. Tel.: (703) 907-7322 or (800) 368-5777.

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AMERICAN PSYCHOLOGICAL ASSOCIATION

The American Psychological Association (APA) is the nation's major psychology organization. The APA works to advance psychology as a science and a profession, and to promote human welfare. When the APA was established in 1892, psychology was a new profession and the organization had fewer than three dozen members. Over the years the organization has grown rapidly: In 1998 the APA had more than 155,000 members, 51 divisions in specialized subfields and interest areas, and 58 affiliated state, provincial, and territorial psychological associations.

The growth of the science and profession of psychology is reflected in the development of diverse programs and services administered by the association. These programs aim to disseminate psychological knowledge, promote research, improve research methods and conditions, and develop the qualifications and competence of psychologists through standards of education, ethical conduct, and professional practice.

The program and business activities of the APA are coordinated at the association's central office in Washington, DC. These offices are headquarters for APA's

programs in governance affairs, national policy studies, public affairs, communications, and financial affairs. Through these programs, the central office staff provides information to members, other professionals, students, and the public through the publication of books, major journals, pamphlets, the monthly APA *Monitor* newspaper, and a growing spectrum of bibliographic and abstracting services covering the literature of psychology.

The affairs of the association are administered by the Board of Directors, which is responsible for the work of an executive officer who administers the affairs of the central office. The Board of Directors is composed of a president, past president, and president-elect, all of whom are elected by APA members at large, and a treasurer, a secretary, and six board members who are elected by the Council of Representatives. The Council of Representatives is composed of members of the association who are elected by their division and state members in proportion to the annual assignment of seats by the membership. The Council of Representatives sets policy for the association, and those policies are administered by the Board of Directors through the executive officer and the staff of the central office.

The governance affairs office of the association coordinates and directs psychology programs and activities such as accreditation of doctoral programs in professional psychology and predoctoral internship sites; supervision of educational affairs aimed at identifying and analyzing developments in higher education and training of psychologists; setting standards for scientific and professional ethics, professional affairs, scientific affairs, social and ethical responsibility of psychologists, and overseeing special issues concerning minority groups and women's programs.

The national policy studies of APA help to formulate and implement federal policy and legislative activities of the association. The Public Policy Office develops advocacy positions, informs Congress and federal agencies of psychology's concerns, keeps the APA membership and governance structure informed of related policy issues, and develops working coalitions with outside organizations on common legislative issues.

The Public Affairs Office works to provide overall direction on the ways organized psychology is presented to its national and international public. The office works with television, radio, and print media to demonstrate the contributions psychologists make to society and to improve public understanding of psychology's broad scope and application.

The APA publishes more than 30 periodicals and a variety of books, brochures, and pamphlets. Among these are *American Psychologist*, the official journal of the association, and *Psychological Abstracts*, which contains abstracts of the world's literature on psychology and related disciplines.

Each year more than 12,000 psychologists and other individuals attend the APA convention in late summer. This is the world's largest meeting of psychologists and one of the largest professional conventions in the United States. The week-long program features more than 3,000 presentations through symposiums, lectures, invited addresses, specialized workshops, and other forums. Through the convention, practitioners and the public are given the opportunity to learn of the latest findings from psychological research, their applications in society, and other professional, scientific, and educational issues.

From energy conservation and industrial productivity to child development, aging, and prevention of stress and related illness, hardly a personal or national problem exists that does not demand an understanding of human behavior. Even modern technological innovations emerge from the ability of the mind to transform observations and data into action. Because of their fundamental understanding of behavior, psychologists are increasingly consulted for ways to increase human progress and well-being. APA can be contacted at 750 First St., N.E., Washington, DC 20002. Tel.: (800) 374-2721.

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AMERICAN PSYCHOLOGIST

American Psychologist is the official journal of the American Psychological Association. Published monthly, it is the most widely circulated psychological journal in the world, going out to more than 155,000 members of the Association around the globe. It is a primary source of discussion on cutting-edge issues in psychology, and it publishes empirical, theoretical, and practical articles on broad aspects of psychology. It is indexed in over 20 abstracting/indexing services, including: PsychINFO, Index Medicus, Academic Index, Social Sciences Index, and Applied Social Science Index & Abstracts, thereby making its contents easily discoverable and highly available to users. As the official journal of the Association, it contains but is not limited to: the annual report of the Association, council minutes, the Presidential address, editorials, other reports of the Association, ethics information, surveys of the membership, employment data, obituaries, calendars of events, announcements, selected award addresses, and (in each year's December issues) a listing of all APA-approved doctoral training programs in clinical, counseling, and school psychology in the United States and Canada.

In setting forth general editorial policy for the *American Psychologist*, past and present editors have agreed that the journal should (a) contribute to enlightened participation in the profession of psychology and thereby to effective function of the association; (b) provide a forum for the examination of the relationship between psychology

and society, especially as historical, cultural, and societal influences have an impact on the science and practice of psychology; (c) foster the development of the diverse applications of psychological knowledge; and (d) present and disseminate psychological knowledge in a form and style suitable to the general membership and to the interested public.

The current editor is Norman B. Anderson. The journal's offices are housed within the American Psychological Association's national headquarters, located at 750 First Street, NE, Washington, DC, 20002. The e-mail address of the editorial office of the *American Psychologist* is APeditor@apa.org.

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AMERICAN SIGN LANGUAGE

American Sign Language (ASL), Pidgin Signed English (PSE), and Signed Exact English (SEE) are a few of the many alternative forms of sign communication taught to either deaf or hearing individuals (Marschark, 1997). Only ASL is discussed in detail.

American Sign Language is a complex visual-spatial language used by the deaf community (Daniels, 2001; Drasgow, 1998; Marschark, 1997; Moores, 2001). American Sign Language is a complete nonauditory yet verbal language that is independent of English (Drasgow, 1998; Marschark, 1997; Moores, 2001), one that is linguistically complete and natural (Daniels, 2001; Drasgow, 1998; Moores, 2001). American Sign Language is the native language of many individuals who are deaf as well as some hearing children born into deaf families (Moores, 2001; Nakamura, 2000). As many as 15 million people in North America communicate to some degree using ASL, thus making it the third most commonly used language in the country (Daniels, 2001).

Like other verbal languages, ASL contains many properties (e.g., phonology, morphology). Its structure can be divided into five components: phonology, morphology, syntax, space, and nonmanual characteristics (Daniels, 2001). The first three will be compared to the English language.

In English, phonology refers to the use of vocal organs. In contrast, the phonological properties of ASL require manual expression and movement that are significant to the visual system.

The four gestural components are location (i.e., the placement of the produced signs at approximately 20 distinct locations on the signer's body), hand shapes (i.e., the shape of each hand when producing the approximate 40 handshapes), movement (i.e., the motion of the hands from one point to another in the signing space), and orientation (i.e., the direction of the hands in relation to approximately 10 distinct orientations to the body; Daniels, 2001; Drasgow, 1998).

Morphology refers to the structure of word, including changes in them by adding prefixes or suffixes. In English, this process generally emerges in a sequential manner (Daniels, 2001; Drasgow, 1998). For example, the letter /s/ at the end of a noun generally makes it plural. In contrast, morphology in ASL is organized in a simultaneous rather than a sequential fashion. That is, rather than adding prefixes or suffixes to a word stem, ASL morphology operates by nesting the sign stem within active movement contours (Daniels, 2001; Drasgow, 1998). For example, the word *improve* (a verb) requires a single slow movement, while the word *improvement* (a noun) requires a faster, more dynamic movement (Daniels, 2001; Drasgow, 1998).

Syntax refers to word order. The word order in English usually is subject-verb-object. Word order is important in English because there are few inflections to show grammatical relationships (Daniels, 2001; Drasgow, 1998). In contrast, ASL is more variable in word order. Although ASL often uses a subject-verb-object sequence, this sequence does not dominate and instead grammatical facial expressions, spatial syntax, and other nonmanual features are used (Daniels, 2001; Drasgow, 1998). *Topicalization*, the process of using facial expressions and head position to alter word order by putting the most important information at the beginning of the sentence, is common in ASL.

The final two components of ASL, space and nonmanual characteristics, are not evident in English. In ASL, space plays a large and complex role as it is used to indicate verb tenses and for indexing (Daniels, 2001; Drasgow, 1998). The notion of tense is represented by an imaginary time line that surrounds the signer's body, where the past is represented by the space behind the signer, the future is represented by the space in front of the signer, and the present is represented by the space nearest to the signer's upper body (Daniels, 2001). *Indexing* refers to pointing to designated locations within the signing space. A signer may place a referent, such as a person or object, in a designated space and then refer to that space later in time (Daniels, 2001; Drasgow, 1998).

Nonmanual characteristics in ASL involve movements of the eyes, mouth, face, hand, and body posture. The purpose of these characteristics is to serve as intonation acts in a spoken language or as punctuation acts in a written language (Daniels, 2001). Alterations in the behavior of

the body determine the meaning or emphasis of a specific sign (Daniels, 2001).

Children can acquire and retain considerable knowledge by learning ASL and spoken English simultaneously (Daniels, 1997). Gallaudet believed that employment of sign language as an additional sensory channel provided a stronger language base for young hearing learners (Daniels, 1997). The basic motor control of one's hands occurs before the use of one's voice. Therefore, the use of sign language with young children has various advantages (Bonvillian & Floven, 1993). For example, the use of both a written alphabet and sign language provides an early and convenient form of writing for young children "who are able to finger spell far sooner than they acquire the manual dexterity to write words with paper and pencil" (Daniels, 1997, p. 29). In addition, as Daniels (1997) states, using sign language "literally allows a child to feel language" (p. 29).

American Sign Language has been incorporated in many programs and research studies that have investigated language acquisition and development (Birke, 2003; Carney, Cioffi, Raymond, & Floven, 1985; Daniels, 1993, 1994, 1996a, 1996b; deViveiros & McLaughlin, 1982; Griffith, 1985; Holmes & Holmes, 1980; Orlansky & Bonvillian, 1985; Prinz & Prinz, 1981; Weller & Mahoney, 1983). Findings show that learning ASL and spoken English simultaneously allows children to acquire a greater language base (Daniels, 1997); basic motor control of the child's hands occurs before the voice; therefore, the use of ASL by young children is favored over the use only of voice (Bonvillian & Floven, 1993); signing helps children expand their vocabulary (Stewart & Luetke-Stahlman, 1998); and ASL improves receptive and expressive language of hearing kindergarten children with no hearing impairments (Birke, 2003; Daniels, 1996b; deViveiros and McLaughlin, 1982).

The literature supports the premise that simultaneously presenting words visually, kinesthetically, and verbally enhances vocabulary development in kindergarten students. The assumption that the use of various modalities when teaching language, including ASL, enriches the language acquisition is reasonable (Birke, 2003; Daniels, 1997). Moreover, their simultaneous use holds promise as an effective multisensory method to use with language-delayed children.

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See also **Alternative Communication Methods in Special Education; Deaf; Gallaudet College**

AMERICAN SOCIETY FOR DEAF CHILDREN

The American Society for Deaf Children (ASDC) is a national nonprofit organization dedicated to providing support, information and access to resources to parents and families of children who are deaf or hard of hearing. Founded in 1967, ASDC's stated mission is to educate parents of deaf and hard of hearing children while advocating for high quality services and programs. The ASDC advocates for four core values: deaf and hard of hearing children are entitled to have full access to communication in their home and school settings, deaf and hard of hearing children should be exposed to sign language and English to have optimal social-emotional development and academic success, deaf and hard of hearing children should have access to early identification and interventions in order to become self-advocating independent adults, and parents should be the primary decision makers of their deaf or hard of hearing children's lives.

Individuals, families, and organizations can obtain membership to ASDC through various levels of monetary support. ASDC keeps parents informed about current issues, such as access to various articles regarding deaf and hard of hearing children, information about American Sign Language (ASL), opportunities for scholarships, various coalitions and partnerships, information about the Individuals with Disabilities Act (IDEA), access to the ASDC lending library, and provides parents with Spanish resources. The ASDC also furnishes individuals with useful links to multiple websites that provide information about relevant topics related to the deaf and hard of hearing community as well as provides individuals with up to date news regarding this population. A list of all the state organizations that support the education of the deaf and hard of hearing and have become members of ASDC can be accessed on the ASCD website. The ASDC also publishes *The Endeavor*, a magazine sent out four times a year to ASDC members, containing relevant articles, personal stories, and advertisements of organizations supporting individuals who are deaf or hard of hearing. Every two years a conference known as the ASDC Biennial Conference is hosted at different schools of the deaf around the country. This 5-day conference provides families with the opportunity to attend workshops, meet other families with deaf or hard-of-hearing children, and partake in entertaining recreational activities. Parents who have demonstrated exceptional dedication, service, and leadership to the deaf or hard of hearing community are recognized with the Lee Katz Award at this conference.

The ASDC headquarters are located at 800 Florida Avenue NE, #2047, Washington, DC 20002-3695. Tel.: (800) 942-2732 (Parent Information Hotline), fax: (410) 795-0965, e-mail asdc@deafchildren.org.

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AMERICAN SPEECH-LANGUAGE-HEARING ASSOCIATION

The American Speech-Language-Hearing Association (ASHA) is the professional, scientific, and credentialing association for more than 140,000 speech-language pathologists, audiologists, and speech, language, and hearing scientists in the United States and international community. For over 75 years, ASHA works with these professionals in the development of national standards for speech-language pathologists and for audiologists. ASHA's vision statement of "Making effective communication, a human right, accessible and achievable for all" is advanced by its mission to advocate on behalf of persons with communication and related disorders, to advance communication science, and to promote effective human communication.

In 1925, a small group of people met at an informal meeting of the National Association of Teachers of Speech (NATS) in Iowa City, Iowa. These individuals, who were primarily teachers of rhetoric, debate, and theater, were interested in communication disorders and wanted to create an organization devoted entirely to the study and treatment of communication disorders. As a result of this meeting the American Academy of Speech Correction was established in December 1925. The current name of the organization, American Speech-Language-Hearing Association, was adopted in 1978.

As the nation's leading professional, credentialing, and scientific organization for speech-language pathologists, audiologists, and speech/language/hearing scientists, ASHA initiated the development of national standards. These national credentialing standards, the Certificate of Clinical Competence in Speech Pathology (CCC-SP) and Audiology (CCC-A), have been in use by ASHA since 1952. The professionals who have achieved ASHA certification have the knowledge, skills, and expertise to provide high quality clinical services, and actively engage in ongoing professional development.

ASHA has five major publications for their members: *The ASHA Leader*, the *American Journal of Audiology*, the *American Journal of Speech-Language Pathology*, the *Journal of Speech, Language, and Hearing Research*, and *Language, Speech, and Hearing Services in Schools*. Resources to help understand communication and communication disorders can be found at http://asha.org

The ASHA offices are located in Rockville, Maryland. Tel.: (800) 638-8255 (voice) or (301) 296-5650 (TTY), e-mail: actioncenter@asha.org.

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AMERICANS WITH DISABILITIES ACT

The Americans with Disabilities Act of 1990 (ADA) is a comprehensive civil rights law designed to prohibit discrimination against people with disabilities. The ADA is a civil rights law; therefore, it preempts any other local, state, or federal law that grants lesser rights to individuals with disabilities (National Association of State Directors of Special Education [NASDSE], 1992), although states may in some instances grant rights in excess of those mandated by the ADA. Federal funding is not provided to carry out the ADA mandates; however, a wide range of public and private institutions, including educational institutions, are required to comply with the ADA provisions. The four purposes of the ADA are

1. to provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities
2. to provide clear, strong, consistent, enforceable standards addressing discrimination against individuals with disabilities
3. to ensure that the federal government plays a central role in enforcing the standards established in this Act on behalf of individuals with disabilities; and
4. to invoke the sweep of congressional authority, including the power to enforce the 14th Amendment, to address the major areas of discrimination faced by people with disabilities. (42 U.S.C. §§ 12101 Sec 2 [b][1–4])

The ADA derives its substance from Section 504 of the Rehabilitation Act of 1973, but its procedures from Title VII of the Civil Rights Act of 1964, amended in 1991 (First & Curcio, 1993).

In 1988, the ADA bill was first introduced in Congress in response to mounting evidence that Americans with disabilities, over 40 million strong, faced an inordinate number of inequities in different spheres of life (Jacob-Timm & Hartshorne, 1995). Moreover, congressional testimony had documented a strong link between disability and economic and social hardships and limited educational opportunities (Burgdorf, 1991). Based on these inequities and disadvantages, congressional legislative action was taken to bring individuals with disabilities into the American social and economic mainstream through the enactment of the ADA. The U.S. Congress approved the final version of the bill on July 13, 1990, and President George Bush signed it into law on July 26, 1990.

The ADA consists of five titles. The areas addressed in these five titles include employment, public services, public accommodations, telecommunications, and miscellaneous provisions. Title I prohibits discrimination in employment of persons with disabilities. Under this title, employers must reasonably accommodate the disabilities of the otherwise qualified applicants or employees unless undue hardship would result. An example of an undue hardship would be a significant difficulty or excessive expense to the employer associated with making alterations or modifications at the job site to accommodate a qualified applicant who is also an individual with a disability. All school districts, regardless of the number of personnel employed, are subject to Title I standards.

Title II prohibits discrimination in programs, activities, and services provided by state and local governments and their instrumentalities. Title II applies to all public entities, including public schools, regardless of federal funding status. Under Title II, school facilities, whether existing facilities or under construction, must meet accessibility requirements for individuals with disabilities consistent with Section 504 of the Rehabilitation Act (First & Curcio, 1993). Public transportation, like buses and rail vehicles, must also meet accessibility requirements. Title II requires school districts to provide appropriate aids so that individuals with disabilities have equal opportunities to participate in available programs and services. Likewise, districts are required to give primary consideration to disabled individuals' requests and to ensure that

individuals with hearing or visual impairments receive information in an appropriate and understandable format about available programs and services. Examples of public school programs, services, and activities covered by Title II include public entertainment or lectures sponsored by the school district, after-school activities and social events offered by the schools, parent-teacher conferences, classroom activities, field trips, and any other service provided for students or staff (Office of Civil Rights [OCR], 1996).

Title III prohibits discrimination based on disability in privately owned public accommodations. Nonsectarian private schools and school bus transportation, as well as other privately owned public accommodations, must make reasonable alterations in policies, practices, and procedures to avoid discrimination. Nonsectarian private schools must provide auxiliary aids and services to individuals with visual or hearing impairments. In addition, physical barriers must be removed unless readily unachievable. If not readily achievable, alternate methods of providing services must be offered. All new construction and alterations in existing facilities must be handicap accessible. School bus transportation services, such as bus routes, must be comparable in duration and distance for disabled and nondisabled individuals.

Title IV requires telephone companies to provide telecommunication relay services for hearing- and speech-impaired individuals. Closed-captioned public service announcements must also be provided. Under Title IV, schools must ensure that communication with disabled individuals is just as effective as communication with nondisabled individuals.

Title V consists of a variety of provisions. The title identifies the federal agencies responsible for the enforcement and technical assistance related to the ADA. The federal agency responsible for the enforcement of Title II, Subtitle A, programs, activities, and services provided by state and local governments and their instrumentalities, which extends to all public school systems, is the Office of Civil Rights (OCR) in the Department of Education. The OCR not only enforces the ADA provisions under Title II, Subtitle A but it also handles complaints filed with regard to alleged violations of this title. Title V also dictates that state governments are not immune from legal actions related to the ADA. In addition, individuals with disabilities have the right to accept or reject accommodations and services offered under the ADA. Furthermore, individuals with or without disabilities cannot be coerced or retaliated against for exercising their rights under the ADA. The title also addresses the relationship between the ADA and other laws and its impact on insurance providers and benefits.

In examining the relationship between the ADA and other federal laws affecting persons with disabilities, ADA is viewed as a complementary law (Cunconan-Lahr, 1991). The ADA does not diminish any of the rights of disabled individuals under the Civil Rights Act of 1964, as amended in 1991, Individuals with Disabilities Education Act (IDEA), or Section 504 of the Rehabilitation Act of 1973 (NASDSE, 1992).

Section 504 and the ADA espouse the same underlying principle, which is that entities under their jurisdiction cannot discriminate against individuals with disabilities in their programs, activities, and services (Cunconan-Lahr, 1991). To eliminate discrimination, both laws stress the importance of equal opportunity, not just equal treatment, for disabled and nondisabled individuals. However, the ADA does create a higher standard of nondiscrimination than does Section 504 in several respects. First, Section 504 applies only to recipients of federal funding, whereas the ADA applies to employment, public services, public accommodations, and transportation, regardless of whether federal funding is received. Second, Section 504 covers qualified individuals with disabilities, whereas the ADA extends protection to a person without a disability who is related to or associated with an individual with a disability (OCR, 1996).

With the aforementioned exceptions, Title II of the ADA, which extends to public schools, does not impose any new major requirements on school districts (OCR, 1996). Much of the language in Title II and Section 504 are similar, and school districts that receive federal funding have been required to comply with Section 504 for over 30 years. In the area of education, nondiscrimination requirements related to disabled individuals are detailed more specifically under Section 504 than under Title II. However, Title II requirements are not to be interpreted as applying a lesser standard or degree of protection for disabled individuals. In fact, if a rule issued under Section 504 imposes a lesser standard than the ADA regulation, the language in the ADA statute replaces the language in Section 504 (NASDSE, 1992).

The ADA statute does not directly specify procedural safeguards related to special education, evaluation and placement procedures, due process procedures, and responsibility and requirements under the provision of a free, appropriate public education (FAPE) as does Section 504 and IDEA. The ADA incorporates the specific details of these concepts from Section 504 and IDEA into Title II, Subtitle A. The ADA also provides additional protection in combination with the actions brought under Section 504 and IDEA. For example, reasonable accommodations must be made for eligible individuals with disabilities to perform essential functions of a job. Special education programs that are community-based and involve job training or placement are covered under the ADA statute. The ADA protections are also applicable to nonsectarian private schools but not to organizations or entities controlled by religious affiliations (Henderson, 1995).

Section 504 and IDEA provide specific details regarding procedural safeguards, whereas the ADA does not. Procedural safeguards involve notification to parents regarding

identification, evaluation, and placement of a child in special education programs and related services. The ADA, on the other hand, specifies administrative requirements, complaint procedures, and consequences for noncompliance related to services (Henderson, 1995).

The ADA does not specify evaluation and placement procedures as does Section 504 and IDEA. However, the ADA does require reasonable accommodations for individuals with disabilities across educational settings and activities. Reasonable accommodations are not limited to, but may include, modifying equipment, hiring one-on-one aids, modifying tests, providing alternate forms of communication, relocating services in more accessible areas, altering existing facilities, and constructing new facilities (Henderson, 1995).

The ADA does not delineate specific due process procedures; however, IDEA and Section 504 do. Section 504 and IDEA require local educational agencies (LEAs) to provide hearings for parents who disagree with the identification, evaluation, or placement of a child. With the passage of the 1997 Amendments to IDEA, parents and LEAs or state educational agencies (SEAs) are strongly encouraged to participate in voluntary mediation to resolve disputes prior to conducting due process hearings. According to the ADA, individuals with disabilities who are discriminated against in an educational setting have the same recourse that is available under Title VII of the Civil Rights Act of 1964, as amended in 1991. Individuals may file complaints with the OCR or sue in federal court. The OCR encourages informal mediation and voluntary compliance (Henderson, 1995). However, administrative remedies do not have to be exhausted prior to filing a lawsuit (28 C.F.R. § 35.172). Federal funds may be removed from schools for noncompliance with the ADA mandates, and individuals with disabilities may be awarded attorney fees if they prevail in any action filed under the ADA (28 C.F.R. § 35.175).

Title II, Subtitle A of the ADA is the section of the statute pertaining to public schools. The statute prohibits discrimination against any "qualified individual with a disability." The ADA's definition of an *individual with a disability* is essentially the same as Section 504's definition. The ADA definition of a *disability* consists of three prongs. The ADA defines a *disability*, with respect to an individual, as "a physical or mental impairment that substantially limits one or more of the major life activities of such individual, a record of such an impairment, or being regarded as having such an impairment" (42 U.S.C. § 12102 [2]).

The first prong of the ADA definition, which is a physical or mental impairment, includes physiological disorders, cosmetic disfigurement, or anatomical loss that affects body systems as well as mental or psychological disorders (28 C.F.R. § 35.104 [1][i]). Examples of physical or mental impairments under the ADA definition of a *disability* are epilepsy; muscular dystrophy; multiple sclerosis; cancer; heart disease; diabetes; intellectual disability; emotional illness; specific learning disabilities; drug addiction; HIV disease (symptomatic or asymptomatic); alcoholism; and orthopedic, visual, speech, and hearing impairments (OCR, 1996). The preceding examples are not an exhaustive list of physical and mental impairments under the ADA definition of a *disability*.

Another key concept in the ADA definition of a *disability* is "a substantial limitation in a major life activity." A major life activity refers to a basic activity that the "average person performs with little or no difficulty" such as walking, speaking, seeing, breathing, working, and learning (28 C.F.R. § 35.104). A person who has a substantial limitation that is determined by the nature, severity, duration, and long-term or permanent impact of the impairment on a major life activity is protected under the ADA (OCR, 1996).

In the second prong, a person with a record or history of an impairment that substantially limits a major life activity also meets the ADA's definition of an *individual with a disability* (28 C.F.R. § 35.104 [3]). Examples include a person who has a history of a mental or emotional illness, drug addiction, alcoholism, heart disease, or cancer. An individual who has been misclassified as having an impairment (such as a person misdiagnosed as being intellectually disabled or emotionally disturbed) is also protected under the ADA (OCR, 1996).

The third prong of the definition of a *disability* under ADA protects a person who has an impairment that does or does not substantially limit a major life activity but is perceived by the public or public entity as being substantially limiting (28 C.F.R. § 35.104 [13]). For example, a girl who walks with a limp but is not substantially limited in her ability to walk is not allowed to participate on the school's soccer team out of fear by school personnel that she will be injured. Under the ADA, the third prong of the definition of an *individual with a disability* applies and thus protects the girl. The third prong of the definition of a *disability* also protects an individual who does not have an impairment but who the public or public entity perceives as having an impairment (28 C.F.R. § 35.104 [3]).

An individual who is covered under the second or third prong of ADA's definition of a *disability* is not necessarily entitled to special education and related services or regular education with supplementary services. If a student is protected under the second or third prong, but not under the first prong, then the student is not eligible for special education and related services. For example, if a student has an Attention Deficit Disorder (ADD) but is performing well in the classroom, then an evaluation for special education and related services at the present time is not needed. On the other hand, if a student's mental or physical impairment substantially limits the student's ability to learn in the classroom, then the student would be entitled to an evaluation, and special education and

related services or regular education with supplementary services may follow (OCR, 1996).

Title II and Section 504 use the three-prong definition of a *disability*, whereas IDEA uses the 13 recognized disability categories and the *need* criteria. In other words, there must be a need for special education and related services. Based on these differences in the definition of a *disability*, there may be some students who qualify for regular or special education and related services under Section 504 and Title II but do not have one of the 13 disabilities recognized by IDEA (OCR, 1996).

Protection under Title II, Subtitle A is afforded to qualified individuals with disabilities. An individual with a disability is qualified to receive services or participate in an elementary and secondary education program if the student meets the eligibility requirements of a qualified individual with a disability established under Section 504. As previously mentioned, Title II incorporates the more specific details and standards in Section 504. A qualified individual with a disability is an individual who has a disability and is of the appropriate age (school-aged), and who, with or without reasonable modifications to rules, policies, or practices, the removal of architectural, communication, or transportation barriers, or the provision of auxiliary aids and services, meets the essential eligibility requirements for the receipt of services or the participation in programs or activities provided by a public entity (28 C.F.R. § 35.104).

Parents or other associates of a student who are disabled themselves and who are invited to attend a school event or choose to participate in a school event open to the public are also qualified as individuals with disabilities and are protected under the ADA. Under these circumstances, the school district must ensure program accessibility and provide auxiliary aids and services to ensure effective communication for these individuals with disabilities. For example, if a parent is deaf and is invited to attend a parent-teacher conference for his or her child, who may or may not be a student with a disability under the ADA, then the school is responsible for providing an interpreter at the parent's request in order for the parent to participate in the meeting (OCR, 1996).

Title II also extends protection to, but does not provide accommodations for, an individual who is not disabled but who assists or lives with someone with a disability (28 C.F.R. § 35.130 [g]). Family members, friends, or any other person or entity who associates with an individual with a disability are protected under this federal regulation. Likewise, Title II extends protection to an individual with or without a disability who takes action to oppose any act or practice prohibited by the statute or assists or encourages others to exercise their rights under the ADA regulations (28 C.F.R. § 35.134). For example, if an educator encourages a family to exercise their rights under the ADA regarding a school policy, then the educator and the family, including the individual with the disability, are protected under ADA from any coercion or retaliation from the school district.

To bring a school district into compliance with the ADA statute, five action steps must be taken by the district. First, the school district must designate a responsible employee to coordinate ADA compliance. Under Title II, if the school district has 50 or more employees, then at least one coordinator must be designated (28 C.F.R. § 35.107 [a]). The ADA coordinator's role includes planning and coordinating compliance efforts, implementing and ensuring completion of the five action steps, and receiving and investigating complaints of possible discrimination against individuals with disabilities. Second, the school district, regardless of size, must provide notice of the ADA requirements to all interested parties including participants, beneficiaries, employees, applicants, and the public. Specific information on how Title II requirements apply to particular programs, services, and activities must be included (28 C.F.R. § 35.106). Appropriate methods to disseminate this information include publications, public posters, or media broadcast. The most effective methods for making people aware of their rights and protections under the ADA, however, are determined by the head of the school district or delegated to the ADA coordinator. Third, school districts with 50 or more employees must adopt and publish grievance procedures providing for prompt and equitable resolution of complaints alleging violations of the ADA (28 C.F.R. § 35.107). These grievance procedures are available to school district employees, students, or the public. Fourth, every school district, regardless of size, must conduct a self-evaluation of its policies and practices, including communications and employment, and correct any inconsistencies in its policies and practices in relation to the ADA statute (28 C.F.R. § 35.105 [a]). However, if the school district has received federal funding and has conducted a self-evaluation as required under Section 504, then only those programs and new or modified policies or practices since the Section 504 self-evaluation must be reviewed and corrections made to be consistent with the ADA regulations (28 C.F.R. § 35.105 [c]). School districts should have completed Title II self-evaluations by January 26, 1993 (28 C.F.R. § 35.105 [c]) for current programs, policies, and practices in existence at that time. Fifth, a transition plan must be developed to bring existing facilities into structural compliance with the ADA statute. A transition plan is needed to ensure that programs, services, or activities are accessible to individuals with disabilities (28 C.F.R. § 35.150 [di [1]). Structural changes outlined in the transition plan should have been completed by January 26, 1995 for existing facilities (28 C.F.R. § 35.150 [c]).

Nondiscrimination requirements are used to analyze the policies, programs, and practices of a public school district. Specific nondiscrimination requirements imposed on a school district under Section 504 are applicable under Title II. According to Section 504, a school district is

obligated to provide a free, appropriate public education (FAPE) to school-aged children with disabilities. The school district's responsibilities are specifically described under Section 504 and are incorporated into the general provisions of Title II (28 C.F.R. § 35.130; 28 C.F.R. § 35.103 [a]; see 34 C.F.R. §§ 104.31-104.37).

Title II also requires a school district to ensure that qualified individuals with disabilities are not excluded from participation in or denied any benefits from the district's programs, services, or activities based on their disability (28 C.F.R. § 35.130 [a]). This requirement applies to programs, services, and activities operated or provided directly by the district as well as those operated or provided by another entity on behalf of the district under contractual agreement or other arrangements (28 C.F.R. § 35.130 [h]). For example, if a student with a disability is excluded from bus service by a private school bus company that is under contract with the school district to provide this service, then the school district would be liable for the alleged discriminatory act under Title II (OCR, 1996).

The school district must also ensure that qualified individuals with disabilities have an equal opportunity to participate in the district's programs as do nondisabled individuals. Likewise, individuals with disabilities must have an equal opportunity to benefit from any aids, benefits, or services provided by the school district as do nondisabled individuals. For example, if a student with a severe visual impairment is evaluated and it is determined, in order to provide FAPE, visual aids and services must be provided, and the school district refuses to pay for the visual aids, citing expenses, then under these circumstances, the school district is in violation of Title II standards because the district has denied related aids and services to the student. As a result, the student does not have an equal opportunity as does a nondisabled student to participate in or receive benefits from the school program (OCR, 1996). Similarly, a school district's benefits and services must be effective enough to afford equal opportunity to obtain the same results, benefits, or levels of achievement for both individuals with and without disabilities.

Under Title II, a school district may not operate different or separate programs or provide different or separate benefits or services, unless the programs, benefits, or services are needed to provide equal benefits to individuals with disabilities (28 C.F.R. § 35.103 [a]; 28 C.F.R. § 35.130 [b1[1] [iv]). If separate or different programs, services, or benefits are needed, then the school district must provide them in the most integrated setting for individuals with disabilities (28 C.F.R. § 35.103 [a]; 28 C.F.R. § 35.130 [d]). However, in the establishment of separate or different programs, services, or benefits, individuals with disabilities may not be denied participation in the regular programs or access to regular benefits and services.

Another nondiscrimination requirement under Title II includes the prohibition of surcharges. A school district is not allowed to place a surcharge on an individual with a disability to cover the costs of measures that are necessary to provide nondiscriminatory treatment (28 C.F.R. § 35.130 [f]). For example, if an evaluation is conducted and it is determined that a student with a disability should be placed in a regular education program with related aids and services, including a computer, then the school district cannot charge the student or his or her parents for the use of the computer as the computer is a necessary aid in order to provide FAPE. Similarly, modifications that would fundamentally alter a specific benefit, program, service, or activity are prohibited. On the other hand, if failure to modify a specific benefit, program, service, or activity results in the denial of FAPE, then the school district must make modifications. However, a school district is not required to provide a personal device, such as a wheelchair, or service of a personal nature, such as toileting, unless the device or service is necessary to provide FAPE to the student.

Nondiscriminatory requirements also apply to eligibility criteria. A school district may not use eligibility criteria to screen out individuals with disabilities from participation in its programs or receipt of its benefits or services (28 C.F.R. § 35.103 [a]; 28 C.F.R. § 35.130 [b][8]). However, a school has the right to impose legitimate safety requirements needed for the safe operation of its services, benefits, or programs, but these safety requirements must be based on actual risks, not stereotypes. For example, if a school offers a course in scuba diving and demonstrates that a certain level of swimming ability is needed for safe participation in the class, then those individuals who cannot pass a swimming test, including some individuals with disabilities, could be screened out without violating the law (OCR, 1996).

Besides nondiscriminatory requirements, a school district must ensure that their programs, services, and activities are accessible to individuals with disabilities. This includes not only students, but also parents, guardians, and members of the public with disabilities. According to Title II, two standards are used to determine program accessibility. One standard deals with existing facilities and the other standard deals with new construction and alterations. For existing facilities, when viewed in their entirety, the program or activity must be accessible to and usable by individuals with disabilities, unless a fundamental alteration in the program or undue financial or administrative burden would result (28 C.F.R. § 35.130). The burden of proof, according to Title II, is placed on the school district. For new or altered facilities, the same standard applies; however, the fundamental alteration or undue burden is not applicable.

Based on the program accessibility standard, numerous misconceptions have evolved, such as the view that buildings must be completely accessible and barrier free. As long as the program, class, or function is accessible, Title II does not require that existing buildings offer a

barrier-free environment. In other words, if the program can be held in another classroom or building, and this classroom or building meets accessibility requirements, then the school district's fundamental alteration in the program is in compliance with the standards set forth under Title II (OCR, 1996).

In addition to program accessibility requirements, transition services are also addressed under Title II as well as Title III of ADA. Transition services are defined as "a set of coordinated activities that promote movement from school to postschool activities" (Jacob-Timm & Hartshorne, 1995, p. 379). Transition services for youth with disabilities are provided in more specific details under IDEA. The enactment of the ADA is expected to lead to the expansion of opportunities for youth with disabilities in their transition to postschool activities (American Council on Education, 1993). Postschool activities may include vocational training, continuing education, integrated employment, independent living, community participation, and postsecondary education.

For postsecondary education, the enactment of the ADA has translated into renewed attention focused on disability access to facilities and programs as well as employment and promotion issues. In addition, the ADA has resulted in a greater number of opportunities for students with disabilities due to increased access to employment, public accommodations, transportation, and telecommunications. Thus, an expanded pool of qualified college-educated disabled workers is expected in the future to address anticipated manpower shortages in the next decade (American Council on Education, 1993).

Numerous implications exist for education officials under Title II. First, local agencies may witness an increase in the number of requests for public hearings to determine student eligibility for special education. A potential increase in the number of students served may occur. Second, parents and other adults' requests to participate in school activities may increase. Because public schools offer programs and opportunities to the community, many adults with disabilities may desire greater participation due to the enactment of the statute. As a result, the public school's responsibilities may increase in meeting program accessibility, service, and benefit requirements. Third, the ADA encourages full participation in society of individuals with disabilities. Thus, parents' requests for their children with disabilities to participate in school activities (e.g., athletic events, field trips, recreational offerings, etc.) may increase, and transportation issues will also need to be addressed (NASDSE, 1992).

The implementation of the ADA has expanded the role of the schools in the preparation of students with disabilities to take full advantage of employment opportunities, to participate more fully in school programs, to achieve greater independence through the use of public transportation, and to learn and to communicate more effectively through the use of telecommunication systems (First & Curcio, 1993). The ADA encourages the education system to become more actively involved in the lives of individuals with disabilities and to assist in the empowerment of students with disabilities. Educators and parents are challenged to bring real meaning into the lives of students with disabilities and to the school environment, not only for the students' benefit, but also for the benefit of all people.

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See also **Architectural Barriers; Individuals With Disabilities Education Improvement Act of 2004 (IDEIA); Rehabilitation Act of 1973, Section 504**

AMES LOUISE BATES (1908–1996)

Born in Portland, Maine, Louise Ames received her BA in 1930 from the University of Maine. She then went on to receive her MA in 1933 and PhD in 1937 in experimental psychology from Yale University, where she studied with Arnold Gesell. Her relationship with Gesell resulted in the founding of the Gesell Institute in 1950, a project where Dr. Ames collaborated with Dr. Frances Ilg and Dr. Janet Learner. Ames was also an instructor. She was assistant professor at Yale Medical School (1936–1950) and curator of the Yale Films of Child Development (1944–1950).

Working with Frances Ilg and Arnold Gesell, Dr. Ames developed the important developmental theory that patterned, predictable behaviors are associated with chronological age, with the explicit implication that human development unfolded in discrete, recognizable stages. Such ideas were relatively novel at the time and have had great impact since their development. Her career interests and research in the behavior and development of normal children resulted in the development of standard references for psychologists working with children, and served to educate nonprofessionals as well through its coverage by the popular media.

Dr. Ames' greatest impact was in teaching parents and teachers about the course of child development, primarily through her prolific publications, which included *Infant and Child in the Culture of Today* (1940), *School Readiness* (1956), the syndicated newspaper column "Child Behavior" in collaboration with her colleagues (which later became a weekly half-hour television show in the 1950s), *Child Behavior* (1981), and *Don't Rush Your Preschooler* (1980), coauthored with her daughter Joan Ames Chase. Ames also had a strong interest in projective assessment and provided normative data in *Child Rorschach Responses* (1974). This interest extended to assessment of the elderly (*Rorschach Responses in Old Age*) and a series of articles developing test batteries for assessing deterioration of functions in old age.

Over her long career, Dr. Ames authored some 300 articles and monographs, coauthored/collaborated on 25 books, and received honorary degrees and many awards for service. One of the most publicized women in psychology, Louise Bates Ames died of cancer in November, 1996, at the age of 88.

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AMNESIA

Amnesia is a disorder of memory that occurs in the absence of gross disorientation, confusion, or dementia. Amnesia may be retrograde, where the individual has difficulty remembering events and information learned prior to the onset of the amnesia, or it may be anterograde, where the individual is unable to learn new information from the point of onset of the amnesia. Amnesics do not have difficulty with immediate memory. Digit span and immediate repetition are intact. Rather, individuals with amnesia are unable to remember after a delay filled with interference.

Amnesia is fascinating because observation of amnesics may help us understand how new information is learned (e.g., what brain structures are involved and what processes facilitate new learning). Amnesics are also of interest because the sense of continuity and time passing, remembering experiences, and hence, self-identity (Walton, 1977) depend on continuous access to information about the remote and recent past. The difficulties that amnesic patients encounter in awareness of their own experiences emphasizes just how important memory is.

Amnesia as an isolated neurologic symptom can be mistaken for a psychiatric disorder (DeJong, Itabashi, & Olson, 1969). There are hysterical amnesias that are a consequence of psychiatric distress alone. Fugue states are 20 dissociative episodes during which an individual forgets his or her identity and past. Hysterical amnesia is discriminable from neurologic conditions causing amnesia in that the total loss of self-identity rarely occurs in neurologically based amnesias, and because the end of the fugue state is abrupt. In the neurologically based amnesias that remit, the cessation of memory loss is gradual, with the period of time for which the individual is amnesic shrinking only gradually.

Transient amnesia is a known consequence of electroconvulsive therapy (ECT shock treatment). Individuals receiving ECT have both retrograde amnesia for events

occurring just prior to treatment, and anterograde amnesia for what happens subsequent to treatment. When compared with their own performance after recovery from amnesia, patients who are amnesic after receiving ECT forget more easily and at an abnormal rate (Squire, 1981). This suggests a deficit in consolidation and elaboration of memory. There is some disagreement as to whether memory loss secondary to ECT is cumulative. Transient amnesia also may occur when an individual receives general anesthesia.

Anterograde amnesia that gradually remits is a frequent occurrence after closed head injuries (Levin, Benton, & Grossman, 1982; Reynolds & Fletcher-Janzen, 1997). There often is a more limited retrograde amnesia for the period just prior to the injury. Anterograde amnesia secondary to closed head injury (also called posttraumatic amnesia) is a good index of the severity of the injury and useful in the prediction of long-term recovery. After the amnesia has remitted, there is often a residual memory disorder.

Transient global amnesia is a neurologic condition that is now assumed to be a consequence of transient ischemia (Heathfield, Croft, & Swash, 1973). The presentation of an individual with transient global amnesia is characteristic. There is an abrupt onset of amnesia, both retrograde and anterograde, with perhaps only initial, mild clouding of consciousness, and no change in cognition or speech. Episodes typically last for several hours only, and the retrograde amnesia gradually shrinks, leaving individuals amnesic only for the period during which they had anterograde amnesia (Hecaen & Albert, 1978).

Amnesia is the hallmark of Korsakoff's disease (an entirely adult disease induced by alcohol consumption). Patients with Korsakoff's have a profound anterograde amnesia. Though immediate repetition is intact, remembering what they have been told after an interference (e.g., a brief conversation) is impossible. Patients hospitalized with Korsakoff's often reintroduce themselves to their physicians when the physician who has been caring for them reenters the room after a short interval. Korsakoff's patients are notable for their tendency to confabulate (i.e., fill in the blanks in their memory with imaginary accounts). The most common etiology of Korsakoff's is thiamine deficiency as a consequence of alcoholism. Head injury, anoxia, carbon monoxide poisoning, tumors, and other pathologies involving the same brain structure are other causes of the disorder (Walton, 1977).

A great deal has been learned about amnesia and memory through the study of groups of patients with unremitting forms of amnesia: amnesia secondary to Korsakoff's syndrome, amnesia secondary to neurosurgery for control of epilepsy, traumatic brain lesions resulting in amnesia, and generalized dementing processes (especially Huntington's disease and Alzheimer's disease) in which memory deficits are disproportionately problematic (at least during specific stages of the disease). Careful investigation of these patients clearly reveals that though the average clinician thinks of memory as a unitary phenomenon, memory loss is a multidimensional symptom with different etiologies resulting in characteristic, discriminable patterns of memory loss and skill (Butters, 1984). One pattern of amnesia reflects hemispheric differences. Individuals with amnesia secondary to isolated damage to the right hemisphere have deficient skills in nonverbal memory when the information is presented visually. Those amnesic secondary to isolated left hemisphere damage have greater difficulty with verbal memory. Verbal memory deficits are seen regardless of the sensory modality used to present the information; for example, visual presentation of verbal information (Hecaen & Albert, 1978).

The pattern of retrograde amnesia is not the same across all amnesic populations. Butters (1984) compared remote memory functioning in Huntington's disease, Korsakoff's disease, and normal subjects by assessing their ability to recall famous people and events from past decades. Korsakoff's patients had more severe difficulties recalling past events, but there was a normal gradation in their ability to remember, with events that occurred further in the past recalled better than more recent past experiences. The Huntington's disease patients demonstrated a flat pattern. They were equally unable to remember any past event. This pattern of remote recollection occurs across the stages of Huntington's disease, though the severity increases as the disease progresses.

Amnesic patients of differing etiologies demonstrate differential responses to manipulations aimed at facilitating memory. For example, Korsakoff's amnesics are assisted in memorization by increasing rehearsal time, intertrial rest intervals, and a structured orientation procedure. They are not aided, however, by the provision of verbal mediation. Conversely, Huntington's disease patients are not assisted as are Korsakoff's patients; neither increased rehearsal time, increased intertrial intervals, nor does general orientation aid their performance. They are assisted, however, by verbal mediation. Patients with Alzheimer's disease are not assisted by verbal mediation.

Another difference between amnesic syndromes is related to the ability to acquire procedural versus declarative memories (Squire, 1982). Declarative memory pertains to specific facts and data. Procedural memory refers to the rules for completing a specific type of task. Studies of amnesic patients indicate that patients with amnesia secondary to Korsakoff's disease acquire procedural information but have great difficulty in learning declarative data. Huntington's disease patients do not remember procedural rules, but do learn (or at least recognize) previously presented data of a declarative type.

The study of patient populations with known etiologies has been useful in increasing our understanding of what brain structures are involved in the elaboration and retrieval of memory. Evidence from neurosurgical intervention to control severe epilepsy has demonstrated

that damage to the medial aspects of both temporal lobes, especially the hippocampus, results in profound amnesia (Hecaen & Albert, 1978; Squire, 1982). This amnesia is distinguished by rapid and abnormal forgetting. Other amnesics appear to have diencephalic damage with some disagreement as to exactly which structures are affected. The mammillary bodies and dorsal-medial nucleus of the thalamus are involved, though the relative contributions of either structure are not known. Damage to the dorsal-medial nucleus appears sufficient to cause amnesia (Squire, 1982). Amnesia secondary to diencephalic damage is notable for a normal forgetting curve, but difficulty with encoding. Identification of structures involved in memory is useful not only in terms of understanding specific syndromes, but also in considering pharmacologic manipulations to assist in treatment.

With the exception of posttraumatic amnesia, amnesia in its pure form is not reported to occur in children. Subsequent to head injuries, children do exhibit posttraumatic amnesia and have difficulty learning new information in school and remembering what they learned just prior to their injuries. Consequently, they will be confused in the school setting. Posttraumatic amnesia generally will remit. Such children should be allowed to recover after their injuries (with the most rapid recovery occurring in the first 6 months; Pompa, 2003) without the expectation that by studying harder they will remember significantly better. Once the major recovery period is over (after 6 to 9 months), cognitive rehabilitation programs aimed at providing strategies to assist in memory may be useful. There are limited data available on how generalizable the effect of cognitive rehabilitation is in the adult population, and less data regarding children.

It should be clear that the short-term memory impairments described in the learning of disabled children bear little resemblance to amnesic disorders. Amnesic patients are capable of short-term memory performance. Children with severe brain injury may become amnesic, but it is most often within the context of general dementia with difficulties in a variety of areas.

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See also **Memory Disorders; Traumatic Brain Injury**

AMNIOCENTESIS

Amniocentesis is the sampling of amniotic fluid surrounding a fetus. A physician anesthetizes a small area of the pregnant woman's abdomen, inserts a small needle through the abdominal wall, and, with the aid of ultrasonography, enters the amniotic sac and removes 20 ml (approximately 1 oz) of fluid. It is performed most frequently between 15 and 18 weeks gestation to detect hereditary disease or congenital defects in the fetus. One disadvantage is that analysis of the fluid takes 2 to 4 weeks. Damage to the fetus also may occur, but the risk is small—.06% or 1 in 1600 (Eddleman, Malone, & Sullivan, 2006; March of Dimes, 2005).

Midtrimester amniocentesis plays an important role in genetic and other prenatal counseling by providing potential parents with reproductive options. It should be considered when the pregnant woman is over 35, or a family history of genetic or congenital disorders is apparent (Kaback, 1979; March of Dimes, 2005). Cytogenetic analysis of fetal fluid leads to prevention of birth of approximately 15,000 chromosomally abnormal infants each year in the United States alone (Pritchard, MacDonald, & Gant, 1985).

Amniocentesis allows identification of about 300 chromosomal, single-gene, and other congenital abnormalities (Pritchard et al., 1985). The list grows with the discovery of new markers. Chromosomally based disorders are identified through karyotyping and resultant abnormal appearance of one or more chromosomes; other disorders

are identified through elevated or reduced levels of particular substances. Among the disorders that can be reliably diagnosed are (a) all chromosomally based disorders such as Down syndrome and cri du chat; (b) about 75 inborn errors of metabolism, including galactosemia, Tay-Sachs disease, and Lesch-Nyhan syndrome (X-linked), but not phenylketonuria; (c) some central nervous system defects including meningocele (a form of spina bifida) and anencephaly; (d) some fetal infections (cytomegalovirus, herpes simplex, and rubella); (e) and some hematologic disorders (e.g., sickle-cell anemia; Pritchard et al., 1985).

The widespread availability of amniocentesis forces many women to confront the decision to terminate an advanced pregnancy. Attachment grows throughout pregnancy, and confronting the decision of choosing termination at a late stage can be emotionally painful (Brewster, 1984). Many women are unprepared for the anxiety associated with both waiting several weeks for results of their amniocentesis and choosing between life and quality of life. Optimally, women in high-risk groups should weigh this decision and discuss other reproductive options with a genetic counselor prior to conception. Some counselors suggest that health caregivers be sensitive to pregnant women's emotional reactions and not use measures such as a doppler to hear the fetus's heartbeat or ultrasonography to take pictures of the fetus, that promote maternal attachment prior to amniocentesis (Brewster, 1984).

A new diagnostic technique, chorion-villus biopsy, usable as early as 8 weeks gestation, may be preferable in some cases, but risks include 1 in 100 pregnancies being at risk for miscarriage.

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***See also* Chronic Villus Sampling; Genetic Counseling; Inborn Errors of Metabolism**

AMPHETAMINE PSYCHOSIS

Amphetamine psychosis results from the neurochemical and behavioral interaction of large doses of amphetamines. The toxic reaction, induced by chronic amphetamine abuse or by an acute overdose, leads to transitory symptoms that are clinically indistinguishable from those of paranoid schizophrenia. Such symptoms, occurring as early as 36 to 48 hours after a large dosage, include vivid auditory, visual, and tactile hallucinations, changes in affect, loosening of associations with reality, and paranoid thought processes (Gilman, Goodman, & Gilman, 1980). Affected individuals may also show behavioral stereotypes such as continuous rocking or polishing motions, repetitive grooming activities (rubbing or picking of the skin), and other locomotor irregularities. Biochemical correlates of amphetamine psychosis, including increased dopaminergic activity, are similar to those of schizophrenia (Kokkinidis & Anisman, 1980).

In addition to reducing amphetamine intake, treatment includes sedatives, psychotherapy, and custodial care. Acidification of the urine will speed excretion of the amphetamines. The psychotic state usually clears in about a week after beginning treatment, with hallucinations being the first symptom to disappear (American Medical Association, 1980). However, some confusion, memory loss, and delusional ideas commonly persist for months (Merck, 2005).

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***See also* Childhood Schizophrenia; Drug Abuse; LSD; Psychotropic Drugs**

AMSLAN (*See* American Sign Language)

AMYOPLASIA CONGENITAL DISRUPTIVE SEQUENCE (ARTHROGRYPOSIS MULTIPLEX CONGENITAL)

Amyoplasia congenital disruptive sequence (ACDS) is a congenital neuromuscular disease. Patients with ACDS are born with markedly diminished muscle mass and multiple joint contractures that are generally symmetrical. These malformations usually affect all four extremities, but they may involve only the arms or only the legs.

The etiology of ACDS is unclear. One plausible explanation for this unique set of anomalies is poor blood flow to the developing fetal spinal cord.

The occurrence of this disorder is sporadic. Its frequency is higher than expected in identical twins, although only one of the pair is affected. This disorder is considered rare; however, more than 500 case reports of ACDS have appeared in the medical literature.

Characteristics

1. Diminished muscle mass and severe, symmetrical joint contractures present at birth.
2. Round face, small jaw, small upturned nose.
3. Rounded, sloping shoulders with decreased muscle mass.
4. Elbows are fully extended. Severe contractures of the wrists, hands and fingers are usually present.
5. Lower extremity findings include fixed dislocation of the hips and bilateral clubfoot.
6. The spine is usually straight and stiff, but scoliosis is common as children age.

Therapy for ACDS patients requires multiple orthopedic procedures to obtain the best functional results. With good physical therapy, almost all of these individuals become ambulatory and self-supportive. However, treatment must be started early to mobilize and strengthen what muscle mass there is. Casting and splinting may be necessary to correct clubfeet and knee contractures.

A child with ACDS may require modifications in the physical environment such as assistive devices or technology of the classroom to allow them to achieve their academic potential in light of their physical limitations. There is no research to support cognitive deficits. Providing a positive environment that builds good self-images will facilitate peer relationships.

The prognosis for this disorder is generally favorable. Intelligence is usually normal. There may be diminished bone growth in affected extremities. Occasionally the joint contractures worsen with age. However, with aggressive management of the orthopedic abnormalities, ACDS patients can achieve a considerable degree of self-sufficiency.

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Anne Anastasi obtained her BA from Barnard College in 1928 and her PhD from Columbia University in 1930 at the age of 21. Influenced by H. L. Hollingworth and articles about early precursors of factor analysis by C. Spearman, Anastasi changed her orientation from mathematics to psychology. She also extended her study of individual differences to include major group differences. These changes began her association with the development of differential psychology. Her major areas of study are the nature and identification of psychological traits, test construction and evaluation, and interpretation of test results with specific reference to the role of cultural factors in individual and group differences.

Anastasi's publication of *Psychological Testing*, in the most recent edition, continues to stress the responsibility of the test administrator in selecting appropriate tests and methods of testing, interpreting test scores, and using and communicating test results. Other major publications include *Differential Psychology* and *Fields in Applied Psychology*. She has published more than 170 journal articles and monographs and was the only author who has contributed to every edition of the *Mental Measurements Yearbook* since its inception in 1938.

Anastasi received several honorary degrees and many awards such as the 1977 Educational Testing Service Award for Distinguished Service to Measurement, the E. L. Thorndike Award for Distinguished Psychological Contributions to Education (from APA Division 15), the American Psychological Association Distinguished Scientific Award for the Application of Psychology, the American Psychological Foundation Gold Medal, and the AERA award for Distinguished Contributions to Research in Education. In 1987 she was presented with the National Medal of Science

by President Ronald Reagan. Anastasi was also professor emeritus at Fordham University and was esteemed as the third female president of the American Psychological Association. Anne Anastasi was known and seen by her peers as the most prominent woman in psychology up until her death in the year 2001.

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Though he retired as Thomas Hunter professor at Hunter College, City University of New York, in 1992, Nicholas Anastasiow maintains his principal interest in early childhood special education and child development. He began his career as an elementary school teacher in the early 1950s and garnered various educational certifications until he received his PhD in child development and guidance from Stanford University in 1963. In 1967, he completed postdoctoral courses in neurology at Columbia University.

Anastasiow believes that "many at-risk children can lead normal lives when they are provided remediation as well as support and education for their parents" (personal communication, August 2, 1985). This belief is well represented in the 200 articles, reports, and books he has published on a vast array of subjects such as language development. Some of his titles are *Language and Reading Strategies for Poverty Children* (Anastasiow, Hanes, & Hanes, 1982), *The At-Risk Infant* (Harel & Anastasiow, 1984), and *Development and Disabilities* (Anastasiow, 1986). He currently has finished the 11th revision of the classic textbook *Educating Exceptional Children*, which he coauthors with Samuel Kirk and Jim Gallagher.

Anastasiow is also interested in the "prevention of at-risk children by educating future parents in knowledge of child development and the skills and strategies of parenting before they become parents" (personal communication, August 2, 1985). He has encouraged schools to establish child development courses for sixth and seventh graders in publications such as *The Adolescent Parent* (1982).

Anastasiow has served as a consultant to the Assistant Secretary on Human Development, the White House Conference on the Handicapped, and the President's Council for Exceptional Children—Early Childhood Division, and as an exchange delegate to the USSR.

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ANDERSON, META L. (1878–1942)

Meta L. Anderson, while a teacher in the New York City public schools, enrolled in a course in the education of children with intellectual disabilities at "The Training School" at Vineland, New Jersey. There, Edward R. Johnstone and Henry H. Goddard, recognizing her unusual ability, recommended her to the Newark, New Jersey, Board of Education, which employed her to begin special classes for children with intellectual disabilities. In 1910 she established two special classes and Newark joined the handful of school systems that provided special programs for handicapped students.

Anderson developed an instructional approach based on careful analysis of the abilities and limitations of each student and devised trade classes and a work experience program to provide vocational preparation. Her book, *Education of Defectives in the Public Schools* (1917), described the program and added impetus to the growing special class movement in the United States. In the closing months of World War I, Anderson was appointed head of reconstruction aid in Europe. After the war she served for a year in Serbia. She returned to the Newark schools in

1920 to become director of the city's comprehensive special education program. She received her PhD from New York University in 1922. She served as president of the American Association on Mental Deficiency in 1941.

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ANEMIA, APLASTIC

There are various types of anemias that differ in severity and etiology (e.g., aplastic, sickle cell, and Fanconi). The first description of aplastic anemia was offered by Ehrlick in 1888 and later named by Vaquez in 1904 (Young, 1995). In general, aplastic anemia is the failure of bone marrow to reproduce new blood cells. Specifically, there is a low production of (a) red blood that carries the oxygen to all parts of the body, (b) white blood cells that help the body fight off infection, and (c) platelets that involve the controlling of bleeding by forming blood clots. Production of new blood is of critical importance because blood cells have very limited life spans (e.g., red about 120 days, platelets about 6 days, and white less than 24 hours). The diagnosis of aplastic anemia is usually done through blood and bone marrow tests, and as blood count decreases, severity and morbidity increase.

Aplastic anemia is a rare disorder; about 2 per 1 million individuals are diagnosed each year in the United States. The incidence of aplastic anemia varies; more cases are identified in Asia (e.g., Thailand about 4 per 1 million new cases each year) than on other continents. Both males and females are equally affected. Although the median age of onset is 20–25 years, newborns have been diagnosed with the disorder. The underlying etiology in about 50% of the cases is unknown, and the other known 50% may be due to physical or chemical damage to the bone marrow, viral infection, cytotoxic drugs used in chemotherapy, prescription and over-the-counter drugs, or heredity.

Characteristics

1. Fatigue
2. Bleeding of the mucous membranes
3. Headaches
4. Dizziness
5. Nausea
6. Shortness of breath
7. Heart palpitations
8. Underside of eyelids, nails, and lips may become very pale
9. May bruise easily
10. High risk for infection

Aplastic anemia is generally considered a medical emergency, and the individual is immediately hospitalized. In cases in which the cause is known, the cause is removed if possible, and the individual is given a transfusion. For more severe cases and for children, the first line of treatment is bone marrow transplantation. The bone marrow of one person is extracted and then grafted into the bone marrow of the affected individual; the ideal donor is a sibling.

If a sibling donor is not viable, other individuals in the family or community may potentially become donors. While waiting for a donor, the child may be given a blood transfusion (not from family or any potential donor) and is carefully monitored because such children are highly susceptible to infections. The transplantation is successful if the recipient's body does not reject the transplant and new blood is reproduced. If a donor cannot be found, treatment with immunosuppressant drugs is prescribed. Immunosuppressant drugs such as cyclosporine are often used with bone marrow transplantations to lessen the possibility of rejection (March & Gordon-Smith, 1998).

Children diagnosed with aplastic anemia may need special education services, including home-based tutoring and psychological services. They may be classified as Other Health Impaired. The classroom and school of the child may also need psychological services with a focus on supportive peer and family counseling.

In the past, for individuals with severe aplastic anemia, prognosis has been grim—about 30% to 50% of individuals died within 6 months of diagnosis. Therefore, research on aplastic anemia has focused on understanding the underlying physiological structure of the disorder and on developing new treatment protocols that can increase survival rate (Fouladi et al., 2000). For example, in an 8-year follow-up study of children with aplastic anemia treated with bone marrow transplant or a regiment of immunosuppressant drugs, the survival rate was 80% (Pitcher, Hann, Evans, & Veys, 1999). The educational or psychological effects of the diagnosis of aplastic anemia have not been adequately addressed in the literature.

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ANEMIA, DIAMOND-BLACKFAN

Diamond-Blackfan anemia (DBA) is a congenital deficiency in the precursor mechanism of red blood cells causing failure or low production rates of new blood cells in the bone marrow. The disease is usually present at birth or develops during the first year of life, with 50% of males developing the disease by 2 months of age and 3 months for females. The ratio of males to females is 1.1 to 1.

The etiology and pathogenesis of DBA is unknown. Researchers have studied the possible link between DBA and mutations of ribosomal protein RPS 19; the presence of a second gene on Chromosome 8p (Willig, Gazda, & Sieff, 2000) and Chromosome 19. The characteristics of individuals with DBA vary, and a consistent pattern has not been established due to the small number of cases seen.

Characteristics

1. Weakness and fatigue
2. Slow growth
3. Webbing or shortness of the neck
4. Hand deformities
5. Congenital heart defects
6. At risk for developing leukemia
7. Facial dysmorphic features such as wide-set eyes, thick upper lip, micro- or macrocephaly
8. Upper limb malformations
9. Cataracts, epicanthal folds
10. Renal structural anomalies
11. Short stature

Individuals with DBA are usually treated with corticosteroids such as prednisone (DeCosta, Willig, Fixer, Mohandas, & Tchernia, 2001). Side effects of prednisone therapy may include growth retardation, hypertension, diabetes, fluid retention, gastric ulcers, cataracts, and weight gain. For individuals who do not positively respond to prednisone, red blood cell transfusion may be an option. Transfusions are generally needed every 3 weeks. Side effects associated with transfusion include adverse reactions and the possibility of contracting hepatitis. Bone marrow transplantation may be utilized in cases in which the individual does not response to other forms of treatment. With advances in bone marrow transplantation and immunosuppressant drug therapy, survival rates after transplantation have increased. However, because the child's bone marrow is destroyed prior to transplantation, rejection or poor functioning of the new grafted bone marrow generally results in death. In about 15% of the individuals with DBA, spontaneous remission occurs, and the median age of survival for individuals with DBA is approximately 31 years.

Educational needs of children with DBA change dependent upon their general health and treatment protocol. Children may receive special education services under the Other Health Impaired category. At times, homebound services may be needed. Children who received successful bone marrow transplantation (i.e., a child has not rejected the marrow and the new marrow is normally functioning) may be considered cured and may only need minimal medical supervision. Predisone treatment or blood transfusion involves many more risks, and frequency of the treatment (3–6 hours for blood transfusion) may result in missed educational opportunities. Fatigue, physical problems, and treatment side effects can have a negative impact on the child's physical and cognitive growth. Because children with DBA may be very fragile, their ability to engage in age-appropriate play and to interact with age mates may be limited.

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ANEMIA, FANCONI

Fanconi anemia (FA) was first reported by Guido Fanconi, a Swiss pediatrician, in 1927. Because FA is an autosomal recessive disorder that leads to bone marrow failure, both parents must carry the recessive gene for the child to have the disorder. People with FA do not produce a protein necessary for cell functioning; as the cells die and are not reproduced, the individual develops aplastic anemia. Because FA is a recessive gene disorder, after a sibling is diagnosed with FA, all siblings should be tested for FA.

FA occurs equally in males and females and can affect all ethnic groups. The prevalence rate is unknown, but there are about 3,500 known cases; estimates of carrier frequency are approximately 1 in 600. Birth defects occur in approximately 75% of the children born with FA, and the disorder affects all body systems (Alter, 1996). Of major concern for children with FA is the high rate of aplastic anemia, leukemia, and cancers (DeKerviler, Guermazi, Zagdanski, Gluckman, & Frija, 2000). Although FA may be diagnosed at birth, age of onset is typically between 3 and 12 years of age, and in rare cases, adults may be diagnosed with FA. Children with the disorder rarely live to adulthood; their life expectancy is about 22 years.

Characteristics

1. Short stature
2. Anomalies of the thumb and arm
3. Skeletal anomalies (e.g., hip and spine)
4. Structural renal malformations
5. Mental or learning disabilities
6. Gastrointestinal difficulties
7. Heart defects, cancer, and leukemia
8. Hyperpigmentation of the skin (café-au-lait spots)
9. Urinary malformations

In children with FA, treatment is usually bone marrow transplantation, androgen therapy, synthetic growth factor therapy, and gene therapy. Androgen and synthetic growth therapies (drug therapies) are used to stimulate blood growth and can be very effective (Frohnmayer & Frohnmayer, 2000). They are not a cure, and most FA patients eventually fail to respond to drug therapy. Bone marrow transplantation is an effective therapy; the best prognosis is seen in young children who are relatively healthy and have received no or few blood transfusions. Five years after transplantation with a sibling donor, the survival rate is about 70%, whereas the survival rate with nonrelated donors is negligible (Bosch, 2000). At the present time, researchers are investigating at least eight different genes involved in FA.

Children with FA should be allowed to engage in age-related activities as much as possible. Some children may need special education services such as hospital or home-bound instruction, individualized instruction focusing on learning problems, or support given through classes for Other Health Impaired children. Children with FA and their families need psychological support, and the child must feel accepted and cared for while attending school. Because about 50% of children with FA are short in stature, care should be given that they are treated as any other child their age and not treated as if they were much younger children.

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ANEMIA, HEREDITARY NONSPHEROCYTIC HEMOLYTIC

Hereditary nonspherocytic hemolytic anemia describes a group of blood disorders that may result from defects in red blood cell membranes, chemical abnormal metabolism,

and approximately 16 enzyme deficiencies in the cells, such as glucose-6-phosphate dehydrogenase deficiency (Fiorelli, Martinez di Montemuros, & Cappellini, 2000). The shape of the red blood cell is not changed as a result of the disorder. The two most common disorders are Glucose-6-Phosphate Dehydrogenase deficiency and Pyruvate Kinase Deficiency.

Glucose-6-phosphate dehydrogenase deficiency (G-6-PD) is a hereditary X-linked recessive enzyme disorder. When an individual with the disorder is exposed to stress of infection or some drugs, the G-6-PD enzyme in the red blood cells is reduced and the red blood cells begin to break down. The incidence for G-6-PD is higher in African Americans; 10–14% of African American males are affected. Individuals with the disorder can remain undiagnosed until their red blood cells are exposed to infections or oxidants such as antimalarial drugs and antibiotics. However, new blood cells do not have decreased levels of G-6-PD and so episodes of anemia may be brief.

Characteristics

1. Fatigue
2. Pale color
3. Shortness of breath
4. Rapid heart rate
5. Yellow skin tone
6. Dark urine
7. Enlarged spleen

If the decrease in red blood cell G-6-PD is a result of infection, the infections is treated, and if the cause is drugs, the drugs are stopped. This form of treatment generally returns the individual to a more normal healthy state.

Pyruvate kinase deficiency is the second most common cause of enzyme related nonspherocytic hemolytic anemia and is an inherited autosomal recessive trait which results in a decrease of the enzyme pyruvate kinase in red blood cells. Evidence of pyruvate kinase deficiency can be found in all ethnic groups, but it appears to affect some groups of people more than others (e.g., Amish). The deficiency can cause mild to severe hemolysis (cell death) and anemia and can be identified in infancy.

Characteristics

1. Family history
2. Pallor
3. Jaundice

Treatment for the disorder depends on severity; some individuals experience few if any symptoms, whereas others may need blood transfusions and a splenectomy to decrease the destruction of red blood cells.

For individuals with G-6-PD or pyruvate kinase deficiency, family and genetic counseling may be appropriate. Children and adolescents with these disorders may not need any additional special educational support unless they develop chronic anemia, which may restrict their activities and result in missed school days. The category of Other Health Impaired may need to be considered if the student's activities are restricted. Providing the individual with information about their disorder is important, since the individual may need emotional support when dealing with life-long conditions. Additional research is needed to understand etiology and treatment.

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ANEMIA, HEREDITARY SPHEROCYTIC HEMOLYTIC

The blood cells in individuals with hereditary spherocytic hemolytic anemia (HSHA) are sphere-shaped due to a defect within the blood cell as a result of a metabolic defect. Because of the cells' shape, they are not readily passed through the small blood vessels of the spleen and are often prematurely destroyed by the spleen. The incidence rate of HSHA in the United States is estimated to be approximately 1 in 5,000 individuals and usually affects Caucasian individuals of northern European ancestry; it is rarely found in other racial groups. The disorder is autosomal dominant, with 50% of the siblings affected. However, in a small number of cases, neither parent has

the defect and the expression of the disorder may be due to a recessive form of the disorder or to spontaneous mutation. The severity of the disorder depends upon whether the individual can compensate for the loss of red blood cells by producing more cells. If the bone marrow temporarily halts production of new blood cells due to infection, the individual may experience an aplastic crisis as a result of the loss of blood.

Characteristics

1. Jaundice, causing skin and whites of the eyes to turn yellow
2. Fatigue
3. Enlarged spleen

Treatment for the disorder for a young child consists of folic acid supplements, and in emergencies transfusions may be provided. For individuals older than 5 years of age, a splenectomy (removal of the spleen, which allows the blood cells to live longer) may be needed (Beutler & Luzzatto, 1999). However, removal of the spleen is not considered a cure, and the individual must take precautions to prevent serious infections that may increase the risk of anemia.

The educational and social-emotional needs of the individual will depend upon the severity of the disorder. In mild cases, the individual may need to avoid infections and stress-related activities. In more severe cases, physical activities may be restricted and the individual may constantly feel fatigued. Children and adolescents should be instructed about their condition and play a vital role in the management of their care. Special education services may need to be provided in the Other Health Impaired category. Psychological counseling and education may also be needed.

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ANENCEPHALY

Anencephaly is a congenital disorder marked by the absence of the cerebral cortices. It belongs to a class of disorders that are termed neural tube defects (NTD) and results from the failure of the neural tube to close during embryogenesis. The neural tube, which is the precursor to the brain and spinal cord, usually closes by the 28th day after conception (Kloza, 1985). If this does not occur completely, various defects to the central nervous system (CNS) become manifest. If this occurs "lower" on the neural tube, spina bifida will be present. However, if the "top" of the neural tube remains open, anencephaly results. Anencephaly with spina bifida rarely occurs (Swaiman & Wright, 1973).

As anencephaly is ostensibly marked by the absence of the cerebral cortices; the centers of higher cognitive functioning are absent. Therefore, while certain subcortical structures may remain intact (producing the reflex patterns and responses often indicative of neonates), higher cerebral activity is precluded by the absence of structures subserving those functions. Many anencephalics are stillborn, as they lack the brain structures necessary to maintain respiration and other functions vital to survival. On the occasion that the newborn is physiologically viable, it should be remembered that associative processes, reasoning, and cognitive and language development are not possible. Therefore, educational services are not a practical consideration and absolute custodial supervision and care are indicated. Ethical considerations pertaining to care must also come into play.

The development of anencephaly and other NTDs is believed to be multifactorial. The second most common group of congenital anomalies, with environment, intrauterine environment, and genetic factors implicated in their development are NTDs. Kandel, Schwartz, and Jessell (1991) provide a detailed review of the development of NTDs, including anencephaly. Geographically, anencephaly appears to be a more common occurrence on the East Coast of the United States and in the Rio Grande Valley of Texas. It is found more frequently in female births than male (2:1). It has been suggested that a higher prevalence of anencephaly is found in lower socioeconomic class families (James, Nevin, Johnston, & Merrett, 1981; Nevin, Johnston, & Merrett, 1981).

Treatment of anecephaly consists of surgically closing the opening of the sac that encloses the brain. This is a very high-risk procedure and still does not prevent infant fatality upon birth due to the complications of anencephaly. With NTDs, a substance called alpha fetoprotein (AFP) occurs in higher concentration in the amniotic fluid surrounding the fetus (Adinolfi, 1985; Kloza, 1985). The AFP enters the mother's circulation either by the amniotic fluid or the placenta; it can then be measured in the mother's blood. Higher levels of AFP in the mother's blood at certain times in fetal gestation indicate NTDs. This method

of identifying anencephaly has been shown to be 99% reliable, with a reliability of similar magnitude for other NTDs such as spina bifida.

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See also **Baby Doe; Congenital Disorders**

ANGELMAN SYNDROME

Angelman syndrome (formally Happy Puppet syndrome) is an emerging disorder, little studied, with no good population studies completed to allow proper prevalence or incidence estimates. However, it is roughly estimated to be 1 in 10,000 to 1 in 20,000 (Steinman, 2003). Many, but not all, Angelman syndrome individuals have deletions on chromosome 15 in maternally related regions (q11–q12) while others are of unknown pathogenic origin. The disorder is characterized by physical, motoric, and behavioral features. Physical features include a wide mouth, prominent lower jaw, and microbrachycephalia. Motor problems are related to diverse, jerky, sometimes rhythmic movements. Some children experience particular difficulties with inadequate control of chewing and swallowing, which creates feeding problems. However, these problems abate after infancy in most cases. Acquisition of walking is delayed, and mild to severe ataxia after learning to walk is common.

A variety of behavioral and cognitive problems are evident. Most children with Angelman syndrome have severe to profound levels of intellectual disability, although some patients may reach moderate and, rarely, mild levels of ID. Spoken language is absent in 75–80% of children with Angelman syndrome, but receptive language is typically superior to expressive language. Some do develop skills in sign language but normal levels of communication have not been seen in any published case. Behavioral presentation of Angelman syndrome often includes hyperactivity, impulsivity, episodic pica, random bursts of laughter (in nearly all cases), jerky nighttime movements, and a generally happy disposition.

Diagnosis is sometimes very difficult, as Angelman has similarities of presentation to Rett syndrome and to Prader-Willi syndrome in a number of cases. Detailed cytogenic studies are often necessary for proper diagnosis and even then the diagnosis may still be only inferred rather than confirmed. EEG is helpful as a common pattern with posterior slow wave activity used as a marker variable. CT and MRI are normal in 30–35% of cases, and others show mixed results with diffuse atrophy, deep white matter lesions (periventricular leukomalacia), and cerebellar growth retardation all having been documented in various cases.

At present 100% of children with Angelman syndrome are believed to require special education services, typically as children with intellectual disability, although numerous related services may be required (Steinman, 2003). Intervention is largely related to symptom management and the teaching of fundamental adaptive behavior and communication skills. Sheltered employment is possible in many but not all cases. However, more and better longitudinal studies of Angelman syndrome individuals are needed to document the long-term effects of interventions and general life outcomes.

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See also **Prader-Willi Syndrome; Rett Syndrome**

ANGIOEDEMA (HEREDITARY)

Occupational therapy may help fine motor and oral motor control. Because expressive speech is very limited, speech

or communication therapy is important for developing nonverbal communication methods. Incorporating communication aids, such as picture boards, at the earliest appropriate time is advisable. Consistency in techniques used at school and home facilitates development of skills for activities of daily living (National Angelman Syndrome Foundation, 2000).

Additional research is needed for better understanding and control of seizures. Future research in genetics holds promise for reversing the abnormal gene processes that cause Angelman syndrome and other disorders with similar etiology.

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ANIMALS FOR INDIVIDUALS WITH DISABILITIES

Today, animals are being used to assist individuals with disabilities with daily living. For centuries, the blind have used dogs to assist them in ambulation. Recently, pilot programs using domesticated monkeys to assist moderately to severely disabled persons in the home to perform rote chores has been a successful innovation. Horseback riding has emerged as a leisure-time pursuit for many types of disabled persons.

The benefits of human/animal interaction are now being realized, especially for special education purposes. Lowered blood pressure has been documented in studies where the participants had regular contact with dogs. In another study, Friedman (1980) found that the survival rate of hypertensive persons increased dramatically with pet ownership. Pets have been considered effective agents in the reduction of everyday stress. They provide a sense of relaxation (Kidd, 1981). They also provide a chance to exercise, and for many a sense of security (White & Watson, 1983).

Animals provide the opportunity to communicate. This is probably the most valuable attribute of the human/animal relationship. Levinson (1969) states that an animal can have a "very positive effect on a family and that they have the potential to bridge the gap between children and adults by providing a common object of responsibility."

According to Levinson (1969), the introduction of animals into a residential setting for the disabled indicates that the staff believes that anything of possible treatment value to the disabled can and should be used. It reveals an awareness of the potential healing properties of pet ownership, even if those benefits have not been scientifically documented in the laboratory.

A child with disabilities is not constantly reminded of his or her disability in the interaction with a pet. A deaf child can care for a dog competently and receive all of the rewards that a hearing child would for the same efforts. The same is true for a variety of handicaps; only the type of pet might have to be changed. A child confined to a wheelchair may interact well with a rabbit or an aquarium and achieve a sense of purpose and responsibility previously unrealized.

The teaching of the emotionally disturbed child provides a setting in which the use of animals may be especially beneficial. Typically, motivating this student to participate in class can be a difficult task for the teacher. Often, these students have never learned to care for or share with others. The animal in the class may provide both the subject matter and the motivation to learn. The child who had previously trusted no one can begin to trust the teacher for the first time when he or she sees the teacher's concern in dealing with the classroom pet. This could be the first step by the child in accepting the structure of the class (Levinson, 1969).

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See also **Equine Therapy**
Therapeutic Recreation

ANIRIDIA CEREBELLAR ATAXIA MENTAL DEFICIENCY

Aniridia cerebellar ataxia mental deficiency, also known as Gillespie syndrome, is characterized by intellectual disability, partial absence of the iris of the eye (partial aniridia), and incoordination of voluntary movements due to underdevelopment of the brain's cerebellum (cerebellar ataxia; National Organization of Rare Disorders, 1998).

Aniridia cerebellar ataxia mental deficiency is an extremely rare autosomal recessive condition, with approximately 16 cases reported in the literature (McKusick, 1997). It affects males and females equally.

Characteristics

1. Child may have slow and halting speech, hypotonia, and an unsteady gait (Nevin, 1990).
2. Child may show developmental delays with certain motor skills, such as walking or speaking.
3. Intellectual disability is usually present.
4. The pupillary margin of the iris and the sphincter pupillae may be absent, resulting in poor vision and photophobia (Wittig, Moreira, Freire-Maia, & Vianna-Morgante, 1988).
5. Child may develop glaucoma, which could lead to loss of vision.

Treatment for aniridia cerebellar ataxia mental deficiency depends on the individual's symptoms. A team of ophthalmologists and optometrists is necessary to treat visual problems. Surgery may be required for the child's visual difficulties, such as diplopia. Glasses or contact lenses may be necessary to alleviate problems caused by partial aniridia. The child should also be monitored for glaucoma to prevent possible vision loss. Physical therapists may assist the child with gross motor skills, and speech therapists may be necessary to address speech delays. In rare cases, individuals with the disorder have heart abnormalities or skeletal malformations that require treatment (McKusick, 1997).

Children with aniridia cerebellar ataxia mental deficiency have intellectual disability, cerebellar ataxia, visual impairments, health problems, and possible speech delays that may interfere with their education. To help them reach their maximum learning potential, most children with this disorder need special education services and early intervention programs. The services required depend on the child's symptoms and needs. Psychoeducational assessments can help school personnel develop an appropriate individual educational plan for each child. Physical therapy and speech therapy may also be necessary for young children with motor impairments or speech delays (Plumridge, Bennett, Dinno, & Branson, 1993).

Individuals with aniridia cerebellar ataxia mental deficiency may require some form of assisted living, depending on the severity of their symptoms. There does not appear to be a decrease in functioning with age, and in some cases motor performance improves (McKusick, 1997). Future research is focusing on the etiology, prevention, and treatment of this disorder.

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ANNALS OF DYSLEXIA

Originating in 1950 as the *Bulletin of the Orton Society* under the editorial leadership of June Lyday Orton, the annual periodical of the Orton Dyslexia Society was renamed the *Annals of Dyslexia* in 1981. It was designed as a means for enhancing communication among the members of the Orton Dyslexia Society, an organization founded in 1949 whose aim was to further research and work with children with specific language disabilities.

The journal was aimed at professional multidisciplinary membership, consisting of neurologists, psychologists, pathologists, psychiatrists, educators, and social workers. Through concrete illustration of the practical applications of new knowledge, *Annals* served as a bridge between the researcher and the field worker.

The Orton Dyslexia Society was renamed the International Dyslexia Association in 1997. The International Dyslexia Association publishes the *Annals of Dyslexia*

in partnership with Springer Publishing. Currently, the *Annals of Dyslexia* is a peer-reviewed journal that prints studies of evidence-based effective practices related to the study of dyslexia and other related language disorders.

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ANNUAL DIRECTORY OF EDUCATIONAL FACILITIES FOR THE LEARNING DISABLED (*See* Biennial Directory of Educational Facilities for the Learning Disabled)

ANNUAL GOALS

Annual goals describe expected student performance as part of an individual education plan (IEP), and are in compliance with the Individuals with Disabilities Education Improvement Act of 2004. Annual goals originated with PL-94-142 in 1975 requiring each IEP to contain a statement of annual educational goals, with specific objectives, conditions under which desired performance should occur, description of the desired performance, and a listing of the criteria for adequate performance. The proportion of IEP objectives achieved by each student at the end of the term divided by the total number written at the start of the term has been used as a measure of educational progress (Brinker & Thorpe, 1984). Progress of annual goals are to be reported at least as frequently as other grade reporting periods.

Public Law 94-142 mandated that pupils' rates of progress be continuously monitored so that educational programs can be reassessed and improved as students move toward goals. A common assessment method used in instruction is the pretest, teach, posttest design. Teachers in special education commonly rely on observation and develop curriculum-based measurement systems matched to annual goals.

Findings indicate that the use of more systematic measurement and evaluation systems than those currently in use result in better student achievement toward goals (Fuchs, Deno, & Mirkin, 1984). Another finding is that public goal setting between student and teacher is more effective than private goal setting in increasing on-task behavior in the classroom (Lyman, 1984). One suggested system is the Goal Attainment Scale (GAS; Kiresuk & Sherman, 1968), a method that can help special educators to become more accountable and effective and increase the likelihood that curricula will become student centered rather than method centered.

The method involves devising a set of goals with the involved persons, developing a set of expected outcomes for each goal, scoring the outcomes on a five-point continuum from worse than expected to better than expected, and calculating a summary score of outcomes across the goals. Mutual determination of goals and their importance by the persons involved ensures relevance and meaning to parents, students, and educators. This mutual determination also helps students to learn about alternative behaviors and helps to clarify expectations for both students and teachers. GAS is independent of theoretical predispositions and can be used by teachers to clarify specific problems, sharpen goal setting, and point out directions for action (Carr, 1979). Setting objective, observable goals and evaluating outcomes is crucial to student progress (Martens, Witt, Daly, & Vollmer, 1999), and this position continues in the latest reauthorization of the Individuals with Disabilities Education Improvement Act (IDEIA) of 2004. While benchmarks and objectives for annual goals have been eliminated from the latest legislation, it remains to be seen how progress toward annual goals will be determined.

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See also **Individual Education Plan; Individuals With Disabilities Education Improvement Act of 2004 (IDEIA)**

ANNUAL REPORT TO CONGRESS ON THE IMPLEMENTATION OF THE INDIVIDUALS WITH DISABILITIES EDUCATION ACT, TWENTY-NINTH EXECUTIVE SUMMARY OF THE

The 29th Annual Report to Congress (2007) focuses on IDEIA results and accountability. The 29th Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act, 2007 focuses on key state performance data following recommendations of the President's Commission on Excellence in Special Education.

National Data

Infants and Toddlers Served Under IDEA, Part C

- In 2005, under *IDEA*, Part C, there were 298,150 eligible infants and toddlers birth through age 2 who received early intervention services. Of these, 293,816 were served in the 50 states and the District of Columbia. This number represents 2.4% of the birth-through-2 population in the 50 states and the District of Columbia (page 14).
- From 1996 through 2005, the percentage of the general population of infants and toddlers who were served under *IDEA*, Part C, increased for each of the age years served. The increase continued to be largest for 2-year-olds. In 1996, Part C served 2.4% of 2-year-olds. By 2005, Part C served 3.9% of 2-year-olds (page 15).
- In 2004, approximately four-fifths of infants and toddlers being served under *IDEA*, Part C, received their early intervention services primarily in the *home* (82.7%). The next most common setting category was *service provider location* (5.6%) followed by *program designed for typically developing children* (4.4%) and *program designed for children with developmental delay or disabilities* (4.4%). Less than three percent (2.9%) of infants and toddlers received early intervention services in the setting categories presented as "Other" (page 19).
- In 2004–2005, about two-thirds (68.6%) of children served under *IDEA*, Part C, who exited Part C when they reached age 3 were determined to be *Part B eligible*. Other children who exited Part C when they reached age 3 did so with their *Part B eligibility not determined* (14%). Of the children who exited Part C when they reached age 3 and who were not eligible for Part B (17.4%), approximately 12% exited with referrals to other programs, and about 6% exited with no referrals (page 22).
- In 2004–2005, for every racial/ethnic group, more than 60% of children exiting Part C when they reached age 3 were eligible for Part B preschool services (page 24).

Children Ages 3 Through 5 Served Under IDEA, Part B

- In 2005, Part B served 704,087 children ages 3 through 5 with disabilities. Of these, 698,938 were served in the 50 states, the District of Columbia, and Bureau of Indian Affairs (BIA) schools. This number represents 5.8% of the U.S. population ages 3 through 5 (page 43).
- The percentage of 3-year-olds in the general population who received special education and related services increased from 2.8% in 1996 to 3.8% in 2005. The percentage of 4-year-olds in the general population who received special education and related services increased from 4.7% in 1996 to 6.5% in 2003 and decreased slightly to 6% in 2005. The percentage of 5-year-olds in the general population who received special education and related services increased from 6.1% in 1996 to 6.6% in 2001, then increased yearly to 7.7% in 2005 (pages 44–45).
- In 2005, American Indian/Alaska Native and White (not Hispanic) children ages 3 through 5 both had risk ratios above 1 (1.5 and 1.3, respectively). This indicates that they were more likely to be served under Part B preschool programs than were children 3 through 5 years of age of all other racial/ethnic groups combined. Black (not Hispanic) children ages 3 through 5, with a risk ratio of 1, were just as likely to be served under Part B preschool programs as same-age children of all other racial/ethnic groups combined. Asian/Pacific Islander and Hispanic children ages 3 through 5 were less likely to be served under Part B preschool programs than same-age children of all other racial/ethnic groups combined (both with risk ratios of 0.7) (pages 47–48).
- In 2005, about one-third of children ages 3 through 5 served under *IDEA*, Part B, received all of their special education and related services in *early childhood* environments (34.1%). Only 2.9% of children ages 3 through 5 served under *IDEA*, Part B, received special education and related services in *home* environments (page 49).

- According to the Pre-Elementary Education Longitudinal Study (PEELS), in 2003–2004, nearly three-fourths of children ages 3 through 5 served under *IDEA*, Part B, were identified as having one of two primary disabilities—speech or language impairments (46.4%) or developmental delay (27.8%) (page 54).
- In 2003–2004, children identified as having orthopedic impairments, *other health impairments* or intellectual disability typically started receiving services from a professional at younger ages (13 months of age, 18 months of age and 19 months of age, respectively) than children identified as having other types of disabilities, according to PEELS (page 55).

Students Ages 6 Through 21 Served Under IDEA, Part B

- In 2005, a total of 6,109,569 students ages 6 through 21 were served under *IDEA*, Part B. Of these, 6,021,462 were served in the 50 states, the District of Columbia, and Bureau of Indian Affairs (BIA) schools. This number represents 9.1% of the U.S. general population ages 6 through 21 (page 58).
- In 2005, the largest disability category among students ages 6 through 21 served under *IDEA*, Part B, was specific learning disabilities (45.5%). The next most common disability category was speech or language impairments (18.9%), followed by *other health impairments* (9.2%), intellectual disability (8.9%) and emotional disturbance (7.7%) (page 61).
- For most disability categories, annual change in the percentage of the population ages 6 through 21 served under *IDEA*, Part B, was negligible from 1996 through 2005 (page 62).
- In 2005, American Indian/Alaska Native students ages 6 through 21 and black (not Hispanic) students ages 6 through 21 were about 1.5 times more likely to be served under *IDEA*, Part B, than same-age students in all other racial/ethnic groups combined (1.54 and 1.47, respectively); Asian/Pacific Islander students, white (not Hispanic) students and Hispanic students, ages 6 through 21, were less likely to be served under Part B than same-age students of all other racial/ethnic groups combined (0.51, 0.89 and 0.92, respectively) (page 71).
- In 2005, 96% of students ages 6 through 21 served under *IDEA*, Part B, were educated in regular classes. However, the amount of time they spent in regular classrooms varied. More than half of all students served under *IDEA*, Part B (53.6 percent) were educated for most of the school day in regular classes; that is, they were *outside the regular class for less than 21 percent of the school day* (page 72).
- In 2005, the percentage of students served under *IDEA*, Part B, receiving special education in each environment varied by disability category (page 75).
- In 2005, 43.9 percent of Black (not Hispanic) students ages 6 through 21 served under *IDEA*, Part B, were educated in the regular class for most of the school day compared to 59.1 percent of White (not Hispanic) students with disabilities (page 77).
- From 1995–1996 through 2004–2005, the rate at which students with disabilities *graduated with a regular high school diploma* improved for students in all disability categories. The largest gains were made by students with speech or language impairments (22.7 percentage point increase) and autism (19.2 percentage point increase). Notable gains were also made by students with emotional disturbance (15 percentage point increase) and specific learning disabilities (11.4 percentage point increase) (page 80).
- From 1995–1996 through 2004–2005, the dropout rate declined for students in all disability categories except deaf-blindness. The improvement was most notable for students with speech or language impairments (25.2 percentage point decrease), emotional disturbance (21.7 percentage point decrease), autism (13 percentage point decrease) and specific learning disabilities (17.6 percentage point decrease) (page 82).
- In 2004–2005, the rate at which students served under *IDEA*, Part B, *graduated with a regular high school diploma* was highest for Asian/Pacific Islander (66.7%) and White (61.5%) students served under *IDEA*, Part B. The graduation rate was lowest for Black students served under *IDEA*, Part B (39.2%). The graduation rate for all students served under *IDEA*, Part B, was 54.4% (page 83).
- According to the Special Education Elementary Longitudinal Study (SEELS), in 2004, the vast majority of students in all disability categories participated in their state accountability systems through standardized or alternate assessments. Between one-half and three-fourths of students with most disabilities participated in standardized tests with accommodations or modifications. The fraction was closer to two-fifths of students with intellectual disability (43%), autism (37%) and multiple disabilities (40%) (page 85).

All reports can be found at: http://www2.ed.gov/about/reports/annual/osep/index.html. Information retrieved on August 10, 2011.

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ANOMALIES, PHYSICAL
(*See* Physical Anomalies)

ANOREXIA NERVOSA

Anorexia nervosa (starvation due to nerves) is a condition in which an individual eats little or no food for prolonged periods. No physical basis for the abnormal eating can be found. This disorder can be life-threatening, is increasing in incidence, and is a serious problem for medical and psychological professionals.

Although famous and tragic cases such as that of singer Karen Carpenter have made anorexia familiar, little can confidently be said about specific etiology or overall effective treatment. Anorexics share certain personality characteristics and frequently have families with a particular complex of unhealthy attitudes and behaviors. The physical appearance of anorexics is emaciated.

Anorexia is largely a disorder of middle- and upper-class adolescent females. It occurs approximately nine times more often in women than in men, and may affect one in one hundred white women between the ages of 12 and 18 years (Newman & Halvorson, 1983). The most common age of onset for anorexia is early adolescence (Newman & Halvorson, 1983).

Diagnostic criteria for anorexia nervosa may be summarized as involving intense fear of becoming obese, which does not diminish as weight loss progresses; disturbed body image (e.g., feeling fat even when emaciated); refusal to maintain normal body weight; and in postmenarcheal females, amenorrhea (i.e., the absence of at least three consecutive menstrual cycles; American Psychiatric Association, 1994).

Anorexics are subject to numerous additional complications, including malnutrition, edema, loss of hair, hyperactivity, hypoglycemia, vitamin deficiencies, constipation, weakness, and fatigue. In extreme cases, death may result from starvation, electrolyte depletion, or cardiac arrhythmia (Newman & Halvorson, 1983).

Anorexic sufferers share many behaviors and concerns among each other. They are terrified of becoming obese and measure their worth and self-esteem by how much they weigh and how much their stomachs protrude. They tend to be perfectionists, overdemanding of themselves, and very success-oriented. Low self-esteem and fear of rejection, especially by the opposite sex, are common. They have difficulty allowing anyone to become emotionally close to them.

Many anorexics were model children who were "people pleasers." They tend to be introverted, well-behaved, compulsive, self-critical, and very conscientious. As the disorder progresses, anorexics frequently become suspicious, indecisive, stubborn, unsociable, and disliking of any change. Phobic, depressive, or hysterical features are also common. Perceptions of events often become very distorted.

Studies indicate that children as young as 8 to 10 years old may be likely to be concerned with weight and body esteem. Shapiro, Newcomb, and Loeb (1997) found that 8- to 10-year-old children admitted to concern with their body weight and dieting. The investigators concluded that eating disorders or disregulated-restrained eating in vulnerable children and adolescents might be both expressed and internalized at an extremely early age. Brumberg (1997) report that studies have demonstrated that as many as 53% of 13-year-olds and 78% of 17-year-olds are dissatisfied with their bodies. *Seventeen* magazine in 1995 ran a headline in the July 1995 issue which asked: "Do You Hate Your Body? How to Stop." Although the article offered adolescents ways to stop hating their bodies, the author confessed that it is very difficult to do so in a culture where your body is very important. Wolf (1994) stated that the world never gives girls the message that their bodies are valuable simply because they themselves are inside them. Until our culture tells young girls that they are welcome in any shape—that women are valuable with or without the excuse of beauty—girls will continue to starve.

The specific etiologies of anorexia nervosa are not known, but are thought to be biopsychosocial diseases. Unknown biological predispositions may interact with both individual psychological states and needs and our culture's emphasis, especially for females, on thinness as a worthy or desirable characteristic (Wooley & Wooley, 1985). Several etiological factors can be described:

1. According to Bruch (1985), in the past 20 years the average female under 30 years of age has become heavier; at the same time, the ideal shape for women has been in the direction of being thinner. To be thin is to increase women's desirability both in their eyes and the eyes of others. The result is demonstrated in the mushrooming of the weight reduction industry and the numerous books and magazine articles that have appeared on losing weight and dieting.
2. Wooley and Wooley (1985) quote from Ambrose Bierce's *Devil's Dictionary*: "To men a man is but a mind, who cares what face he carries? Or what form he wears? But woman's body is the woman." For many centuries females' cultural conditioning has tied self-esteem to physical attractiveness. Many therapists think that recent cultural emphasis on "thinness is beautiful and good" has contributed to the increased incidence of eating disorders (Wooley & Wooley, 1985). The message to woman in particular is that in order to be popular, attractive, accepted, sexy, healthy, and desired in the world of work, they must be thin. The ideal of feminine beauty increasingly conforms each year to the adolescent male physique, implying emulation of men both behaviorally and physically (Wooley & Wooley, 1985). This change may be due to broader social changes involving competition between women and men for prestige and power. Also involved for many young women is the resolution of intense identification

conflicts with their parents. Young women today are the first generation raised by extremely weight-conscious mothers who additionally view themselves as failures by current social standards of beauty.

3. Bruch (1985) says that a cultural emphasis for slimness as a determining factor does not explain the more severe disturbance of "frantic preoccupation with excessive slenderness of the anorexic." She believes that the changing status of expectations for women is important in understanding the etiology. Females, says Bruch, who have been raised as "clinging vines" and future wives, and who find themselves during their teens with the expectation to demonstrate that they are women of achievement, may find that they are filled with self-doubt and uncertainty. By bowing to the dictum to be thin, they are validating that they deserve respect.

Anorexia can begin with a stressful life situation for which the young woman does not possess appropriate coping skills. Real or perceived perfection, sexual engagements, or loss of some kind frequently precedes development of the disorder. Any change can be catastrophic for an anorexic. Worrying about performing perfectly and being socially accepted often results in situations in which anorexics find themselves out of control. Magical thinking is common.

According to Bemis and colleagues, who have studied hypothalamic functions in anorexics, starvation may actually damage the hypothalamus, and emotional stress may interfere with hypothalamic functioning. Further, psychological aberrations associated with anorexia may be relatively independent expressions of a primary hypothalamic deficiency that is of unknown origin (Bemis, 1978).

Women may be biologically more susceptible to eating disorders than men because women tend to demonstrate greater appetite fluctuations when confronted by stress. Also, through socialization, women are more likely than men to inhibit expression of negative feelings, leading to internal stress. This internal stress may exacerbate a biological predisposition.

Certain family factors facilitate the development of anorexia. If a parent has had the disorder or is either extremely thin or obese, the chances of a young woman becoming anorexic increase (Neuman & Halvorson, 1983). In families of anorexics, food is usually a primary issue. The family may use food for other than nutritional purposes. For example, eating may be a way of dealing with personal problems or negative or positive feelings, or it may be a method of presenting the appearance of a happy family. Power struggles over eating are extremely common.

Families of anorexics show certain personality patterns, although no one pattern appears consistently. Mothers are frequently intrusive and dominating and have experienced clinical depressions, whereas fathers appear passive and aloof from the family. Less frequently, these patterns may be reversed (Newman & Halvorson, 1983).

Family interpersonal dynamics are a significant contributing factor. Features that appear to be correlated with the development of the disorder are rigidity, lack of conflict resolution, overprotectiveness, and enmeshment (appearing to be a very close family). Keeping the peace at any cost is a high priority in these families; conflicts are not dealt with openly. In many families of anorexics, the anorexic generally feels powerless and ineffective, and behaves primarily on the basis of what other people want or need. Often the family has not encouraged or allowed the young woman to develop her autonomy or individuality. Only compliance is tolerated. Anorexia may develop as a result of a young woman's attempt to take control of her own life and achieve her own sense of identity. She learns that one thing she can control is her weight. Families must realize that this is an emotionally based disorder with the attempt to control, hide, avoid, and forget emotional pain. Nobody can make these anorexics eat, therefore it is important not to immediately focus on the food (http://www.something-fishy.org/).

In some cases the family unconsciously does not want the child to grow up. This message is received by the child, who in turn exhibits anorexic behavior, which then leads to failure to develop secondary sexual characteristics. Some anorexics enjoy being viewed as special by their families. Thus being anorexic can bring a great deal of attention, leading to self-perpetuation of the disorder.

Adolescent peer memberships are viewed as being critical in making the transition from childhood to adulthood. Some investigators have noted that anorexics have few if any close peer friendships (Neuman & Halvorson, 1983). Adolescent anorexics' overdependence and involvement with their families may prevent the formation of normal adolescent peer relationships. Thus, these youngsters may be at great disadvantage in making the essential developmental transition to adulthood.

Fifty percent of women diagnosed and treated for anorexia nervosa can be expected to recover completely within 2 to 5 years. Nutritional improvement or recovery can be expected in approximately two thirds of treated cases. Usually, after adequate body weight has been attained, menstruation will resume within a year.

As many as half of all anorexics experience a relapse. Approximately 38% may be re-hospitalized at some point during the next 2 years. Three to 25% of anorexia nervosa cases end in death from medical complications or suicide. This disorder has the highest death rate in psychiatry.

No consensus exists regarding the most effective form of treatment for anorexia nervosa (Vandereycken & Meermann, 1984). The course of treatment typically begins with stabilizing the patient's health, and then it is important that a course of therapy takes place (http://www.something-fishy.org/). Current treatment is aimed at first normalizing body weight, correcting the irrational

thinking about weight loss, and finally preventing relapse. To obtain these goals, one must be admitted to a hospital or a day treatment program where the disorder can be monitored (Walsh & Devlin, 1998).

Many forms of treatment for anorexia are used. Therapists have used behavioral therapy, diet counseling, cognitive therapy, cognitive-behavioral treatment, drug treatment, and family therapy with varying degrees of success (Garner & Garfinkel, 1985). Whatever the treatment approach, the usual goals are aimed at increasing confidence and self-esteem, challenging irrational or "anorexic" thinking, developing autonomy, and teaching coping skills. Further, Vandereycken and Meermann (1984, p. 219) suggest that the "best guarantees of success in therapy are a constructive patient/therapist working relationship and an explicit but consistent treatment plan/contract." In the case of drug treatment, the therapist is not trying to treat the eating disorder with medication, but the emotional disorder that they are suffering from that causes the eating disorder (http://www.something-fishy.org/).

Hospitalization becomes necessary when outpatient therapy fails to reverse an impasse or a deteriorating physical or psychological course. The therapist assumes considerable physical and psychological control and responsibility for the care of the hospitalized anorexic. A weight restoration program is usually initiated in which the anorexic is expected to gain at least 1 pound a week until she achieves a target weight consisting of 95% of her ideal weight (Anderson, Morse, & Santmyer, 1985).

Psychotherapy combined with the restoration of weight through direct management of the anorexic's eating is effective in varying degrees. The anorexic has, through her disorder, avoided dealing with several important issues that need to be addressed in psychotherapy. These include individuation, assuming responsibility, separation, becoming an adult, making career and other decisions, and dealing with the loss of one's own life. A key factor in treating eating disorders is to develop a framework for intervention. One should begin prevention of eating disorders to help control the problem. Prevention should be aimed at the students who are susceptible to develop this disorder (Schwitzer, Bergholz, Dore, & Salimi, 1998). Prevention relies on educating individuals about anorexia nervosa. Educating these individuals by giving them facts increases knowledge, and that will likely change their attitude toward anorexia. If the individual continues to develop anorexia, it is assumed that this education will intrigue them to seek help for their existing problem.

Certain beliefs and values seem very important in the maintenance of these conditions. One of these is the belief that weight and shape are extremely important and need to be closely controlled at all cost. A change in these psychopathological beliefs and values concerning body weight and shape may be necessary for complete recovery. Self-help and support groups may be valuable. According to Garrett (1997), anorexics claim that events, people, and processes outside therapy were the most relevant things toward their recovery.

Because eating-disordered individuals are usually perfectionists, teachers can help by advising and encouraging them to take fewer courses and to balance academic loads by combining difficult classes with classes that are less demanding. If hospitalization becomes necessary, and the anorexic student expresses fear that she will be unable to maintain her academic standing, the teacher can point out that usually hospital personnel are more than willing to assist the patient by insuring that the patient will be provided the opportunity to continue uninterrupted with academic requirements. Major treatment centers as well as many hospitals have educational components and academic teachers on their staff.

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See also **Bulimia Nervosa; Eating Disorders; Obsessive-Compulsive Disorders**

ANOSMIA

The term *anosmia* derives from the Greek *an* (without) and *osme* (odor); it refers to the absence or impairment of the sense of smell. Hyposmia refers to diminished olfactory functioning (Mannella, 1999). Synonyms for this condition include anodmia, anosphrasia, and olfactory anesthesia (*Dorland's*, 1981). Organic forms of anosmia are categorized as afferent (related to impaired conductivity of the olfactory nerve), central (due to cerebral disease), obstructive (related to obstruction of the nasal fossae), and peripheral (due to diseases of peripheral olfactory nerves; *Blakiston's*, 1979).

The most common cause of anosmia is a severe head cold or respiratory infection, which intranasal swelling blocks the nasal passages, preventing odors from reaching the olfactory region. This type of anosmia is temporary. Other organic causes of this condition include neoplasms (tumors), head injuries, or chronic rhinitis associated with granulomatous diseases (Levin, Benton, & Grossman, 1982; Mennella, 1999; *Mosby's*, 1983; Thomson, 1979). Anosmia also is a characteristic of olfactogenital dysplasia, also known as *Kallman's syndrome* or anosmia-eunuchoidism. This condition, more prevalent in males, is associated with lack of development of secondary sexual characteristics and anosmia. The apparently X-linked autosomal dominant or recessive inheritable condition is associated with dysfunction of the hypothalamus and the pituitary (Magalini, 1971). Anosmia with these etiologies typically is a permanent condition. Decreased sense of smell, microsmia, is also common with aging and among smokers.

Psychological forms of anosmia, while less common, may occur. Phobias or fears have been identified as precipitating such forms of anosmia (*Mosby's*, 1983). Specific types of anosmia include anosmia gustatoria (loss of the ability to smell foods) and preferential anosmia (loss of the ability to smell certain odors; *Dorland's*, 1981). Mennella (1999) provides a detailed description of conditions associated with a disturbance of olfaction and excellent clinical analyses with children.

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See also **Traumatic Brain Injury**

ANOXIA

Anoxia literally means an absence of oxygen, a condition that is incompatible with life. Recent terminology more correctly uses the term hypoxia to refer to a condition of lowered oxygen intake. Although hypoxia is compatible with life, long-term sequelae may result depending on the degree and duration of the condition.

Anoxia may be a rare cause of mortality in individuals experiencing status epilepticus (Pellock, 1999) carbon monoxide poisoning, placental insufficiency, microcephaly, or micrencephaly (De Meyer, 1999).

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See also **Asphyxia; Hypoxia**

ANTECEDENT

An antecedent is a stimulus that precedes a behavior and may exert discriminative control over that behavior (Heward, 2006; Liauspin, Nelson, & Jolivetter, 2003). Antecedents are implemented by structuring the environment to prevent behavior problems and increasing motivation (Kern & Clemens, 2007). Isolating a specific behavior and defining it in observable and measurable terms allows the antecedents and consequences to be identified. The behavior that is being analyzed is often referred to as the *target behavior* (Alvero & Austin, 2004; Pierangelo & Giuliani, 2006). By manipulating either an antecedent that leads to the target behavior or a consequence of the behavior, modifications can be made to the target behavior. In this way, the teacher or researcher may increase a desired behavior or decrease an undesirable behavior (Scott, Liaupsin, Nelson, & Jolivette, 2003).

Following the preceding procedure, if there is a student that is engaging in disruptive behaviors, the first step is to define those behaviors. For example, a student's disruptive behaviors may be operationally defined as repeatedly tapping his pencil on his desk hard enough to produce noise. We then monitor these behaviors recording not only their frequency but also the events that occur before (antecedents) and after (consequences) the behaviors.

Antecedents can be divided into three categories: (1) antecedents that occur in the environment of the target behavior, sometimes called *fast triggers*, (2) antecedents that occur outside of the environment of the target behavior, sometimes called *setting events* or *slow triggers*, and (3) conditions that increase or decrease the likelihood of the behavior occurring, sometimes called *establishing operations*. An antecedent that occurs immediately before the specific, or target, behavior is the easiest to identify and manipulate. When this occurs, the link from antecedent to behavior may become obvious if systematic observation of the target behavior is implemented (Magg, 1999; Scott et al., 2003; Taylor, 2006; Heward, 2006).

We may find that the tapping behavior described previously increases after the teacher has asked for a volunteer or when instructions are given to read silently. By knowing these events trigger the target behaviors, they can be manipulated to reduce the occurrence of the target behaviors. The teacher may ask that the students to put all materials away, including pencils, before asking the class to get out silent reading books.

When an antecedent is removed from the specific environment (occurring before the behavior, but not in the same environment) it is referred to as a *setting event*, as it sets the stage for the event (target behavior) to occur (Heward, 2006; McLoughlin & Lewis, 2005; Taylor, 2006). Because of the separation in time from the antecedent to the target behavior, this form of antecedent is more difficult to connect to the target behavior. However, this form of antecedent is important to identify in order to understand why the behavior is occurring. It is therefore necessary to monitor and accurately record the events that occur regarding a student in all environments so that accurate information can be used to analyze a behavior.

Using the example of the pencil-tapping behavior, a teacher may discover that the behavior increases whenever the student has missed the bus that day or on the days that the student goes to speech therapy. These events are outside of the immediate classroom environment but are affecting the behavior. Knowing this, the teacher may choose to have silent reading on a different day instead of one of the days the student has speech therapy.

The final form of antecedent that may affect the target behavior is an establishing operation or ecological event. This type of antecedent is a condition that affects the likelihood that the student or subject will perform the target behavior (Heward, 2006; Taylor, 2006). Some examples of such conditions include the student or subject being tired, rested, full, hungry, cold, or hot. Because these conditions are intangible, this form of antecedent is the most difficult to monitor; however, once they are identified, they can be controlled.

Continuing to use the example of the student that taps his pencil, by examining all the factors that could be contributing to the tapping behavior, it is possible that intangible patterns may be discovered. It is possible that the teacher, using systematic monitoring of the behavior, discovers that the behavior escalates as the day goes on and then drops again in the afternoon. In this example, it is possible that hunger is adding to the frequency of the tapping. Decreasing the level of hunger in the student may decrease the behavior.

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ANTECEDENT TEACHING

Antecedent stimuli are those events that occur before a desired response that affect the probability of the occurrence of that response. In *Science and Human Behavior*, Skinner (1953) describes the response sequence as having three parts: the antecedent events, the response, and the consequences. Although much of operant conditioning focuses on the use of consequences to shape learning, antecedent events are equally important in this process. Antecedent teaching involves the use of both antecedent stimuli and antecedent responses in order to increase the frequency of the desired response (Ormrod, 2003). Examples of antecedent stimuli include cueing (or prompting), setting events, generalization, and discrimination. An example of an antecedent response is behavioral momentum.

Cueing involves verbal and nonverbal signals that remind students of expected behaviors. Directing a class to put away their reading materials before lining up to get a drink is an example of a verbal form of cueing. Placing a finger over one's lips in order to quiet a class is an illustration of nonverbal cueing. Setting events involve creating environments whereby the desired response is more likely to occur. An example of a setting event is increasing students' social interaction by having them complete projects in small groups.

Generalization occurs when a learner recognizes that certain responses are expected in similar types of settings. After learning that one must speak quietly in a school library, one recognizes that similar behavior is expected in public libraries. The final component, discrimination, occurs when one recognizes the conditions or circumstances when certain behaviors are expected and when they are not. One raises a hand to ask a question during school but not at home during dinner.

Behavioral momentum, an antecedent response, is the phenomenon of continuing to make appropriate responses based on prior responses. This is more likely to occur if tasks are arranged from least difficult to most difficult. Adding a column of four-digit numbers is more likely to occur after successfully adding a series of two- and three-digit number columns.

Researching the effects of antecedent stimuli on student behavior has been particularly helpful in assisting students with special needs in inclusive settings (Flood & Wilder, 2002; Harrell, 1996; Scott, Liaupin, Nelson, & Jolivette, 2003). Scott et al. (2003) analyzed teachers' directives that triggered inappropriate verbal outbursts in a middle-school student. By examining patterns in verbal antecedent stimuli, student responses, and resulting consequences, the team was able to identify the types of antecedents that worked effectively in facilitating appropriate student behavior. Whereas directions that required extensive peer interaction resulted in disrespectful comments, instructions that allowed for individually completed assignments resulted in compliance and significant achievement. By subsequently allowing the student to complete all group assignments independently, teachers were able to interact effectively with the student, and the student was able to remain in the general education setting.

Research involving antecedent stimuli has also focused on increasing student achievement and teacher effectiveness. Comparing various types of antecedent stimuli enables educators to determine more effective methods when working with students with special needs. Singleton, Schuster, Morse, and Collins (1999) found that students with intellectual disability mastered grocery vocabulary more rapidly when utilizing an antecedent prompt and testing approach. However, students retained the information longer and were able to make generalizations more effectively when utilizing simultaneous prompting procedures.

Research of antecedent stimuli has also focused on teacher effectiveness. Wolfe (1990) found that utilizing visual prompts enhanced teacher questioning strategies and directives when teaching music. Britton, Raizen, Kaser, and Porter (2002), in seeking to close the current

achievement gap that exists in mathematics between White and urban minority schools, call for more ethnographic studies that focus on the antecedent instructional conditions that facilitate or frustrate the development of proficiency in quantitative problem solving.

Teachers exert tremendous control over the antecedents to which their students are exposed. These include not only methodological approaches but also curriculum, materials, and classroom atmosphere. The area of antecedent teaching is both broad and important. For more information on how this strategy blends with the area of behavioral teaching, the reader is referred to Skinner (1953, 1968) and Repp (1983).

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See also **Advance Organizers; Applied Behavior Analysis**

ANTHROPOSOPHIC MOVEMENT

The anthroposophic movement was founded by Rudolf Steiner (1861–1925). Steiner defined anthroposophy as knowledge produced by the higher self in man, and a way of knowledge that undertakes to guide man's spirit to communion with the spirit of the cosmos (Wannamaker, 1965). Anthroposophy postulates a spiritual world beyond man's sensory experiences. Steiner proposed that, through proper training, each person could develop an enhanced consciousness that would restore values and morality to materialistic society.

Steiner became involved in the education of both adults and children. Anthroposophic education for adults took place at the Goetheanum, a school for physical science, near Basel, Switzerland. The Waldorf School, founded in Stuttgart, Germany, in 1919, was the first of several schools for children that sought to reach the inner nature of the child and provide guidance to maturity. By 1965, 80 Waldorf Schools had been attended by more than 25,000 children in the United States and Europe (Wannamaker, 1965). Eurythmy (movement of speech and music) was used to develop concentration, attention, imitation, and an awareness of position in space (Ziegler, 1979). The schools included programming for the emotionally disturbed, socially maladjusted, and other exceptional children.

During a residential tutorship, Steiner began to apply anthroposophic training to the mentally handicapped. Karl Konig, a student of Steiner's, continued the application of Steiner's techniques in an approach known as curative education (Payne & Patton, 1981). In 1939 Konig founded the first integrated community for the intellectually disabled, founded on the anthroposophic philosophy and based in Aberdeen, Scotland (Payne & Patton, 1981). This "Camphill movement" formulated anthroposophy into the following four bases of curative education:

1. A right to education for all children
2. A humanistic/developmental perspective
3. An accepting milieu, providing the disabled with stability and support
4. Group and individual instruction, providing the disabled with a sense of integration with mankind

Camphill communities are comprised of approximately equal numbers of disabled and normal citizens. These self-sufficient, monasticlike communes are comprised of "families" of no more than 15 persons, about half of whom are disabled. Criteria for admission include the ability to care for personal needs and adequate physical health (Zipperlen, 1975). Presently, there are communities in 21 countries in the world (Camphill, 2005).

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***See also* Camphill Community Movement; Humanism and Special Education**

ANTICONVULSANTS

Anticonvulsants are medications used to control seizure activity. The appropriate anticonvulsant is chosen on the basis of its safety record, side effects, and the type of seizures that need treatment (Kutscher, 2005). Investigation of the possible effects of anticonvulsant medications on a person's ability to function has been complicated by certain methodological difficulties, including the use of only normal controls, the interaction of a placebo with an active agent, and the use of a limited number of performance measures. Studies tend to fall into three different groups: those that have not distinguished among different drugs, those examining the effects of specific drugs, and those that have included the measurement of serum (blood) anticonvulsant levels (Corbett & Trimble, 1983).

Phenobarbital is perhaps one of the most widely investigated anticonvulsants with regard to effects on cognitive functioning. Lennox (1940) assessed the causes of mental deterioration in 1,245 individuals with epilepsy and determined that in 15% of the cases, the anticonvulsant medication was the cause. In a later publication, Lennox and Lennox (1960) reduced this number to 5%. Relatively few studies on the effects of multiple drugs on children have been carried out. Of the investigations reported, the results have been conflicting. Chaudhry and Pond (1961) examined the causes of intellectual deterioration in 28 children with epilepsy and found no evidence to suggest that anticonvulsant medications were responsible for the noted declines in functioning. Rather, these authors suggested that such declines were related to seizure frequency. In a study of 117 children with seizures in regular public school classes, Holdsworth and Whitmore (1976) reported no differences in academic achievement depending on whether or not phenobarbital had been prescribed. These findings lend support to an earlier study that assessed the psychological performance of 26 epileptic patients over a 3-month period and found little effect on total environmental adjustment caused by the use of anticonvulsants (Loveland, Smith, & Forster, 1957). There were, however, no controls in the study and the majority of patients had been receiving anticonvulsant medication for several years prior to the study.

Conversely, a number of studies of multiple drug effects have reported learning impairments with specific deficits noted in visual-spatial perception and performance (Cepeda, 1997; Rayo & Martin, 1959; Tchicaloff & Gaillard, 1970). In a study by Hutt, Jackson, Belsham, and Higgins (1968), phenobarbital was administered to normal subjects with serum level control. Decreases in abilities were noted that were related to phenobarbital blood serum levels. These effects were seen most prominently on tasks requiring sustained attention, psychomotor performance, and spontaneous speech. The drug effects became more prominent as the tasks became longer and more difficult and as the degree of external constraint (having the examiner in the room) was decreased. It was concluded that phenobarbital has effects maximally evident on tasks requiring attention and concentration, but that it also may have pronounced effects on motor coordination.

Unfavorable behavioral changes have been estimated to occur in 20% to 75% of children receiving phenobarbital as prophylaxis for febrile convulsions in infancy (Bennett & Ho, 1997; Heckmatt, Houston, & Dodds, 1976; Thorn, 1975; Wolf & Forsythe, 1978). Although no significant IQ differences were reported for groups of toddlers receiving an 8- to 12-month period of phenobarbital or placebo, there were effects on memory that were related to blood serum levels and effects on comprehension that were related to the duration of treatment (Camfield et al., 1979). There was no evidence of hyperactivity, although 15 of the 315 children on phenobarbital in the study did demonstrate an increase in "daytime fussiness and irritability."

Phenytoin (Dilantin) is the most widely used anticonvulsant in the world (Bennett & Ho, 1997; Dodrill, 1981; Hartlage & Hartlage, 1997). It has been shown to be effective with a broad range of attacks including generalized tonic-clonic seizures, most types of partial seizures, and some other less frequently observed seizure types. Acute intoxication with phenytoin leads to a confusional state, occasionally referred to as encephalopathy, which is associated with neurological symptoms of toxicity, especially ataxia and nystagmus (Corbett & Trimble, 1983). It also has been demonstrated that prolonged use of this medication, even in low doses (Logan & Freeman, 1969; Vallarta, Bell, & Reichert, 1974), may result in a clinical picture of a progressive degenerative disorder that may occur without the classic signs of such a disorder. Rosen (1968) and Stores (1975) have both reported impaired intellectual performance on long-term treatment with phenytoin. Dodrill

(1975) reports that phenytoin has behavioral effects specifically related to motor performance decrements.

Ethosuximide (Zarontin), an anticonvulsant used with children for control of absence (petit mal) seizures, has been shown to impair memory and speech as well as result in affective disturbances (Guey et al., 1967). Soulayrol and Roger (1970) reported intellectual impairment in children treated with this medication; however, other studies have not confirmed this (e.g., Brown et al., 1975).

Carbamazepine (Tegretol) has been reported to have psychotropic effects. About half of 40 studies cited by Dalby (1975), in a major review of the literature, reported a beneficial psychologic effect. Typically, improvements in mood and behavior have been noted, as manifested by greater cooperativeness, reduced irritability, and a possible decrease in aggression. Increases in cognitive skill levels have been reported as well (Bennett & Ho, 1997). There have been no reported studies of the effects of primidone (Mysoline) on behavior in children, although adults occasionally have been reported to develop a florid confusional state on doses within the normal therapeutic range (Booker, 1972). It is well recognized that the drug initially may cause drowsiness and have effects similar to phenobarbital in causing restlessness in some children.

Trimble and Corbett (1980a, 1980b) studied the relationship between anticonvulsant drug levels and the behavior and cognitive performance of 312 children with seizures. The drug most commonly prescribed was phenytoin, followed by carbamazepine, valproic acid, primidone, and phenobarbital. A decrease in IQ was noted in 15% of the 204 children studied; these children had significantly higher mean phenytoin and primidone levels than other subjects. A distinct relationship between an increase in serum drug levels and a decline in nonverbal skills was reported.

Newer anticonvulsants such as gabapentin (Neurontin), topiramate (Topamax), tiagabine (Gabatril), and lamotrigine (Lamictal) are generally used as add-on therapy for partial seizures in children under the age of 12 (Kutscher, 2005). Despite these side effects associated with anticonvulsants, they are recognized as essential in the management of epilepsy. According to Dodrill (1981), when anticonvulsant blood serum levels fall within therapeutic ranges and when there are no overt signs of toxicity, the chances of deleterious effects are minimal if detectable at all. Furthermore, the deleterious effects are distinctly offset by decreased seizure frequency, which has known effects on the deterioration of mental functions. It is far preferable to have modest drug side effects than seizures. Other, low incidence drugs used as anticonvulsants are reviewed in detail by Bennett and Ho (1997).

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See also **Dilantin; Medication; Phenobarbital; Seizure Disorders; Tegretol**

ANTIHISTAMINES

Antihistamines are a class of pharmaceutical agents that block the effect of histamine. Histamine is a naturally occurring body substance that is released in certain allergic reactions. Typically, antihistamines are more effective in preventing rather than in reversing the action of histamine. For pediatric populations, antihistamines may be effective in the treatment of hay fever or mild recurrent hives of unknown etiology. Some antihistamines, particularly Atarax and Vistaril, are used as safe, alternative antianxiety medications without withdrawal (Cepeda, 1997). Some research also has suggested the potential efficacy of antihistamines in the prevention of motion sickness in children (Macnair, 1983).

Typically, antihistamines are found in cold preparations prescribed for children (Pruitt, 1985). Children who are treated with antihistamines are likely to have less severe runny noses, yet the other features of the common cold are not significantly affected by this class of drugs. Antihistamines have atropine like effects that diminish the amount of secretions produced by the irritated lining of the nose or bronchial passages. Although some antihistamines have been marketed as cough suppressants, a number of studies have shown that antihistamines are no better than placebos in relieving children of the symptoms of the common cold (Markowitz, 1983).

Because the use of minor and major tranquilizers carries significant disadvantages in the treatment of behavioral and anxiety disorders in children (Popper, 1985), it has been suggested that antihistamines be used short term for calming acutely anxious children (Cepeda, 1997) and for controlling agitation in severely psychotic children (Popper, 1985). Risks of recreational abuse, management abuse, tolerance, and dependence are also lower than for anti-anxiety agents and major tranquilizers (Cepeda, 1997; Popper, 1985), making this class of drugs more appealing for use by the practicing physician. The enduring cognitive effects of antihistamines are not well documented in the empirical literature, although some recent research has suggested an amelioration of behavioral difficulties and improved academic performance in response to antihistamine therapy (McLoughlin et al., 1983). Further, some investigators (Mattes, 1979; Millichap, 1973) have found antihistamines to be efficacious in the treatment and management of hyperactivity. While the effects of antihistamines on cognitive and learning outcome appear to be somewhat promising, more research must be mounted before any definitive conclusions can be made in this area. Moreover, while the use of antihistamines in the treatment of psychiatric disorders of children may provide a safer alternative than the use of other psychotropic agents, including neuroleptic agents and antianxiety drugs, it still entails some of the same risks and the physician must carefully weigh the potential benefits against any possible risks.

Although the long-term effects of antihistamines have received little systematic study, the use of these agents appears to provide primarily short-term benefits. They are typically safe and consequently are often sold without a prescription. They may have adverse effects, although these usually occur with higher doses. Sedation is the most common side effect in children, but some tolerance may develop. These negative side effects are associated mostly

with the first-generation oral antihistamines. Second-generation antihistamines cause little or no sedation effect due to their low lipophilicity, their large molecular size, their greater affinity for peripheral H_1 receptors, and their relative lack of affinity for neuroreceptors (NIAID, 2003).

Combinations of anthistamines with other central nervous system depressants (e.g., alcohol) should be avoided. In high doses, or for children who are particularly sensitive to these agents, antihistamines may cause undesirable side effects. These may include excitation, nervousness, palpitations, rapid heartbeat, dryness of the mouth, urinary retention, and constipation. In rare instances, red blood cells can burst (hemolytic anemia) or bone marrow can be depleted of blood-forming cells (agranulocytosis; Markowitz, 1983). Sustained antihistamine usage with pediatric populations may be associated with persistent daytime drowsiness, "hangover," or mild enduring effects on cognition (Popper, 1985). Although such side effects are better tolerated by younger children than by adolescents, the occurrence of these effects should result in the prompt cessation of antihistamine therapy.

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See also **Tranquilizers**

ANTISOCIAL BEHAVIOR

A study by Peterson (1961) considered a sampling of many behaviors of children that could be considered as antisocial. More than 400 representative case folders from files of a child-guidance clinic were inspected and the referral problems of each child noted. Peterson's results indicated that the interrelationship among 58 items could be reduced to two independent clusters: conduct problems and personality problems. The two dimensions of problems most frequently reported among the public school students in these two major clusters were aggression and withdrawal. Each child could be placed somewhere in these two dimensions regardless of the number of problem behaviors or other dimensions the child manifested. Children's behaviors differ quantitatively not qualitatively. The degree of quantitative difference between normal and abnormal is usually slight.

Definitions are particularly difficult to generate when context is general and critical, as is the case when the word "social" is used. While there is a need to convey with words what is meant by antisocial behavior, the intensity, timeliness, and impact of a behavior on others in the culture/society/group where the behavior is experienced determines the definition; therefore, a static meaning is not effective. Antisocial behaviors or misbehaving (disliked performances) are accepted daily by society. A behavior is labeled antisocial when the tolerance level of an observer is exceeded with respect to that observer's interpretation of societal rules.

For example, aggressive antisocial behavior is manifested when a student stands and yells a phrase of profanity during a school assembly. The consequences of such behavior could be removal from the audience (peer group), immediate verbal reprimand by adult authorities, a quick trip to the administrator's office, or dismissal from a school. In contrast, if the same pupil were to stand during a professional ball game and yell the same phrase of profanity, not only might the audience approve of the behavior, it might even reward the verbal expressiveness.

Variables in the environment that define the tolerance level of observers when a behavior is judged antisocial are many: time, social status, money, event, location, age, reputation, intensity, duration, frequency, and group expectations. When the cumulative effect of these variables is negative, exceeding the dynamic acceptable definition of the moment, a person's behavioral performance is judged antisocial. For example, when a behavior is poorly timed, appropriate social status is not recognized, intensity is high and loud, the behavior is against school rules, reputation is known, duration is long, frequency is perceived as too often, and other students are conforming to rules of the environment, an antisocial behavior is said to exist. To identify specific factors related to perceptions of antisocial behavior, recent investigation has emphasized those behaviors that teachers and students

find most disturbing. Aggressive behavior is most often primary, but withdrawal behaviors such as fear, anxiety, and tension are also defined as antisocial.

This second type of antisocial behavior is reported to be more tolerable to society. The child suffering from withdrawal may be in deeper pain, despair, or depression than an aggressive individual; however, such a child is less aversive to adults and peers, and less likely to excite the environment into action. These children have too little behavior rather than too much. Characteristics accompanying withdrawal are feelings of inferiority and self-consciousness, social withdrawal, shyness, anxiety, weeping, hypersensitivity, infrequent social smiles, nail chewing, depression and chronic sadness, drowsiness, sluggishness, daydreaming, passivity, short attention span, preoccupation, and somber quietness. These children are also picked on by others.

The term antisocial behavior is often applied when behaviors remain inflexible, or frozen, and the person performing the behaviors continues to react to the environment in a manner judged by the group to be displeasing, inappropriate, and uncomfortable. The label antisocial behavior is attached to the person displaying the behavior and the definition itself magnifies the individual's differences. Not only does the behavior classify a person, but the antisocial definition itself accentuates differences. Only if classification leads to positive action through school programs on the behalf of the child is this definition constructive.

Characteristics

Patterns, for example, of antisocial behavior have received a variety of labels, for example, unsocialized aggressive, conduct disorder, aggressive, unsocialized psychopathic, psychopathic delinquent, antisocially aggressive, and sadistically aggressive. Children exhibiting antisocial behaviors apparent to school officials and teachers may demonstrate one or more of the following characteristics.

1. An inability to learn that cannot be explained by conventional intellectual, sensory, or health factors. A learning-disabled child seldom escapes recognition. He or she is frequently labeled learning disabled, thus lowering self-esteem. The inability to learn is perhaps the single most significant characteristic of antisocial children, with the learning disability manifested as the inability to profit from social experiences and/or academic instruction.
2. An inability to build and maintain satisfactory interpersonal relationships with peers and teachers; to demonstrate sympathy and warmth toward others; to stand alone when necessary; to have close friends; to be aggressively constructive; to enjoy working and playing with others as well as working and playing alone. Children who are unable to build and maintain satisfactory interpersonal relationships are easily defined as different by teachers and peers.
3. "Inappropriate" behaviors or feelings that occur under normal conditions. What is appropriate is judged by the teacher and the student's peers. This judgment is sensed by children because of their ability to profit from school experiences and relate to their teachers. Children classified as antisocial often cannot learn what is appropriate because of their inability to relate to and profit from cultural experiences. This amplifies the daily failures of children who fail to conform to social/cultural rules and exacerbates their lack of socialization.
4. Lack of flexibility. When behaviors become frozen into patterns of inappropriateness of such intensity, duration, and frequency that they interfere with social activities of a group, those behaviors are identified as antisocial.
5. Depression and general moods of unhappiness, characteristics of withdrawal. When children seldom smile and express unhappiness in play, art work, group discussions, and language arts, the observer should watch for antisocial expression.
6. A tendency to develop physical symptoms, pains, or fears, especially in reaction to school situations or authority figures. These symptoms may indicate potential antisocial behaviors.
7. Disobedience, disruptiveness, fighting, temper tantrums, irresponsibility, impertinence, jealousy, anger, bossiness, the use of profanity, attention-seeking behavior, boisterousness, defiance of authority, feelings of guilt and inadequacy, irritability, and quarrelsomeness. These descriptors are often associated with antisocial phenomena.

Behaviors described by these characteristics may formulate a pattern of active antisocial behavior that results in conflict with parents, peers, and social institutions. Children and adolescents who represent extreme patterns of antisocial behaviors are likely to have difficulty with law-enforcement agencies. Extreme antisocial behavior will be defined as criminal conduct and result in arrest, incarceration, recidivism, and failure to become a good citizen.

Acquisition

The possibility of hereditary or predispositional factors cannot be ignored, neither can the contributions of organic factors be ruled out. Prematurity (birth weight less than 5 pounds), is regarded as an important cause of brain damage in children. Epilepsy and cerebral palsy studies report higher prevalances of antisocial behaviors among those with known brain lesions. Situations where trait patterns

of deviant behavior can be studied along with the mechanisms by which the acquisition of the traits occurs is very revealing. Sociological literature has emphasized social class, deviant social organization, and social inequalities as influential. The family is also a setting where deviant behavior has been studied. It is obvious in making the acquisition of principal behavioral patterns of antisocial behavior more probable. Psychiatric illness in parents reflects an increased rate of behavior problems in children. Antisocial parents tend to rear antisocial children. Childhood behavior problems are more common among lower socioeconomic classes. To what extent the influence of parents' disturbances on the child's behavior is genetic and to what extent it is environmental, is speculative.

Children with antisocial behaviors are most visible when required to pay strict attention, follow directions, demonstrate control, exhibit socially acceptable behavior, and master academic skills. School, the primary socializing agency for society, emphasizes conformity and educational achievement. These expectations are basic to the order of formal training. When children are unable to meet these expectations, concerns frequently arise among teachers. Questions educators pose may include: How many children are there? How do they behave? How can they be controlled and managed in the classroom? How should they be classified to reduce effects created by labels? What support systems can provide these children with needed programs?

Terms used in educational settings to describe children with antisocial behaviors are emotionally disturbed, socially maladjusted, minimally neurologically impaired, culturally disadvantaged, behavior disordered, educationally handicapped, and conduct disturbed. Such labels represent different orientations that exist among educators confronted with the task of providing educational programs for children with antisocial behaviors. All these labels could be used collectively for a single child experiencing difficulty in school. For qualification for programs, labels and treatments should be closely related to how the antisocial child (in classroom, community, or at home) is perceived (by educators, social groups, or family). Educational offerings frequently depend on how a child is perceived and the attitude of the referring school toward the child.

Treatment

When an individual has appropriate behavioral responses in his or her repertoire and exhibits these responses under appropriate circumstances, antisocial behavior is interpreted. Through systematic and explicit application of the principles of learning, behavior management can be applied in educational settings to treat antisocial behaviors.

The individual can be helped to change deficient or maladaptive behavior by receiving assistance to modify his or her responses to specific sound cues. In the case of maladaptive behavior, for example, aggression could be modified to be elicited or emitted under appropriate circumstances only. This type of behavioral learning, unlearning, or relearning is known as behavior management. The teacher or behaviorist operates on the assumption that the behavior can be modified without understanding why the behavior is antisocial. The antecedents to the behavior need not be reconstructed to initiate corrective action. Teaching the child to react more appropriately is the only relevant issue, not finding out how the child came to behave antisocially. The focus during behavior therapy is on teaching new behaviors and eliminating old ones. The first task of the therapist (teacher) is to decide which behavior should be modified. Once a target behavior is defined, the treatment goal can be specified. Treatments are based on principles of learning: respondent learning, operant conditioning, interrelationships of operation and respondent factors, social reinforcement, desensitization, and aversive and contingency control. The treatment goal is assessed when the antisocial behavior has become adapted. If in the process of identifying target behaviors the teacher discovers antecedents as causes, the organization of the classroom environment, stimuli, and consequences can be arranged so that the learning situation supports the child's development. An engineered, structured classroom with clear-cut expectations and rewarding consequences for appropriate behavior and academic accomplishment can result in definite academic and behavioral gains. Primary or tangible rewards, teacher attention, "game" approaches, and high-interest activities can become successful interventions for adapting antisocial behaviors. Precision teaching involves selecting a behavior, charting it on a graph, recording changes and occurrences, analyzing the child's performance, and changing the program according to program effects. Some schools use a resource room concept, in which the child participates part time in a special program and part time in a regular class program.

Completely self-contained classrooms for children with more severe learning and behavioral problems can be successful. The engineered classroom directs attention to the establishment of specific goals or develops a sequence of behavioral objectives, for example, attention, response, order, exploration, social activity, mastery, and achievement. This engineering translates behavior modification strategy into realistic use in the classroom. There is constant manipulation of stimuli and intervention in the class to assure a child's continued success.

There are limitless behaviors that can disturb, interfere, or interrupt. There are as many interventions to attempt to modify disturbing behaviors. The range of children's behaviors that are judged negatively is extensive, especially in the complex social system called school. Our tendency is to cause a child to internalize his

or her problematic characteristics through inadvertent reinforcement.

Reactors classify, define, program, analyze, label, and provide some services to those identified as aggressive when threatening behaviors become a serious concern. Seldom do educators recognize the responder as a contributor to the disturbances. The child judged as antisocial is the one who violates a large number of behavioral codes, yet some of the most seriously troubled go unrecognized and untreated as passive aggressors.

The intensity of observer reaction may be related to the observer's own social tolerance and his or her difficulty in controlling comparable tendencies. Certainly, the observer's tolerance plays a significant role in determining the services to be received by the antisocial performer.

If a tree crashes in the forest but there is no human ear to hear it, is there a noise? When an individual behaves in an antisocial fashion, does the disturbance exist without a reactor to register the event? Does the disturbance reside in the child or the reactor, or is it a product of both?

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***See also* Conduct Disorder; Emotional Disorders; Seriously Emotionally Disturbed**

ANTISOCIAL PERSONALITY

The antisocial personality is characterized by a recurring pattern of antisocial behaviors and a general disregard for the rights of others. This pattern of behavior has, in the past, been referred to as psychopathy or sociopathy. It emerges during childhood in the form of truancy and other school-related academic and behavior problems such as delinquency, lying, fighting, sexual promiscuity, substance abuse, and running away from home. The *DSM-IV* (American Psychiatric Association [DSM-IV-TR], 2000) requires at least four of the following nine manifestations of the disorder be present before a diagnosis of antisocial personality disorder (APD) is made: inability to sustain consistent work behavior; lack of ability to function as a responsible parent; failure to accept social norms with respect to lawful behavior; inability to maintain enduring attachment to a sexual partner; irritability or aggressiveness; failure to honor financial obligations; failure to plan ahead, or impulsivity; disregard for the truth; and recklessness. Cleckley (1976) has identified other characteristics such as lack of remorse or shame, failure to learn from experience, poor judgment, and absence of anxiety.

The diagnosis of APD is typically reserved for individuals age 18 and over. Younger children and adolescents who manifest signs of APD are diagnosed as conduct disorder. There are four subtypes of conduct disorder depending on the presence or absence of normal social attachments and aggressive behavior. Many, but not all, children who manifest conduct disorder go on to develop an antisocial personality disorder (Loeber, 1982). Research has identified five factors that appear to play a role in the etiology of APD including heredity, brain abnormalities, autonomic nervous system underarousal, and family and environmental influences.

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***See also* Aggression; Conduct Disorder**

ANTISOCIAL PERSONALITY DISORDER

Antisocial Personality Disorder (ASPD) falls under the broadband heading of *Personality Disorders* found in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (*DSM-IV;* American Psychiatric Association, 2000). According to the *DSM-IV*, to be diagnosed with ASPD an individual must demonstrate a pervasive pattern of disregard for and violation of the rights of others occurring since age 15, as evidenced by three or more of the following seven characteristics: (1) a failure to conform to social norms with respect to lawful behaviors such as by repeatedly engaging in acts that are grounds for arrest; (2) a pattern of deceitfulness exhibited by the use of aliases, repeated lying, or surreptitiously depriving others out of personal profit or pleasure; (3) impulsivity or failure to plan ahead; (4) behaving in an irritable and aggressive manner, as documented by repeated physical fights or assaults; (5) showing reckless disregard for the safety of others or one's self; (6) consistent irresponsibility, as documented by a failure to honor financial obligations

or being unable to maintain consistent work or employment over time; and (7) demonstrating an aloofness or lack of remorse toward having hurt, mistreated, or stolen from someone.

In addition, the individual must be at least 18 years of age at the time of ASPD diagnosis; there must be evidence of a diagnosis of Conduct Disorder (CD) with onset before age 15 years; and the individual's antisocial behavior cannot occur exclusively during the course of Schizophrenia or a Manic Episode. As the *DSM-IV* points out, the core feature of ASPD is the pervasive pattern of disregard for and violation of the rights of others that often begins in childhood or early adolescence. The use of deceit and manipulation are constant themes in the life and behavior of such individuals (American Psychiatric Association, 1994).

Educational practitioners need to be aware that just as there is a developmental progression or link between Oppositional Defiant Disorder (ODD) and CD, there is also a developmental progress, or strong link, between CD in childhood or adolescence and ASPD in adulthood (Hinshaw & Lee, 2003; for a broader understanding of developmental issues related to ODD or CD, child psychopathology, and antisocial behavior, the reader is directed to the work of Cicchetti & Nurcombe, 1993; Dishion, French, & Patterson, 1995; Mash & Dozois, 2003). Adults diagnosed with ASPD have almost always been diagnosed with CD earlier in life, with the predicted poor outcome of ASPD being increased significantly if Substance Abuse is involved (Hinshaw & Lee, 2003). Moreover, official court record evidence shows that 50% to 70% of youths with CD, or youths who have been arrested for delinquent acts during childhood or adolescence, are arrested in adulthood (Lahey & Loeber, 1997). Longitudinal sample studies have documented that 40% to 43% of children or youth with CD who had either been reared in institutional or group home settings or who had been receiving treatment in psychiatric clinics for severe Antisocial Behavior met criteria for ASPD in adulthood (Harrington, Fudge, Rutter, Pickles, & Hill, 1991; Zoccolillo, Pickles, Quinton, & Rutter, 1992). Kratzer and Hodgins (1997) study also supports these findings in which a large birth cohort of over 12,700 males and females were followed up at age 30. By age 30, 76% of the males and 30% of the females who met criteria for childhood CD had either a criminal record, a mental disorder (i.e., severe Substance Abuse), or both.

Although, as the preceding data suggests, not all children or youth with CD end up with a diagnosis of ASPD, it still begs the question of what predicts whether a child with CD will be diagnosed with later adult ASPD. To date, relatively few predictive studies have been carried out; however, some researchers have found that (a) children with CD with a biological parent with ASPD are more likely to meet the criteria of ASPD than children with CD who do not have a biological parent with ASPD, (b) lower intelligence is associated with the persistence of juvenile delinquency and CD into adulthood, and (c) a history of ASPD in a biological parent is the most powerful predictor of *persistence* of CD from childhood into adolescence, but this predictive relationship is affected by whether youths have strong verbal abilities (i.e., verbal IQ score above 100), such that if a child or youth with CD possesses a verbal IQ score of above 100 and does not have a biological parent with ASPD, then there is a substantially lower risk of persistent CD than for all other children or youth with CD (Lahey & Loeber, 1997).

The preceding data and information make it clear that adults who meet criteria for ASPD will have started their antisocial lifestyle earlier in life, before age 15, in fact, as the diagnosis of ASPD requires an individual to have previously met criteria for CD (Hinshaw & Lee, 2003; Kratzer & Hodgins, 1997). Interestingly, and while rare, there are small subgroups of adults who engage in antisocial activities without any noteworthy childhood patterns of behavior indicative of CD (Hinshaw & Lee, 2003). Children and youth who display CD are highly likely to become substance abusers, juvenile delinquents, and adult criminals; as adults with ASPD, these poor and negative outcomes continue to exacerbate, leading to further troubles such as marital discord or divorce; mental health or psychiatric difficulties of all types; premature death; holding multiple jobs over a short time span; unemployment; having no confiding relationships; persistent friction with friends, workmates, and neighbors; domestic violence; inept parenting; drug and alcohol addiction; and so on (Dishion et al., 1995; Kratzer & Hodgins, 1997). These poor adult outcomes have their genesis in childhood, making it abundantly clear that in order to prevent such outcomes, early intervention and treatment at home and school is critical and may be the best and only opportunity these children have to lead successful lives as adults (Farmer, Compton, Burns, & Robertson, 2002; Walker, Colvin, & Ramsey, 1995).

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ANTLEY-BIXLER SYNDROME

This syndrome is a rare hereditary disorder. It causes distinctive deformities of the head and face. There are also other skeletal anomalies of the extremities.

Only a few cases have appeared in the medical literature. One instance of affected siblings suggests an autosomal recessive pattern of inheritance.

Characteristics

1. High, arched skull with flattening of the back of the skull
2. Craniosynostotis (premature closure of the sutures between the skull bones)
3. Protruding forehead
4. Flattened, underdeveloped midfacial area, including the bridge of the nose and the eye sockets
5. Choanal atresia (very small nasal openings)
6. Lowset, malformed ears; bulging eyes
7. Limb deformities, including fusion of the bones of the forearm (radioulnar synostosis), joint contractures, arachnodactyly (long, thin fingers) and femoral bowing (curvature of the thigh bone)

These infants have a very dysmorphic appearance. However, plastic surgeons who specialize in the repair of craniofacial anomalies can transform their appearance in an almost magical way. Several operations may be necessary to achieve acceptable cosmetic results. Babies who survive past the first few months of life may need tracheostomy to relieve severe upper airway obstruction and gastrostomy (a surgical opening into the stomach through the abdominal wall) to overcome feeding difficulties. Joint contractures usually improve with age and respond to physical therapy.

There is no research to support the need for educational modifications due to the rarity of the disorder and the poor prognosis.

Prognosis for the disorder is rather dismal. There is an 80% mortality rate in the first few months, secondary to breathing difficulties, including apneic episodes. After these patients survive infancy, their outlook improves. One 10-year-old child with this problem is currently a normal fifth grader who functions well both socially and intellectually.

For more information, please contact FACES: The National Craniofacial Association, P.O. Box 11082, Chattanooga, TN 37401. Tel.: (423) 266-1632 or (800) 332-2373, website: http://www.faces-cranio.org

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ANXIETY

We live in an "age of anxiety" (Spielberger & Rickman, 1990, p. 69). People have become more anxious and worried than ever before (Twenge, 2000). In recent years, children and adolescents have reported higher levels of anxiety than individuals in decades past (Twenge, 2000). Twenge

suggests that a decrease in social connectedness and an increase in environmental threat may be responsible for the increased levels of anxiety reported among our nation's youth.

Anxiety is a basic emotion that humans have experienced since the beginning of mankind (McReynolds, 1985). Anxiety is a unique emotion as it may be viewed in both a positive and negative light. From a positive perspective, anxiety occurs normally in a child's development, and its presence indicates that one's development is progressing at an expected rate (Huberty, 1997). For example, toddlers typically show signs of anxiety in the presence of strangers, preschoolers and elementary school–age children usually become anxious in the presence of animals, children in middle school typically show signs of anxiety when they visit a dentist's or principal's office, and adolescents usually become anxious when they are required to give a speech in front of a class (Barrios & Hartmann, 1997). Anxiety may also be adaptive and alert a child to a real threat or potentially dangerous situation (Huberty, 1997). The child may react to the real threat or potentially dangerous situation with a fight-or-flight response. Besides being a normative indicator of development or an adaptive response to a potentially threatening environmental event or cue, anxiety may motivate and facilitate a child's performance so that the child performs optimally on a task or an activity (Huberty, 1997). Research has suggested that a moderate level of anxiety (i.e., not too much or not too little) may boost a child's performance. In contrast, very low and very high levels of anxiety are more likely to be associated with poorer performance (Yerkes & Dodson, 1908). Most researchers in the field of anxiety believe a curvilinear relationship (i.e., an inverted U-shaped relationship) exists between anxiety and performance. From a negative perspective, anxiety may be "a destructive and debilitating force in human behavior" (Richmond, 2000, p. 124). At extremely high levels, anxiety may interfere with a child's academic, behavioral, emotional, and social functioning. As a result, clinic- or school-based interventions may be required to treat the devastating effects of anxiety.

Anxiety is somewhat portentous and may manifest itself in many different ways. As mentioned earlier, anxiety may be a simple reaction to an environmental event, or it may represent a symptom in and of itself. Anxiety may be a symptom in another disorder, or it may represent a disorder of various types (American Psychiatric Association 2000; Lowe & Reynolds, 2000; Reynolds, 1998). Anxiety consists of feelings of uneasiness, tension, and worry which can be further examined through observation or self-report of an individual's reactions to stress, performance on tasks, behavior, or other manifestations of physical signs (Lowe & Reynolds, 1998). People may experience thoughts of avoidance, fear, dizziness, sweating, or perform rituals to cope with the overwhelming thoughts or fears (DSM-IV; American Psychiatric Association, 2000).

Defining the boundary between normal and pathological anxiety has been a struggle within the field. Wakefield (1992) proposed that normal and pathological anxiety can be distinguished from each other based on a harmful dysfunction account of the disorder. According to Wakefield, two interrelated criteria must be met in order for pathological anxiety to exist: (1) a psychobiological mechanism must malfunction, and (2) the malfunctioning of the psychobiological mechanism must result in suffering, maladaptation, or both (Evans et al., 2005). In contrast, Evans and colleagues proposed that normal and pathological anxiety can be distinguished from each other based on three clinical features: distress, dysfunction, and symptom inflexibility. Although Wakefield (1992) and Evans and colleagues (2005) have suggested criteria for distinguishing normal and pathological anxiety, it is not known at the present time whether their criteria represent the ideal criteria in making this distinction.

Anxiety is viewed as a multidimensional construct and consists of three dimensions—cognitive, behavioral, and physiological. These three components may be manifested by a child in varying degrees. The cognitive component may consist of ruminative thoughts, excessive worries, and attention and memory difficulties. Behavioral manifestations may include fidgety behaviors, motor restlessness, and avoidance or escape behaviors in the presence of anxiety-provoking stimuli. The physiological component may consist of rapid heartbeat, perspiration, muscle tension, headaches, and stomachaches (Huberty, 1997).

One of the most prevalent conceptualizations of anxiety is provided by the state-trait model of anxiety. Spielberger (1972) viewed state anxiety as a transitory condition that varied across individuals and situations, whereas trait anxiety was viewed as a more permanent condition. Spielberger (1972) defined *state anxiety* as "feelings of tension, apprehension, nervousness, and worry, with associated activation or arousal of the autonomic nervous system" (p. 29). State anxiety occurs when a child perceives a situation as threatening, resulting in a complex set of emotional reactions that may vary in degree and intensity to a real or imagined threat (Reynolds & Richmond, 1985). In contrast, trait anxiety is viewed as a stable personality characteristic. A child with a high level of trait anxiety has a propensity to feel anxious (Spielberger, 1972). The child frequently experiences anxiety even when anxiety-provoking stimuli are relatively weak (Reynolds & Richmond, 1985).

Prevalence rates of various anxiety symptoms in community samples of children have been difficult to estimate. Kashani and Orvaschel (1990) reported that the prevalence of anxiety symptoms in community samples of children and adolescents have ranged as high as 67%. In contrast, Puskar, Sereika, and Haller (2003) examined anxiety symptoms in a community sample of 466 adolescents and found that 20% of their sample reported elevated levels of anxiety. Vannest, Harrison, & Reynolds

(2010) identified anxiety as a "top ten problem" in students nationwide as rated by teachers and parents. Puskar and colleagues also found that females reported more anxiety than males. This finding of a gender difference in anxiety symptoms reported is consistent with the literature. However, it is unclear at the present time whether females experience more anxiety symptoms than males or whether females recognize more readily their anxieties than males (Reynolds, 1998). Additional research is needed to explore this issue. Few studies have examined racial or ethnic differences in anxiety symptoms among children. Of the few studies conducted to date, findings suggest that ethnic majority and minority children may have more similarities than differences in the levels and types of anxieties reported (Ginsburg & Silverman, 1996; Neal, Lilly, & Zakis, 1993). Although additional studies need to be conducted to obtain a better understanding of the relationship between anxiety and different demographic variables, it is clear, based on the prevalence rates reported, that anxiety is a major problem experienced by many children and that early detection is needed to reduce anxiety and its negative effects in the child population.

Early detection of anxiety in children typically involves the use of different assessment techniques. A multimethod approach is strongly advocated in the assessment of anxiety in children. In the multimethod approach, a variety of measures are used, including clinical interviews, direct observations, behavior rating scales, personality measures, and possibly psychophysiological measures (Lowe & Reynolds, 2006). Behavior rating scales, including self-report measures, are popular and effective techniques used in the early detection of anxiety in children.

Because other emotional, behavioral, and social concerns often accompany anxiety problems in children, it is useful to use both broadband and narrowband behavioral rating scales. Broadband instruments allow a more global assessment of a child's behavior. With broadband measures, different dimensions of personality may be assessed, such as depression and withdrawn behavior, in addition to anxiety. Broadband instruments may include different forms for different raters such as parents, teachers, and the child. This allows information to be collected from multiple sources in multiple settings in which a child's behavior is observed. One of the most widely used broadband measures is the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach & Rescorla, 2001). The ASEBA consists of three scales: a parent rating scale, a teacher rating scale, and a self-report scale. The ASEBA is used to assess social competencies, adaptive functioning, and problematic behaviors, including anxiety, in children and adolescents, ages 1.5 to 18. Another widely used broadband instrument is the Behavior Assessment System for Children—Second Edition (BASC-2; Reynolds & Kamphaus, 2004). The BASC-2 assesses behavioral and emotional difficulties, including anxiety, in children and adolescents, ages 2 to 25. Like the ASEBA, the BASC-2 consists of multiple forms that are completed by multiple raters. The BASC-2 includes a parent rating scale, a teacher rating scale, and a self-report scale. Finally, the Beck Youth Inventories—Second Edition (BYI-II; Beck, Beck, Jolly, & Steer, 2005) measures emotional and social difficulties in children and adolescents, ages 7 to 18. The BYI-II is a self-report measure and consists of five scales assessing symptoms across several domains, including anxiety.

When assessing anxiety in children, it is also useful to include one or more narrowband measures of anxiety. Whereas broadband instruments measure a wide array of psychological dimensions, narrowband measures focus on a specific domain such as anxiety. One of the most widely used narrowband instruments is the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). This scale provides a measure of both state and trait anxiety and can be used with high school students and adults. A children's version of the STAI, the State-Trait Anxiety Inventory for Children (STAI-C; Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973), is also available for individuals in Grades 4 through 6. Another popular measure used to assess anxiety in children and adolescents is the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978). The RCMAS is a self-report measure designed to assess the level and nature of anxiety in children and adolescents, ages 6 to 19. The RCMAS consists of a Total Anxiety scale, which provides a global measure of chronic manifest anxiety, and three anxiety subscales (Worry/Oversensitivity, Social Concerns, and Physiological Anxiety). The Multidimensional Anxiety Scale for Children (MASC; March, 1997) is another self-report measure used to assess anxiety in individuals between the ages of 8 and 19. The MASC consists of four scales: Physical Symptoms, Harm Avoidance, Social Anxiety, and Separation/Panic. Several MASC scales also include subscales. The Fear Survey Schedule for Children–Revised (FSSC-R; Ollendick, 1983) is a narrowband instrument used to measure the number of fears and the overall level of fearfulness in children, ages 7 to 18. The Social Anxiety Scale for Children, Revised (SASC-R; LaGreca & Stone, 1993) and the Social Anxiety Scale for Adolescents (SAS-A; LaGreca & Lopez, 1998) are self-report measures used to assess a child or adolescent's anxiety in social situations. Both the SASC-R and the SAS-A include a Total Social Anxiety scale as well as three subscales: Fear of Negative Evaluation (FNE), Social Avoidance and Distress of New Situations or People (SAD-New), and Social Avoidance and Distress of General Situations or People (SAD-General). Finally, the Social Phobia Anxiety Inventory for Children (SPAIC; Beidel, Turner, & Morris, 1998) and the Social Phobia Anxiety Inventory (SPAI; Turner, Dancu, & Beidel, 1996) are measures used to assess anxiety and fears related to social situations in individuals, ages 8 to 14 and 15 and older, respectively. These broadband and narrowband measures

are widely used in the schools and clinical settings by mental health professionals to specify the nature of anxiety along with other concerns. Results obtained with these assessment tools are then directly linked to intervention strategies when needed in an attempt to reduce a child's anxiety and collateral concerns.

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ANXIETY DISORDERS

Anxiety is a common mental health concern found among many children. *Anxiety* is defined as "an unpleasant emotional state or reaction that is distinguished from other states by a unique combination of experiential qualities and physiological changes" (Spielberger & Rickman, 1990, p. 69). Anxiety consists of multiple cognitive, physiological, and behavioral phenomena. The cognitive component may include worry, concentration difficulties, and memory and attention problems. Physiological manifestations may consist of muscle tension, perspiration, heart palpitations, headaches, and stomachaches, whereas the behavioral patterns may include motor restlessness and fidgety behaviors (Huberty, 1997). Mild anxiety problems found in children are typically short-lived. However, severe anxiety problems experienced by some children are typically chronic, interfere with their adaptive functioning, and persist into adulthood (Keller et al., 1992; Ollendick & King, 1994; Vasey & Ollendick, 2000).

Pathological anxiety in children is determined by three clinical features: degree of distress and dysfunction and symptomatic inflexibility. Degree of distress and dysfunction varies in importance as a function of an individual's age, whereas symptomatic inflexibility is relevant, regardless of a person's age (Evans et al., 2005). Children with Anxiety Disorders experience a high degree of distress, severe dysfunction, and symptomatic inflexibility.

There are 15 types of Anxiety Disorders specified in the *Diagnostic and Statistical Manual of Mental Disorders—4th Edition, Text Revision* (*DSM-IV-TR;* American Psychiatric Association, 2000). These disorders include Generalized Anxiety Disorder, Separation Anxiety Disorder, Specific Phobia, Social Anxiety Disorder, Obsessive-Compulsive Disorder, Posttraumatic Stress Disorder, Acute Stress Disorder, Anxiety Disorder Not Otherwise Specified, Panic Attack, Panic Disorder with and without Agoraphobia, Agoraphobia without a History of Panic Disorder, Anxiety Disorder Due to a General Medical Condition, and Substance-Induced Anxiety Disorder. Of these 15 types of Anxiety Disorders, the most common Anxiety Disorders found among children are Separation Anxiety Disorder, Generalized Anxiety Disorder, and Specific Phobia (Silverman & Kurtines, 2001).

Although there are different types of Anxiety Disorders, these disorders share several common features. These features include sympathetic activation, faulty threat perception, attentional hypervigilance, chronic worry, and escape and avoidance behaviors. Activation of the sympathetic nervous system is an adaptive response to a potential threat. Most anxiety states result in the activation of the sympathetic nervous system, producing physiologic changes in the body such as increased muscle tension, respiration, cardiac output, and sweating. However, in the case of Anxiety Disorders, the system is activated in the absence of a real or potential threat. Faulty threat perception is another common feature found among individuals with Anxiety Disorders. Individuals with Anxiety Disorders erroneously perceive situations as threatening when, in fact, they are not. The third common feature is attentional hypervigilance. Individuals with Anxiety Disorders attend excessively to what they perceive as threat cues. The excessive attention to these perceived threat cues reduces attentional resources to process corrective threat disconfirming information. As a result, attentional hypervigilance may exacerbate anxiety because these individuals continue to perceive the cues as threatening when in reality they are not. A fourth feature is chronic worry. Individuals with Anxiety Disorders worry about current and future events. Avoidance and escape behaviors are additional features shared among individuals with Anxiety Disorders. Escape or avoidance behaviors are likely to be demonstrated when a perceived threat cue is present (Telch, Smits, Brown, & Beckner, 2002).

Prevalence rates for any Anxiety Disorder found in children range from 5.78% to 17.7% (Silverman & Kurtines, 2001). According to Merrell (2001), Anxiety Disorders may be the largest group of internalizing disorders found among children. Gender differences have been reported among children, with girls more likely than boys to have an Anxiety Disorder (Costello, Egger, & Angold, 2004). Of the few studies conducted to date, there is little evidence to suggest differences in the pattern of childhood Anxiety Disorders across different racial groups (Safren et al., 2000). In contrast, age differences have been noted in Anxiety Disorders across the child and adolescent life span, with an increase in the prevalence of Anxiety Disorders reported with an increase in age. However, Separation Anxiety Disorders do not follow this age trend (Silverman & Kurtines, 2001).

Examination of Anxiety Disorders from a developmental perspective reveals that Specific Phobias and Separation Anxiety Disorders have the earliest onset. Both disorders have an onset in early childhood. Generalized Anxiety Disorders are likely to appear slightly later, around the age of 8 to 10. In contrast, the onset for Social Anxiety Disorders, Panic Disorders with and without Agoraphobia, and Obsessive-Compulsive Disorders typically occurs in adolescence (Saavedra & Silverman, 2002).

Children diagnosed with an Anxiety Disorder are likely to have another comorbid condition (American Psychiatric Association, 2000). High rates of comorbidity exist between Anxiety Disorders and depression. The rate of comorbidity reported between these two internalizing disorders is as high as 60% to 70% (Wilmshurst, 2005). There is much discussion in the field as to whether anxiety and depression are separate disorders. Some researchers believe that the two disorders are distinct, whereas other researchers believe that the two disorders are related. Watson and Clark (1984) proposed a tripartite model to explain the relationship between anxiety and depression. According to the tripartite model, negative affectivity (emotional

distress) is the underlying trait shared by both disorders, whereas low positive affectivity (anhedonia) is unique to depression, and physiologic arousal is unique to anxiety (Watson & Clark, 1984). Other researchers have suggested a sequential link between the two disorders, with anxiety serving as an early precursor to a Depressive Disorder (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Comorbidity rates between different types of Anxiety Disorders are also high. Children who have been diagnosed with an Anxiety Disorder as their primary diagnosis often present with another Anxiety Disorder (Wilmshurst, 2005). Besides depression and Anxiety Disorders, other common comorbid disorders include Attention-Deficit/Hyperactivity Disorder, Oppositional Defiant Disorder, and Conduct Disorder (Costello et al., 2004).

The costs of Anxiety Disorders are high (Greenberg et al., 1999). Greenberg and colleagues conducted one of the most comprehensive studies of the monetary costs of Anxiety Disorders. Greenberg et al. reported the total costs of Anxiety Disorders were $63.1 billion. This figure is based on the monetary value of the dollar in 1998. Nonpsychiatric and psychiatric treatment were identified as the major costs.

Many children with Anxiety Disorders experience difficulty in the school setting. Impairments in social (Beidel, Turner, & Morris, 2000; Caster, Inderbitzen, & Hope, 1999) and academic functioning (Ialongo, Edelsohn, Werthamer-Larsson, Crockett, & Kellam, 1994, 1995; Woodward & Fergusson, 2001) have been reported. Ialongo et al. (1994) assessed 1,197 children in the first grade and found an inverse relationship between anxiety and academic performance. Ialongo and colleagues reported that children with higher levels of anxiety were 2.4 times more likely than their same-age peers to perform in the lowest quartile of reading achievement. These same children were 7.7 times more likely to perform in the lowest quartile of math achievement in comparison to their peers. Four years later, these children with higher levels of anxiety were 10 times more likely than their same-age peers to be in the lower one-third of their class academically.

Besides academic difficulties, many children with Anxiety Disorders experience poor peer relationships. These children are more likely than their peers to have negative perceptions about themselves and their relationships with others (Huberty, 1997). These negative perceptions about their relationships with others reduce the likelihood of these children's interactions with others and may result in social isolation.

Most schools are cognizant of the negative effects anxiety has on the socioemotional and academic functioning of children (Cohen, 1999). Children with an Anxiety Disorder may qualify for special education and related services under the emotional disturbance (ED) category of the *Individuals with Disabilities Education Improvement Act of 2004* (IDEIA). To meet the eligibility criteria, a child must exhibit one or more of the following five conditions, and the condition(s) must have occurred over a long period of time and to a marked degree and must adversely affect the child's educational performance:

1. An inability to learn that cannot be explained by intellectual, sensory, or health factors.
2. An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.
3. Inappropriate types of behavior or feelings under normal circumstances.
4. A general pervasive mood of unhappiness or depression.
5. A tendency to develop physical symptoms or fears associated with personal or school problems (34 C.F.R. § 300.8).

Different theories exist about the origin of an Anxiety Disorder. According to the psychoanalytic approach, anxiety results from the conflict between a child's ego and impulses unacceptable to it. The child's ego defends itself by forcing the impulses out of consciousness. In the conflict, anxiety is displaced or transferred to some other form or idea, giving rise to one of the Anxiety Disorders (Freud, 1924). Learning theories suggest that anxiety is acquired through and maintained by classical and operant conditioning or possibly modeling (Dashiell, 1935). In classical conditioning, a neutral stimulus becomes associated with an aversive stimulus (an unconditioned stimulus) and acquires the properties of the unconditioned stimulus. The neutral stimulus is designated the conditioned stimulus. The conditioned stimulus then produces fear, which may generalize to other neutral stimuli. In operant conditioning, fear of an object or a situation is maintained by a negative reinforcement contingency. The feared object or situation is avoided or attempts are made to escape from the situation. Escape or avoidance behavior is maintained because it reduces a child's anxiety. In modeling, the child observes other's reactions to aversive stimuli and situations. The child then models the behavior of others in response to similar aversive stimuli and situations (Vasey & Ollendick, 2000). The cognitive approach to Anxiety Disorders assumes aberrant cognitions underlie symptom expression. Cognitive researchers suggest that a child who is anxious exhibits threat-related attentional and interpretive biases. That is, the child selectively attends to threat-related stimuli and interprets ambiguous stimuli in a threatening manner (Evans et al., 2005). Biological explanations of Anxiety Disorders have focused on structural regions of the brain, genetic transmission, neurotransmitter functions, immunology, and autonomic nervous system activity. Abnormalities of autonomic regulation, with greater activation in the right frontal area of the brain (Gorman & Sloan, 2000), perturbations in the hypothalamic-pituitary-adrenal axis (Essex, Klein,

Cho, & Kalin, 2002), and abnormalities in the immune system (Kagan, Snidman, McManis, & Woodward, 2001) have been reported in individuals with Anxiety Disorders or the offspring of individuals with Anxiety Disorders. Recent studies in behavioral genetics have suggested that childhood anxiety symptoms are moderately inheritable, accounting for about one-third of the variance in most cases (Eley, 1999; Silverman & Kurtines, 2001). Examination of epidemiological findings and genetic data strongly imply distinct biological profiles for the different types of Anxiety Disorders. Many of these biological profiles suggest neurochemical processes are the underlying factor in many of these disorders (Evans et al., 2005). Behavioral inhibition, another biological factor, has received attention as a risk factor in the development of childhood Anxiety Disorders (Vasey & Ollendick, 2000). Emotional factors and family factors may also predispose a child to an Anxiety Disorder. Deficits in emotional regulation and overcontrolling parents low in affection who demonstrate inconsistent parenting styles are believed to put a child at risk for an Anxiety Disorder (Vasey & Ollendick, 2000).

A multimethod, multisetting, multitrait approach has been recommended in the assessment of children with an Anxiety Disorder (Huberty, 1997). A multimethod, multisetting, multitrait approach involves obtaining information from multiple sources (parent, teacher, and child) and settings (home and school) and assessing multiple traits or characteristics (internalizing, externalizing, and social behaviors) to pinpoint problematic areas of concern. As part of the assessment process, behavior observations are performed; parent, teacher, and child interviews are conducted; rating scales are completed by the parent, teacher, and child if applicable; and multidimensional personality scales are administered. If cognitive or academic difficulties exist, standardized measures of intelligence and academic achievement as well as informal measures such as curriculum-based measures may be administered. Other areas that may need to be assessed include a child's self-esteem, coping skills, and peer relationships. Family functioning may be another area to examine as well as a child's thoughts, beliefs, and attributions about anxiety (Huberty, 1997).

Once an evaluation has been conducted, the results of the assessment are linked to intervention strategies to address the areas of concern. For children with Anxiety Disorders, pharmacotherapy, cognitive-behavior therapy, or a combination of the two are effective strategies to treat Anxiety Disorders in children (Evans et al., 2005). Other treatment strategies may be needed to address related concerns and comorbid conditions.

Specific information about the common Anxiety Disorders (Generalized Anxiety Disorder, Obsessive-Compulsive Disorder, Panic Disorder, Posttraumatic Stress Disorder, Separation Anxiety Disorder, Specific Phobia, and Social Anxiety Disorder) found in children follows. Although not listed as a separate disorder in the *DSM-IV-TR*, School Phobia is also included because of its prevalence among children. Controversy exists as to whether School Phobia is a Specific Phobia, Social Anxiety Disorder, Separation Anxiety Disorder, or a behavioral outcome, resulting from one of the Anxiety Disorders. A description, prevalence, comorbidity, etiology, and treatment of each Anxiety Disorder are discussed.

Generalized Anxiety Disorder

Generalized Anxiety Disorder, which now includes Overanxious Disorder of Childhood, is characterized by an excessive and chronic state of worry about a variety of events, circumstances, or situations such as friends, family, health, schoolwork, appearance, money, or one's future. Another central characteristic of a Generalized Anxiety Disorder is a child's inability to control his or her worry. Children with a Generalized Anxiety Disorder may experience restlessness, fatigue, irritability, concentration difficulties, muscle tension, or sleep problems. These symptoms must be present for at least 6 months (American Psychiatric Association, 2000). Lifetime prevalence of a Generalized Anxiety Disorder is between 2% and 5% (Wilmshurst, 2005). Prevalence estimates reported for an Overanxious Disorder in children range from .5% to 7.1% (Evans et al., 2005). Comorbid disorders found among children with a Generalized Anxiety Disorder include Separation Anxiety Disorder, depression, Specific Phobia, and Social Anxiety Disorder (Evans et al., 2005). Genetics may play an important role in the development of a Generalized Anxiety Disorder in children. Cognitive factors may also explain the development of Generalized Anxiety Disorder as children may attend to and interpret ambiguous stimuli negatively. Finally, familial factors such as parenting and behavior modeling may increase the risk for a Generalized Anxiety Disorder in children (Wilmshurst, 2005). Cognitive-behavioral therapy can help children cope with and reduce their levels of anxiety. For children of anxious parents, it is most effective to involve the entire family in cognitive-behavioral therapy as reinforcement and modeling of appropriate behavior at home is important. Medication has also been shown to be effective in the treatment of a Generalized Anxiety Disorder in children (Evans et al., 2005).

Obsessive-Compulsive Disorder

Obsessive-Compulsive Disorder usually develops during adolescence and consists of obsessions or compulsions. Obsessions are recurrent thoughts or worries that cause distress or interfere with one's ability to function normally. These obsessions then may lead to compulsions, which are repetitive behaviors or rituals that the individual performs in order to relieve the distress caused by obsessions or prevent dreaded events or situations from occurring (American Psychiatric Association, 2000). Obsessions and

compulsions in children often center on four primary areas: contamination (hand washing), safety (checking), preoccupations with orderliness and symmetry (aligning), and counting or touching rituals. An Obsessive-Compulsive Disorder may cause severe difficulties in children's lives, as they may feel embarrassed by their rituals or the need to follow rigid routines. In addition, many children experience problems in school because of concentration problems, preoccupations, or perfectionist tendencies (Wilmshurst, 2005). Prevalence estimates for an Obsessive-Compulsive Disorder in children have ranged from 1% to 4% (Evans et al., 2005; Wilmshurst, 2005). Co-occurring disorders include depression (Evans et al., 2005), behavior disorders (Geller et al., 2001), and Tic Disorders (Evans et al., 2005). A number of etiologies have been offered to explain an Obsessive-Compulsive Disorder, including genetics, neurotransmitters (i.e., low levels of serotonin), highly critical and overinvolved parents, and maladaptive thinking patterns (Wilmshurst, 2005). Treatment strategies to address an Obsessive-Compulsive Disorder in children include medication and cognitive-behavior therapy involving repeated exposure and response prevention (Evans et al., 2005).

Panic Disorder

A Panic Disorder consists of recurrent, unexpected Panic Attacks. Each attack is followed by a concern about having another attack, worry about the consequences of an attack, or change in behavior related to the attack. The concern, worry, or change in behavior lasts at least 1 month (American Psychiatric Association, 2000). These attacks consist of an extreme fear of imminent danger along with associated somatic symptoms such as heart palpitations, difficulty breathing, sweating, and choking (Evans et al., 2005). Cognitive symptoms include feelings of depersonalization, urge to leave the situation, and feelings of losing control or going crazy. To meet the diagnostic criteria for a Panic Attack, at least four somatic or cognitive symptoms must be present (Wilmshurst, 2005). Attacks have an acute onset and often last for approximately 10 minutes. This disorder is relatively rare in children before puberty. When a Panic Disorder follows a progressive pattern, it often develops in puberty with attacks becoming more frequent and often evolving into Agoraphobia (fear of public places) in adulthood. Community samples have reported lifetime prevalence rates as high as 3.5%, with onset typically occurring in later adolescence to early adulthood. Panic Disorders occur more frequently in females (Wilmshurst, 2005). This disorder is often comorbid with Agoraphobia, other Anxiety Disorders, and depression. The etiology of Panic Disorders suggests that genetics plays a role as well as the neurotransmitter norepinephrine. One treatment option is the use of antidepressant medication. Many antidepressant medications increase the level of norepinephrine in the brain. Another treatment option is the use of cognitive-behavioral techniques, with an emphasis on increasing coping skills, reevaluating cognitive appraisals, and systematic desensitization (Wilmshurst, 2005). Studies conducted using cognitive and cognitive-behavioral strategies appear promising (Evans et al., 2005).

Posttraumatic Stress Disorder

Posttraumatic Stress Disorder is a disorder in which an individual reexperiences a traumatic event along with a state of heightened physiological arousal and the avoidance of stimuli associated with the event. The traumatic event may involve the experience of a serious injury or witnessing a serious injury or a death. The response to the traumatic event consists of fear or helplessness and, in children, agitation or disorganized behavior. The symptoms must last for at least 1 month; if less than 1 month, an Acute Stress Disorder may be present. There must also be significant distress or impairment in social, school, or other important areas of functioning (American Psychiatric Association, 2000). Reexperiencing the trauma is another central characteristic and may manifest itself in several ways, including flashbacks, nightmares, or images (Evans et al., 2005). Young children may also reenact the trauma through play (Wilmshurst, 2005). High comorbidity rates with Social Anxiety Disorder, Disruptive Behavior Disorders, depression, and Panic Disorder have been reported (Evans et al., 2005). A common reaction to trauma in adolescents is to increase risk-taking behaviors, which can lead to additional stress (Wilmshurst, 2005). Community-based studies suggest that the lifetime prevalence rate for a Posttraumatic Stress Disorder is approximately 8% (American Psychiatric Association, 2000). Community violence is a variable that is strongly correlated with a Posttraumatic Stress Disorder, and there is a high rate of Posttraumatic Stress Disorder in those that have experienced Sexual Abuse (Wilmshurst, 2005). Factors that can influence a person's vulnerability for a Posttraumatic Stress Disorder include gender (i.e., being female), history of Physical or Sexual Abuse, exposure to violence, separation from parents before the age of 10, and existence of an Anxiety Disorder, Depressive Disorder, or another psychiatric disorder. Evidence indicates that stressful events can lead to physiological changes in the body. Abnormal levels of the neurotransmitter norepinephrine and increases in the hormone cortisol have been found in children with a Posttraumatic Stress Disorder as well as alternations in the hippocampus's ability to regulate stress hormones (Wilmshurst, 2005). Limited use of medication has been reported in the treatment of a Posttraumatic Stress Disorder in children (Evans et al., 2005). Studies conducted using cognitive-behavioral strategies have found significant increases in adaptive functioning and a decrease in Posttraumatic Stress Disorder symptoms in groups of children who have experienced Sexual

Abuse, war, earthquakes, and exposure to community violence and crime (Evans et al., 2005).

School Phobia

School Phobia is generally described as frequent absences from school, which are not due to an actual illness or truancy. Several other terms such as *school avoidance* and *school refusal* have also been used to describe the same behavior (Paige, 1993). Common symptoms of a School Phobia are somatic complaints and excessive fears, although the fears do not have to be excessive in a child. The somatic complaints disappear once school has been avoided for the day (Paige, 1993). Research on the prevalence rate of School Phobia varies from 1.7% to 5%, with a similar prevalence rate for males and females (Paige, 1997). Typical age of onset for a School Phobia is between 6 and 10 years of age. Theories about the etiology of a School Phobia vary and include anxious mothers who want to keep their child at home, separation anxiety, school factors such as bullying, or the occurrence of a significant event such as an accident or a death. A School Phobia is maintained by the positive reinforcement and reduction of fear a child receives for staying home (Paige, 1993). Children with a School Phobia are also more likely to exhibit another Specific Phobia, Social Anxiety Disorder, Separation Anxiety Disorder, or depression (Paige, 1997). One of the key components of treatment of a School Phobia is that it must occur quickly before a pattern of school avoidance becomes ingrained and reinforced. Research indicates that behavioral techniques such as systematic desensitization, contingency management programs, and behavioral contracting have been successful in the treatment of a School Phobia. Medications which help children to relax or reduce depression might be helpful as an adjunct to a behavioral approach. A team approach involving parents and school personnel working together is recommended (Paige, 1993).

Separation Anxiety Disorder

Separation Anxiety Disorder involves unrealistic worry or anxiety that accompanies separation from home or a caretaker to such a degree that it interferes with appropriate behavior. The unrealistic worry or distress must be present for at least 4 weeks. A Separation Anxiety Disorder usually develops before adolescence, and is one of the earliest-occurring Anxiety Disorders (Evans et al., 2005). Children may experience nightmares involving the theme of separation as well as physical symptoms such as headaches, stomachaches, nausea, or vomiting. The excessive worry may stem from a child's fear of harm coming to the caregiver or fear of being separated from or losing the caregiver. Children with a Separation Anxiety Disorder may refuse to be separated from the caregiver, to be alone without the caregiver, or even to sleep separately from the caregiver (American Psychiatric Association, 2000). Children with a Separation Anxiety Disorder are often described by parents as being demanding and intrusive (Wilmshurst, 2005). A Separation Anxiety Disorder affects approximately 4% of the general population (Wilmshurst, 2005). Comorbid disorders found among children with a Separation Anxiety Disorder include a Generalized Anxiety Disorder, Specific Phobia, Social Anxiety, and possibly Panic Disorder (Evans et al., 2005). Many children with a Separation Anxiety Disorder also have a mother with a history of an Anxiety Disorder, suggesting either a genetic link or other familial factors, such as overprotectiveness, modeling of avoidant behavior, or reinforcement of the child's avoidant behavior. Other familial factors that play an important role are maternal depression and family dysfunction. In these situations, the child may be reluctant to leave the home for fear that he or she will not be able to care for or protect the primary caregiver (Wilmshurst, 2005). Finally, from a cognitive perspective, children with a Separation Anxiety Disorder may experience distorted, maladaptive, catastrophic, and ruminative thoughts, which lead them to misinterpret ambiguous stimuli as threatening. Treatment of a Separation Anxiety Disorder includes cognitive-behavior techniques and behavioral strategies such as contingency management programs or behavioral contracts. Additionally, if familial factors are involved, it is often most effective to involve the entire family with the chosen intervention (Wilmshurst, 2005).

Specific Phobia

Specific Phobia is one of the earliest occurring Anxiety Disorders (Wilmshurst, 2005). Symptoms of a Specific Phobia include an extreme or irrational fear or anxiety that is associated with specific animals or insects, aspects of the natural environment (e.g., storms, heights, or water), blood (e.g., seeing an injury or receiving an injection), situations (e.g., crossing bridges or being in enclosed places), or other stimuli (e.g., loud sounds or costumed characters). This fear causes extreme distress and significant impairment in normal functioning and may be expressed in children by crying, tantrumming, freezing, clinging, or experiencing physiological reactions such as dizziness, shortness of breath, increased heart rate, and fainting (American Psychiatric Association, 2000; Wilmshurst, 2005). Children may often feel a strong desire to escape from or avoid the fear-inducing object or situation, which may result in even more intense feelings of anxiety and panic when they are unable to escape or avoid the feared object or situation. Prevalence rates for a Specific Phobia among children are estimated to be around 15% (Silverman & Nelles, 2001). Comorbid conditions associated with a Specific Phobia include another phobia, Depressive Disorder, Generalized Anxiety Disorder, Separation Anxiety Disorder, and Social Anxiety Disorder (Evans et al., 2005; Wilmshurst, 2005). The development

of a Specific Phobia is best understood as an interaction between the child's temperament, characteristics of the child's family, and the child's exposure to traumatic or frightening experiences. Most commonly, a Specific Phobia is linked to conditioning experiences, wherein a child develops anxious or fearful reactions in response to a frightening or stressful experience (i.e., classical conditioning). Other theories suggest that a Specific Phobia may result from family characteristics. For example, children may learn to react in certain ways by observing a parent's fearful behavior (Wilmshurst, 2005). Behavioral and cognitive-behavioral techniques such as participant modeling, reinforced practice, systematic desensitization, and self-instructional training have been suggested as useful techniques in the treatment of a Specific Phobia in children (Ollendick & King, 1998).

Social Anxiety Disorder

Social Anxiety Disorder, also known as *Social Phobia*, is characterized by an extreme worry over ridicule, humiliation, or embarrassment in social situations, which may include speaking in class, talking to authority figures, conversing with peers, eating, drinking, or writing in public (American Psychiatric Association, 2000). Children with a Social Anxiety Disorder tend to respond to social or performance situations with avoidant or escape behavior and increased physiological arousal (Wilmshurst, 2005). These individuals often have poor social skills. A Social Anxiety Disorder usually develops during adolescence (American Psychiatric Association, 2000). Prevalence estimates of 1% to 2% have been reported for children with a Social Anxiety Disorder (Wilmshurst, 2005). Children with a Social Anxiety Disorder are at an increased risk for depression, Substance Abuse, Specific Phobia, Separation Anxiety Disorder (Evans et al., 2005), and Generalized Anxiety Disorder (Wilmshurst, 2005). A Social Anxiety Disorder is strongly linked with children's temperament styles (Biederman et al., 1993). Biederman and colleagues found that children with behavioral inhibition were at an increased risk for a Social Anxiety Disorder. Children who are at a higher risk of developing a Social Anxiety Disorder are more likely to have a first-degree biological relative with the disorder, suggesting a genetic component (American Psychiatric Association, 2000). Treatment for a Social Anxiety Disorder includes social skills training (Wilmshurst, 2005), cognitive-behavior therapy, family therapy, and medication (Evans et al., 2005).

Anxiety Disorders are chronic and debilitating conditions that impact a large number of children with mental health disorders. The costs associated with Anxiety Disorders are exorbitant to the child, family, and society. After two decades of research, medication, cognitive-behavior therapy (CBT), and a combination of the two strategies have been shown to be effective in treating most Anxiety Disorders in children (Evans et al., 2005). However, it is unclear at the present time whether the combination of CBT and medication is more effective in treating Anxiety Disorders in children than either treatment alone (Evans et al., 2005). Empirically supported treatments (ESTs) are available to treat Anxiety Disorders. Empirically supported treatments consist of education, cognitive restructuring, relaxation training, and exposure. Future research is still needed to identify the most essential components of these multitreatment packages.

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APECED SYNDROME

APECED is also known as autoimmune polyglandular disease Type I or autoimmune-polyendocrinopathy-candidias. APECED stands for autoimmune polyendocrinopathy (APE), candidiasis (C), and ectodermal dysplasia (ED). It is a very rare genetic syndrome that involves the autoimmune system. It is a combination of several distinct disorders and is defined as the subnormal

functioning of several endocrine glands at the same time (National Organization for Rare Disorders [NORD], 2000; Tierney, McPhee, & Papadakis, 2000; Ward et al., 1999). There are three types of APECED: polyglandular autoimmune syndrome, Type I; polyglandular autoimmune syndrome, Type II; and polyglandular autoimmune syndrome, Type III. Type I affects children and adults younger than age 35. Type II more frequently strikes adults, with peak incidence at about 30 years.

APECED syndrome affects people of all ages. It usually begins in childhood. However, it can develop as late as the fifth decade. The syndrome affects equal numbers of males and females. It is a very rare disease that occurs in only about 170 persons worldwide. The majority of the affected persons live in Finland (NORD, 2000).

APECED is defined as a combination of at least two of the following disorders: hypoparathyroidism (a disorder that causes lower than normal levels of calcium and phosphate in the blood), candidiasis (harmless yeast infection that occurs in the mouth, intestinal tract, skin, nails, and genitalia), ectodermal dysplasia (a group of hereditary nonprogressive syndromes that affects tissues derived from the ectodermal germ layer).

Characteristics

1. Children with hypoparathyroidism have symptoms such as weakness, muscle cramps, and abnormal sensations such as tingling, burning, and numbness of the hands. Excessive nervousness, loss of memory, headaches, and uncontrollable cramping muscle movements of the wrists and feet are also present.
2. Children with hypoparathyroidism may have inability to adequately absorb nutrients (malabsorption), and diarrhea can result. Anemia and autoimmune thyroid disease may also occur.
3. Children with candidasis have the symptoms of yeast infection of either the mouth or nails.
4. Dystrophy of the teeth and nails.

The treatment of APECED syndrome is directed toward the specific diseases that are apparent in each patient. Hypoparathyroidism (low plasma levels of calcium and phosphate) is treated with calcium, ergocalciferol, or dihydrotachysterol (forms of Vitamin D). There is no known cure for ectodermal dysplasia. Treatment is directed at symptoms. Over-the-counter creams may relieve skin discomfort. Dentures, hearing aids, and so forth may be required. Heat and overexercise are to be avoided due to impaired sweating. Cleft lip and palate, syndactyly, and other limb deformations are treated by surgery (NORD, 1999). Genetic counseling is important for patients with APECED and for their relatives.

This syndrome would probably not necessitate special education services. Classification under Section 504 of the Vocational Rehabilitation Amendment of 1973 would be appropriate to release the child from physical education requirements. Furthermore, modifications can be made if the child is frequently absent from school.

The researchers showed that mutations in the gene AIRE (autoimmune regulator) are responsible for the pathogenesis of APECED. The identification of the gene defective in APECED should facilitate finding a potential treatment for the disease. Some studies (Ward et al., 1999) have supported the use of cyclosporine (CyA) therapy for the treatment of severe APECED.

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See also **Ectodermal Dysplasia**

APERT SYNDROME

Apert syndrome is a genetic defect that is classified as a craniofacial and limb anomaly. It can be either inherited or sporadically occurring. Apert is one of four autosomal dominant disorders and is a result of de novo mutations (Ferreira et al., 1999). It results in specific distortions of the head, face, hands, and feet during fetal development, including abnormal skull development (craniosynostosis), concave face (midface hypoplasia), and fusion of the fingers and toes (syndactyly). The presence of syndactyly separates Apert syndrome from other similar syndromes.

Apert syndrome is caused by a mutation of fibroblast growth-factor receptor-2 (FGFR2; Wilkie et al., 1995). Ninety-nine percent of patients identified with Apert syndrome had mutations on chromosomes S252W or P253R

of the fibroblast growth factor gene. Infants with P253R mutations generally have better craniofacial appearance after surgery than do infants with S252W mutations.

In a study involving 53 affected children, approximately 50% of fathers were over the age of 35, whereas in approximately 20% of cases, both parents were over 35 (Tolarova, Harris, Ordway, & Vargervik, 1997). This finding suggested that mutations may be more associated with paternal alleles. Rare cases in offspring of healthy couples can be explained by germinal mosaicism (Allanson, 1986).

Since its discovery in the late 19th century, more than 300 cases of Apert syndrome have been reported (Cohen, 1991). The prevalence was found to be 12.4 cases per million births (Tolarova et al., 1997). Asians were found to have the highest prevalence rate (22.3 per million live births), and Hispanics had the lowest prevalence rate (7.6 per million live births). Both genders seem to be affected equally.

Characteristics

1. At birth or during sonogram, the following features are found:
   Craniosynostosis—distortions of the head and face, primarily with a large skull, widely spaced and slanted eye sockets, and crowding of the teeth
   Midface hypoplasia
   Syndactyly of the hands and often the feet—webbed or "mitten" hands
2. Brain scans reveal malformations of the corpus callosum, limbic system, gyral abnormalities, hypoplastic white matter, and heterotopic gray matter.
3. Cleft palate occurs in 30% of cases.

For infants with Apert syndrome, premature fusion of plates in the skull restricts brain growth and causes increased pressure in the brain as it develops. Early surgery can detach the plates to relieve the pressure. Craniofacial surgery results in some healing of features (vonGernet, Golla, Ehrenfels, Schuffenhauer, & Fairley, 2000). Surgery is needed to separate the fingers to maximize functionality, but this procedure is performed on the feet only if walking will otherwise be impaired. Surgery normally takes place between 5 and 8 months.

In the past, diagnosis was made at birth, but advances within the last decade have made prenatal diagnosis possible. In mothers with Apert syndrome, detection as early as 20 weeks has been made (Lyu & Ko, 2000). In unaffected mothers, prenatal diagnosis is typically in the third trimester (Kaufmann, Baldinger, & Pratt, 1997). Prenatal diagnosis is generally based on findings of craniosynostosis and syndactyly originally using fetoscopy and more recently using sonograms (Lyu & Ko, 2000).

Although cases of normal cognitive functioning are common, varying degrees of intellectual disability are found in 50% of patients (Sarimski, 1998). Psychosocial functioning of children with Apert syndrome is similar to that of children with facial disfigurement in general, with children with more severe cognitive deficits experiencing more severe psychosocial impairment (Sarimski, 1998). Twenty percent of patients were found to suffer from emotional lability, social competence deficits, hyperactivity, or attentional problems. Psychosocial intervention is implicated for children with Apert syndrome as well as their parents, but little research on specific interventions has been conducted.

Prognosis and complications vary between patients. Additional reconstructive surgeries may be needed and congenital abnormalities may exist that require additional treatment. More research is needed in order to improve treatment and early detection of Apert syndrome.

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APGAR RATING SCALE

The Apgar Rating Scale was specifically designed to assess medical distress in newborns. Ratings are made by attending nurses or physicians at 1 minute after birth, with possible further ratings at 3, 5, and 10 minutes. Five vital signs, heart rate, respiratory effort, reflex irritability, muscle tone, and color, are rated on a 3-point scale: 2 if present, 1 if not fully present, and 0 if absent. Thus the range of possible scores is 0–10, with scores greater than 7 (about 70% of all newborns) indicating excellent condition, 3–7 (24% of all newborns) indicating a moderately depressed condition, and less than 3 (6% of all newborns) indicating a severely depressed condition (Apgar, 1953; Apgar, Holaday, James, & Weisbrott, 1958; NCEMI, 2005).

The Apgar Scale has been used extensively in research in anesthesiology, obstetrics, pediatric neurology, and developmental psychology. Apgar scores are predictive of infant mortality: 15% of neonates with severely depressed scores die within 7 months, compared with 0.13% of those receiving scores of 10 (Apgar et al., 1958). There is also a moderate relationship between Apgar scores and intellectual and motor development: Edwards (1968), for example, found an Apgar correlation of 0.251 with Stanford-Binet IQ, 0.456 with a battery of fine-motor tasks, and 0.480 with gross-motor tasks at age 4. The 5-minute postnatal Apgar scores were more predictive than 1-minute scores in Edwards' study.

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See also **Low Birth Weight Infants; Neonatal Behavioral Assessment; Prematurity/Preterm**

APHASIA

Everyone with the diagnosis of aphasia has an acquired language disorder, but the type of language disorder (problems understanding talking, problems talking, problems reading, problems writing) and the severity of these difficulties vary, reflecting the different locations and the extent of the damage to the brain. For most people, damage to the left side (hemisphere) is responsible for the aphasia. Aphasia usually has a sudden onset such as a result from a brain injury or stroke, but some individuals have a slower onset as with the development of a brain tumor (NIDCD, 2005).

There also are similarities in the type of problems using language among persons whose brains have been damaged in the same location. Aphasiologists are persons who study aphasia and attempt to provide a structure for understanding and diagnosing this language disorder upon the basis of these variations and similarities. As a result of their studies, there are many different definitions of aphasia and many different classification systems offering a means of subdividing aphasia (Chapey, 1994; Davis, 1993).

Literature within the past decade reflects a general agreement on the following: The term aphasia (acquired language disorder due to brain damage) applies to persons who formerly had intact, developed language functioning and, therefore, the term aphasia does not apply to language disorders experienced by children (Davis, 1993). Some aphasiologists (Darley, 1982; Schuell, 1972) set forth arguments against subdividing or classifying aphasia according to differences or similarities of symptoms. In the opinion of these experts, the variations in symptoms reflect degrees of problems in the total, integrated brain function.

However, if classification is considered, one common basis is nonfluent versus fluent. In this case, separation is made on the basis of whether the symptoms of a person's language disorder result in a disruption of fluency (Hegde, 1994). Rosenbek, Wertz, and LaPointe (1989) define being fluent as producing five or more connected words. Obviously, persons who have aphasia and who cannot produce five or more connected words have nonfluent aphasia. Further common subdivision types within nonfluent aphasia include Broca's, global, isolation, and transcortical motor. Subdivisions of fluent aphasia include Wernicke's transcortical sensory and conduction.

Other common perspectives seen in the literature for defining symptoms of aphasia are those in terms of cognitive impairments (Chapey, 1981; Davis, 1993) and linguistic analysis of the disordered language (Caplan, 1991; Jakobsen, 1971). Cognitive definitions of aphasia are based on the idea that cognition underlies language and that if language is impaired, some aspects of cognition also must be impaired. Descriptions of symptoms are reported as impairments in long- and short-term memory for words, phrases, and sentences and as impairments in processing linguistic information (Hegde, 1994). Research done from the linguistic point of view is called "neurolinguistic," and it analyzes the symptoms from a perspective of whether a patient shows difficulties in linguistic units if they are

shorter or longer, simple or complex, active or passive, embedded or unembedded, and so forth (Hegde, 1994).

The types of language disorders encountered by persons with aphasia include difficulties in comprehending spoken language (for example, the patient cannot point to a picture or object named, or the person may not know the meaning of ordinary words) and difficulties in talking (the patient may substitute sounds or words and create new words that do not mean anything to the listener, or the person may omit sounds within words or whole words). Persons with aphasia may struggle to get out any words and speak very little, or they may talk a great deal with ease, but the words and grammar do not have meaning for the listener. Persons with aphasia may also experience difficulties in reading or writing and doing number calculations (Hegde, 1994). In addition, there are often many related disorders that occur from the damage to the overall neurological network, such as motor speech problems or paresis of the oral structure and/or arm and leg.

Over one million people in the United States suffer from aphasia and each day almost 300 new cases occur. Rehabilitation requires commitment and support from professionals and family. In an effort to provide a better understanding of this disorder, a national organization, the National Aphasia Association has been formed (LaPointe, 1997).

National Aphasia Association, 350 Seventh Avenue, Suite 902, New York, NY 10001. Tel.: (800) 922-4622, e-mail: responsecenter@aphasia.org, website: http://aphasia.org/index.html.

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***See also* Childhood Aphasia; Developmental Aphasia; Language Disorders**

APHASIA, BROCA'S

Often called expressive or motor aphasia, Broca's aphasia is characterized by difficulties with the motor production of speech, problems with articulation, and a paucity of spoken language. Broca's aphasia can vary in severity from a slight difficulty in the reproduction of a spoken word to a complete inability to produce spoken language.

Broca's aphasia occurs in children who either fail to or have difficulty in expressing themselves despite normal cognitive abilities and normal linguistic comprehension. Developmental language disorders and intellectual disability should be ruled out when screening for this disorder. The main cause is a traumatic brain injury resulting in a lesion to the left hemisphere of the brain in either the frontal operculum or the corticocortical association pathways in the white matter of the temporal, parietal, and frontal lobes that relate to the motor speech areas (Martin, 1989).

Characteristics

1. Difficulties in the production of spoken language, accompanied by a varying impairment in language comprehension.
2. Verb forms are often reduced to the infinitive or participle; nouns are usually expressed in singular form and conjunctions; and adjectives, adverbs, and articles are often omitted. This type of speech is often labeled telegraphic speech (Goodwin, 1989).
3. Speech tends to be slow, nonfluent, effortful, and poorly articulated.
4. Repetition of single words is effortful but usually accomplished.
5. Although Broca's aphasia is associated with language expression, difficulties in language reception and comprehension may accompany this disorder. This symptom can be observed in deficits in comprehension, reading, naming, and memory (Hynd & Willis, 1988).

6. May be associated with hemiplegia, a weakness or paralysis on the right side of the body. This tends to be manifested by motor weakness and sagging or drooping of the lower right side of the face. There also may be weakness in the right arm and leg (Goodwin, 1989).

The treatment of Broca's aphasia focuses on retraining the child to recover or gain the ability to produce spoken language; this is done by addressing the child's deficits by symptom, such as intense retraining using picture cards to improve naming ability. It is hoped that retraining will have the effect of shifting language expression to an area of the brain that is not impaired. Because Broca's aphasia tends to be associated with left-hemisphere damage, the expectation is that the right hemisphere will assume the responsibility of producing expressive language.

The effect of treatment on Broca's aphasia in children can vary greatly. Children tend to have greater success in recovery than do adults, due to their increased brain plasticity. Many predictive factors can influence a child's level of recovery. The size and type of lesion in the brain is the most critical variable. For example, a minor closed head injury that results in slight swelling of the brain could produce signs and symptoms of Broca's aphasia that could later disappear completely. A traumatic brain injury that involves extensive bilateral damage could produce a case of Broca's aphasia resulting in a complete loss of language expression, from which the child would never recover.

Another major predictive recovery factor is the age of the child when the lesion occurs. It is thought that younger children have increased plasticity of the brain, the ability to reorganize actions within levels of functioning, and the ability to shift functioning to different areas of the brain that have not been impaired (Goodwin, 1997). A problem can emerge, however, with shifting functions from one area of the brain to another. It may be that when an area of the brain not yet specialized in function assumes a new responsibility, a compromise in meeting later developmental milestones may emerge (Fletcher-Janzen & Kade, 1997).

Special education placement can be a very important issue for children with Broca's aphasia. If their impairment is severe, they will probably be classified as a child with a traumatic brain injury. If their difficulties are related to academic problems, they could be served as children with learning disabilities or as children needing speech and language services. Difficulties with expression of language can inhibit many educational, emotional, and social aspects of a child's development. The special education teacher will need to be cognizant of a number of special considerations that these children require. For example, the ability to learn to read can be severely affected by Broca's aphasia, even if the child's receptive language skills are intact. The child may have difficulty exchanging and expressing thoughts and ideas and asking questions; this could result in a significantly reduced vocabulary and an inability to obtain phonemic awareness of words and rules of grammar. The child's social skills can also be affected because the child may have problems with positive, normal peer interactions; this can also lead to a deficit in the development of social skills and nuances as well as the development of appropriate behavior. Children with Broca's aphasia may demonstrate signs of depression, especially those children with localized impairment, because they have no other cognitive difficulties and are fully aware of their deficits.

The future for children with Broca's aphasia appears to be promising. Improved technology helps emergency services respond more quickly to accidents involving brain trauma and new medical technology such as the positron-emission tomography (PET) scan is helping neurologists understand more about how the brain operates. Although prognosis for recovery still remains guarded for children with severe lesions and diffuse damage, improved understanding of Broca's aphasia is offering increasing amounts of hope for children with expressive language problems.

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APHASIA, DEVELOPMENTAL (See Childhood Aphasia, See also Language Disorders)

APHASIA, JARGON

Jargon aphasia (JA) is an acquired language disorder in the comprehension and use of words, in which patients use incorrect words or sounds in place of intended words. The speech jargon in JA can be (a) paraphasic—grammatically intact with the inclusion of misused, semantically related

words; (b) asemantic—intact speech with the inclusion of nonsense words, or neologisms; and (c) phonemic, a stream of nonsense syllables. Given the intact ability to produce speech, JA is considered a form of fluent aphasia.

In children and adults, JA results from brain damage due to infection, tumors, cerebrovascular disturbance, or head trauma. Although early conceptualizations assumed a right-hemisphere damage bias in childhood aphasias, more recent analyses have found that childhood aphasias are usually the result of left-hemisphere damage, which is consistent with the etiology of adult aphasias (Woods & Teuber, 1978). The trauma responsible for the acquired aphasias may initially lead to other symptoms, such as headaches, muscle weakness or paralysis, visual field deficits, and personality changes. It is important to note that children with JA may have difficulties in auditory comprehension, despite their ability to produce speech.

Characteristics

1. Language disorder involving use of incorrect words or sounds and auditory comprehension
2. Result of severe brain damage
3. Prognosis is good, but some language and educational deficiencies persist

Recovery from JA depends on a number of interrelated factors, such as etiology, the site and size of the brain damage, age at which the brain insult occurred, and the presence of other neurological disturbances (Murdoch, 1990). It is generally believed that younger children show more complete and rapid recovery from acquired aphasias, reflecting the plasticity of the developing brain. However, several reports have documented slow (months to years) and incomplete recovery in children, resulting in persistent language deficits. There are numerous treatments available for JA and other aphasias, such as speech or writing therapies, but their efficacy is variable. Often, language ability exhibits spontaneous recovery, in which the natural healing of the brain restores some speech capacity—that is, in the absence of any intervention, children with acquired aphasias show improvement over time. This tendency underscores the fact that the defining symptoms of a form of acquired aphasia (such as the jargon in JA) may subside as the recovery process unfolds, but that other subtle language and cognitive impairments may persist.

In general, children with JA and other acquired aphasias show lower levels of scholastic achievement due at least in part to persistent language impairments. Cooper and Flowers (1987) tested individuals on a variety of language and academic achievement tests 1 to 10 years after suffering childhood aphasias. They found that although these individuals were competent verbal communicators, they performed more poorly than did age-matched controls on tasks of word, sentence, and paragraph completion, naming, production of complex sentences, and word fluency. Other academic difficulties included arithmetic and spelling skills. Accordingly, two thirds of the group were receiving special education services at the time of testing. Thus, regular monitoring of JA children after apparent clinical recovery is crucial for supporting educational achievement.

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APHASIA, TRANSCORTICAL

Three types of transcortical aphasia were identified by Goldstein in 1948, including transcortical sensory aphasia, transcortical motor aphasia, and mixed transcortical aphasia. In transcortical motor aphasia, the damage occurs in the frontal lobe, anterior to Broca's area along the motor speech cortex. The lesion is often deep in the cortical matter. In transcortical sensory aphasia, the damage occurs in the occipito-temporal area, posterior to Wernicke's area. Some authorities believe the two types are actually deficits to the same semantic accessing system and that they simply differ in the anatomical levels that are involved (Rothi, 1998). They can result from trauma, stroke, or disease. In mixed transcortical aphasia, the damage can occur in both areas or in the association cortex; it often occurs as a result of diffuse damage (i.e., carbon monoxide poisoning, dementia, multiple infarctions). The incidence of transcortical aphasia is not reported in the literature, and prevalence likely depends on the etiology of the disorder. However, in children it is considered rare.

Characteristics

Transcortical motor aphasia:

1. Able to maintain a simple conversation.
2. Speech may be somewhat disfluent as a result of lack of connector words and is often characterized as having phonemic and global paraphasias.
3. The ability to repeat is very good; often they are echolalic and visual and auditory comprehension is adequate.

Transcortical sensory aphasia:

1. Often have anosognosia, meaning it is difficult for children to recognize that they have deficits.
2. Speech is often quite fluent but may have paraphasias.
3. Often able to repeat and may be echolalic, which distinguishes them from Wernicke aphasia.
4. The primary concern is the very poor comprehension.

Mixed transcortical aphasia:

1. The speech is often disfluent.
2. Diminished quantity of speech.
3. Poor comprehension.
4. Adequate ability to repeat.
5. Individuals with the mixed variety may be able to correct syntactic errors but not semantic errors.

Treatment of aphasias generally follows one of two major regimes, including restoration of functioning or development of compensatory strategies. The treatment of transcortical motor aphasias tends to follow the restoration philosophy, often because the transcortical variety is believed to be a less severe form of aphasia and more likely to show improvement. For example, treatment may focus on restoring volitional initiation of motor acts through practice and self-cueing techniques. The use of pharmacology has also been reported to improve functioning in some individuals. The treatment of transcortical sensory aphasia is highly dependent on the etiology of the aphasia. For example, when the aphasia results from dementia, therapy is different from that used to treat aphasia resulting from a stroke. Rothi (1998) reported that therapy of transcortical sensory aphasia has received no attention in the rehabilitation literature. Treatment of the mixed variety has also not been discussed in the literature.

In children, the terms acquired aphasia and developmental aphasia must be distinguished. Acquired aphasia refers to language disorders that are the result of identifiable neurological insults (tumor, stroke, trauma, etc.). Developmental aphasia, also known as developmental language disorders, has no known neurological etiology, but the child fails to develop language and speech in an expected manner (Aram, 1998). Depending on the degree of deficit and concomitant problems, the child will likely qualify for special education. Acquired aphasia will likely be identified in the schools under the Traumatic Brain Injury or Physical or Other Health Disorders labels, but depending on the presence of other symptoms, it could be identified as a Speech and Language Disorder. If the disorder is acquired, revision of the child's educational plans should parallel gains. Developmental aphasia will likely be treated under the category of Speech and Language Disorder. Special education plans should be reviewed at least annually, and monitoring of academic progress is highly encouraged.

Generally, the best prognosis is reserved for transcortical motor aphasia, followed by sensory aphasia, and then by mixed transcortical aphasia. Based on several single-case studies, the prognosis for TMA is good; however, with studies that have larger sample sizes, the results have been less encouraging. Wernicke aphasia patients often recover into a condition of transcortical sensory aphasia. When this occurs, the prognosis is considered favorable. Future research dealing with treatment efficacy and future theoretical models will add much to the knowledge based in aphasiology.

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APHASIA, WERNICKE (SENSORY APHASIA)

Wernicke aphasia is characterized by the inability to comprehend speech or to produce meaningful speech following lesions to the posterior cortex. Individuals with Wernicke aphasia rarely experience muscular weakness affecting one side of the body, or hemiparesis. In most cases, its etiology involves a lesion affecting the dominant temporal lobe, particularly the auditory association cortex of the posterior-superior portion of the first temporal gyrus (Benson, 1993; Kolb & Whishaw, 1990).

Although anyone can acquire Wernicke aphasia, it most often affects people in their middle to late years of life. It has been estimated that 80,000 adults and 1,400 children acquire some type of aphasic disorder each year; this results in an estimated 1 million Americans who currently live with some type of aphasia. Although the exact prevalence of Wernicke aphasia is unknown, Wernicke is one of the more commonly recognized aphasic syndromes. Men and women appear to be equally affected, and common causes include stroke, severe head trauma, brain tumors, and infections (National Institute on Deafness and Other Communication Disorders, 2000).

Characteristics

1. This disorder is acquired following a period of normal language functioning.
2. The key feature of the disorder is a striking disturbance in comprehension of verbal and/or written language.
3. Deficits in the ability to repeat information (e.g., when patients are instructed to repeat "no ifs, ands, or buts") and to name common objects are frequently noted.
4. Verbal output is fluent, but it is almost always contaminated by unintended syllables, words, or phrases (paraphasias) and by made-up words (neologisms).

Some individuals with Wernicke aphasia will experience a spontaneous recovery within a few hours to a few days following the injury, and no additional treatment will be necessary. In most cases, however, language recovery is neither quick nor complete. In these instances, the most common treatment involves some form of language therapy. Although there are various approaches to conducting language therapy, all approaches attempt to help individuals utilize remaining abilities, restore impaired abilities, compensate for lost abilities, and learn alternative methods of communicating. It is widely believed that language therapy is most effective early in the recovery process. Additional treatment modalities may include medications, such as the anticoagulant Heparin, and in some instances, surgery (Richman & Wood, 1999).

Children with Wernicke aphasia will likely require speech and language services and frequently qualify for special education services for individuals with speech and language impairments, traumatic brain injuries, or learning disabilities. For severely impaired children, compensatory strategies intended to maximize the amount of communication they can regain will be indicated. Children with less severe deficits will probably have phonemic segmentation weaknesses. They may benefit from reading instruction that focuses on phonemic awareness and synthesis activities such as being presented with the same and different sounds through headphones in a repetitive manner. Placement in the regular education classroom with full inclusion will probably be problematic. Individual services in a special education resource room will probably be needed. Some children may have such difficulty with phonemic awareness activities that whole-word approaches will be necessary for reading instruction. Deficits in listening or reading comprehension are also likely to be present, and instructional modifications will probably be necessary (Richman & Wood, 1999).

Children with significant language deficits have also been found to be at increased risk for both internalizing and externalizing behavior problems (Cantwell & Baker, 1991). Consequently, children with Wernicke aphasia may also qualify for special education services under the Serious Emotional Disturbance or Other Health Impaired categories. Treatment for these comorbid psychological and behavioral problems will probably need to be addressed in order for speech and language therapy to be effective. Due to problems with language comprehension, traditional "talk therapies" are likely to be of limited benefit. Behavior modification techniques and highly structured, and repetitive exercises that address specific topics (e.g., social skills training, impulse control) may be most beneficial for managing the comorbid behavior problems associated with language deficits in children (Richman & Wood, 1999). Parent training and parent education will also probably be important treatment interventions.

In general, the prognosis for recovery from Wernicke aphasia is influenced by a number of factors. The first is related to the severity and location of the lesion. The more isolated and limited the lesion, usually the better the prognosis. The age of the individual is also an important factor. Younger patients—usually no older than early adulthood—tend to recover prior levels of functioning more fully than do older patients. Healthier patients also tend to recover more fully. Finally, the time at which educational interventions are initiated also appears to be important. The sooner services can be provided, the better the outcome.

Research activities that investigate new combinations of medications to improve recovery or decrease the risk of the vascular accidents that frequently result in Wernicke aphasia are currently in progress. Research activities that investigate the use of new gene therapies to actually regenerate neural pathways are on the horizon. Studies investigating new diagnostic devices such as positron-emission tomography (PET) and functional magnetic resonance imaging (fMRI) are ongoing. It is hoped that with these new devices, more accurate diagnostic techniques will be identified. Investigations concerning which language therapy techniques work best and how computer-aided interventions can help aphasic patients are also currently underway.

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APNEA, INFANTILE

Apnea is defined as a lack of respiration for a period of 20 to 30 seconds with or without an accompanied decrease in heart rate. Infant apnea is defined as resulting in a blue or purplish color of the skin. Twenty-five percent of infants in premature nurseries, but only a small percentage of full-term infants, exhibit apnea (Nemours Foundation, 2005). Apnea, therefore, appears in most cases to stem from actual immaturity of the neural mechanism responsible for regulation of respiration. When immature, this mechanism is vulnerable to metabolic disturbances in calcium and blood-sugar levels, changes in body temperature, or disturbances in brain-wave patterns that occur during seizures or normal REM (rapid eye movement) sleep. The association between apnea and sleep is significant because premature infants sleep up to 80% of the time and REM sleep is the predominant sleep state of these infants (Parry, Baldy, & Gardner, 1985). Apnea is less frequently caused by actual obstruction of the airway itself either from excessive mucus or improper body positioning, as premature infants have very flexible tracheas.

Apnea owed to immaturity or genetic influences appears to be a possible cause of sudden infant death syndrome (SIDS). The fact that SIDS occurs most frequently in children less than 1 year of age supports this theory. Treatment focuses on prevention and involves general measures to promote adequate respiration until the infant "outgrows" the condition. Correction of existing chemical imbalances may be all that is required. Theophylline, a respiratory stimulant drug, decreases apnea and is widely used. Most infants reinstitute breathing with gentle tactile stimulation such as stroking or jostling, but at times they require manual ventilation to prevent prolonged anoxia and to restore breathing. Occasionally apnea becomes so severe that the child has to be temporarily placed on a respirator (Volpe & Koenigsberger, 1981). Generally, the heart and respiratory rates of premature infants should be closely monitored for signs of apnea. A home monitor may be necessary for infants with persistent apnea. Full-term infants who are at high risk for SIDS should also be monitored for apnea (Spitzer & Fox, 1984).

Prognosis is generally good for infants who do not experience prolonged apnea and who are otherwise healthy. It becomes less favorable with increased frequency and duration of apneic episodes (Parry et al., 1984). However, at least one study suggests that infantile apnea may be associated with deficiencies in later gross motor, and perhaps some cognitive, functions and behavior (Deykin, Bauman, Kelly, Hsieh, & Shannon, 1984). Since apnea produces transient hypoxia, it can, when extensive, cause many of the problems associated with that disorder.

Patients and family members may find assistance with the American Sleep Apnea Association located at 1424 K Street NW, Suite 203203, Washington, DC 20005. Tel.: (202) 293-3650, website: http://sleepapnea.org/

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See also **Anoxia; Infant Stimulation**

APPLIED BEHAVIOR ANALYSIS

Applied Behavior Analysis (ABA) is a known and effective treatment for autism spectrum disorders (ASD; National

Standards Project, 2009; Simpson, 2005) and others who desire approaches to changing behavior. There is not a single manualized approach that is called ABA. Rather, there are several approaches and strategies that fall under the ABA umbrella. While several manualized programs that are based in ABA do exist (e.g., STAR, LEAP, PECS), some of which also have efficacy, several programs for ASD that utilize a variety of strategies including those under the ABA umbrella, as well as those not falling under this umbrella (e.g., visual schedules, story-based interventions) also have efficacy (see National Autism Center, 2009).

Definition of ABA

Applied Behavior Analysis is defined as "the process of applying sometimes tentative principles of behavior to the improvement of specific behaviors, and simultaneously evaluating whether or not any changes noted are indeed attributed to the process of application" (Baer, Wolf, & Risley, 1968, p. 91). In practice, ABA utilizes the principles of behavior to assess, shape, and modify socially important behaviors with the aim of generalization of success to the real world (Boutot & Hume, 2010). To be considered to be ABA, Baer, Wolf, and Risley (1968, 1987) recommend that interventions and research be judged according to six criteria:

1. Intervention/Research should be *applied*, meaning that it must address socially important, functional skills and behaviors.
2. Intervention/Research should be *behavioral*, meaning that behaviors addressed are observable and measurable.
3. Intervention/Research should be *analytic and conceptual*, meaning that a functional relation should be established between the intervention and any behavioral change through the use of data collection and the interventions should be conceptually sound.
4. Intervention/Research should be *technological*, meaning that procedures should include clarity and details to allow for replication.
5. Intervention/Research should be *effective*, meaning that noticeable and meaningful changes in the individual's natural environment are key to determining true success of an intervention.
6. Intervention/Research should have *generality*, meaning that changes should last over time and after the intervention is withdrawn.

(Boutot & Hume, 2010)

When these six criteria are met, then ABA is said to be in place. In the absence of these six criteria, regardless of strategies used, ABA is not in place.

Strategies Based on ABA

Similar to the field of medicine, where "medicine" is a term used for both the science and the treatment (e.g., pharmacology), ABA is both a science and a collection of treatments or strategies (Choutka, Doloughty, & Pirkel, 2004). Such strategies include discrete trial training (DTT), incidental teaching, task analysis and chaining, functional behavioral assessment, shaping, and prompting. ABA strategies may be used in natural environments such as home, schools, and communities, or in clinics (Boutot & Hume, 2010). While research supports each of these strategies, it is important to recognize that what is appropriate for individuals may vary (Simpson et. al., 2005).

One ABA strategy that is frequently used with students with ASD is discrete trial training (Choutka, et al., 2004). Though many laypersons mistakenly believe that DTT is synonymous with ABA, DTT is only one component of an effective intervention package based on the principles of ABA (National Autism Center, 2009). This strategy is used to teach single-step skills through a three-term contingency. The three-term contingency involves an antecedent (which may be thought of as the instructional cue; also called the discriminative stimulus or S^D), a behavior (the student's response), and a consequence (such as a positive reinforcer designed to increase the likelihood that in the future, in the presence of this same S^D the student will engage in this behavioral response; Olive, Boutot, & Tarbox, 2011). For example, a teacher may present a field of three color cards, red, blue, and yellow, and say to the child, "Give me blue" (S^D), the child then hands the teacher the blue card (behavior), and is rewarded with a high five (reinforcing consequence). DTT may be conducted in either massed (multiple) trials of 3–5 or more or in single trials and should be used as part of a comprehensive treatment approach to ASD, not viewed as the sole treatment option (Boutot & Hume, 2010). For more information on applied behavior analysis and certification programs, please access the website: http://www.abainternational.org/

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APPLIED PSYCHOLINGUISTICS

Applied Psycholinguistics publishes original articles on the psychological processes involved in language. Articles address the development, use, and impairment of language in all its modalities, including spoken, signed, and written. *Applied Psycholinguistics* is of interest to professionals in a variety of fields, including linguistics, psychology, speech and hearing, reading, language teaching, special education, and neurology. Specific topics featured in the journal include language development (the development of speech perception and production, the acquisition and use of sign language, studies of discourse development, second language learning); language disorders in children and adults (including those associated with brain damage, intellectual disability and autism, specific learning disabilities, hearing impairment, and emotional disturbance); literacy development (early literacy skills, dyslexia and other reading disorders, writing development and disorders, spelling development and disorders); and psycholinguistic processing (bilingualism, sentence processing, lexical access).

In addition to research reports, theoretical reviews will be considered for publication, as will short notes, discussions of previously published papers, and book reviews. The journal will occasionally publish issues devoted to special topics within its purview. *Applied Psycholinguistics* is published by Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU UK.

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APPLIED VERBAL BEHAVIOR

Applied verbal behavior (AVB) is a type of behavioral intervention that focuses primarily on increasing functional verbal communication in children with autism and related disorders (LeBlanc, Esch, Sidener, & Firth, 2006). AVB is based in a Skinnerian approach to language (see Skinner, 1957). Thus, in AVB, language is viewed not in terms of words but rather in terms of operational units of language, which are based on the function or purpose of the communication, such as "mands" and "tacts." A mand, derived from the word "demand," is a word or phrase that can achieve a desired response by the speaker and is unique in its ability to produce a desired result whereas a tact, which is a comment or label, describes language and lacks the direct purpose of a mand (Skinner, 1957). AVB promotes the use of language by rewarding the use of mands and tacts and by using operant conditioning principles to teach that specific mands can lead to certain specific and desired outcomes, such as the receipt of a desired item (LeBlanc et al., 2006).

For children who do not yet have a large number of mands, AVB promotes the use of mands through the use of establishing operations (EOs) (LeBlanc et al., 2006). As described by Michael (1993, 2000), EOs increase the desirability of a reward (e.g., using food restriction as an EO to increase the potency of food as a reward). This can involve either direct, unconditioned EO relationships (e.g., food deprivation and hunger) or conditioned EO relationships established through classical conditioning by pairing an unconditioned EO with an initially neutral stimulus.

Theoretically, the use of an EO during AVB will entice a child to establish some sort of mand (e.g., manual sign, spoken word) in order to receive the desired reward (e.g., food or drink). The mand can be further shaped and reinforced through subsequent operant conditioning and further use of EOs (LeBlanc et al., 2006). Use of tacts, on the other hand, may be trained through intraverbal techniques (e.g., pairing a tact with a question where the tact would be an appropriate response) and maintained through general social reinforcement (LeBlanc et al., 2006). AVB initially focuses more heavily on mands, given their functional use and natural development through the use of EOs.

Although AVB can be used in naturalistic settings, it differs from other verbal and language therapies in that it places greater value on establishing a direct, "pure" relationship between a mand and a response than it does on naturalistic training settings (LeBlanc et al., 2006). In other words, while generalization is a goal of AVB, the principles of the intervention hold that creating a pure operant relationship between specific mands and specific outcomes should come before attempts to teach and promote the use of verbal behavior in naturalistic settings (LeBlanc et al., 2006). For example, the relation between the mand "cookie" and the presentation of a chocolate chip cookie should be directly and firmly established before the

mand is used in a preschool setting where the result of the mand may be less explicit and consistent.

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APRAXIA, DEVELOPMENTAL

Developmental apraxia refers to a sensory integration problem that involves praxis and motor planning deficits. It can affect gross and fine motor performance as well as speech. The disorder is one of higher cortical process and results in problems with planning and executing learned, volitional movements. These children, however, show normal strength, tone, reflex, sensation, and coordination. Developmental apraxia can affect a broad range of functioning, including self-care and academic performance. There are also social implications for children with this disorder (Ripley, Daines, & Barrett, 1997).

Extensive searching of the literature failed to provide prevalence data. There is, however, evidence to suggest that developmental apraxia is a function of immature brain development, or fewer connections between nerve cells (Portwood, 1999). There is also evidence of low weight gain during pregnancy and infant feeding problems. In these cases, neural pathways may be poorly developed, causing problems with neurosynaptic transmission.

The Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition (DSM-IV) uses the term *Developmental Coordination Disorder* to refer to developmental apraxia (American Psychiatric Association [APA], 1994). Children with this disorder may qualify for special education services under the Individuals with Disabilities Education Act (IDEA). Typically, these services are provided under the category of Other Health Impaired. In order to qualify for services, the child must demonstrate a marked impairment in the development of motor coordination that significantly interferes with academic achievement or activities of daily living. Coordination difficulties cannot be due to a general medical condition, such as cerebral palsy, muscular dystrophy, or hemiplegia. Furthermore the diagnosis is not made when problems with sensory integration are a function of a pervasive developmental disorder (PDD). It can, however, be made concurrent with a diagnosis of intellectual disability (ID); however, motor difficulties must be in excess of those found in children with MR. Associated features include phonological disorder, expressive language disorder, and mixed receptive-expressive disorder (APA, 1994). Developmental apraxia has also been found among children diagnosed with attention-deficit/hyperactivity disorder and specific learning disorders such as dyslexia, dyspraxia, and dyscalculia (House, 1999). According to House, it is important to consider developmental apraxia as a possible comorbid diagnosis in children with dyscalculia or mathematics disorder, both of which are linked to nonverbal learning disabilities.

Characteristics

1. Delayed development of motor skills, with tasks performed slowly and inefficiently
2. Visuospatial deficits and a poor sense of body and objects in space
3. A tendency to fall and bump into objects
4. Heightened sensitivity to sensory input (e.g., noise and lights)
5. Difficulty carrying out a sequence of movements causing oral production (articulation) and fine and gross motor problems (illegible handwriting)
6. Associated problems with attention, concentration, hyperactivity, following directions, and interacting socially

Depending on the severity and nature of the problem, a number of professionals may be involved in the assessment process; this includes the school psychologist, speech-language pathologist, and occupational (and sometimes physical) therapists. Pediatric neurologists may also be involved in order to rule out alternative explanations for the apraxia (e.g., acute or degenerative central nervous system disorder). Tools that are used to evaluate developmental apraxia include the Sensory Integration and Praxis Tests, Bruininks-Oseretsky Test of Motor Proficiency, Comprehensive Apraxia Test, and the Movement Assessment Battery for Children (see Portwood, 1999). In addition to administering standardized measures such as these, it is important to obtain an in-depth developmental history and comprehensive evaluation of the child's cognitive skills and academic performance. Behavioral observations should be a part of the assessment process

in order to identify specific deficits that might interfere with the child's classroom performance and extracurricular activities (e.g., recreation).

Treatment often includes speech and language services and occupational therapy involving sensory integration techniques. There are a number of classroom accommodations that may prove beneficial, including allowing extra time to complete assignments, requiring smaller amounts of information to be worked on at any given time, providing extra structure and organization (e.g., line up columns for math assignments), and offering alternative tests and assignments such as dictated rather than written homework.

With appropriate accommodations and services, the prognosis should be good. Further research, however, is needed to provide information about the incidence of this disorder and ways to best remedy the problem.

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APRAXIA, OCULAR MOTOR COGAN TYPE

Ocular motor apraxia, Cogan type (OMA) is a rare congenital eye disorder. This is also referred to as congenital oculomotor apraxia (COMA). Cogan (CaF Directory, 1997) first reported this disorder in 1952. It is thought to be inherited as an autosomal recessive genetic trait. However, school-age children, as a secondary problem to neurological and metabolic diseases, may acquire this condition. Ocular motor apraxia can be associated with a wide array of brain malformations, metabolic disorders, and perinatal problems (OMA Homepage, 2000).

Ocular motor apraxia effects the mechanism that controls horizontal eye movement, both voluntary and responsive. This disorder is characterized by defective or absent horizontal ocular attraction movements or absence of horizontal voluntary or responsive eye movements. Infants with the disorder may appear to be blind at first because they do not seem to respond to visual stimuli, but later they may develop head movements to shift their gaze (Kearney, Groenveld, Sargent, & Poskitt, 1998). In addition, there have been some reports of infants with the disorder having colic during their first few months of life. Many children fail hearing tests when there is nothing wrong with their hearing because traditional hearing tests do not account for the impact of visual impairment on a child's responses.

The condition and its causes are relatively unexplored because of the rarity of its occurrence. Additionally, due to the rarity of this congenital disorder, its epidemiology was difficult to obtain. The National Organization for Rare Disorders (2000) stated that there were only 50 reported cases in the medical literature.

Characteristics

1. Infant may seem visually unresponsive from birth, behaving as if he or she were blind.
2. There is difficulty with horizontal eye movement. The child will develop a jerking of the head or excessive blinking, which helps to break and then realign focus.
3. The child will have to turn his or her head for side vision instead of using peripheral vision.
4. Low muscle tone is common but is usually due to the secondary condition of being developmentally delayed.
5. The child may reach developmental milestones more slowly than do his or her peers.

There is no direct treatment for ocular motor apraxia. Most treatment is related to the secondary effects of the disorder. Regular visits to a physiotherapist to assist in the development of muscle tone and the use of special toys and equipment in an attempt to correct the effects of ocular motor apraxia are examples of treatments for this condition (CaF Directory, 1997; OMA Homepage, 2000). Parents of children with OMA may find a valuable support system by registering with the OMA organization (http://www.oma.org/). This is a helpful site to interact with other families and gather information regarding this disorder.

Children with OMA may be eligible for special services at school. These children, due to the nature of their disorder, typically have poor reading skills that require remedial assistance. Many of these individuals also display speech apraxia and require speech and language services. Secondary to OMA itself, there may be gross and fine motor difficulties that may make the child appear clumsy. In an effort to cope with such clumsiness, a child may develop behavior problems.

OMA is not a progressive disease. Generally it is thought that the prognosis of this disorder is good and has a developmental resolution. This disorder typically improves or disappears between the ages of 5 and 10. However, there are cases still apparent in adulthood (Prasad & Nair, 1994).

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APRAXIA (*See* Developmental Apraxia)

APTITUDE TESTING

The term *aptitude test* has been traditionally employed to refer to tests designed to assess the level of development attained by an individual on relatively homogenous and clearly defined segments of ability, such as spatial visualization, numerical aptitude, or perceptual speed. Aptitude tests measure the effects of learning under the relatively uncontrolled and unknown conditions of daily living. In this sense, they differ from achievement tests that measure the effects of a relatively standardized set of experiences encountered in an educational program. The two types of tests differ in use as well. Achievement tests generally represent a terminal evaluation of an individual's status on the completion of training. Aptitude tests serve to predict subsequent performance. They are employed to estimate the extent to which an individual will profit from a specific course of training, or to predict the quality of achievement in a new situation.

The term *special aptitude* originated at a time when the major emphasis in testing was placed on general intelligence. Traditional intelligence tests were designed primarily to yield a single global measure of an individual's general level of cognitive development such as an IQ. Although they were comprised of a heterogeneous grouping of subtests, both practical and theoretical analysis soon revealed that intelligence tests were limited in their coverage of abilities, and that more precise measures were required. This development led to the construction of separate tests for measuring areas of ability that were not included in the intelligence batteries. Traditional intelligence tests oversampled abstract functions involving the use of verbal or numerical symbols; therefore, a particular need was felt for tests covering the more concrete or practical abilities. The earliest aptitude tests were those measuring mechanical aptitude, but soon tests to measure clerical, musical, and artistic aptitude were developed. These special aptitudes were regarded as supplementary to the IQ in a description of an individual, and were usually administered in conjunction with a standard intelligence battery.

A strong impetus to the construction of special aptitude tests was provided by the problems of matching job requirements with the specific pattern of abilities that characterize each individual, a task commonly faced by psychologists in career counseling or in the classification of industrial and military personnel. Intelligence tests were not designed for this purpose. Aside from the limited representation of certain aptitudes discussed earlier, their subtests or item groups were often too unreliable to justify the sort of intra-individual analysis required for classification purposes. To respond to this need, the testing field turned to the development of multiple aptitude batteries.

Like intelligence tests, multiple aptitude batteries measure a number of abilities, but instead of a total score, they yield a profile of scores, one for each aptitude; thus they provide a suitable instrument for making intra-individual analysis (Anastasi, 1997). In addition, the abilities measured by multiple aptitude batteries are often different than those measured by intelligence batteries. Aptitude batteries tend to measure more concrete skills, such as arithmetic reasoning, numerical aptitude, perceptual speed, and spatial visualization, thereby placing less emphasis on verbal skills than intelligence tests.

Nearly all multiple aptitude batteries have appeared since 1945. Much of the test research and development began in the armed forces during World War II, when the Air Force designed special batteries to select training candidates to be pilots, bombardiers, radio operators, and range finders. The armed services still sponsor a considerable amount of research in this area, but a number of multiple aptitude batteries have been developed for civilian use in educational and vocational counseling and in personnel selection and classification (Murphy, 1994).

The application of factor analysis to the study of trait organization provided the theoretical basis for the construction of multiple aptitude batteries. Factor analysis identified, sorted, and defined the abilities that were loosely grouped under the definition of intelligence. The

tests that best measured the factors identified in the analysis were then included in the multiple aptitude battery. The Chicago Test of Primary Mental Abilities (1941) represents the first attempt to construct a battery based on factor analysis using the pioneer factor analytic work of Thurstone (1938). Most multiple aptitude batteries developed since that time have employed the use of factor analysis in construction.

About a dozen multiple aptitude batteries have been developed for use in a number of fields. These instruments vary widely in approach, technical quality, and the amount of available validation data. In business and industry, data gained from the administration of multiple aptitude test batteries may be used for institutional decisions regarding the assignment of personnel to different jobs. In education, multiple aptitude batteries such as the SRA Primary Mental Abilities Test (Hanna, 1992) are used to guide the admission of students to different educational curricula (Schutz, 1972). The armed services use aptitude data to assign specific job classifications to personnel after screening with a more general instrument (Weitzman, 1985). The Air Force pioneered this practice, but all branches of the armed services now use the Armed Services Vocational Aptitude Battery (ASVAB; Bayroff, 1968).

A number of multiple aptitude batteries have been designed for use with high school students to aid in the transition from high school to work or postsecondary training (e.g., Ball Foundation, 2002). The most widely used of these tests is the Differential Aptitude Test (DAT; Bennett, Seashore, & Wesman, 1990). Based on the factor analytic work of Thurstone (1938), the DAT is used in the educational and vocational counseling of students. It provides a profile of scores on eight subtests: Verbal Reasoning, Numerical Ability, Abstract Reasoning, Clerical Speed and Accuracy, Mechanical Reasoning, Spatial Relations, Spelling, and Language Usage. In the most recent fifth edition of the DAT, significant changes have occurred in the battery of tests. The fifth edition is divided into two parallel forms for grades 7–9 and 10–12. New items have been added, old items have been revised and updated, and the overall testing time has been shortened by reducing the length of some tests. Using the student's profile in conjunction with an interest inventory, a counselor can use a computer or casebook to predict the student's success in postsecondary education, or generate a list of potential careers. A vast amount of validity data is available for the DAT. The predictive validity coefficients are high, indicating that the DAT serves as a good predictor of high school achievement in academic and vocational programs (Schmitt, 1995). However, the differential validity of the separate tests is quite poor. The DAT should therefore be used cautiously for classification purposes (such as to identify possible fields of educational or occupational specialization; Hattrup, 1995; Wise, 1995).

In 1987 the Computerized Adaptive Testing (CAT) edition of the DAT was developed, which allowed the test to be administered via Apple II or DOS-based IBM-compatible systems. However, the CAT has not been revised in light of recent technological innovations, and has therefore become somewhat obsolete (White, 1985). The Comprehensive Ability Battery (Hakstian & Cattell, 1977) and the Guilford-Zimmerman Aptitude Survey (Guilford & Zimmerman, 1956) are other multiple aptitude batteries that are often used in transition and vocational education (Biskin, 1995).

Many aptitude tests have been designed explicitly for counseling purposes in which classification decisions are preeminent. In a counseling situation, the profile of test scores is used to aid the counselor in choosing among several possible fields of educational or occupational specialization. The General Aptitude Test Battery (GATB; U.S. Department of Labor, 1980) was developed by the U.S. Employment Services (USES) for use by employment counselors in state employment services offices. The GATB is comprised of 12 tests that combine to yield nine factor scores: Intelligence, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The profile of these subtest scores can then be compared with profiles corresponding to a huge number of job categories. An alternative form is available for nonreading adults and there is also an addition for use with individuals who are deaf. A host of studies have been conducted on the GATB, which have consistently shown that the test is a reasonable predictor of performance across a range of jobs (Bemis, 1968).

Unlike the multiple aptitude batteries, special aptitude tests typically measure a single aptitude. Certain areas such as vision, hearing, motor dexterity, and artistic talents are often judged to be too specialized to justify inclusion in standard aptitude batteries, yet often these abilities are vital to a certain task. Special aptitude tests were designed to measure such abilities. They are often administered in conjunction with an aptitude battery, either to assess a skill not included in the battery or to further probe a skill or interest. Special aptitude tests may also be custom-made for a particular job, and be constructed using a simulation of the requisites of the job, such as the Minnesota Clerical Test (The Psychological Corporation, 1992), the Meier Art Judgment Test (Meier, 1942), or the Seashore Measure of Musical Talents (Seashore, 1938). Despite wide use in education, counseling, and industry, the development of aptitude tests has been slow (Murphy, 1994). Many of the aptitude tests currently in use were developed in the 1940s and 1950s and have been revised and reissued in subsequent years.

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***See also* Achievement Tests; Assessment, Curriculum-Based; Criterion-Referenced Testing; Vocational Education**

APTITUDE-TREATMENT INTERACTION

Aptitude-treatment interaction refers to an educational phenomenon in which students who are dissimilar with regard to a particular aptitude perform differently under alternate instructional conditions. The alternate instructional conditions are specifically designed to reflect the students' aptitude differences. Thus, if a significant performance difference between the groups results under alternate instructional conditions, an aptitude by treatment interaction has occurred.

Aptitude-treatment interactions have been discussed at length by Bracht (1970), who defines an aptitude-treatment interaction as "a significant disordinal interaction between alternate treatments and personological variables" (p. 627). A personological variable is any measure of an individual characteristic such as learning style, intelligence, achievement anxiety, or locus of control. Disordinal interactions refer to performance differences between groups that denote the significantly better performance of one group under one set of conditions and the significantly better performance of the second group under alternate conditions. Figure A.2 graphically displays a disordinal aptitude-treatment interaction.

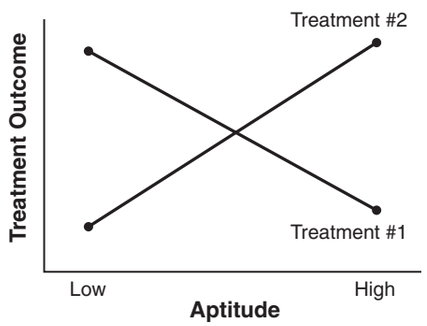

Figure A.2. Disordinal experimental outcome that is not indicative of an aptitude-treatment interaction.

Source: Bracht, G. H. (1970). Experimental factors related to aptitude-treatment interactions. *Review of Educational Research, 40*(50), 627–645.

Figure A.2 depicts hypothetical data for two groups of students who differ on a particular aptitude, one group being high and the other being low. Alternate treatments, matched to the students' aptitude, were provided. Students with low aptitude performed better under treatment number 1. Students with high aptitude performed better under treatment number 2. The data confirm the occurrence of an aptitude-treatment interaction and support the use of different instructional approaches for these two groups of students.

Figures A.3 and A.4, respectively, display hypothetical experimental outcomes that are not indicative of an aptitude-treatment interaction. In Figure A.3, both groups of students, despite the aptitude difference, performed better under treatment number 1. In Figure A.4, treatment number 1 was again superior for both groups of students. However, the differences for the low-aptitude students under treatment conditions number 1 and number 2 were not significant. The aptitude difference does not suggest the use of different treatments for the two groups; other factors may dictate the use of one or the other treatment for both groups. In this instance, the aptitude dimension did not clarify the choice between treatments.

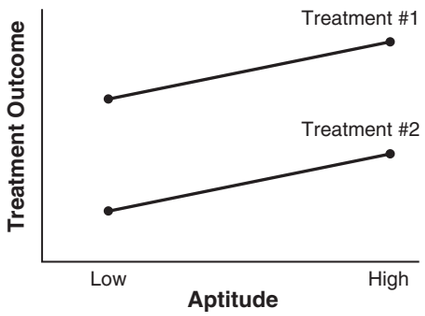

Figure A.3. Hypothetical experimental outcome that is not indicative of an aptitude-treatment interaction.

Source: Bracht, G. H. (1970). Experimental factors related to aptitude-treatment interactions. *Review of Educational Research, 40*(50), 627–645.

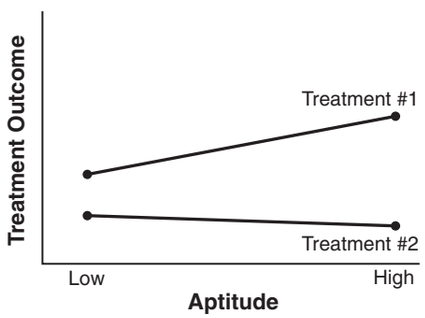

Figure A.4. Hypothetical experimental outcome that is not indicative of an aptitude-treatment interaction.

Source: Bracht, G. H. (1970). Experimental factors related to aptitude-treatment interactions. *Review of Educational Research, 40*(50), 627–645.

Interest in aptitude-treatment interactions is fueled by the widely espoused commitment to individualization of instruction and the quest for teaching adaptations that enhance individual student performance. Appreciation for individual differences is a relatively recent development (Snow, 1977). Snow believes that the "recognition that individual differences in aptitude not only predict learning outcomes but also often interact with instructional treatment variations" (p. 11). This concept makes adaptive instruction a possibility. Teachers have long recognized individual differences and have accommodated such differences in a myriad of ways. Nowhere is the concern for individual differences greater than in special education. The Individual Educational Program requirement of PL 94-142 and its revisions has mandated individualized educational planning for all exceptional children. Adaptation and accommodation to individual learner needs and characteristics is at the heart of the special education instructional process. Corno and Snow (1986), in a discussion of adapted teaching, view adaptations as involving either direct aptitude development or circumvention of inaptitude. In special education, the adage "teach to the strengths and remediate the weaknesses" prevails. Teachers generally seek intact or relatively strong abilities as avenues for instruction. Accompanying remediation is most often focused on specific skill or knowledge deficits that impede academic performance or independent functioning. Unfortunately, the commitment among educators, particularly teachers of the exceptional, to individualized instruction in practice is not matched by a strong commitment to educational research. "While it is clear that teachers adapt their behavior to students' individual differences at virtually all levels of education, what is less clear is the underlying logic and intentionality that governs these adaptations" (Corno & Snow, 1986, p. 614).

The systematic experimental investigation of teaching adaptations in relation to student characteristics is the focus of aptitude-treatment interaction research. However, the research to date underscores the difficulties associated with investigations of this kind. Bracht's review of 90 aptitude-treatment interaction studies yielded only five in which disordinal interactions were found. However, Bracht's review did help to clarify the nature of the aptitude and treatment variables and to identify the variables that increase the probability of significant aptitude-treatment interactions. Bracht's review included five studies that involved handicapped learners; none of the studies yielded significant interactions. Bracht notes that the subjects in these five studies bore categorical labels such as intellectually disabled and emotionally disturbed. Such broad categories tend to mask the considerable heterogeneity that exists within the groups—a factor that works against the probability of aptitude-treatment interactions. In another review, Ysseldyke (1973) discussed five aptitude-treatment interaction studies

involving handicapped learners grouped for instruction according to modality differences. Auditory and/or visual functioning were the modalities under consideration. Instruction matched to modality strengths or preferences failed to yield evidence of significant interactions across a variety of academic outcome measures (e.g., reading achievement and word recognition skills) in any of these studies.

Another review of research specifically involving modality-instructional matching was reported by Arter and Jenkins (1977). Preset criteria limited the number of studies reviewed in depth to 14. In all of the studies, the students were assigned to a modality group based on a statistical difference in modality functioning (modality assessments had adequate test-retest reliability and validity). Alternate instructional methods had a clear modality emphasis and outcome measures were constant across the groups. Only one study (Bursuk, 1971) demonstrated a significant modality-instruction interaction. This study involved tenth-grade below-average readers who were given instruction in listening and reading comprehension (reading comprehension lessons were given to the visual modality preference group only) over an entire school semester. The authors point out the specificity and control of subjects, treatments, and outcome measures that distinguish the Bursuk study from the remaining 13 research reports.

The results from studies specifically designed to demonstrate the interaction between modalities and instruction have not been a deterrent to practitioners. Despite the lack of supportive research, instruction based on the modality concept has been used for many years. The modality model of instruction is founded on aptitude-treatment interaction theory, but the applicability of aptitude-treatment interaction theory to modality-based instruction has yet to be demonstrated and validated to this day.

Aptitude-treatment interaction research is by no means confined to special education or to investigations of modality-based instruction. Aptitude-treatment interaction research has been conducted in other academic areas such as math (Holton, 1982) and reading (Blanton, 1971). The results generally have been disappointing.

The number of research studies that have successfully demonstrated aptitude-treatment interactions is limited, but the research has provided considerable insight into the complexities of the interaction phenomenon and the conditions that favor the occurrence of aptitude-treatment interactions (Veeman & Elshout, 1994). Bracht (1970) found that disordinal interactions were related to the degree of control over treatment tasks, the factorial makeup of the specific personological variables, and the nature of the dependent outcome variables. Controlled treatments, factorially simple personological variables, and specific, rather than complex, outcome variables favor aptitude-treatment interaction (Mills, Dale, Cole, & Jenkins, 1995). Snow (1977) stresses the "essential importance of detailed description of specific instructional variables and specific groups of people" (p. 12) to aptitude-treatment interaction research. In retrospect, the research reports that documented significant aptitude by treatment interactions displayed the prerequisite degree of control and specificity of critical variables that seem essential for aptitude-treatment interactions to occur.

The research findings to date suggest that each aptitude-treatment interaction, when found, will be valid only in a specific context. Each finding will pertain to a particular group of students under particular instructional conditions. Generalizations, if made at all, will be limited. Educators should not anticipate general educational theories with potential for broad application to emerge from aptitude-treatment interaction research. Rather, aptitude-treatment interaction theory implies ongoing evaluation of student and instructional variables and a constant readiness to adjust to meet changing conditions.

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See also **Diagnostic Prescriptive Teaching; Direct Instruction; Remediation, Deficit-Centered Models; Teacher Effectiveness**

ARACHNOID CYSTS

Arachnoid cysts are benign cerebrospinal fluid-filled sacs that develop between the surface of the brain and cranial base or attach to the arachnoid membrane (National Institute of Neurological Disorders and Stroke [NINDS], 2000). The cysts may develop anywhere along the cerebrospinal axis but have a predilection for the Sylvian fissure. Arachnoid cysts account for approximately 1% of all intracranial space-occupying lesions (Wester, 1999). Although most are slow growing and asymptomatic at first, if untreated, they can have devastating effects as a result of increased intracranial pressure.

Symptoms are often dependent on the size and location of the cyst. Common symptoms, however, include headache, vomiting, and papilloedema (i.e., problems associated with hypertension). Other symptoms associated with increased pressure include hydrocephalus and subsequent changes in the cranial vault. Gait can also be disturbed, and both endrocrine problems and seizures can occur (Adan et al., 2000). Although epilepsy occurs more often in adults than children with cysts, in 20% of pediatric cases a seizure disorder is diagnosed (compared to 80% in adults; Artico, Cervoni, Salvati, Fiorenza, & Caruso, 1995).

Most arachnoid cysts are congenital; however, they can be acquired. Head injury is often responsible for acquired cysts. Ultrasound is often used to make the diagnosis, even in utero. Males seem to be more prone to developing arachnoid cysts, and the cysts most often occur in the left temporal lobe (Wester, 1999). No sex differences have been found for other cyst locations.

Characteristics

1. Common symptoms include those associated with hypertension (headache, vomiting, papilloedema)
2. Less common problems include gait disturbance, endrocrine abnormalities, and epilepsy
3. Cognitive problems are often associated with etiology (e.g., head injury causing poor verbal memory, visuo-spatial deficits, difficulty shifting sets, and slowed processing)

Arachnoid cysts must be treated in order to avoid severe brain damage from increased pressure, hemorrhaging, or both. Treatment depends on the size and location of the cyst, but most interventions are intended to drain the cyst and prevent the accumulation of fluid. Surgical procedures typically include cyst fenestration and shunt placement. Although fenestration appears to be preferred over shunt placements (i.e., to avoid shunt dependency and infection), when arachnoid cysts communicate with the subarachnoid space to cause increased pressure (and hydrocephalus), shunts are used (Artico et al., 1995).

Although there is little indication that these cysts have any long-term physical or cognitive sequelae, some problems appear to be associated with the cause of the cyst (e.g., traumatic brain injury). Other symptoms, however, that have been related to arachnoid cysts include problems such as verbal memory and learning, visual-perceptual skill, cognitive flexibility, and psychomotor speed (Soukup, Patterson, Trier, & Chen, 1998). The impact on learning, beyond the acute phase, is unclear. Neuropsychological assessments are, therefore, in order to identify potential deficits in order to design effective interventions. Special education may in these cases be necessary and provided under the category of Other Health Impaired. In cases in which a traumatic brain injury causes the cyst, however, services may be more appropriately provided under that category. More often than not, Section 504 services or classroom accommodations will suffice (e.g., assistance to catch up on missed assignments or reduction of homework to assist the child in completing work in a reasonable time frame).

Prognosis appears to be good when arachnoid cysts are treated early—that is, before they cause further neurological damage (NINDS, 2000). Research, however, is needed to better diagnose the cyst in utero and in infants. Further investigations of preferred treatment strategies are also needed in order to maximize treatment outcome and reduce negative side effects (e.g., problems associated with shunts).

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The Arc was founded in 1950 by a group of parents and other individuals to assist in the development and care of children and adults with intellectual disabilities and or to help support families. The organization has undergone several name changes, but its mission has remained constant: The Arc promotes and protects the human rights of people with intellectual and developmental disabilities. It actively supports their full inclusion and participation in the community throughout their lifetime. Throughout its 60-year history, the Arc has taken a leadership role in encouraging research into the causes and prevention of intellectual disability, and in educating the public in the results of that research. Some of the research projects and developments funded by the Arc include a new screening test for phenylketonuria (PKU) in 1961, the Bioengineering Program launched in 1982, and ongoing research on fetal alcohol syndrome. The Arc has also spearheaded efforts to influence federal policy toward children and adults with intellectual disabilities. Some of its successes include the expansion of Medicaid to finance residential programs, Supplemental Security Income, the passage of Public Law 94-142, the passage of the "Baby Doe" Amendments to the Child Abuse Act protecting newborns with disabilities from the withdrawal of medical care, and the Fair Housing Act Amendment of 1988, which prohibits housing discrimination based on disability. One of the national initiatives of the Arc is the "Autism NOW: The National Autism Resource and Information Center," which helps to provide evidence-based resources and support for individuals with Autism Spectrum Disorder.

The Arc also serves as a clearinghouse for information on subjects important in the field of intellectual and developmental disabilities, from medical advances to education to setting up financial trusts. It funds numerous publications, many of which can be downloaded from its website. The Arc is considered one of the nation's leading advocates for people with intellectual and developmental disabilities. Having its national office located in Washington, DC affords it the opportunity to lead legislative changes.

Among the supports and services the Arc provides for individuals with intellectual and developmental disabilities and their families are:

- Early intervention
- Availability of healthcare
- Assisting with employment, including help with job skills and help with finding a job
- Ensuring a free and appropriate public education for all children with intellectual and development disabilities
- Supports for families, including respite care
- Assisting with independent living
- Advocacy

The Arc has 700 state and local chapters, with over 140,000 members. Information on membership, publications, and topics of interest can be obtained from The Arc National Headquarters, 1825 K Street NW, Suite 1200 Washington, DC 20006. Tel.: (202) 534-3700 or (800) 433-5255, fax: (202) 534-3732, e-mail: info@thearc.org.

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***See also* AAIDD, American Association of Intellectual Developmental Disabilities; Intellectual Developmental Disabilities**

ARCHITECTURAL BARRIERS

Efforts to fully integrate individuals with disabilities into the societal mainstream have demanded the elimination of physical barriers that impede access to facilities, work (Stark, 2004), and the surrounding environment. Common barriers to facility or service accessibility confronted by handicapped citizens include constricted entranceways, ill-equipped public facilities (e.g., restrooms and parking areas), limited passageways, poor room spacing and layout, inadequate lighting, and limitations in the availability of supplementary mediums for providing public information (e.g., Braille directions, visual warning or evacuation alarms).

Prior to the 1960s, the vast majority of buildings and thoroughfares were designed for the "ideal user" (i.e., an able-bodied young adult). However, with the passage of the Architectural Barriers Act of 1968 which mandated all buildings being accessible, the National Center for Law and the Handicapped (1978) and the U.S. Department of Housing and Urban Development (1983) the confluence of

federal and state legislation, judicial pronouncements, and publicly accepted standards of accessibility brought about significant and permanent changes in the architectural design of structures and thoroughfares. These changes prompted the removal of barriers that inhibited the accessibility (e.g., mobility and orientation) of physically and sensorily impaired citizens.

The American National Standards Institute (ANSI) specifications, originally adopted in 1961 and updated in the 1970s, establish barrier-free criteria for buildings, entranceways, and thoroughfares. These standards are designed to eliminate all architectural barriers that have historically impeded the access of the following populations:

Nonambulatory Disabled. People with physical impairments that confine them to wheelchairs.

Semiambulatory Disabled. People with physical impairments that cause them to walk with insecurity or difficulty and require the assistance of crutches, walkers, or braces.

Coordination Disabled. Those with impairments of muscle control that result in faulty coordination and that create an increased potential for personal injury.

Sight Disabled. Those with impairments that affect vision, either totally or partially, to the extent that an individual functioning in the environment is insecure or liable to injury.

Hearing Disabled. People with impairments that affect hearing, either totally or partially, to the extent that an individual functioning in the environment is insecure or liable to injury.

Modifications that may be required to eliminate architectural barriers in facilities and along public accessways include, but are not limited to, the construction of ramps, wheelchair lifts, and curbing cutouts; the improvement of transfer areas and enlarged spaces for parking facilities; the enhancement of public facilities such as restrooms, telephones, physical education facilities, and dining areas; and the improvement of passageways, entrances (e.g., doors, doorways), room designs (e.g., spacing and layout), facility lighting, and public/user information systems.

The Americans with Disabilities Act of 1990 extended all of the architectural barrier-free activities of state and local governments and businesses whether they were receiving federal funding or not. Regularly updated guidelines are published and the minimal requirements for accessibility include guidelines for new construction, additions, alteration, and historic buildings. The full guidelines can be seen at the ADA website: http://www.access-board.gov/adaag/html. The guidelines are extensive in breadth and depth and include subjects such as platform lifts, sinks, signage, telephones, and drinking fountains. The last update was in 2002. Direct inquiries can be answered by tel.: (800) 872-2253 (voice) or (800) 993-2822 (TTY), or e-mail: ta@access-board.gov.

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See also **Accessibility; Americans With Disabilities Act; Architecture and Individuals With Disabilities**

ARCHITECTURE AND INDIVIDUALS WITH DISABILITIES

The 2000 National Census results state that 77,429,844 individuals have a sensory, physical, mental, or self-care disability in the United States (U.S. Census Bureau, 2003). Just over 6.8 million Americans living outside of institutions use assistive devices to help them with mobility. The use of wheelchairs, canes, and other devices is influenced by age, ethnicity, and gender (Kaye, Kang, & LaPlante, 2000).

Apart from the visually handicapped/blind, hearing impaired/deaf, and physically/orthopedically impaired, are those individuals who have health impairments involving cardiopulmonary disorders or neuromuscular diseases. These disorders may permit some mobility but may result in diminished stamina, poor coordination, or limited grasping and manipulative capacity.

Architectural considerations vary and are dependent on whether the handicap is physical, visual, or aural. In fact, such considerations can involve competing requirements that necessitate the establishment of unique environments for the physically handicapped in comparison with the visually handicapped. For example, a physically handicapped person confined to a wheelchair may function best in spaces that are open and large. In contrast, individuals who are blind may do better in smaller spaces where key elements of the sensory environment are within close range. Similarly, an environment that reflects noises may be advantageous for the blind but a disadvantage to the

hearing impaired, who have difficulty in attenuating to multiple acoustical cues.

There are a number of general factors to be considered in designing or adapting environments:

1. Many handicapped persons may be smaller or weaker than average; therefore, slopes, reach distances, and forces necessary to open and close objects should be reduced.
2. A number of individuals who use mobility-assist devices (e.g., wheelchairs) may have secondary disabilities that involve difficulty in strength, grasping, and so forth.
3. Most persons blind at birth, or shortly after birth, know braille, while those adventitiously blind often do not know braille.
4. Tactile signals and signs should be few in number and their location carefully considered to ensure uniformity of placement throughout a building.
5. Audible signals should be in the lower frequencies, because persons lose the capacity to hear higher frequencies with increasing age.
6. Many deaf and blind persons can hear and see in favorable environments such as acoustically "dead" surroundings for the deaf and well-lit and magnified print environments for the blind.
7. Visual and aural signals are best to provide redundancy of cues and to accommodate deaf or blind persons (Sorensen, 1979, p. 2).

Through the use of mobility training programs provided through special education classes or rehabilitation efforts, the blind are able to go virtually anywhere. While guide dogs are used by a small proportion of the blind population, most blind people are initially guided through a building and later follow a memorized route. As might be expected, the primary impediments for the blind are unanticipated hazards such as people or objects moving across their paths or objects placed temporarily in a familiar area. Some specific building modifications that can be of assistance to the blind include:

Providing steps and stairs that are not open and do not have square, extended nosings on each step.

Using sound-reflecting walls since such walls allow the blind to better use their sense of hearing as a guide (moreover, sounds reflected from surfaces assist in orienting the blind to their position in an area).

Changing the construction materials in walking surfaces to denote entrances, restrooms, stairs, and other potentially hazardous areas.

Identifying doors leading to dangerous areas by door knobs that are distinctive from that of hardware used throughout the remainder of a building.

Placing all signs and letters/numbers at a consistent height, usually between 5 feet and 5 feet, 6 inches from the floor, so that the blind will know where to find them.

Of all those having auditory deficits, few are totally deaf. Even with a large hearing loss, many of those who are legally deaf can hear and comprehend if the environment is devoid of ambient noises. Modifications that can be of assistance to the deaf include:

Warning and direction devices equipped with visual indicators, as well as audible signals.

Telephones equipped with amplifiers for the hard of hearing and telephone typewriters for those who cannot use a standard phone even with amplification.

Clear signs so the deaf do not have to ask for directions since some deaf individuals have a difficult time talking and being understood.

Those individuals who have physical disabilities can be divided into those who are ambulant (able to walk with canes, crutches, or braces) and the chair-bound. The architectural requirements for those two groups, while similar, differ in some respects.

The ambulant disabled frequently have difficulty in stooping or bending. Consequently, modifications may include:

Placing handles, controls, switches, etc., within the reach of a standing person so stooping is unnecessary.

Placing ramps with a maximum gradient of slope of 1:12.

Using steps and stairs with nonprotruding nosings so individuals with restricted joint movement or braces will not catch their toes as they climb.

Placing hand rails on both sides of steps and stairs that extend beyond the first and last steps.

Chairbound individuals evidencing high degrees of independence use collapsible adult-size wheelchairs. Apart from the greater space needed for wheelchair movement, the chair-bound individual may need:

Grab bars to transfer via the front of the wheelchair to the shower, bed, and so on.

Space alongside a chair or bed.

The placement of countertops, control devices, and so on within the low to middle range of a standing person's areas of reach.

Much of the impetus for the modification of buildings and facilities for the physically handicapped began with the Architectural Barriers Act of 1968 (PL 90-480) and its subsequent amendments. The act specifies that buildings financed with federal funds must be designed and constructed to be accessible to the physically handicapped. In addition, the Rehabilitation Act of 1973 (PL 93-112 and its amendments) created the Architectural and Transportation Barriers Compliance Board, which has as its mission, in part, to:

Ensure compliance with the Architectural Barriers Act, as amended.

Examine alternative approaches to barriers that confront handicapped individuals in public settings.

Determine the measures that federal, state, and local governments should take to eliminate barriers.

Many states, by state statute, require that accessibility for the physically handicapped be provided in newly constructed, privately funded buildings that are open to the public. All states require that publicly funded buildings be accessible to the handicapped. A number of states require that when extensive remodeling is undertaken, such remodeling will include making the building accessible.

The Americans with Disabilities Act of 1990 requires accessibility, and its subsequent revisions have provided up-to-date and consistently revised guidelines for removing and preventing architectural barriers for individuals with disabilities. An ADA technical assistance center has an extensive list of resources and can be found at http://www.adaportal.org.

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See also **Accessibility of Buildings; Americans with Disabilities Act; Mobility Instruction; Mobility Trainers**

ARCHIVES OF CLINICAL NEUROPSYCHOLOGY

Archives of Clinical Neuropsychology (*ACN*) is the official journal of the National Academy of Neuropsychology (NAN), a 4,000+ member organization composed primarily of practicing clinical neuropsychologists. The journal was founded in 1985 under the NAN Presidency of Raymond Dean, who became its first editor. Originally a quarterly, the journal increased to eight times a year in 1996, and also enlarged its page format to accommodate more articles. It is free as a benefit of membership in the Academy and available by subscription to nonmembers. The present editor is W. D. Gouvier of Louisiana State University. The journal is owned by the Academy and published by Elsevier Science, the largest scientific publisher in the world today.

The journal publishes original research dealing with psychological aspects of the etiology, diagnosis, and treatment of disorders arising out of dysfunction of the central nervous system. Manuscripts that provide new and insightful reviews of existing literature or raise professional issues are also accepted on occasion. The journal reviews books and tests of interest to the field, and publishes the abstracts of the annual meeting of the Academy. A Grand Rounds section is also included that provides in-depth information about individual or small groups of patients with unique, unusual, or low incidence disorders. According to impact factors calculated by the Social Science Citation Index, the journal is one of the most influential in the field of clinical neuropsychology.

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ARGENTINA, SPECIAL EDUCATION SERVICES FOR YOUNG CHILDREN IN

Among the countries of Latin America, Argentina has a well-established record of providing educational services to its citizens. Mandatory school attendance was established in 1884 and Argentina has the highest literacy rate (84%) in Latin America (UNESCO, 1984). The National Directorate of Special Education is responsible for the special instruction of mentally, physically, and socially handicapped students. Services are provided from preschool through adulthood.

Early intervention services for children from birth to age 3 were scarce in Argentina and poorly organized (UNESCO, 1981). There was a need for early educational intervention services for children and their families prior to enrolling a child in a nursery school or special center. As a result, services were developed for early stimulation

and education. These services are divided by handicapping condition and are provided in infant consultation units. For children with slight to moderate mental handicaps, services focus on sensory and motor stimulation, socialization skills, and speech development. Parents are involved in these activities so that follow through can be done at home. For children with physical handicaps (blind, partially sighted, deaf or hard of hearing), the education is divided into two stages. The first stage is early neurological and sensory stimulation; it is continued until the child has reached a developmental level of 18 months (UNESCO, 1981). The next stage involves stimulation of sensorimotor activities, language development, and the development of self-care and socialization skills. Guidance and educational services also are given to the families.

The primary goal of these intervention programs is to raise the child's level of developmental functioning so that he or she can enter a prenursery special education program. Along with outreach to parents is the involvement and continuing education of special education teachers. There is a central registry of handicapped children so that they may be referred to the appropriate resources. Primary prevention programs are initiated via the media, with special programs for or articles on handicapped children. Public meetings on issues relating to handicapped students constitute an ongoing effort at general education as to the needs of handicapped children.

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See also **Peru, Special Education in**

ARITHMETIC REMEDIATION

Remediation in arithmetic has evolved into an instructional system consisting of goals and objectives; tests at various levels and of kinds that assess the objectives; instructional activities that represent curriculum at the concrete, pictorial, and abstract levels; and summative evaluations. Instructional goals are based on the general mathematics goals of a school district or similar educational agency. These goals usually emerge from curriculum groups of teachers, supervisors, administrators, and content specialists from outside the school district. In some cases, goals are determined by available textbooks. Objectives are translations of the goals into observable performance statements.

According to the National Council of Supervisors of Mathematics (NCSM, 1979), the goal of the mathematics curriculum that was determined in 1977 (NCSM, 1977) should be to ensure that each student is able to

1. Solve problems
2. Apply mathematics to everyday situations
3. Determine if results are reasonable
4. Estimate
5. Compute
6. Use geometry
7. Measure
8. Read, interpret, and construct tables, charts, and graphs
9. Use mathematics to predict
10. Understand the role of computers

Objectives used to assess each of the NCSM goals might be to

1. Generate a list of possible solutions for finding the difference between two integers
2. Purchase items from a store and use the correct amount of money
3. State whether a series of answers make sense
4. State whether a quantity is reasonable for a specified purpose
5. Add with renaming
6. Find the circumference of a circle
7. Find the volume of a container
8. Interpret a graph showing income of teachers compared to inflation rates over time
9. Use a graph to predict direction of a group of stocks over time
10. Describe the use of the computer as a mathematics tutor

Diagnostic assessments may include survey tests, concept tests, interviews, attitude scales, and learning style inventories. Survey tests tap broad ranges of mathematics competence and serve to present an overview of students' strengths and weaknesses. Survey tests also are referred to as screening tests, where there are relatively few items for each of a great number of objectives. Survey tests have the following characteristics:

1. They may be group or individually administered
2. Test items are usually sequenced from easy to difficult

3. They are usually not timed
4. They may be machine scored
5. Test results indicate further areas of investigation in terms of student strengths and weaknesses

Concept tests may be used for diagnosing in more depth weaknesses identified in the survey test. Concept tests tap objectives with a greater number of items than survey tests. There may be five items on the concept test as compared with two on the survey test for each objective. Furthermore, a greater number of objectives are assessed on achievement or concept tests.

Interviews are crucial to diagnostic assessment, which is the foundation for designing, developing, implementing, and evaluating remedial programs in mathematics. Interviews occur after the paper-pencil assessments and may accompany additional diagnosis at concrete and pictorial levels. Interviews provide a structure for probing how and what a student is thinking. The following types of data may emerge from interviews: (1) what the student is thinking; (2) the student's thought processes, for example, whether the thinking is concrete or simplistic, whether cause-effect relations are apparent; (3) the problem-solving strategies being used by the student; (4) the mode of representation that appears most comfortable for the student: concrete, pictorial, or abstract; (5) how the student's performance compares with age peers as well as with other things that the student can do, for example, science, writing, art, music, sports, and social interaction. Interviews may be organized around topics such as whole numbers, fractions, geometry, measurement, and mathematical applications. The purpose of the interview is to collect data in a manner that is more thorough than from written tests. It is important to probe during an interview and to avoid correcting errors and instructing. If the student gets stuck, rephrase questions and move to a lower but related objective. The interview should allow the diagnostic teacher to identify error patterns, understand the student's thinking in regard to isolated errors, and observe whether the student's performance differs on the same objective with concrete models, or pictorial and abstract representations. Data from interviews should clarify performance on written assessments. The following matrix serves as a structure for selecting interview activities in terms of mode of representation of probe items:

The following are guidelines for conducting an interview:

1. Establish rapport to get to know the student and allow the student to relax.
2. Explain the purpose of the meeting as well as what you wish to learn. Ask the student whether he or she has any questions about the meeting.
3. Probe and learn about the student's strengths and weaknesses; do not teach.
4. Check to determine whether the student can perform prerequisite as well as corequisite skills. Prerequisites are subskills or components of a task; corequisites are parallel tasks. Multiplication and division may be considered corequisites by the time the student is in grade five; addition is prerequisite to multiplication, while subtraction is prerequisite to division.
5. Look for generic patterns of performance that may be trouble spots. Most errors in arithmetic are not random but represent patterns of misunderstanding.
6. Ask questions that serve different purposes to help identify different styles of thinking. Include divergent and convergent types such as "How many different ways can you use these materials to help you find an answer?" or "What is your favorite color?"

Attitude scales provide information about the student's interest in, fear of, or enjoyment of arithmetic. Often those students who do not do well in mathematics have high anxiety toward the subject and do not like mathematics. Thus because attitude often interacts with performance, it is necessary to gather information about the student's attitude as part of the diagnostic process. The following are some instruments that assess attitude toward mathematics: (1) Aiken Mathematics Attitude Scale (Aiken, 1972); (2) Dutton Mathematics Attitude Scale (Dutton, 1956); and (3) Mott Mathematics Student Survey (Mott, 1984).

Learning style inventories provide another view of how the student learns best. This type of inventory may assess preferences by the student such as grouping (e.g., small group, large group, or individual), or preferences concerning instruction (e.g., teacher explanations, peer tutoring, or self-instruction).

Cawley (1985), Reisman and Kauffman (1980), and Reisman (1981), presented a number of remedial instructional strategies. These include the following:

1. Present small amounts of a sequence to be learned in an organized format
2. Use visual or auditory cues that highlight what is to be learned
3. Use separating and underlining as cues
4. Emphasize patterns
5. Teach rehearsal strategies such as repetition, verbal elaboration, systematic scanning, and grouping material to be remembered
6. Reinforce attention to a relevant dimension
7. Point out relevant relationship
8. Emphasize differences in distinctive features of stimuli
9. Control irrelevant stimuli

10. Replace incidental learning tasks with structured intentional learning tasks
11. Reduce complexity of task
12. Use consistent vocabulary
13. Use a model whose competency in the task has been established
14. Encourage deferred judgment during problem solving
15. Use peer-team learning
16. Provide immediate knowledge of results
17. Plan for transfer in learning
18. Use short, simple sentences when giving directions
19. Use concrete examples of spatial and quantitative relationships
20. Use prompting

Summative evaluation should include broad objectives that allow students to demonstrate their ability to compare, summarize, classify, interpret, judge, imagine, hypothesize, and engage in decision making. Remediation is an integrated system of assessment and instruction. The concept of remediation described here goes beyond the diagnose-prescribe model that focuses on fixing with a remedy, to the preventive model that implies doing it right the first time.

The NCSM has called for schools to have designated mathematics program leaders to help meet the current challenges in mathematics education (NCSM, 1998).

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See also **Acalculia; Mathematics, Learning Disabilities In**

ARMITAGE, THOMAS RHODES (1824–1890)

Thomas Rhodes Armitage, an English physician forced by failing sight to leave the practice of medicine, founded the British and Foreign Blind Association in 1868. This organization, which became the Royal National Institute for the Blind, had as its major purposes the establishment of an effective educational program for the blind and the elimination of the existing confusion over printing systems for the blind.

Armitage established the Royal Normal College and Academy of Music to provide vocational preparation for blind students. Eighty percent of its graduates became self-supporting, a unique accomplishment in that time. After conducting an extensive study of printing systems for the blind, Armitage and his association became the leading English proponents of braille. They were instrumental in the ultimate adoption of that system throughout Britain.

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ARMSTRONG V. KLINE (1979)

Armstrong v. Kline was filed on behalf of children with disabilities seeking special education services during the summer term. The plaintiffs argued that handicapped children needed continuous, year-round programming in order to receive an appropriate education. The state countered that summer school was beyond the needs of these children and was not made available to nonhandicapped children free of charge and therefore was not required. In finding that some handicapped children are in need

of year-round services, the court used the reasoning that "the normal child, if he or she has had a loss, regains lost skills in a few weeks, but for some handicapped children, the interruption in schooling by the summer recess may result in substantial loss of skills previously learned."

The court was referring principally to the severely handicapped, concluding that they would most likely require summer sessions. Of particular importance is that the court's finding seems to shift the burden of proof from the parents (to show need) to the school district (to show a lack of necessity for year-round programming). This ruling has been upheld in the appeals process and subsequent court cases (e.g., *Battle v. Commonwealth of Pennsylvania*, 1980). The court did not issue a blanket requirement for summer sessions for all handicapped children but, rather, required a determination to be made on the basis of the needs of the individual child. This ruling ultimately forced the development of better techniques for assessing retention and regression among disabled students and helped pave the way for later federal regulations relating to extended school year services.

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See also **Extended School Year for Students With Disabilities**

ARMY GROUP EXAMINATIONS

The Group Examination Alpha, better known as the Army Alpha, was the first group test of intelligence for adults. The examination was one of a battery of tests developed as a result of the armed forces's need during World War I to have an objective means of classifying vast numbers of recruits for military service.

The original examination, consisting of 13 subtests, was developed between June and September 1917 by the Committee on the Psychological Examining of Recruits. The committee was chaired by R.M. Yerkes and included W.V. Bingham, H.H. Goddard, A.S. Otis, T.H. Haines, L.M. Terman, F.L. Wells, and G.M. Whipple. Although experience among measurement experts with group examination procedures was rare, the committee relied heavily on A.S. Otis's group adaptation to the Binet scales for content and standards for administration (Yoakum & Yerkes, 1920). The committee worked continuously for almost a month developing, selecting, and adapting methods for the test content, and another month thoroughly testing the efficacy methods in military stations across the United States. The resulting version of the test consisted of eight subtests: (1) oral directions, (2) disarranged sentences, (3) arithmetic reasoning, (4) information, (5) Otis synonyms and antonyms, (6) practical judgment, (7) number series complete, and (8) analogies. There were five alternative forms provided and the average administration time was 40 to 50 minutes for groups of up to 500 recruits (Linden & Linden, 1968).

Between April 1 and December 1, 1918, Army Alpha was administered to approximately 1,250,000 military recruits. Contributing to its reliability and concurrent validity, the Army Alpha correlated with other ability measures as follows:

0.50 to 0.70 with officer ratings
0.80 to 0.90 with Stanford-Binet
0.72 with Trabue B and LC completion test combined
0.80 with Beta
0.94 with composite of Alpha, Beta, and Stanford-Binet.

Army Beta

The Army Alpha had more than adequately addressed the need for an instrument with which large numbers of individuals could be evaluated in a short period of time, but another problem quickly emerged. Army psychologists did not know what to do about the approximately 30% of the draftees who either could not read English or read so slowly that they could not perform on the Army Alpha. The Army Group Examination Beta, or Army Beta, was prepared to meet this need. The development of an instrument that could be group-administered without a heavy emphasis on reading or understanding verbal language presented special problems. These problems were mainly eliminated through the use of demonstration charts and pantomime to convey instructions (Yoakum & Yerkes, 1920).

The final version of the examination consisted of seven subtests: (1) maze test, (2) cube analysis, (3) X-O series, (4) digit symbol, (5) number checking, (6) pictorial completion, and (7) geometrical completion. The Beta also took approximately 50 minutes to administer and yielded the same type of numerical scores as the Alpha. Although the ability scores obtained on the Beta were somewhat less accurate than on the Alpha for the higher range

of intelligence, the data obtained revealed the following correlations:

0.80 with the Alpha
0.73 with the Stanford-Binet
0.91 with the Stanford-Binet, Alpha, and Beta

The general administration procedure for the Army examinations soon became routine. Groups of draftees (100 to 500) reported to a special building to take the mental test(s). Based on whether the draftees could speak and/or write English, they were assigned to take either the Army Alpha for literates or Army Beta for illiterates or foreign-born recruits. Depending on the individual's performance on one of these tests, a decision was made regarding classification in the military or on the need for further testing to ascertain mental capacity for military service. Individuals failing the Alpha exam were automatically administered the Beta exam to factor out the possible role of reading and oral language in their poor performance. Anyone failing the Alpha exam and the Beta exam initially was given one of three individual performance examinations. Thus, no individual was designated as mentally incompetent solely based on performance on the group examinations.

The Army Alpha and the Army Beta yielded numerical scores of ability ranging from 0 to 212, which for military classification purposes were translated into the letter grades A, B, C, D, or E. Classifications were assigned as in the following examples:

Intelligence Grade	Probable Classification	Definition	Score (Alpha)
A	High officer type	Very superior	135–212
B	Commissioned/ Noncommissioned officer	Superior	105–134
D–	Considered fit for regular duty; rarely suited for tasks requiring special skill or alertness	Very inferior	0–14

The scores on the Alpha showed a high correlation with the individual's social status. The data also seemed to indicate a high correlation between an individual's Alpha score and level of occupational responsibility (Yoakum & Yerkes, 1920). These data were at least partially responsible for the soon to be widespread use of tests to predict vocational success, but as Matarazzo (1972) points out in reporting this data, there was a failure to highlight the considerable overlap in the scores obtained by individuals in the various occupational groups. More important, the vast amounts of data generated from the Army Alpha exams provided glimpses of the full range of adult abilities, confirming Galton's assumption that intelligence test scores are normally distributed in the population at large. Additionally, these data were largely responsible for the practice of using a fixed mental age for calculating adult intelligence.

The practical utility of the entire battery is expounded in terms of the number of men discharged from military service before the country wasted vast amounts of money, effort, and time training them. Yoakum and Yerkes (1920) reported that between April and November 1918, 45,653 draftees were found deficient to serve in the military. From a measurement or psychometric perspective, the subtests and techniques developed and used for the army group examinations paved the way for the tremendous growth of group and individual testing in education and industry. Subtests developed for the army examinations are very much in evidence on most current tests of intelligence. For example, the Wechsler scales are composed of subtests that are in many respects identical to the subtests on the Army Alpha and Beta. This is not surprising: The author of these scales, David Wechsler, participated in the army testing program during World War I.

The influence of the army group examinations is not all positive. Anastasi (1976) reminds us that often tests modeled after the army examinations failed to acknowledge and account for the limitations of the technical properties of the group examination methods. This failure resulted in much of the negative sentiment toward ability testing in the United States. That sentiment threatened the demise of psychological testing. Thus the army examinations may have done as much to retard as to advance the progress of psychological tests. The ease and efficiency of these group techniques also created a preference for impersonal testing as opposed to the more clinical, individual testing methods promoted by pioneers such as Binet (Matarazzo, 1972).

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See also **Intelligence Testing; Measurement**

ARTERIOVENOUS MALFORMATIONS

Arteriovenous malformations (AVMs) of the central nervous system are a set of vascular abnormalities. These congenital lesions are typified by the failure of development of the capillary network normally separating arteries and veins. Lack of a capillary bed allows exaggerated blood flow through the malformation, shunting and stealing blood from other areas of the vascular system, potentially hemorrhaging, and at times growing, so as to lead to obstructive hydrocephalus. The clinical features of the malformation depend on the site, size, and integrity of the malformation. The most common presentation is related to the hemorrhage of an AVM (Humphreys, 1999). Less than 15% of children with AVMs present with seizures, and the remainder are identified secondary to symptoms that include evidence of ischemia, congestive heart failure, developmental delay, or chronic headaches (Humphreys, 1999). AVMs may be divided into three subtypes: true AVMs, AVMs involving the vein of Galen (aneurysms of the vein of Galen), and cavernous hemangiomas (Brett, 1997).

Arteriovenous malformations of the brain or spinal cord are reported to be rare (Hubbard & Meyer, 1998). Prevalence and incidence rates are not reported, however, probably because these lesions are identified only when there is a clinical event (e.g., hemorrhage or seizure). Humphreys (1999) reported that AVMs are rarely discovered as an incidental finding, except in the context of trauma.

Characteristics

1. True AVMs
   - These are structural defects in the formation of the capillary network.
   - The etiology of the abnormality is unclear.
   - Classic AVMs may expand their bulk, causing obstructive hydrocephalus. They may present when they hemorrhage. The gliotic cortex may become a seizure focus.
2. AVMs involving the vein of Galen
   - AVMs involving the vein of Galen are marked by direct communication between the cerebral arterial circulation and the vein of Galen.
   - Congestive heart failure is the usual presentation in infants and occurs when massive amounts of blood are shunted to the malformation leading to progressive high-output heart failure.
   - In toddlers, presentation is frequently that of obstructive hydrocephalus. A reversible hemiplegia, secondary to a steal effect (blood being shunted away from one hemisphere), may be present.
   - Older children may present with headaches, pyramidal and cerebellar signs, hydrocephalus, or intellectual disability.
3. Cavernous hemangiomas
   - Cavernous malformations (also called angiographically occult vascular malformations) are comprised of dilated thin-walled vascular channels.
   - Cavernous angiomas may be inherited as an autosomal dominant disorder. The genetic abnormality is not the same between pedigrees (e.g., there is genetic heterogeneity; Labauge, Lagerge, Brunereau, Levy, & Tournier-Lasserve, 1998).

AVMs are treated when they become symptomatic. Treatment goals are to preserve life and limit neurologic compromise while achieving complete removal of the AVM and maintaining cerebral circulation (Humphreys, 1999). AVMs can be ablated via surgical resection, intravascular embolization, radiosurgery, or a combination of these modalities. The choice of modality is dependent on the size and site of the lesion. Seizures, which often persist after surgical resection, are treated with anticonvulsant medication but may require repeat surgery for seizure control (Humphreys, 1999). The natural history of cavernous angiomas is less clear, so treatment decisions are difficult (Humphreys, 1999; Labauge et al., 1998).

Educational needs are dependent on the degree of neurologic dysfunction. A full neuropsychological evaluation is required to identify current needs and establish areas of deficit and strength. The mechanism of damage (e.g., hemorrhage vs. hydrocephalus vs. ischemia, etc.), as well as location and age of symptom onset, will mediate educational needs. There is some suggestion that the less invasive nature of radiosurgery will mitigate cognitive consequences for those children in whom it is an appropriate treatment modality (Humphreys, 1999).

Prognosis depends on the type of AVM involved. Eighty percent of children who have symptomatic AVMs will require neurosurgery (Humphreys, 1999). History of a previous bleed, a single draining vein, and diffuse AVM morphology are the most important risk factors predicting additional hemorrhage in those with classic AVMs (Kondziolka, Pollack, Lunsford, 1999). There is some suggestion that mortality from hemorrhage is higher in children than in adults (Kondziolka et al., 1999). The risk of hemorrhage in children with cavernous angiomas is unclear (Humphreys, 1999). Functional outcome depends on the site of a cavernous lesion (Labauge et al., 1998). Vein-of-Galen malformations are associated with high

morbidity, and treatment is difficult (DeVeber, 1999). Progress in imaging and treatment of AVMs has decreased mortality and morbidity and will be the focus of continued investigation (Humphreys, 1999).

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ARTHRITIS, JUVENILE

Juvenile rheumatoid arthritis (JRA) is a systemic disease that causes inflammation of one and usually more joints. The manifestations of JRA vary considerably among patients. The most common symptoms include joint swelling, warmth, tenderness, and pain, which may lead to stiffness, contractures, and retardation of growth. This disease is usually accompanied by fever bursts, rash, and visceral symptoms.

This form of arthritis is the most common connective tissue disease in children and is the most prevalent of the arthritic diseases. It has been estimated that around 250,000 Americans have JRA with an incidence of 1.1 cases per year in 1,000 school-age children (Varni & Jay, 1984). The disease affects more girls than boys. It is similar to adult rheumatoid arthritis except that it typically appears before puberty and is more likely to stay in remission.

The causes of JRA are only recently known. Infection, autoimmune disorders, trauma, psychological stress, and heredity all have been considered, but evidence now supports the ideas that JRA is primarily an autoimmune disorder (Rennebohm, 1994). As there are no known causes, there are also no known cures. The most common treatment is the administration of nonsteroidal anti-inflammatory drugs such as aspirin. Other common drug treatments include gold salts, antimalarial drugs, corticosteroids, and penicillamine. Immune system medications such as methotrexate and azathiprine may also be employed (Arthritis Foundation, 2005). Special exercises and sometimes periods of rest may also be employed. Different kinds of heat may be applied to reduce stiffness and pain, and a variety of other pain-control measures have been tried. Splints are often used to prevent deformity and enhance function. Surgery, including total joint replacement, may sometimes be necessary and can be beneficial.

There are basically three forms of JRA: systemic, polyarticular, and pauciarticular. The systemic form accounts for approximately 20% of the population with JRA. High fevers, rashes, stomach pains, and severe anemia are usually present in this type. Pauciarticular accounts for 30% to 40% of the cases. It begins by affecting only a few joints, usually the large ones (knees, ankles, or elbows). Polyarticular is the most common type, accounting for 40% to 50% of children with JRA. This type affects several joints (five or more), usually small joints of the fingers and hands (Arthritis Foundation, 1983).

The long-term effects of JRA vary greatly depending on the type as well as the individual. There is no way to know the outcome of the disease in its early stages. However, the overall prognosis for children with JRA is good. Most will be able to go through adulthood without any severe physical limitations. Only about 25% will suffer any significant disability (Jay, Helm, & Wray, 1982). In most cases the disease will go into permanent remission but structural damages and functional limitations will remain. In other cases the disease may continue to be active throughout the individual's life (Rennebohm, 1994).

In addition to physical considerations, certain psychological aspects of JRA are also important. McAnarney, Pless, Satterwhite, and Friedman (1974) found that children who have JRA but no disabilities have more emotional problems than disabled arthritics. They also found that parents of the nondisabled children had a poorer understanding of the disease and were less likely to acknowledge its impact on the child's behavior, schooling, and social relations. Litt, Cuskey, and Rosenburg (1982) found that good self-image and greater autonomy coincided with higher compliance in treatment.

Wilkinson (1981) studied the emotional and social behavior of adolescents with chronic rheumatoid arthritis.

She found that one of the major complaints among these adolescents was people's tendency to treat them as younger than their age because of their smaller size. She also reported a high anxiety level because of restricted mobility and fears about an uncertain future. Children with JRA are at increased risk of emotional and behavioral problems but there is considerable variability in the response to the disorder psychologically (Varni, Rapoff, & Waldrov, 1994).

Schaller (1982) stressed the need to avoid an image of chronic invalidism. It is important to account for the limitations experienced by individuals with JRA; however, when not specifically restricted by the disease, they should be expected to perform as well as their peers.

The way children are treated by others affects their self-image; therefore, those working with these children should help them to avoid feelings of inferiority. Wilkinson (1981) reported that the adolescents in her study expressed a desire for more social contacts with able-bodied individuals and a desire to be in regular rather than special classes.

In the classroom as well as at home, children should not be unnecessarily restricted from activities. They should be encouraged to find alternatives when they cannot participate in regular play. Periodically calling on the child to do an activity requiring movement may help relieve stiffness whenever the child is not in pain. Beales, Keen, and Holt (1983) stressed the importance of being aware of the child's perception of pain. Children may be less likely to interpret internal sensations as pain and therefore may fail to recognize it as a warning sign. Often, even when children know they are in pain they may not complain and may even try to conceal it. Some visible signs that may help determine the presence of pain are walking with a stiff gait, taking short steps, tense muscles, and inability to perform certain tasks. Cognitive behavior therapies may be useful in controlling chronic pain in JRA (see Arthritis Foundation, 2005; Varni et al., 1994).

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See also **Physical Disabilities**

ARTICULATION DISORDERS

Articulation involves the study of (1) the phonemes in a given language, (2) the manner in which they are produced, (3) the order in which they are acquired by the members of a culture, and (4) the disorders which may occur. There are 40 phonemes in the English language, consisting of 26 consonants and fourteen vowels (Bernthal & Bankson, 1998). A phoneme is defined as the smallest difference conveying a change of meaning. This is in contrast to an allophone which includes all of the acceptable productions of a given phoneme. Allophonic variations do not impact meaning.

The consonant sounds may be differentiated on the basis of three distinctive features: place, manner, and voicing. A vowel varies according to tongue height, placement, and whether the tongue is tense or lax. There are also other characteristics of phonemes, known as suprasegmentals, that cause variations in sounds but do not signal a difference of meaning in English. Suprasegmentals are distinctive in some languages. For example, in tonal languages, the pitch of a phoneme signals a change in meaning.

If a traditional view of articulation development is taken, the age of emergence of specific phonemes may be identified. For example, /p/, /b/, and /m/ are early developmental phonemes and are typically in a child's repertoire by age 3. In contrast, the /s/ phoneme may not emerge

until a child is 8 years of age or older. Numerous studies, including one by Sander (1972), have examined the age of emergence of various phonemes. All children have articulation errors when they are young and are moving through the normal developmental process. The errors decrease in number as the child matures. Generally, articulation development is thought to be complete by age 8, although some children continue to develop articulation skills beyond this age.

When a child or adult has an articulation disorder, it is characterized by sound production errors, usually involving less than 10 phonemes. The individual's underlying rule system for combining sounds into words is thought to be intact. That is, the speaker understands how sounds are put together to make words which convey meaning, but the speaker is having trouble making individual sounds. The errors can further be classified as phonetic or phonemic in nature.

A listener will generally understand a person with articulation errors, although speech production will attract the listener's attention. The misarticulations may vary in severity from a mild distortion to omission. The least noticeable error is a mild distortion. The listener will recognize the sound as an /s/, for example, but its production will be just outside of the acceptable allophonic range. Only the skilled listener is likely to note this error. As the degree of distortion increases into the more severe range, the average listener will become aware of the error in production. Even though the phoneme is recognizable as a particular phoneme, it will call attention to itself. Further on the continuum of severity is substitution, in which another phoneme is used in place of the one that is intended. For example, a person may substitute a /t/ for a /k/. The most severe error is an omission, in which the sound is left out.

The order of progression of severity is based on the impact the error has on intelligibility and the knowledge the speaker has about the phoneme. In regard to intelligibility, a distortion of a phoneme in a word generally does not impair the listener's understanding of a word. A substitution or omission may make it difficult for the listener to identify the word being used. The knowledge a speaker has about the phoneme is also reflected in the type of error used. When the phoneme is distorted, the speaker knows that for example, it is an /s/ but they are unable to correctly execute the production. When the error is a substitution, for example /p/ for /s/, the speaker knows a sound is required in a particular location in a word but isn't sure which sound belongs there. In contrast, when a phoneme is omitted, the speaker doesn't realize a phoneme is needed. Thus, omission is the most severe type of error, followed by substitution and distortion.

The more common sources of articulation errors are (1) inaccurate learning, (2) incorrect speech models, (3) structural deficits of the speech and hearing mechanism, and (4) imprecise and/or poor coordination of motor movements. In the first instance, inaccurate learning, something interferes with the process as the child is acquiring a sound. For example, if a child has fluid in his or her ears or brain injury at a critical point in the acquisition of a phoneme, the child may not hear the sound or its replication accurately. It is thought that children rely heavily on the auditory modality when sounds are being learned, but later shift their focus to the proprioceptive/kinesthetic aspects for monitoring the accuracy of their productions. Thus, initially they focus on how their sound matches up auditorily to that produced by others, but later, once the phoneme is learned, they pay less attention to the auditory aspects and focus on how it feels both proprioceptively and kinesthetically. They then are thought to make the assumption that if the phoneme felt like last time, it must be correct. An erroneously learned production is thus maintained. Second, a child may have a family member or significant other who has an articulation error and is providing incorrect models for the child. Learning of faulty articulation is likely to occur because the child will imitate the errored phoneme and incorporate it into his or her repertoire. Third, structural abnormalities of the speech and hearing mechanism may be a contributing factor to articulation errors. Examples are teeth that do not occlude properly or inadequate velopharyngeal closure. The structure may interfere with the ability to produce acceptable phonemes. Fourth, imprecise motor movements and/or the coordination of these movements may cause articulation errors. Correct articulation requires precise placement, timing, and accurate movement of the articulators. Persons with cerebral palsy, dysarthria, or apraxia, for example, have difficulty in these domains, and their speech production is affected to varying degrees.

The treatment for articulation errors generally consists of teaching the phoneme in isolation, and then assisting the client in generalizing the new sound throughout their sound system. Traditional strategies, such as those suggested by Van Riper (1978) or Bankson and Bernthal (1998), may be used. Minimal pairs and co-articulation strategies may also be utilized. Typically, the prognosis for resolving the errors is good. The American Speech-Language-Hearing Association (2005) has an excellent website with current and helpful resources for articulation problems.

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***See also* Communication Disorders; Speech and Language Disabilities; Language Disorders**

ARTS INTEGRATED WITH MATHEMATICS

All forms of arts are related with mathematics from various perspectives, and most of the connections between arts and mathematics could be developed as alternative mathematics instructional approaches to demonstrate and explain certain mathematics concepts, especially for students with special needs. In general, arts can facilitate mathematics learning from two aspects—provide a high motivational environment for students with mathematics anxiety and behavior problems to engage them in learning mathematics (Mansilla, 2005) and provide alternative approaches to understand mathematics for students who have difficulty understanding specific mathematics content as well as those students who do not possess intelligence strengths in mathematics (Gardner, 1993).

Emotion is essential in students' learning, because positive emotions may lead to higher levels of motivation facilitating students' ability to focus on attention to learning (Sylwester, 1995). In applying motivational theories, Miller and Mitchell (1994) suggested teachers should create a highly motivational environment for learning, free from tension and other possible causes of embarrassment or humiliation. Music, visual arts, dance and drama along with their aesthetical features, have the potential of creating highly motivational environments for students, in which they can discover and think about mathematical concepts in various ways and build fundamental understandings and appreciation for both mathematics and the arts. What is more, arts can provide students a highly motivational environment with less prejudice and violence, helping them becomes better risk takers and communicators (Trusty & Oliva, 1994). Arts not only can intrinsically motivate students to facilitate them to pursue more advanced mathematical knowledge based on their own initiative as well as accept more challenging task during learning but also can extrinsically motivate students to learn mathematics by increasing students' engagement in learning mathematics concepts and doing mathematical problems (Glastra, Hake, & Schedler, 2004).

Multiple intelligences theory has advocated that some students may have lower logical/mathematical intelligence than others, and some students might experience difficulties in learning mathematics through traditional instruction (Gardner, 1993). Using arts to enhance children's enjoyment and understanding of mathematical concepts and skills, can help students gain access to mathematics through new intelligences. For example, music (linked with musical intelligence), visual arts (linked with spatial intelligence), dance (linked with bodily-kinesthetic) and drama (linked with linguistic intelligence) all can be used to promote the development of intellectual domains of mathematics. Different form of arts can enable students to use different learning styles and prior knowledge, pulling together diverse cognitive and affective experiences and organizing them to assist understanding (Selwyn, 1993). As an application of multiple intelligence theory, teaching mathematics integrated with arts facilitates students to complete the process of knowledge transfer; as a result, students whose strengths lie in areas other than the logical-mathematical intelligence can learn mathematics more easily (Johnson & Edelson, 2003).

Teachers should take advantage of the opportunities that the variety of arts offers to help all students learn mathematics in challenging and enjoyable ways. By designing appropriate arts integrated into mathematics lessons, students can understand, analyze, and interpret mathematics through different routes (An & Capraro, 2010). Teaching mathematics linked to suitable arts elements is an effective strategy in designing and teaching mathematics in a pleasurable way with sense-making.

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ART THERAPY

The use of clients' artwork by psychiatrists and psychologists to understand their psychopathology has been around for many years. There have been instances as early as the 1900s, where psychiatrists used drawings to observe and understand the psychopathology of their clients. Despite this practice, the actual practice of art therapy has only existed since the mid 20th century (Malchiodi, 2005).

There have been two pioneers for art therapy in the United States: Margaret Naumburg and Edith Kramer (Ulman, 2001). Naumburg based her concept of art therapy on the psychoanalytic approach by Freud and Jung. Naumburg believed that artwork could be used as symbolic speech for the unconscious, uncovering deep emotions. Expressions of these unconscious emotions using artwork have been based on psychoanalytic and analytic techniques such as free association, transference between the client and therapist, and spontaneous art expression. About the same time Naumburg began to make advances in the area of art therapy, there was a second pioneer, Kramer, in the United States who brought her ideas and concepts to the area of art therapy (Ulman, 2001).

Kramer comprised her concept of art therapy using an emphasis on art in psychotherapy. Kramer believed that art is a means by which therapists can create human experiences. These experiences allowed the individuals to relive particular experiences in therapy as a way to resolve any conflicts that have arisen (Ulman, 2001). Both Naumburg and Kramer's concepts were used to help adults and children deal with depression and traumatic events.

Art therapy has been used to help juvenile offenders. Venable (2005) found that engaging juvenile offenders in artwork afforded them opportunities that gave them a better insight on life. For example, through a mural project the juvenile offenders were able to maintain positive relationships with teachers as well as learn various techniques pertaining to art.

Another population that art therapy has been used with is children with emotional disturbances. Graham (1994) believed that art could be a successful way for children with emotional problems to deal with the traumas or negative experiences in their lives. For example, through their paintings and drawings, children can express their feelings and thoughts that they may feel are hard to express to others. Although advances have been made in art therapy, there is still little research on outcome studies addressing the effectiveness of art therapy; however, the techniques and concepts of art therapy are still used by many in diverse professions.

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***See also* Behavior Disorders; Emotional Disorders; Recreational Therapy**

ASPERGER, HANS (FEBRUARY 18, 1906–OCTOBER 21, 1980)

Hans Asperger was a 20th-century Austrian pediatrician. He was best known for his work with a group of individuals with a constellation of symptoms that were both similar and distinct from autism as first described by Kanner in 1943. This constellation of symptoms was later called Asperger Syndrome (or Asperger Disorder)—named so after Hans Asperger. Currently, in the *Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition–Text Revision* ([DSM-IV-TR], American Psychiatric Association [APA], 2000), Asperger Syndrome is considered one of the Pervasive Developmental Disorders.

Asperger was born in the Austrian countryside in 1906. He went to school in Vienna, eventually graduating with his medical degree in 1931. He worked at several hospitals and clinics over his career, most notably, the Children's Hospital of the University of Vienna and the University Pediatrics Clinic (Frith, 1991; Klin et al., 2000).

In 1944, Asperger published an article that described his work with a group of four youngsters that displayed characteristics of a condition that had not been described before. These children were cognitively bright but, most strikingly, had persistent social interaction difficulties. Other characteristics included intense obsessions and interests, nonverbal communication issues, sensory issues, and various repetitive behaviors (Asperger, 1944/1991). Asperger labeled these children as having "autistic psychopathy."

Coincidently at the same time in the United States, Leo Kanner (1943) was working with another group of children who he also called autistic. Unfortunately due to World War II, and because Asperger's (1944) work was published in German, it was not familiar in the west for decades, while Kanner's autism case studies became very well recognized. It was not until after Asperger died that his work became well known in the United States and subsequently important to several fields, including special education, psychology, and child health.

Lorna Wing (1981), a British physician and psychologist, brought the condition to a wider public and highlighted this disorder, which had both similarities to and differences from autism. Asperger Syndrome became an official diagnosis in the DSM-IV (APA) in 1994, distinct from autism due to lesser or nonexistent delays in communication, although individuals with AS have difficulty with pragmatics, or social use of communication. However, as of early 2013, with upcoming revisions to the DSM in progress, it was speculated that the Asperger diagnosis would be removed from the manual and that all autism related conditions be placed in one autism spectrum disorders category.

Asperger was a prolific writer with more than 300 publications (Lyons & Fitzgerald, 2007). His legacy in the areas of child health and education is evident in the hundreds of books, manuals, teaching guides, and personal stories that other authors have written about this syndrome. Based on accounts of his own behaviors and interests it has been speculated that perhaps Asperger himself had an autism spectrum disorder (Lyons & Fitzgerald, 2007). Asperger was married and had five children. He died in Vienna in 1980.

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ASPERGER SYNDROME

In 1944 a Viennese physician, Hans Asperger, published a seminal paper that described four children with an unusual pattern of poor social skills and other atypical behavior (e.g., self-stimulatory responses and insistence on environmental sameness), albeit normal cognitive and language abilities. Asperger concluded that the condition was a unique and previously unidentified neurodevelopmental disorder that he termed "Autistic Psychopathy" in childhood (Asperger, 1944). Interestingly Hans Asperger made this discovery shortly after Leo Kanner identified children with early infantile autism (Kanner, 1943).

Following its identification in 1944 there was virtually no mention of Asperger syndrome (subsequently referred to as AS; also referred to as Asperger disorder) until 1981 when Lorna Wing wrote about Hans Asperger's work and Uta Frith translated Asperger's original paper in 1991 (Frith, 1991; Wing & Potter, 2002). Subsequent to the work of Wing and Frith there began a general and increasingly rapid acceleration and intensification of interest in AS; currently the condition is widely recognized by both professionals and the general public. The wide-scale awareness of the disorder has been accompanied by a dramatic increase in the number of individuals diagnosed with AS, including school-age children and youth. In spite of the extraordinary increase in interest in AS, the condition is generally poorly understood, including the unique and defining elements of the disability that distinguish it from other forms of higher-functioning autism. Identification and implementation of evidence-based methods that can assist individuals diagnosed with AS also significantly trail behind its recognition.

The dramatic increase in recognition and identification of individuals with AS correlates with addition of AS as a sub-classification of *Pervasive Developmental Disorder*, beginning in 1994, in the widely applied *Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition–Text Revision* (DSM–IV-TR; American Psychiatric Association, 2000) and the parallel international classification system, *International Statistical Classification of Diseases and Related Health Problems* (World Health Organization, 2007). According to the current DSM–IV–TR, *Pervasive Developmental Disorder* is used as a diagnostic reference for persons who are "characterized by severe and pervasive impairment in several areas of development: reciprocal social interaction skills, communication skills, or the presence of stereotyped behavior, interests, and activities" (p. 69). Specific Pervasive Developmental Disorders identified in the DSM–IV–TR, in addition to AS, are Autistic Disorder, Childhood Disintegrative Disorder, Rett Disorder, and Pervasive Development Disorder–Not Otherwise Specified. The term "higher functioning autism spectrum disorders" is not a separate DSM classification; nevertheless this term is widely used to refer to a variety of children and youth who function

at the higher end of the autism spectrum, i.e., relative to intellectual, cognitive, academic, language, and overall functioning. The increased acceptance and use of terms such as "higher functioning autism spectrum disorders" and "high functioning autism" is connected to the similarity in characteristics of children and youth with AS and other forms of higher-functioning autism.

In 2013, there will be a revision in the DSM classification system wherein the current subclasses of autism disorder, including AS, will likely be eliminated (Regier Narrow, Kuhl, & Kupfer, 2009). Those specific diagnostic elements will likely be replaced by *autism spectrum disorders* to account for autism-related disabilities falling on a continuum and in recognition that AS and higher functioning autism spectrum disorders make up similar and frequently indistinguishable conditions. The trend to reference AS and high-functioning autism as a similar entity is also related to recognition that the support and intervention methods and strategies for these individuals are often identical.

On the education front, AS was noted within the 1997 Individuals with Disabilities Education Act (IDEA) disability classification *Autism*. This education-policy amendment reflected the wide-ranging variability of the autism spectrum and that learners with AS and other forms of autism share core social, communication, and behavior characteristics that significantly affect educational performance and major life activities and functioning. As is the case with autism, AS is understood to be a biologically based disorder that causes impairments in social understanding and interactions, communication, and behavior. AS and other forms of autism spectrum disorders are not caused by poor parenting (Klin, Volkmar, & Sparrow, 2000; Thompson, 2007; Wing & Potter, 2001).

AS and other forms of autism spectrum disorders are approximately 5 times more common among boys than girls. These disorders have been identified throughout the world among all racial, ethnic, economic, and social groups. The Centers for Disease Control and Prevention (CDC, 2010) currently estimates that approximately 1 out of every 110 individuals will fall on the autism spectrum. That count is a striking increase when contrasted with the 4–5 per 10,000 prevalence estimate of past years (Lotter, 1996). It is also noteworthy that a number of professionals and professional organizations generally estimate that the current prevalence estimate is approximately 1 in 100 persons (Autism Society of America, 2010). It is difficult to precisely disaggregate the prevalence of AS and higher functioning autism spectrum disorders from all autism spectrum disorders. Brasic (2008) notes that "various studies indicate rates ranging from 1 case in 250-10,000 children"; and consequently that "additional epidemiologic studies are needed" (p. 1). Volkmar and Klin (2000) perceptively acknowledged that "the lack of a real consensus on the diagnosis of [AS] means that present data are, at best, 'guestimates' of its prevalence" (p. 62). The DSM–IV–TR (2000) also withholds an exact prevalence estimate for AS, noting that "definitive data regarding the prevalence of Asperger Syndrome are lacking" (p. 82). Notwithstanding problems in knowing the exact prevalence of AS and higher functioning autism spectrum disorders, it appears that these disabilities are on the increase and are increasingly being documented.

Characteristics of Asperger Syndrome

As discussed below, common features of individual's diagnosed with AS fall in the areas of (a) social skills, (b) communication, (c) cognitive, academic, and learning, (d) behavior, emotion, and sensory characteristics; and (e) physical and motor skills.

Social Skill Considerations. First and foremost, AS is a social disorder (Frith, 1991; Klin, Volkmar, et al., 2000; Simpson & Myles, 2011). Individuals with AS are notable for their awkward and inept social behavior. Many children and adolescents with AS appear interested in interacting with others; however, their interactions tend to be unskilled or characterized by inability to engage in age-expected social interactions, including appropriate play. Indeed, the social deficits of many children and adolescents with AS and higher functioning autism spectrum disorders appear to primarily be due to a lack of recognizing and understanding appropriate social customs and poor skill in executing and participating in social interactions rather than a disinterest or fear of social contact and lack of motivation to interact with others. It is not unusual for children who appear motivated to interact with others to become less inclined to engage others socially in their teen and adult years, possible because of a lifetime of being rejected or snubbed. Individuals with AS may display emotional vulnerability and stress over not understanding social situations and how to apply social rules, especially when social circumstances, settings, and situations are variable and inconsistent. In this context it is common for individuals with AS to want environmental constancy and uniformity and strict application of rules (Williams, 2001).

A deficit in *theory of mind* capacity, wherein individuals with AS are thought to possess limited empathy and understanding of the internal thoughts, feelings, and beliefs of other people (Safran, 2001; cf. Frith, 1991; Klin, Volkmar, et al., 2000), is a commonly used explanation for these and related problems. Not surprisingly, many individuals with AS are poor incidental social learners. That is, they may attempt to learn appropriate social responses independent of context and without fully comprehending their meaning.

Communication and Language. Individuals with AS typically do not manifest clinically significant delays in language (American Psychiatric Association, 2000; Thompson, 2007). Frith (1991) observed that children with AS "tend to speak fluently by the time they are five" (p. 3).

However, she also noted that their language is frequently "odd in its use for communication" (p. 3). Without a doubt, children with AS tend to have a variety of unusual communication characteristics, especially with respect to standard pragmatic social and conversational standards. Voice quality, pitch and modulation characteristics may also be atypical. Common concerns include one-sided monologues, self-centered conversational styles, and narrowly focused interests. Nonverbal communication deficits and related social communication difficulties are also common, including eye contact and knowing how close to stand to another person while talking; making odd gestures or movements while talking; unusual body posture; and failing to use or understand gestures and facial expressions. It is not unusual for children with AS to experience problems in comprehending abstract concepts, figures of speech such as idioms and metaphors, and rhetorical questions (Shore, 2003).

Cognitive, Academic, and Learning Characteristics. Individuals diagnosed with AS are generally believed to have average or above-average intellectual abilities (World Health Organization, 2007), yet many of these learners experience academic performance problems (Attwood, 2007; Frith, 1991; Siegel, Minshew, & Goldstein, 1996). Obsessive and narrowly defined interests, concrete and literal thinking styles, inflexibility, poor problem-solving skills, poor organizational skills, and poor social abilities often result in poor classroom performance and educational outcomes that fall short of learners' potential. Children and youth with AS frequently experience difficulty in generalizing previously learned knowledge and skills and applying information and skills. Notwithstanding these challenges, many children and youth with AS attend college and there are a number of adults with AS who have successful professional careers and personal lives (Harpur, Lawlor & Fitzgerald, 2004).

Behavior, Emotion, and Sensory Characteristics. Behavioral problems are not universal among persons diagnosed with AS, though not uncommon (Barnhill et. al., 2000). Often these problems occur in response to disorganized, confusing, and unpredictable situations; related to stress, anxiety, loss of control or inability; and associated with social ineptness and obsessive and single-minded pursuit of idiosyncratic interests.

As individuals with AS get older, more significant social, emotional, and other mental health problems may develop (Attwood, 2007; Tantam, 2000). Studies of adolescents (Cesaroni & Garber, 1991; Ghaziuddin, Weidmer-Mikhail, & Ghaziuddin, 1998) suggest that a number of these individuals may experience heightened anxiety in social situations. Wing (1981) first noted that it is at this time that depression and anxiety tends to occur, a pattern that has been confirmed by others (Barnhill, 2001; Ghaziuddin et al., 1998; Tantam, 2000). It is also significant that individuals with AS are vulnerable to teasing and bullying across the lifespan.

Relative to sensory matters, individuals with AS are known for their hypersensitivity and hyposensitivity for sensory stimuli (Dunn, 2007). For instance, atypical responses to particular sounds, smells, visual stimuli, and food textures are common.

Physical and Motor Skill Abnormality. Wing (1981) observed that children with AS tended to have body balance and motor coordination problems. Others (Attwood, 2007; Smith, 2000; Smith & Bryson, 1994) have also observed that it is not unusual for individuals with AS to be clumsy and awkward. The significance of these problems can be far-reaching in that they can affect participation in games and activities calling for good motor skills. Because many school-related activities such as handwriting require fine motor dexterity these deficits can be associated with a number of significant problems (Todd & Reid, 2007).

Relative to matters related to characteristics it is also significant that individuals with AS have high rates of comorbidity (i.e., presence of related disorders and conditions). Attention-deficit/hyperactivity disorder, obsessive-compulsive disorder, mood disorders, and anxiety disorders are especially common in individuals with AS (American Psychiatric Association, 2000; Volkmar & Klin, 2000).

Assessment

As a general rule, assessment of individuals with AS falls within two major domains: (a) screening and diagnostic evaluations and (b) assessment for purposes of programming, instruction, and intervention planning (Simpson & Myles, 2011). Screening and diagnostic assessments may be undertaken by clinical professionals such as psychologists, psychiatrists, mental health teams, or by educational professionals. Clinical professionals typically use the diagnostic guidelines of the previously noted *Diagnostic and Statistical Manual of Mental Disorders* (DSM) (American Psychiatric Association, 2000). Educational diagnostic professionals, such as school psychologists, commonly rely on guidelines of the *Individuals with Disabilities Education Improvement Act*.

Accurate screening and diagnosis are fundamental and imperative. However these initial steps must be followed by assessments geared to intervention, program planning, and identifying individualized supports and accommodations (Simpson & Myles, 2011). Thus both clinical and educational screening and diagnostic evaluations must be followed by evaluations that are designed to understand students' needs and identify support programs and services. This second phase of the evaluation process will be the primary determinant of school and community success for children and youth with AS.

Screening, diagnostic assessments and evaluations focused on identifying individuals' unique learning, social, communication, adaptive, and other needs is based on both formal and informal assessment methods (Lord &

Bishop, 2009). *Formal assessment* generally refers to tests and other norm-referenced measures while *informal assessment* uses information and data based on record reviews, interviews, observations of students, curriculum-based assessments, and evaluation of informal learning traits. These methods are used to assess individuals' intellectual and cognitive abilities, academic skills and needs, language and communication, sensory and motor needs, adaptive behavior and independent living abilities and needs, behavior and emotional strengths and needs, and social abilities and challenges.

Screening and assessment scales specifically designed to evaluate children and youth for AS are limited. Two of the most widely used of these scales are the *Asperger Syndrome Diagnostic Scale* (Myles, Bock, & Simpson, 2000), a 50-item pencil-paper scale; and the *Gilliam Asperger Disorder Scale* (Gilliam, 2001), a 32-item scale that has four subscales (social interaction, restricted patterns of behavior, cognitive patterns, and pragmatic skills). The Australian Scale for Asperger's Syndrome (Garnett & Attwood, 1998) is another recognized screening tool. Another commonly used and well-accepted diagnostic tool appropriate for use with individuals suspected of having AS is the *Autism Diagnostic Interview–Revised* (ADI-R; Couteur, Lord & Rutter, 2003). The ADI-R uses a standardized, semi-structured clinical interview format that focuses on reciprocal social interaction; language and communication; and stereotyped, restricted, and repetitive interests and behaviors.

Interventions, Supports, and Accommodations

In spite of having a challenging disorder, individuals with AS typically have relatively strong cognitive, language, and learning abilities (Thompson, 2007). These assets generally bode well for school and post-school success. This optimistic note and corresponding potential, however, are contingent upon availability of appropriate supports and accommodations; and assistance, backing, and advocacy of knowledgeable and committed families, educators and other professionals. To be sure, it is extraordinary for individuals with AS to be successful in school and life without appropriate support services. Social impediments along with learning problems, unsupportive environments, and uninformed teachers, families, and others all too often result in significant problems and ultimately a failure on the part of individuals with AS to achieve on a plane with their potential. For this reason it is essential that persons connected to individuals with AS, especially teachers and related service educational personnel, use individualized and proven support methods and strategies.

First and foremost there is a need for social and behavioral supports for individuals with AS (Attwood, 2007). Social skills and social behavior affect and influence virtually every facet of life, including formation and maintenance of friendships and working relationships, employment, independent living, and overall quality of life throughout the life cycle. Particularly important are those skills that are foundational and essential to a number of areas, including development of social assets needed for peer and adult social interactions and positive and productive relationships; self-management, personal responsibility, and self-realization activities; and social skills specifically needed for school and academic success (Simpson & Myles, 2011). These domains can be developed using a variety of basic proven approaches, including explicit instruction of specific individualized social skills, programs that develop social understanding and social problem solving, social interpretation interventions, and intervention programs that rely on peer-mediated activities and supports (Simpson & Myles, 2011).

Academic and school-related supports are also essential. Strategies that assist learners with AS to deal with problems of distraction and inattention; narrow, obsessive, and unusual interests; atypical learning styles; fine and gross motor deficits; and poor motivation are especially important (Mesibov & Shea, 2010; Simpson & Myles, 2011). Supports that have proven to be generally effective include educational programs that provide strong structure, including predictable schedules and established routines, consistent assignment formats, clearly delivered and consistent expectations, and structured physical settings. Teachers and programs that provide ongoing assistance that facilitates learners' problem solving and development of skills needed to apply academic skills to address real-life problems and issues are also important. Academic and learning supports for students with AS include use of proven instructional support strategies such as priming, assignment modifications, and organizational methods such as visual supports, task organization programs, peer buddy programs, assignment notebooks, timelines, travel cards, and home base programs are also recommended (Myles & Simpson, 2001; Safran, 2001; Simpson & Myles, 2011; Williams, 2001).

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ASPERGER SYNDROME DIAGNOSTIC SCALE

The Asperger Syndrome Diagnostic Scale (ASDS, 2000) is an individually administered measure used to identify

children or adolescents ages 5 through 18 who manifest the characteristics of Asperger Syndrome. The scale contains 50 YES or NO items that are divided into five subscales of behavior including Language, Social, Maladaptive, Cognitive, and Sensorimotor. These items are summed to produce an Asperger Syndrome Quotient (ASQ), which indicates the likelihood that an individual has this disorder. Administration time usually takes between 10 to 15 minutes and the measure should be completed by an individual who has had direct, sustained contact with the child or adolescent for at least two weeks (e.g., parents, teachers). The record form provides the rater with instructions and contains a score summary section, a profile of scores, and an ASQ interpretation guide. There is also an additional section that provides the examiner with questions that may be used to obtain further diagnostic information.

This measure was normed on a sample of 115 children and adolescents between 5 and 18 years of age, who had been diagnosed with Asperger Syndrome. The sample was representative of the 1997 U.S. census data with respect to race and geographic region. There was a significantly larger percentage of males in the sample compared with females, which is appropriate, as it has been reported in research that males are four times more likely to be diagnosed with Asperger Syndrome than females (Kadesjo, Gillberg, & Hagberg 1999). The ASDS yields percentile ranks and standard scores (with a mean of 10 and a standard deviation of 3) for the subtests and a percentile rank and quotient score (with a mean of 100 and a standard deviation of 15) derived from the sum of the subscale scores.

The internal consistency of the items on the ASDS was determined to be adequate (Cronbach's coefficient alpha = .83), suggesting that the items measure the same construct as one another. Despite the criticism that some behavior rating scales have received regarding their lack of established interrater reliability (Reid, Maag, & Vasa, 1993) the ASDS has demonstrated an interrater reliability coefficient of .93. Item analysis of the ASQ has shown that the items have strong discriminating power and the ASDS has demonstrated an 85% accuracy rate in the identification of individuals with Asperger Syndrome. Research has shown that this measure can effectively discriminate individuals with Asperger Syndrome from other diagnostic groups such as autism, behavior disorders, attention-deficit hyperactivity disorder and learning disabilities.

Goldstein's review of the scale (2002) raised concerns about the validity of the ASDS, the population upon which it was normed, and the ability of the ASDS to provide accurate differential diagnoses. Goldstein noted that the scale may hold promise as a research tool, but there appeared to be little evidence that it could distinguish among the various types of pervasive developmental disorders or diagnose Asperger Syndrome specifically.

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ASPHYXIA

Asphyxia is a medical emergency requiring immediate intervention to prevent infant mortality and morbidity (Golden & Peters, 1985). Asphyxia occurs with inadequate oxygenation and cellular perfusion. This article deals specifically with asphyxia that occurs during the time of birth or shortly thereafter. Many terms are associated with oxygen deprivation during this period; pertinent information can be found in different sources under the headings of neonatal asphyxia, asphyxia neonatorium, perinatal asphyxia, intrapartum asphyxia, and hypoxic ischemic encephalopathy (HIE). Asphyxia has been hard to define accurately, which has caused difficulty in research on its effects and prognosis for recovery. The classical definition of asphyxia has been a low Apgar score with more emphasis on the 5- or even 10-minute scores than on the 1-minute (Fitzhardinge & Pape, 1981). As low Apgar scores are not necessarily associated with asphyxia, however, this definition is not always accurate and is a poor predictor for neurological outcome. Predicting outcome is very difficult. Even infants with 0 Apgar scores at birth have survived after efficient intervention with no serious handicaps (Rosen, 1985). Incidence of damage is generally overestimated when compared with actual findings (Brann, 1985). HIE, whose description follows, is predictive of later deficits.

Four basic mechanisms underlie asphyxia during the immediate perinatal period: (1) interruption of umbilical blood flow; (2) failure of placental exchange because of premature separation of the placenta from the uterus;

(3) inadequate perfusion or oxygenation of the maternal side of the placenta as in severe hypotension; and (4) infant failure to inflate the lungs and complete transition to extrauterine life. In early stages, asphyxia may reverse spontaneously if the cause is removed, but later stages require varying degrees of medical intervention because of circulatory and neurological changes (Fitzhardinge & Pape, 1981).

Asphyxia is a progressive yet potentially reversible process with severity and duration of the insult affecting later outcome. Severe asphyxia can result in death within 10 minutes without proper intervention (Fitzhardinge & Pape, 1981). Delayed intervention may exacerbate cellular injury in all organ systems, contributing to a poor outcome. The brain is the most vulnerable system and mediates the most pronounced effects on later life. Asphyxia not only affects the brain directly, but also impairs the autoregulation centers controlling cerebral blood flow, which may cause intraventricular hemorrhage with resultant complications (Golden & Peters, 1985). Premature infants appear to be particularly susceptible to this complication.

Cerebral palsy (CP) is the most frequent complication of asphyxia (Swaiman & Russman, 2006). Even then, risk is high only when the Apgar score is low. and can result in death within 10 minutes without proper intervention (Fitzhardinge & Pape, 1981). Delayed intervention is associated with intellectual disability in the absence of CP (Paneth & Stark, 1983).

HIE may result from severe asphyxia. Children diagnosed with HIE show signs of neurologic dysfunction within 1 week, and often within 12 hours, after birth. The major signs of dysfunction include seizures, altered states of consciousness, and abnormalities in tone, posture, reflexes, and respiration. Infants who exhibit seizures have a 30 to 75% likelihood of long-term sequelae. Mortality is high among infants who had definite neurologic abnormality at discharge. Full-term infants with a history of asphyxia and an abnormal neurologic exam during the first week of life show a 7% incidence of early death and a 28% incidence of neurological handicaps. The most common deficits seen in severely affected children include spastic quadriplegia (a form of CP), severe intellectual disability, seizures, hearing deficits, and microcephaly. Treatment for HIE is improving but research is difficult. Identification of infants at risk for neurological handicaps is becoming increasingly important as early intervention techniques improve (Brann, 1985).

Overall, the majority of asphyxiated infants suffer no detectable neurologic or intellectual sequelae. Prognosis is good even in relatively serious cases if neurologic examination is normal by 1 week of age. As would be expected, prognosis is poor when the asphyxia is long and severe or subsequent abnormal clinical features appear (Paneth & Stark, 1983). Much about asphyxia and its sequelae is still not well understood. However, adequate prenatal care, careful monitoring during labor and delivery with prompt obstetrical intervention, and immediate intervention after delivery by professionals skilled in resuscitation all contribute to lowering the incidence of asphyxia and lessening its long-term effects (Hill & Volpe, 2006; Phibbs, 1981).

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***See also* Anoxia; Apgar Rating Scale; Cerebral Palsy; Low Birth Weight/Prematurity**

ASSESSMENT OF BASIC LANGUAGE AND LEARNING SKILLS—REVISED (ABLLS-R)

The Assessment of Basic Language and Learning Skills–Revised (ABLLS-R) is a criterion-referenced assessment,

curriculum guide, and progress monitoring tool (Partington, 2007). The *ABLLS-R* is designed for children with autism spectrum disorders or language delays between the ages of 3 and 9 years. This tool is designed for parents and professionals to gain information regarding the child's current skill repertoire and to facilitate the development of learning objectives, particularly as they relate to language skills. The assessment can be administered by parents, teachers, or therapists through direct observation of the child's skills and though interviews with persons familiar with the child.

The *ABLLS* was originally developed by Mark Sundberg, PhD, and James Partington, PhD (1998). In 2007 Partington released the *ABLLS-R* while Sundberg went on to develop the *VB-MAPP*, which was released in 2008 (see *VB-MAPP* entry). The *ABLLS-R* is based on the science of applied behavior analysis and B.F. Skinner's (1957) analysis of verbal behavior. Skinner's analysis of verbal behavior emphasizes the functional properties of language that are derived from environmental situations. According to Skinner, expressive language can be divided into different functional categories, or operants (e.g., echoics, mands, tacts, intraverbals) The *ABLLS-R* assesses each of these verbal operants separately.

The *ABLLS-R* is a criterion-referenced assessment, not a normed assessment (Partington, 2007). Therefore, the assessment does not compare the child's progress with the progress of groups of children. Additionally, the sequence of skills in the *ABLLS-R* is based upon observation of 100 children with language delays. Partington (2007) states that individual children may proceed through the skills differently and educators should not strictly adhere to a particular sequence when determining appropriate goals.

The *ABLLS-R* consists of two books: the *Assessment Protocol* and the *Scoring Instructions and IEP Development Guide* (Partington, 2007). The *Assessment Protocol* contains task analyses of 25 skill areas with a total of 544 discrete skills organized in a hierarchical manner to facilitate the development of appropriate target skills. While the primary focus of the *ABLLS-R* is on language development, skill areas also pertain to social, play/leisure, academic, daily living, and motor skills. For each discrete skill, information is presented regarding criteria for mastery, conditions under which skills are to be performed, and additional materials that pertain to demonstrating that skill. Data on the child's performance of specific skills are collected using direct observation or via caregiver interview and are entered by hand into the scoring booklet. The entire assessment can be completed in 10 to 14 hours and is designed to be administered every 6 to 12 months to monitor the child's progress toward specific goals. The *Scoring Instructions and IEP Development Guide* (Partington, 2007) presents instructions for administering and scoring the assessment along with procedures for updating the child's progress in the skills tracking log and the corresponding grid on which the child's progress is visually represented. This manual also provides an overview of how to transfer information gathered from the assessment into measurable learning goals.

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ASSESSMENT, CURRICULUM-BASED
(*See* Curriculum-Based Assessment)

ASSESSMENTS, ALTERNATE

Alternate assessments provide a vehicle for students to demonstrate their knowledge and skills through an alternative format to traditional testing. With the passage of the No Child Left Behind (NCLB) Act of 2001 (2002) and the reauthorization of the Individuals with Disabilities Education Improvement Act (2004), alternate assessments are most frequently defined in the context of statewide assessment programs. In a statewide test program, alternate assessments are used to evaluate the performance and progress of students with significant cognitive disabilities who are deemed unable to validly participate in a state's traditional assessment system. They are designed to capture a student's performance and progress toward grade-level content standards and are judged against a state's alternate achievement standards.

Typical statewide assessments are designed to allow educators to make broad inferences about what a student knows and can do in various settings and under various conditions; statewide alternate assessments do not allow for similar inferences. Because alternate assessments usually narrow the depth, breadth, or complexity of the content being assessed, inferences based on a student's score are restricted. In most cases, the data derived from alternate assessments will have limited generalizability to other contexts. Educators who interpret and use scores on alternate assessments should be aware of the limited generalizability of the data they provide.

Federal regulations make it clear that *all* students are to be assessed on a state's academic content standards (U.S. Department of Education, 2003). For example, a student who is expected to demonstrate knowledge of the critical features of biographies in the 10th grade may demonstrate their knowledge through a traditional statewide assessment or through an alternate assessment. The content remains the same regardless of assessment format. However, in an alternate assessment, the depth, breadth, or complexity of behaviors required on the test will be different from those expected of students on the traditional test. Differences between alternate assessments and traditional assessments, therefore, do not lie in their content standards but instead in the achievement standards associated with each type of assessment.

The format of alternate assessments varies from state to state. The majority of states use portfolio systems (Thompson & Thurlow, 2003), while a smaller number employ checklists or rating scales to measure the performance and progress of students with significant cognitive disabilities. A student's individualized education program (IEP) should not be used as an alternate assessment (U.S. Department of Education, 2003). Although the data obtained from an IEP is valuable and should be used to drive instructional programs for students with disabilities, it should not be used in a state accountability system. Empirical research into the effects of various formats on the technical adequacy of the test or the quality of inferences derived from test scores is limited. As states continue to refine their alternate assessments, the focus needs to be on creating assessments that accurately measure students' performance on grade-level content standards as well as contribute valid data to a state's accountability system (Johnson & Arnold, 2004).

Each student's IEP team decides how he or she will participate in a state's assessment system, and decisions are made on an individual basis. The federal government places only one parameter around this decision: Only those students with significant cognitive disabilities may participate (U.S. Department of Education, 2005). Once it is established that a student has a significant cognitive disability, his or her IEP team relies on various sources of information to inform their decision about the appropriateness of that student participating in an alternate assessment. Only if the student is unable to validly participate in a state's traditional assessment (with or without accommodations) is participation in an alternate assessment considered. The decision is not based on the student's disability per se but instead based on the student's ability to validly participate in a state's traditional assessment.

The percentage of students participating in an alternate assessment differs by state (Wiley, Thurlow, & Klein, 2005). No limits exist related to the number of students who may participate in an alternate assessment. However, according to NCLB, a school district may only include 1% of the total number of scores rated "proficient" or higher (on the alternate assessment) in their adequate yearly progress (AYP) calculations. All of the scores beyond the 1% cap are scored as "not proficient" regardless of the actual score.

In May 2005, the U.S. Department of Education released initial guidelines allowing states to include up to 2% of students measured against modified achievement standards. Unlike alternate achievement standards developed to measure students with significant cognitive disabilities, modified achievement standards are developed to measure progress and performance of students with persistent academic difficulties that challenge their ability to reach grade-level achievement standards even with research-based instruction. Release of these guidelines on the inclusion of an additional 2% of students in alternate assessments measured against modified achievement standards was due in part to research demonstrating that some students display persistent cognitive challenges that impede their ability to meaningfully participate in a state's traditional assessment. The decision was also in response to the concerns of many educators that including only 1% of students in an alternate assessment program leaves many students with no options for validly participating in a statewide test system. For these students, the alternate assessment has been shown to be too easy, while the traditional assessment is too hard. Other educators, however, are concerned that increasing the percentages allowable for AYP will result in lower expectations for those students with disabilities who are currently making progress toward passing the traditional assessment. This concern may be addressed at the level of the state department, as participation in an alternate assessment judged against modified achievement standards will not be mandated but instead will provide another option for educators as they strive for valid inclusion of all students in statewide accountability programs.

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See also **Achievement Tests; Behavior Assessment System for Children–Second Edition; *g* Factor Theory; Individuals with Disabilities Education Improvement Act of 2004 (IDEIA); Intelligence Testing; Intelligent Testing; Kaufman Assessment Battery for Children–Second Edition; No Child Left Behind Act; Vineland Adaptive Behavior Scales—Second Edition; Wechsler Adult Intelligence Scale; Wechsler Intelligence Scale for Children—Fourth Edition**

ASSESSMENT, TRANSITION

Transition assessment as a key component of the transition planning process was primarily a recommended practice in transition services literature until the Individuals with Disabilities Education Improvement Act of 2004 and its supporting regulations in 2006. While not defining transition assessment precisely, the Act used language that left no doubt of bipartisan Congressional intent. In the definition of transition services, the specific addition of the terms "improving the academic and functional achievement . . . " gave focus to a transition services process that addressed both academic and life-related competencies. The definition of transition services also qualifies the phrase, "a set of coordinated activities," with the caveat that those services " . . . shall be based on the individual child's needs, taking into account the child's strengths, preferences, and interests." (Authority: 20 U.S.C. § 1414 *et seq*.)

To further emphasize Congressional intent, the language of IDEA 2004 specified that the Individual Education Program (IEP) for all students 16 and older (and younger when appropriate) must have appropriate measurable postsecondary goals " . . . based upon age-appropriate transition assessments related to training, education, employment, and, where appropriate, independent living skills." The language in this section gives an assessment target for getting at academic and functional achievement or performance across the areas of education and training, employment, and independent living skills. These three areas may be generalized in terminology as the areas of learning, working, and living—the three primary areas of possible postsecondary outcome goals.

Without a legal definition of transition assessment, professionals are left to try to define it in terms of recommended practice. Sitlington, Neubert, Begun, Lombard, and Leconte (2007) propose this definition:

> Transition assessment is an ongoing process of collecting information on the student's strengths, needs, preferences, and interests as they relate to the demands of current and future living, learning, and working environments. This process should begin in middle school and continue until the student graduates or exits high school. Information from this process should be used to drive the IEP and transition planning process and to develop the SOP [Summary of Performance] document detailing the student's academic and functional performance and postsecondary goals. (pp. 2–3)

If one can agree to Clark's (2007) broad view of assessment as "question-asking," then it follows that transition assessment is a process of asking the important questions that every student and family should ask when planning for current and future learning, working, and living environments. That is, what are the postsecondary goals for continuing on for further education or training, for employment, and/or for living in the community? Once one or more of these dreams for the future translate into tentative postsecondary goal statements, they inform the school on the direction of next steps in question-asking. If the student or family chooses not to use school time or focus on all three of these goal areas, the nature and type of question-asking activities get more targeted in content. These questions can be raised in a variety of both formal and informal activities.

Typically, there are three general types of information needed in the transition planning process: (1) knowledge (information, facts, concepts, etc., related to adult learning, living, and working); (2) skills (performance of skills expected in learning, working, and living environments); and (3) intelligent application of knowledge and skills (functional achievement, including practical and social intelligence, self-determination, maintenance of physical and mental health and fitness, social and interpersonal relationships, community participation, etc.). Assessment activities that cut across all three of these general types of information for use in planning would include or be based on questions related to strengths, support needs, preferences, and interests.

Specific areas for question-asking vary with individual students and their postsecondary outcome goals but may include:

- Interests related to learning, living, and working
- Preferences related to learning, living, and working environments
- Physical health and fitness status
- Communication skills

- Current information on cognitive development and performance
- Adaptive behavior and skills
- Social and interpersonal relationship skills
- Emotional development and mental health
- Independent and interdependent living skills
- Recreation and leisure skills
- Employability and vocational skills
- Choice-making and self-determination skills
- Community participation and citizenship skills
- Needed supports or accommodations
- Needed linkages with current and future support services

IEP case managers, transition services personnel, IEP team members, special education support staff, and related services personnel may select from a variety of formal or informal assessment alternatives. Formal transition assessment instruments will have some evidence of validity and reliability and some might also have norms. Informal assessments do not have any demonstrated validity or reliability evidence, nor would they ever have norms.

Formal assessment instruments used in transition planning may include standardized tests or formal inventories or scales. Most of these are paper-and-pencil or computerized assessments that require varying degrees of reading comprehension and response capability. Accommodations may be appropriate for some of these (e.g., reading items to student, manual signing for student, extended time, adaptation of materials for blind students, etc.) but for others standardized administrations must be used. Formal transition instruments or scales may include general screening inventories of transition knowledge and skills or specific inventories of transition-related knowledge and skills. Most of the instruments directly pertaining to transition-related strengths, interests, or preferences do not require a highly skilled psychometrist or diagnostician, although those related to cognitive functioning, adaptive behavior, and emotional or behavioral functioning likely will. Administration of formal assessments is a matter of careful reading and administration procedure. Accurate interpretation and communication of results also require users to read and follow the instrument administration and interpretation guidelines in the manuals.

Informal assessment activities include curriculum-based assessments, interviews, surveys or questionnaires, checklists, rating scales, observation logs or observation protocols, commercially available or web-based instruments, environmental/ecological assessments, or person-centered planning. Each of these has its own advantages and disadvantages. Each also requires a set of skills for administration or interpretation that not all school personnel have without some training.

A practical issue in the transition assessment process is determining responsibility for coordinating the process. That person is most often the IEP case manager, but in some cases a transition specialist may assume the role of transition assessment coordinator and case manager when a student reaches 16. Whoever does assume the coordination role draws on the assistance and collaboration of a range of possible contributors, starting with the student and his/her family. At school there will be special education personnel, paraprofessionals, general educators, career and technical educators, school administrators, guidance counselors, school psychologists and/or diagnosticians, related services personnel, and school building employees. Outside of school there are employers, work supervisors, extended family, community organizations and agencies, health care professionals, or disability advocates (adults or peers).

The most critical uses of transition assessment information are the IDEA mandates for developing a student's IEP annually and then as the basis for the Summary of Performance (SOP) for all students graduating or exiting after age eligibility expires. Other uses include course of study placement decisions, instructional decisions, guidance and counseling, referrals, curriculum planning, and documentation of procedures under IDEA.

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ASSIMILATION

Assimilation is one of two complementary processes of adaptation to the environment in Jean Piaget's theory of intellectual development; its counterpart is accommodation. Assimilation involves incorporating external elements (objects or events) into existing cognitive or sensorimotor schemes; incoming information is interpreted or adjusted in a manner consistent with current cognitive structures. In contrast, accommodation involves changing the structures that assimilate information (Brainerd, 1978).

The distinction between assimilation and accommodation can be illustrated by a physiological example: digestion of food (Ginsburg & Opper, 1969). Acids (or the body's current schemes or structures) transform the food into a form that can be used; thus elements of the

external world are assimilated. Accommodation occurs in this example when, in order to deal with a foreign substance, stomach muscles contract, acids are released by certain organs, and so forth. Physical structures (the stomach and other organs) accommodate to an external element (food).

Assimilation involves both constraints on the nature and range of a child's interactions with the environment and the seeking out of new stimuli that can be assimilated into existing schemes (Gelman & Baillargeon, 1983). Piaget discusses three forms of assimilation: functional assimilation, which involves a basic tendency to use an existing structure such as a sucking reflex; recognitory assimilation, which involves recognizing particular situations in which the scheme should be applied; and generalizing assimilation, which involves a tendency to generalize a scheme to new objects and situations (Ginsburg & Opper, 1969).

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See also **Accommodation; Piaget, Jean**

ASSISTIVE TECHNOLOGY ACT

In 1998 Congress enacted the Assistive Technology Act (P.L. 105-394), commonly known as the *Tech Act*. Today, funding authorized by the Tech Act supports three general types of programs, which vary from state to state:

1. Assistive technology (AT) state grant programs, which provide a variety of services including demonstration centers to allow people to see different types of assistive technology, equipment loan and recycling programs, and information and referral services
2. Protection and advocacy services for persons needing legal assistance in obtaining services
3. Federal or state partnership alternative financing programs that provide low-interest loans to persons with disabilities to purchase assistive technology.

On June 14, 2004, the House passed H.R. 4278, the Improving Access to Assistive Technology for Individuals with Disabilities Act of 2004, introduced on May 5, 2004. The bill amends the Assistive Technology Act of 1998 to support programs of grants to states to address the assistive technology needs of individuals with disabilities. The House and the Senate passed H.R. 4278, and it was signed into law by President Bush on October 25, 2004. To read the bill as signed into law, go to http://archives.republicans.edlabor.house.gov/archive/markups/108th/21st/hr4278/513main.htm

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ASSISTIVE TECHNOLOGY DEVICES

Whereas many people believe the term assistive technology is a recent development that applies only to computers, in reality, assistive technology devices (e.g., adaptive feeding instruments, wheelchairs, vision aids, etc.) have a long history in the field of special education and rehabilitation (Blackhurst, 1965, 1997; Office of Technology Assessment, 1982). Jacob (1999) provides an interesting historical timeline of devices that were originally developed for individuals with disabilities that subsequently became mainstream tools such as the typewriter, telephone, captioning, and talking books.

In the United States, the federal definition of assistive technology (AT) was first advanced in the 1988 Tech Act (P.L. 100-407) and has been subsequently cited in every federal and state law associated with technology use by people with disabilities:

> §300.5 Assistive technology device.
> . . . Assistive technology device means any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability. (20 U.S.C. 1401(1))

The definition is complex and therefore is worthy to be deconstructed into its four essential elements. First, AT is described as *any item, piece of equipment, or product system*. This broad statement is intended to cover a vast array of devices from a switch that is used to operate a computer by a person who cannot use a keyboard, to a powered wheelchair controlled by a person who is nonambulatory, to a talking cane that helps an individual who is blind independently navigate an environment. The second phrase, *whether acquired commercially off the shelf, modified, or customized*, speaks to the issue of how the assistive technology is obtained. When this definition was first written, assistive technology was generally created

for an individual. Today the paradigm is reversed in that most assistive technology can be purchased off-the-shelf. The core issue here is that an array of interventions are needed to match the device with the unique capabilities and special needs of the individual. Third, the statement, *that is used to increase, maintain, or improve the functional capabilities*, addresses the purpose for using AT. The explicit goal is to enhance function (and presumably independence). Finally, the definition concludes with a focus on the user: *of a child with a disability*.

The value and significance of assistive technology can be understood in relation to a performance problem. That is, a person with a disability encounters a task that they are unable to successfully complete. Following the identification of an appropriate assistive technology device, acquisition of the product, training and support in its use, the person is subsequently able to complete the same task that was previously difficult or impossible. Thus, the motivation for locating appropriate assistive technology devices and services is to enhance the performance of individuals with disabilities by enabling them to complete tasks more effectively, efficiently, and independently than otherwise possible.

Edyburn (2001, 2009) has commented on several shortcomings of the definition of AT that are impossible to revise because of its extensive citation within federal and state laws and policies. He argues that the definition of assistive technology is so broad that it could include anything. Indeed, that is a simple way to think about it: *Assistive technology is anything that improves the functional performance of an individual with a disability*. However, this statement is particularly problematic if it reveals that the definition of AT has no value in discerning what is and isn't AT.

Consider for example, the sensor above a store door that opens when a person approaches. If a person without a disability enters the stores, we cannot conclude that the device was a form of AT since the definition indicates that AT is only for people with disabilities. However, if a person using a power wheelchair enters the store, we must conclude that the sensor and door opener functioned as AT. How can the same sensor and door opener be AT in one situation and not AT in another?

Twenty-five years after the definition of AT was included in the Tech Act, we are still dealing with a legacy definition that does not clearly discern what AT is, and what AT is not. This problem is particularly disconcerting in the context of mild disabilities where technology performance-support tools take on the form of cognitive prostheses that may be useful to everyone, not just individuals with disabilities (Edyburn, 2006).

Concern over what is assistive technology and how to find the appropriate AT device has led to several important efforts within the field. Current estimates suggest that there are over 40,000 assistive technology devices designed to enhance the life functioning of individuals with disabilities (AbleData, 2011). Another promising, but controversial, initiative has been created by Speech Language Therapist Debby McBride. *AAC Device Assistant* (http://www.aactechconnect.com/index.php/device-assistant) is a web-based decision-support system that guides users through a decision-making process based on key features (i.e., type of display, number of direct select cells, size of vocabulary) to yield a set of devices to explore from the more than 100 alternative and augmentative devices available in the marketplace. While the value of this system is that it allows nonexperts to explore the possibilities, experts decry the system as devoid of the clinical judgment needed to select the appropriate device. However, since such advanced product knowledge is not available in every community, such a system seems to have a place in helping the profession advance the systematic provision of assistive technology devices to those who could potentially benefit.

Edyburn (2001) has also argued that the federal definition of AT includes only two legs of a three-legged stool. That is, we have a definition of AT Devices, a companion definition of AT Services (see also Assistive Technology Services), but we lack a definition of AT outcome (see also Measurement of Assistive Technology Outcomes). That is, there is nothing in the existing definition of AT that involves collecting and evaluating evidence that AT actually produces enhanced functional outcomes in any measurable and meaningful way. Since federal law provides no guidance concerning how much benefit should be expected to accrue from the use of an AT device, the profession is woefully unprepared to answer questions concerning the outcome and benefit of AT device use (Edyburn, 2009).

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ASSISTIVE TECHNOLOGY FOR HEARING IMPAIRMENTS

Telecommunication Device for the Deaf (TDD)/ Text Telephone (TTY)

This is a device that enables people who are deaf to communicate by phone via a typewriter that converts typed letters into electric signals through a modem. These signals are sent through the phone lines and then translated into typed messages and printed on a typewriter connected to a phone on the other end.

Assistive Listening Device (ALD)

The intelligibility of the human voice is degraded by poor room acoustics as well as hearing loss. Most assistive listening devices (ALDs) use a microphone or transmitter positioned close to the instructor's mouth to send the instructor's voice through the air or by cable to the receiver worn by the student. By placing the microphone close to the instructor's mouth, ALDs can provide clear sound over distances, eliminate echoes, and reduce surrounding noises. This is a distinct acoustic advantage of ALDs compared to personal hearing aids. The microphone location allows the level of the speaker's voice to stay constant to the listener regardless of the distance between the two.

There are different types of ALDs (FM, Soundfield Amplification, and Induction Loop Systems), each system having special features, capabilities, advantages, and disadvantages. No single technology is without limitations or can be expected to fulfill all the essential auditory needs of all users. It is important to find the one that is right for the individual with a hearing loss.

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See also **Assistive Devices; Assistive Technology Act**

ASSISTIVE TECHNOLOGY IN HIGHER EDUCATION

Assistive technology is used extensively in higher education. Although the laws and statutes that govern the provision of services in higher education are somewhat different, the types of technologies used are very similar. As in the lower grades, alternative format production is a big issue. But unlike them, higher education has additional issues, especially with the textbook adoption process. Alternative format production is often the first step in the service provision process for a disability service office and therefore warrants some attention.

Textbook Adoptions and Alternative Format Production

Differences between the textbook adoption models of elementary and higher education contribute to major differences in the service provision model of the two systems. In the kindergarten through 12th grade (K–12) environment, it is typical for the textbook adoption process to take 2–3 years. Books are submitted by publishers to the state board of education for review. To even be considered, most publishers have to sign assurances that the book will be provided in accessible formats by the time of purchase. Publishers agree to this because they know that they will have sufficient time to produce such resources when and if the book is adopted. They further know that the quantities ordered will justify the time and expense of creating accessible formats. After a lengthy period of time, the book is officially adopted by the state, purchased in quantity, and shipped to the school districts for use. The average lifespan of a typical K–12 textbook is 2–3 years, but some states use books much longer.

In contrast to the K–12 model, textbook adoptions in higher education proceed much quicker as they are, in many cases, determined solely by the instructor. The instructors choose their course books, in many cases, independently of other instructors or departments. To keep current with this selection process, publishers focus more on variety and currency. Consequently, textbooks must be constantly updated in order for the publisher to keep competitive and make money. In general, institutional adoption policies in the higher education environment are loosely enforced, even if they exist. Many instructors feel strongly that institutional adoption policies are a blow to academic freedom, while others see utility in having some policies to insure consistency across the institution. The net result is a system of textbook adoption that has far more current textbooks than the K–12 system, but sacrifices process, consistency, and accessibility.

Given this model, there are three issues that affect format production in higher education when compared to that of K–12. The first issue relates to publishers. In most states, publishers have no legal responsibility to provide alternative formats to institutions of higher education. Some exceptions to this are California and Illinois. Moreover, publishers' infrastructures have been optimized to produce a final product that is physically printed on paper and distributed. Any other product format (such as a hypertext markup language [HTML] version of a textbook) must be produced from the print-optimized version. This leads to accessibility barriers. The bottom line is that publishers have little or no responsibility to provide accessible text materials in the higher education environment.

At this point in time, publishers cannot produce an accessible format without significant time and money. Recently, publishers have examined a change in process to produce digital formats of textbooks that transform gracefully into other formats. Slowly, publishers are moving in the digital direction. As more and more states approve statutes requiring accessible texts and national pressure mounts to address the issue in a legal manner, publishers are beginning to put the necessary changes into place.

This illustration is not meant to infer that publishers don't care about accessibility. On the contrary, they see accessibility as a means not only of assisting students with disabilities but also as a competitive advantage. After all, the same techniques that make information accessible to students with disabilities also make the information

accessible to nondisabled students who may access the information using other means.

The second issue is related to the manner of provision of higher education. Higher education has evolved more and more into a customer-driven model of consumerism. This has led to a wide variety of classes and courses of study to meet the needs of the diverse student population. As a result, students can register for any course they are qualified to take at virtually any time. Because very few textbooks are available in an accessible format, accessible formats must be created ad hoc by the institution. This problem gives the disability services office little or no time to prepare.

The third issue is related to the selection of textbooks by instructors. It is not uncommon for the more populous courses to change textbooks annually or even each semester. Because staffing for courses is often delayed, instructors are sometimes assigned late to courses. In the absence of a textbook adoption policy, instructors may choose textbooks just before or even after a course begins. A recent survey of a major 4-year university revealed that 15% of textbook adoptions were given to the bookstores after the first day of class. This selection process provides little time for the disability services office to produce alternative formats.

Types of Assistive Technology in Higher Education

All of the major classes of assistive technology are represented in higher education, but some are less common than others. For example, augmentative communication technology, which is common in K–12, is generally not provided in higher education. Devices such as communication boards and speech synthesis microphones are generally provided by the student, not by the institution. Under the higher education model, augmentative communication in most cases would be considered a personal device and therefore not legally mandated to be provided, whereas in K–12, these devices were provided by the school district (under the Individuals with Disabilities Education Act [IDEA]). Once the student moves out of the K–12 system, their personal technology needs are handled in many cases by state vocational rehabilitation (VR) agencies. Thus assistive technology is split between VR and the college, with the college providing access to learning materials and VR supporting personal technology needs.

Many colleges offer alternative format production services to include recording text materials onto tape and textbook scanning. In some cases, braille and tactile graphic production services are provided. Modern braille printers are capable of combining tactile graphics with braille text and in some cases can even produce multiheight graphic embossing (see http://viewplustech.com/). Scanners are common and are usually equipped with optical character recognition software that is used to produce electronic versions of printed materials.

Getting the material converted into an accessible format is only the first step in giving the student access via assistive technology. Technologies commonly used to deliver the accessible material once it is converted include text-to-speech, print braille, refreshable braille, and screen magnification. Some student populations such as those with visual impairments may use a combination of technologies, such as text-to-speech and screen magnification. Increasingly, students with learning disabilities are using assistive technologies such as text-to-speech to listen to their text materials while reading them.

The advent of ubiquitous digital players such as MP3 players has given rise to a new alternative format process. Recently, some colleges have begun using textbook scanning combined with text-to-speech to output audio of scanned materials to digital files, such as MP3 files. These files can be burned to CD and played on a computer or downloaded to a portable digital audio player. The new technologies available greatly automate and speed this process to help disability services meet the tight turnaround requirements associated with higher education structures. For example, there is equipment readily available that removes a textbook's binding, and the pages are then scanned via an automatic feeder to provide an electronic version of the contents. The electronic text content is then converted to audio files for use in a digital audio player or integrated into special instructional resources.

Voice recognition software has been used in higher education for a number of years although it is not as common as other technologies. In the opinion of this reviewer, the technology is just now coming into its own, and it will be several years before voice recognition is as common as other assistive technologies. Currently, voice control over regular computer operations (e.g., open, close, send, print) is readily available on standard operating systems. Affordable dictation software is also available but requires extensive training for efficient use.

For students with hearing impairments, the use of wireless amplification systems (often termed *FM systems*) is a fairly common accommodation. Because this device offers access to the material presented in class, many colleges consider this device within their purview and will provide them. Computer-assisted captioning systems are also becoming more common. This accommodation consists of software usually used with a portable computer in the classroom that is used to record the audio portion of a class. Most systems do not produce a word-for-word transcript but rather an approximation or summary of what is said. Computer-assisted captioning requires a trained captionist in most cases. Although word-for-word, real-time captioning (e.g., courtroom type captioning) is sometimes used, it is less common than approximate dialog systems. As faculty more commonly use electronic formats for creation of their lecture materials, these materials may be made available to disability services offices for conversion to alternative formats. In keeping with the

concept of universal design, such multiple formats are beginning to appear as part of the delivery format of many courses and will benefit all students, whether or not they have a disability.

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See also **Assistive Technology Act; Learning Disabled College Students**

ASSISTIVE TECHNOLOGY, TRANSITION PLANNING

Assistive technology can play a vital role in supporting the transition from high school to adult life for youth with disabilities. IDEA 2004 defines assistive technology as, "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability"(34CFR SS 300.5 [Authority: 20 USC §1401 (1)]). The purpose of assistive technology (AT) is to promote greater independence for people with disabilities, enabling their opportunity to perform tasks that they may have had difficulty performing or accomplishing. That purpose applies to the role that AT can provide in supporting the transition planning process: it can and should support the ability of youth with disability in meeting their goals for a preferred adult lifestyle.

As part of the development of a comprehensive annual Individualized Education Program or IEP, team members are required to consider whether assistive technology is needed to help support the acquisition of annual goals. During this annual planning meeting as goals are developed for students with disabilities, teams should consider whether there are AT devices and/or services that could help support a student in accessing the general education curriculum, participating in state and/or district-wide assessments, and/or achieving preferred postschool outcomes (for students who are required to have a transition plan as part of the IEP plan). Postschool outcomes include goals for a preferred adult lifestyle in one or more adult living domains including: employment, independent living, self-care, community involvement, recreation and leisure, postsecondary education, and/or transportation.

Not only must these various domains be taken into account, but teams must also think creatively to include consideration of a range of technology that can meet student transition goals. AT devices can be categorized along a continuum from low to high technology. Examples of low-tech equipment can include magnifying glasses, color-coding for keys or files, or large print. High technology examples can include computer equipment, environmental control systems, or insulin pumps. Most AT equipment serves a specific purpose, although some, like computer equipment, can be used for multiple purposes. Typically, AT devices are further categorized according to their purpose, including: positioning (assisting an individual in maintaining a body position/posture for a particular function); mobility; augmentative and alternative communication; computer access; adaptive toys and games; environmental control; instructional aides.

If a student with a disability could benefit from AT to support his or her transition plan, a comprehensive AT assessment might be necessary. AT assessments can be done in a number of different ways, but the processes that work the best use a team approach and consider not only the needs of the student and features of a specific AT device, but also the environment in which the device will be used, the support of others, and the preferences of the individual. For example, the SETT framework (Zabala, 1995) recommends that AT assessment focus on the **S**tudent, **E**nvironments, **T**ask, and **T**ools. Other similar AT protocols include the Matching Person and Technology (Craddock & Scherer, 2001) process and the Assistive Technology Protocol for Transition Planning (Reed & Canfield, 2001). Another option is the Adaptations Framework (Bryant & Bryant, 1988) which helps IEP teams consider a range of accommodations or adaptations including AT. Regardless of which assessment process is used, it is important that team members include individuals who know the individual best, the student himself or herself, as well as those who know enough about AT equipment to identify creative and useful options. And, when postschool outcomes are being considered, including those who understand the environments in which they will be used is also recommended.

Each of these AT assessment procedures include as a central feature the preferences and interests of the individual student. The most effective procedures for transition planning involve some level of student self-determination in the process (Wehmeyer, 1999), and AT assessment process is no different. Craddock & Scherer (2001) found that when the preference of individuals with disabilities is not considered as part of an AT assessment, there is a greater likelihood that the device will be unused. While one individual might enthusiastically embrace the use of a high-tech piece of equipment, another might prefer the support of a friend or aide.

The source of funding for AT devices is another important consideration for transition teams. While transition planning is a school-based process, the participation of adult service agencies is critical when AT devices are needed to support student postschool outcomes. Schools are required to provide AT to help students access the school learning, but these devices typically belong to the school and not to the student himself or herself. This can mean that funding from adult agencies will be necessary if an individual needs AT to meet a postschool outcome such as employment, community living, or transportation. It is important to identify the specific funding options, and to justify the expense given the mission of the funding agency. For example, justification for a communication device made to a local office of vocational rehabilitation should be made in reference to its necessity to secure and maintain employment while justification to Medicaid or to a health insurance agency should be made in reference to its necessity to secure and maintain medical care. Each state has agencies that can help provide more information about AT, including local, state, and national funding sources. Many of these also provide training for team members, parents, and individuals with disabilities as well as provide AT lending libraries that provide an option to practice with the device in the setting in which it will be used. In addition, AT device manufacturers often provide guidance and/or assistance in identifying and securing funding.

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ASSOCIATION FOR CHILDHOOD EDUCATION INTERNATIONAL

Founded in 1892, the Association for Childhood Education International (ACEI) is a not-for-profit professional education association of educators, parents, and other caregivers interested in promoting quality education practices for children. The organization was originally conceived to provide a formal organization to promote the interest and professionalism of the kindergarten movement throughout the world. With over 11,000 members in the United States and Canada, ACEI is the oldest organization of its kind. Members participate in local and state group activities, including meetings, workshops, and regional conferences. Annual Study Conferences have been held each year since 1896 to share ideas and contribute to the standard of excellence in teaching in all arenas, such as public and private day care centers, kindergartens, elementary schools, middle schools, high schools, and university-level teacher education programs.

The mission of ACEI is to promote the inherent rights, education, and well-being of all children, from infancy through early adolescence, in the home, school, and community. The organization is member-driven and is guided by a dynamic philosophy of education that is flexible and responsive to human needs in a changing society. Members are dedicated to a holistic, child-centered approach to education that considers the child's experiences in the home, school, community, and world.

ACEI is interested in promoting good educational practices for children. By acting as a facilitator for the sharing and dissemination of information through publications and conferences, the organization provides a service to its members and to the education community as a whole. This is accomplished through the regular publication of two refereed professional journals, *Childhood Education* and *Journal of Research in Childhood Education*. Additionally, the Association publishes books, newsletters, pamphlets, position papers, and position statements that relate to the welfare of children; recommend sound, developmentally appropriate educational practice; and include practical application guidelines for educators.

Other contributions of the organization include the publication of *Childhood Education*, a professional journal of theory and practice in the field. The journal has consistently sought to make a thoughtful, multifaceted contribution to the growing body of knowledge concerning children and the learning process. In 1986 an additional publication, *Journal of Research in Childhood Education*, was created as a vehicle for sharing research knowledge as it is acquired. A catalog containing information regarding ACEI publications is available free upon request.

Improved standards for teacher preparation and others involved with the care and development of children are among the association's goals. ACEI was appointed to serve as the organization responsible for overseeing

the folio review process of elementary teacher preparation programs offered at U.S. colleges and universities seeking accreditation through the National Council for Accreditation of Teacher Education.

A library, including volumes on childhood and elementary education, is maintained at association headquarters. Association offices are located at 17904 Georgia Avenue, Suite 215, Olney, MD 20832. Tel.: (800) 423-3563 and (301) 570-2111.

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ASSOCIATION FOR CHILDREN AND ADULTS WITH LEARNING DISABILITIES (*See* Learning Disabilities Association)

ASSOCIATION FOR PERSONS WITH SEVERE HANDICAPS (*See* TASH)

ASSOCIATION FOR POSITIVE BEHAVIOR SUPPORT (APBS)

The Association for Positive Behavior Support (APBS) is an international organization dedicated to promoting research-based strategies that combine applied behavior analysis and biomedical science with person-centered values and systems change to increase quality of life and decrease problem behaviors. The single subject research studies in applied behavior analysis beginning back in the 1960s have contributed to an applied science that describes how learning principles can be systematically applied to produce socially important changes in behavior (Baer, Wolf, & Risley, 1968; Cooper, Heron, & Heward, 1987). This research in applied behavior analysis provided an important foundation for what is now known today as positive behavior support (Dunlap & Horner, 2006), although positive behavior support also is known for employing concepts and methods from other disciplines and areas of study, including person-centered planning, wraparound and systems of care, self determination, systems change, physiological research and biomedical science (Carr et al., 2002).

One area of positive behavior support research that is growing at a very fast rate involves school-wide and organization-wide behavior prevention efforts. The school and/or organization is considered the unit of analysis, while the goal is to establish a positive "host" environment by teaching and reinforcing social behaviors in order to prevent the likelihood that problem behaviors will occur (Sugai et al., 2005). School-wide and organization-wide positive behavior support are currently being implemented in a variety of settings including elementary, middle, and high schools, early childhood organizations, and alternative settings (Fox & Hemmeter, 2009; Sugai & Horner, 2009; Simonsen, Britton, & Young, 2010; Stormont, Lewis, Beckner, & Johnson, 2007; Walker et al., 1996). New terms have emerged to describe the implementation of positive behavior support across larger scale systems change efforts, including *school-wide positive behavior support* in educational settings (Sugai et al., 2000), and *program-wide positive behavior support* in early childhood environments (Hemmeter, Fox, Jack, Broyles, & Doubet, 2007).

A major focus of positive behavior support is on the application of a research-validated technology in everyday home, school, and community settings with professionals and other individuals who do not have highly specialized degrees or training actively involved in implementing interventions to prevent the likelihood of problem behavior. The goal of positive behavior support is to provide families and professionals who work with children and adults both with and without disabilities with a set of systems, tools, and processes that can be used to prevent problem behavior in home, school, work, and community settings, and to respond to problem behavior if and when problem behaviors do arise. Problem behaviors such as aggression, self-injury, various forms of bullying, insubordination, disruption, vandalism, and withdrawal continue to be among the most common reasons why people with and without disabilities are excluded from typical home, school, work, and community contexts. Problem behaviors can serve as barriers to the development of meaningful social relationships, employment, academic achievement, functional life-skills, self-determination, health, and personal safety. Typical responses to problem behavior in society have historically been reactive since interventions tend to be implemented after problem behaviors have already occurred. The most common response to severe problem behavior has been to exclude individuals who engage in problem behaviors from local home, school, and community settings by placing them in alternative educational or institutional settings (Lane & Murakami, 1987). Furthermore, research indicates that the use of punishment alone without positive social instruction can actually have the counterintuitive result of increasing problem behavior (Mayer & Butterworth, 1981; Mayer, Butterworth, Nafpaktitis, & Sulzer-Azaroff, 1983; Mayer, Nafpaktitis, Butterworth, & Hollingsworth, 1987; Mayer & Sulzer-Azaroff, 1990).

Public policy in the areas of prevention, early intervention, education, adult services, and family support has increasingly emphasized the active inclusion of all individuals with disabilities in typical social and cultural contexts. However, problem behaviors remain a major barrier to achieving these public policy goals. Reducing problem

behaviors in our schools and communities requires a fundamental shift that can be guided by the science of changing and influencing social and cultural practices (Biglan, 1995). Reduction of problem behavior will occur when *all* of the individuals in school and community settings place a stronger emphasis on prevention by teaching social skills, modeling appropriate behavior, providing reinforcement ratios for positive social behaviors that are higher than the negative interactions that occur when responding to problem behavior, and when more consistent and humane responses to problem behaviors set the stage for a positive and predictable social environment (Freeman et al., 2005; Sugai & Horner, 2009; Walker et al., 1996). The cultural shift toward prevention may occur only when families, professionals, policymakers, and other important stakeholder groups work together to implement positive behavior support on a large-scale basis. This cultural shift will be further enhanced by the creation of regional, national, and international networking to promote knowledge and awareness of positive behavior support and by establishing ways in which interagency collaboration can be enhanced in order to blend limited resources for positive behavior support implementation efforts.

The vision and mission of APBS is to assist in this effort by ensuring that: (a) information about the science (and associated practices) of positive behavior support is available on a wide-scale basis both nationally and internationally, (b) opportunities for networking across geographic areas as well as topical areas of interest are nurtured, and (c) information is made available for all stakeholders interested in advocating for research and practice in positive behavior support. APBS is an active organization, focusing its attention on dissemination, education, and public policy efforts. Specifically, APBS:

- Serves as an international forum for individuals interested in PBS
- Hosts an annual international conference
- Supports and promotes the *Journal of Positive Behavior Interventions*
- Publishes a quarterly newsletter
- Manages its website (www.apbs.org) and links to other important websites on PBS practices, systems, and examples
- Provides the resources and materials necessary for members to develop policy and practice related to positive behavior support at regional, national, and international levels
- Maintains a directory of members to facilitate interaction among individuals interested in positive behavior support practices
- Provides opportunities for informal collaborative groups to form by geographic and/or topical area in a loose affiliation with APBS through a network petition process that includes at least five or more APBS members (each network submits an action plan and provides annual updates that are posted on the Association's website)
- Is working toward establishing national standards that define competency in the application of positive behavior support across various units of analysis (individual and systems levels)
- Encourages the training of professionals for various stakeholders in PBS practices through the development of training materials
- Promotes access to state-of-the-art books and literature pertaining to PBS

Membership, Products, and/or Publications

All members are given a variety of opportunities to become directly involved in outreach endeavors, pertinent business matters of the Association, and the election of members to the Board of Directors. In addition, members receive: a subscription to *The Journal of Positive Behavior Interventions (JPBI)* published by Hammill Institute on Disabilities, the quarterly *APBS Newsletter* included in *JPBI*, discounted registration for the annual APBS Conference, and access to valuable information and training materials posted in the Member's section of the apbs.org website. There are a variety of membership categories within APBS. The three most prevalent types of membership include: (1) Regular Membership: $80.00 annually or $200 for a 3-year membership; (2) Student or Family Membership: $35.00 annually; and (3) Agency Membership: $125.00 annually.

The Association for Positive Behavior Support (APBS) can be found at: P.O. Box 328, Bloomsburg, PA 17837. Website: www.apbs.org

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ASSOCIATION FOR SPECIAL EDUCATION
(See Center for Applied Technology)

ASSOCIATION FOR THE ADVANCEMENT OF BEHAVIOR THERAPY

The Association for the Advancement of Behavioral Therapies was founded in 1966 and renamed the Association for the Advancement of Behavior Therapy (AABT) in 1968. Headquartered in New York City, the AABT is a not-for-profit organization of over 4,500 mental health professionals and students who utilize and/or are interested in empirically based behavior therapy and cognitive behavior therapy. Membership is interdisciplinary and consists of psychologists, psychiatrists, social workers, physicians, nurses, and other mental health professionals who treat over 90 mental health problems. AABT does not certify its members.

Among its activities, the AABT sponsors training programs and lectures aimed at professionals and semiprofessionals, provides communication accessibility among behavior therapists interested in similar areas of research or specific problems, and maintains a speaker's bureau. Affiliates of the Association conduct training meetings, workshops, seminars, case demonstrations, and discussion groups. In addition, the AABT holds committees on continuing and public education and provides referrals to the general public upon request (a $5 postage and handling fee is required). A Fact Sheet regarding the problem for which help is being sought and the pamphlet, *Guidelines for Choosing a Behavior Therapist*, are included with mailed referrals. Referrals can be obtained by visiting AABT's website at www.aabt.org/aabt.

The Association's Media & Community Connection Program assists the media with background information and news of the latest developments in the behavioral therapies. The program also helps locate suitable experts in the field for interviews or speaking engagements. Providing membership services to mental health professionals and students seeking to network with like-minded colleagues

and to remain current in the behavioral therapies is another activity of the AABT.

AABT offers Full and Associate professional memberships and sponsors an Annual Convention every November, attracting approximately 2,000 participants. One to three smaller educational seminars are held each year as well. Two peer-reviewed journals, *Behavior Therapy* and *Cognitive & Behavioral Practice*, are published by the organization in addition to its newsletter, *The Behavior Therapist*. For a list of AABT publications or for information regarding upcoming educational programs, please call (212) 647-1890 or visit the AABT website at www.aabt.org/aabt.

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ASSOCIATION FOR THE GIFTED, THE

Founded in 1958, The Association for the Gifted is one of the 17 divisions of the Council for Exceptional Children. The five purposes of this association are to (1) promote the welfare and education of children and youth with gifts, talents, and/or high potential; (2) improve educational opportunities for individuals from all diverse groups with gifts, talents, and/or high potential; (3) sponsor and foster activities to develop the field of gifted education, such as the dissemination of information, the conduct of research, and other scholarly investigations; (4) support and encourage specialized professional preparation for educators of individuals with gifts, talents, and/or high potential, as well as for professional persons in related fields; and (5) work with organizations, agencies, families, or individuals whose purposes are consistent with those of the Association for the Gifted.

The Association distributes two publications to its membership. One, the *Journal for the Education of the Gifted*, is a forum for theoretical, descriptive, and research articles that analyze and communicate information about the needs of children and youth with gifts, talents, and/or high potential. The *Journal* also serves as a forum for the exchange of diverse ideas and points of view on the education of the gifted and talented. The second publication, *TAG Update*, is the Association's newsletter, containing brief, timely information on the Association's activities, upcoming events, workshops and institutes, reports on legislation, and relevant news from other organizations.

Membership inquiries should be made to the Association for the Gifted, The Council for Exceptional Children, 1110 N. Glebe Road, Suite 300, Arlington, VA 22201. Only members of the Council for Exceptional Children are eligible to join the Association for the Gifted. Special membership categories for students and parents and professionals are available for those who qualify for these discounted membership rates.

Staff

ASSOCIATION OF BLACK PSYCHOLOGISTS

The Association of Black Psychologists (ABPsi) was founded in San Francisco in 1968 when a number of Black psychologists from across the country met to discuss the serious problems facing Black psychologists and the larger Black community. The founding members began building an organization through which they could confront the long-neglected needs of Black professionals. They also hoped to have a positive impact on the mental health of the Black community through programs, services, training, and advocacy. The Association is organized into four regions as well as a student division. From the original group, the membership of ABPsi has grown into an international organization of over 1,300 psychologists and mental health professionals, committed to addressing the mental health issues of individuals throughout the African diaspora.

The main offices of the Association of Black Psychologists can be reached at P.O. Box 55999, Washington, DC 20040-5999. Tel.: (202) 722-0808.

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ASSOCIATIVE LEARNING

Associative learning, as demonstrated in the classical conditioning experiments of Pavlov (1927), is based on the concept that events or ideas that are experienced at the same time tend to become associated with each other. When a new (conditioned) stimulus is presented with an old (unconditioned) stimulus, the conditioned stimulus assumes the capability of eliciting a (conditioned) response almost identical to the original (unconditioned) response. The conditioned stimulus should be presented about half

a second before the unconditioned stimulus for maximum effectiveness.

Associative learning is routinely applied when students recognize words, spell, and recall math facts. A number of remedial techniques are also based on the associative principle. Multisensory approaches to reading, which presume the formation of associative bonds across sensory modalities, have been successful in remediating deficits in mildly and severely reading-disabled children and in intellectually disabled students (Sutaria, 1982). Visual imagery training, in which children learn to associate mental pictures with printed text, has been shown to improve learning-disabled students' reading comprehension (Clark, Warner, Alley, Deshler, & Shumaker, 1981).

Children with intellectual disability, for whom associative skills are often an area of relative strength, have improved their memory performance when taught to pair words according to their conceptual similarity (Lathey & Tobias, 1981). Associative learning is a fundamental principle of teaching, and children's associative learning skills can be corrected and compensated for by using a variety of techniques (Woolfolk, 1995).

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***See also* Conditioning; Revisualization**

ASTHMA

Asthma is the most prevalent chronic health problem among children (American Lung Association, 2005). In 2002, asthma was the third leading cause of hospitalizations among children under 15 years of age. An asthmatic episode is characterized by a series of events that conclude in narrowed airways within the lungs. Initially, the lining of the lungs swells, the muscle surrounding the bronchial tubes tightens, and mucus secretion is increased in the airway. As a consequence, wheezing, coughing, shortness of breath, and tightness in the chest is evident during an asthmatic episode and results from this narrowing of airways.

There are two types of asthma: extrinsic and intrinsic (Asthma and Allergy Foundation of America, 2005). Extrinsic (or allergic) asthma symptoms are related to a specific allergen. Extrinsic asthma is the most common form of asthma and can be triggered by the inhalation of dust mites, animal dander, pollen, mold, chemicals, and so on. Intrinsic (or nonallergic) asthma symptoms are not related to a specific allergic reaction. Triggers for intrinsic asthma include anxiety, stress, vigorous exercise, cold or dry air, smoke, environmental pollution, and other irritants.

Medical treatments in the form of prescription drugs for childhood asthma are separated into five groups: inhaled bronchodilator medications, anti-inflammatory medications, systemic bronchodilator medications, systemic corticosteroid medications, and leukotriene modifiers (American Lung Association, 2005). Inhaled bronchodilators are the most effective treatment for opening of airways constricted by asthma and are commonly used by children with mild asthma. This type of medication is only used when necessary, while anti-inflammatory medication is used on a daily basis. Anti-inflammatory medications are used for children with moderate to severe asthma to control airway inflammation. Neither inhaled bronchodilators nor anti-inflammatory medications have severe side effects. Systemic bronchodilators, on the other hand, can have unpleasant side effects that are rarely life-threatening. This type of medication is available in a slow-release form, which can be especially helpful for nocturnal asthmatics. Systemic corticosteroid medication is prescribed for children who have severe asthma attacks that are not effectively helped by the aforementioned medication groups. Systemic corticosteroids are used only for severe episodes and are not recommended for long-term use. However, because severe uncontrolled asthma is a potentially life-threatening illness, use of a corticosteroid may be the better option. Leukotriene modifiers are a new type of medication for long-term, everyday usage. They open the airways by preventing inflammation and swelling, and decreasing mucus in the lungs.

Children using medications containing corticosteroids decrease serotonin levels (Pretorius, 2005). There are researchers that argue that lower free serotonin levels in the plasma are advisable to reduce asthmatic symptoms. However, reduced serotonin levels in the brain can be linked to depressive symptoms, impulse control

problems, and aggression. It is therefore plausible for a child prescribed with antidepressants, or medication for Attention-Deficit/Hyperactivity Disorder (ADHD) to display asthmatic symptoms, while, conversely, children utilizing corticosteroid medications may show depressive symptoms, behavior problems, or aggression.

Research aimed at pinpointing possible interventions to reduce asthma symptoms are commonly related to diet (Nafstad, Nystad, Magnus, & Jaakkola, 2003; Oddy, Klerk, Kendall, Mihrshahi, & Peat, 2004). Studies have shown that increasing food rich in omega-3 fatty acids (e.g., fresh or oily fish, whole grains) while decreasing intake of omega-6 fatty acids (e.g., margarines, processed food) can help with children's asthma symptoms (Oddy et al., 2004). Researchers hypothesize this phenomenon may be related to the anti-inflammatory effects of omega-3 fatty acids. In a related study research showed that fish consumption in the first year of life reduced the likelihood of asthma in children at risk for developing the disease (Nafstad et al., 2003).

Children with asthma should have an asthma-management plan on record in the administrative office (Madden, 2000). This plan is developed by the child's physician and should include such information as routine and emergency medications, symptoms of attack, emergency contact information, and whether the child should have an inhaler at all times. This point may conflict with certain schools' zero-tolerance drug policies and decrease a child's self-confidence to manage his or her chronic illness. Indoor air quality should be monitored on a regular basis to help avoid potential asthmatic reactions (DePaepe, Garrison-Kane, & Doelling, 2002). The Environmental Protection Agency (EPA) has published a guide to managing asthma in schools that includes such suggestions as controlling animal and cockroach allergens, controlling moisture and cleaning up any mold, eliminating secondhand smoke, reducing dust, developing asthma management plans, and providing school-based education (2000).

School teachers can easily be taught to recognize symptoms of respiratory distress in children with asthma (Sapien, Fullerton-Gleason, & Allen, 2004). In one study, after a 1-hour informational video, teachers were more accurate in identifying asthma symptoms. Teachers also expressed an increase in their comfort level in regard to general asthma knowledge and medication information. A greater improvement in asthma-related knowledge was related to the video intervention when compared to didactic intervention.

Approximately 20% to 25% of all school absences are accounted for by children with asthma (Sapien, Fullerton-Gleason, & Allen, 2004). The effects of absenteeism can commonly be seen in the child's academic performance. Asthmatic children may also display concentration problems, inattentiveness, problems with short-term memory, and decreased psychomotor functioning (Naudé & Pretorius, 2003).

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See also **Chronic Illness**

ASTIGMATISM

Astigmatism is a refractive error that causes reduced visual acuity and a lack of sharply focused, clear vision. In astigmatism, the curve of the cornea is irregular. Because of this irregularity, some light rays may come to focus in front of the retina, some on the retina, and some at the theoretical point behind it. The result is distorted or blurred vision and headache or eye fatigue after intensive close work.

Astigmatism does not seem to be clearly related to difficulties in learning to read. However, astigmatism can be a component of amblyopia (lazy eye) which does have a serious effect on reading and near work in general (NEI, 2005).

The special educator should be aware of the symptoms of astigmatism (Rouse & Ryan, 1984): headaches; discomfort in tasks that demand visual interpretation; problems seeing far as well as near; red eyes; distortion in size, shape, or inclination of objects; frowning and squinting at desk tasks; and nausea in younger or lower-functioning students. Astigmatism is generally correctable with eyeglasses or contact lenses, which should be worn full-time by affected students. These students may be helped in the classroom by being moved closer to the front of the room and by a reduction in the amount of time spent on near tasks.

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See also **Visual Acuity; Vision Training**

ASTROCYTOMAS

Astrocytomas are neoplasms of the stellate astrocytic neuroglia. Low-grade astrocytomas have a favorable prognosis in the pediatric age group. Slow-growing tumors, pediatric astrocytomas are far more benign than are those in adults. In children, astrocytomas usually occur in the posterior fossa (Brett & Harding, 1997).

The most widely used system for grading astrocytomas is the World Health Organization's four-tiered grading system. Grade I includes astrocytomas with an excellent prognosis following surgical excision, such as juvenile pilocytic astrocytomas of the cerebellum, the most common tumor of childhood (Sagar & Israel, 1998). Grade IV astrocytomas include glioblastoma multiforme, with the four features of endothelial proliferation, nuclear and cytoplasmic atypia, mitosis, and necrosis. Grade II tumors have two of the four features, whereas Grade III tumors are anaplastic, with three of the four features (Hanieh, 2000; Sagar & Israel, 1998). Unlike in adults, pediatric brain tumors are mostly infratentorial, representing 59% of all childhood neoplasms (Hanieh, 2000). The majority of cerebellar astrocytomas are histologically benign (B. Cohen & Garvin, 1996).

The histologically benign juvenile pilocytic astrocytoma of the cerebellum is the most common childhood brain tumor. Typically, this low-grade astrocytoma is well demarcated and is composed of compact, fibrillated cells alternating with looser, spongy areas (B. Cohen & Garvin, 1996; Sagar & Israel, 1998). Approximately 80% of cerebellar astrocytomas are cystic (M. Cohen & Duffner, 1999). The cyst contains straw-colored, proteinaceous fluid and has a mural nodule, the active portion of the tumor. Computerized tomography (CT) and magnetic resonance imaging (MRI) are equally sensitive in the diagnosis of cerebellar astrocytomas (B. Cohen & Garvin, 1996).

Astrocytomas affect males and females equally (Brett & Harding, 1997). They can occur at any age, with a peak incidence between ages 10 and 14 for both low- and high-grade astrocytomas, and a peak incidence between ages 5 and 9 for cerebellar astrocytomas (M. Cohen & Duffner, 1999). There is a lack of clear data regarding the link between ethnicity and incidence of low-grade astrocytomas, although malignant central nervous system (CNS) tumors are slightly more common in American Whites than in Blacks (Benardete & Jallo, 2000). Familial and genetic syndromes have been identified as most important risk factors for astrocytomas. These include the autosomal dominant conditions neurofibromatosis Types 1 and 2, tuberous sclerosis, and epidermal nevus syndrome (B. Cohen & Garvin, 1996; M. Cohen & Duffner, 1999). Environmental factors are believed to increase the risk of developing CNS tumors, including exposure to aromatic hydrocarbons, N-nitroso compounds, triazines, systemic hydrazines, and ionizing radiation (Benardete & Jallo, 2000; B. Cohen & Garvin, 1996; M. Cohen & Duffner, 1999).

Characteristics

1. There is no typical presentation of a child with an astrocytic CNS tumor. Signs and symptoms vary greatly, depending mostly on the location of the tumor and on the presence or absence of increased intracranial pressure (B. Cohen & Garvin, 1996).
2. The child is brought to the pediatrician most often due to headache. Other signs and symptoms include seizures, vomiting, weakness, dysmetria, gait disturbance, endocrinological dysfunction, decreased visual acuity, papilledema, nystagmus, abducens (sixth cranial nerve) palsy, behavioral abnormalities, confusion, memory loss, emotional lability, and declining school performance (Brett & Harding, 1997; B. Cohen & Garvin, 1996; M. Cohen & Duffner, 1999).

Diagnosis of a mass lesion is confirmed by MRI, with and without gadolinium enhancement, or by high-resolution CT scans with contrast. These have replaced other forms of imaging. Arteriography provides

information regarding vascularity of the tumor and helps exclude vascular malformation (M. Cohen & Duffner, 1999).

The treatment of choice is gross total surgical resection (B. Cohen & Garvin, 1996). This intervention alleviates increased intracranial pressure, relieves local compression of the tumor on functional areas, and provides a tissue diagnosis (M. Cohen & Duffner, 1999). Total surgical removal is often possible in pediatric astrocytomas, especially in the case of cystic lesions. In more solid lesions and those involving the brain stem or midbrain, excision may be dangerous or impossible (Brett & Harding, 1997). There is no universally accepted approach to treatment of optic pathway gliomas (M. Cohen & Duffner, 1999). Drainage of the cyst may relieve blockage of cerebrospinal fluid (CSF) flow and the consequences of hydrocephalus. Ventriculostomy or shunting may be required (Hanieh, 2000). As many as 30% of patients with a posterior fossa mass will require CSF diversion via shunt (M. Cohen & Duffner, 1999).

In terms of adjuvant therapy, low-grade supratentorial astrocytomas and brain stem gliomas usually do not seed the CSF; therefore, radiation can be limited to the tumor bed alone (M. Cohen & Duffner, 1999). Radiation is not indicated for low-grade cerebellar astrocytomas. For some astrocytomas, radiation has been used only after partial removal or after partial removal of a recurrence (Brett & Harding, 1997). In some cases, chemotherapy is an alternative for patients who have progressive disease after surgery or who cannot undergo resection (B. Cohen & Garvin, 1996).

Special education services may be available to children with astrocytomas by qualifying under the Other Health Impairment handicapping conditions. The 504 plan is another alternative, allowing for classroom and learning modifications. Children with astrocytomas can expect to spend many days out of the classroom. Changes in intellectual functioning and academic performance may involve decrements in executive functioning, heightened sensitivity about performance, demoralization, and lower frustration tolerance, especially in cerebellar lesions with or without radiation therapy (Karatekin, Lazereff, & Asarnow, 2000).

Prognosis is excellent following gross total surgical resection without further treatment of low-grade astrocytomas, with a 5-year survival rate of 90–95%. Up to 85% of children with aggressive but subtotal resection will survive 5 years (Brett & Harding, 1997; B. Cohen & Garvin, 1996). In high-grade astrocytomas without postsurgical irradiation, the 5-year survival is 0–3%, compared with 15–20% in those who received radiotherapy (B. Cohen & Garvin, 1996; M. Cohen & Duffner, 1999).

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ASYMMETRICAL TONIC NECK REFLEX

Asymmetric tonic neck reflex (ATNR) is one of a group of postural central nervous system reflexes that in the normal child is inhibited and incorporated into more sophisticated motor skills. The ATNR can be demonstrated easily in normal infants to about 40 weeks by placing the child on the back and turning the head to the left or right. As the face is turned to the left, the left arm extends and the right arm flexes, bringing the right hand flexed to the skull side of the head simultaneous with flexion of the leg on that and the opposite side. In the normal child with no pathology, this reflex is gradually inhibited; thus, children of 24 to 36 months can reach for toys in front of them, look to the side and still bring a cracker or spoon to the mouth when the head is in midposition, and cross the midline. Later on, the child can sustain weight on the arms and knees, and rotation of the head will not result in collapse or support on the skull side arm.

The child who has central nervous system damage above the level of the midbrain (usually considered to be in the basal ganglia, cerebral cortex, or both) will demonstrate a persistent ATNR well beyond the age of 1 year, with accompanying profound damage into adult life. The child with severe ATNR finds self-feeding impossible. Persistence of ATNR can interfere with sitting and standing balance and dressing and writing, and make voluntary motion difficult or impossible.

Some help can be provided to children with delayed inhibition of ATNR by positioning and adaptive motor responses in physical and occupational therapy. Proper classroom seating can help moderately to severely involved children learn to diminish uninhibited reflexive responses when they are relaxed and listening. Excitement, anxiety, and stress may override the child's ability to inhibit the reflexive movement, making controlled, purposeful movement difficult or impossible for the more severely involved young adult with persistent uninhibited ATNR.

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See also **Central Nervous System**

ATAQUE DE NERVIOS

Ataque de nervios is a culture-bound idiom of mental distress principally reported among Latinos from the Caribbean but recognized among many Latin American and Latin Mediterranean groups (American Psychiatric Association [APA], 1994). Ataque de nervios has a very broad range of diagnosis and is apparently neither age nor gender specific (Cardenas et al., 1998).

Ataque de nervios first appeared in medical literature in 1955. The initial case study focused on extreme emotional reactions seen in Puerto Rican army recruits. From this initial study, the disorder has been documented as appearing in many Latin groups from Colombian Indians (Calderon, Pineros, & Rosselli, 1998) to Puerto Rican populations in Houston, Texas (Cardenas et al., 1998). In the incidence of immigrant Puerto Rican populations, "self-report of Ataque de Nervios was the central variable; 16% of all respondents reported having experienced an Ataque de Nervios at some point in their lives" (Cardenas et al., 1998, p. 233). When this rate is compared to the total population of Puerto Rico, the 16% positive responsive rate approximated a 13.8% overall prevalence. Typically, ataques de nervios are expressions of self-labels of psychiatric symptoms that have been shaped by cultural factors such that many cases are reported within family groups. Respectively, this disorder apparently affects all age groups, although cases are initially reported at adolescence (Calderon et al., 1998).

Characteristics

1. Uncontrollable shouting
2. Attacks of crying
3. Trembling
4. Heat in chest rising to head
5. Verbal or physical aggression
6. Asphyxia
7. Fear of dying

According to the Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition, dissociative experiences are closely related to ataque de nervios. Seizure-like or fainting episodes and suicidal gestures are prominent in some attacks but absent in some others (APA, 1994). Ataque de nervios also seems to be stress related such that ataques have been known to occur typically at funerals, accidents, or family conflicts and "will call forth family or other social supports, suggesting that [ataques] may be culturally shaped and sanctioned responses to severe stress" (Cardenas et al., 1998, p. 234).

In treatment of this syndrome, diagnosticians created the Ataque de Nervios Questionnaire–Revised (ANQ-R). The ANQ-R is a "self-related questionnaire, which starts by asking subjects directly if they have ever experienced an Ataque de Nervios" (Cardenas et al., 1998, p. 234). Following completion of the questionnaire, a structured diagnostic interview is conducted with the Anxiety Disorders Interview Schedule–Revised (ADIS-R) or the Structured Clinical Interview for DSM-III (SCID) to detect the degree and frequency of the ataques (Cardenas et al., 1998). When treating and diagnosing children, a separate questionnaire is recommended, the Ataque de Nervios Questionnaire for the Child Study. Similarly, a semistructured diagnostic interview with a psychiatrist is recommended with child cases. Typically, ataque de nervios is treated with antidepressants.

When encountering a child exhibiting characteristics of ataque de nervios, utilizing the above methods of treatment is encouraged, and performing a proper family history to examine the degree of assimilation and family environment is recommended (Cardenas et al., 1998). Special education services may be needed if the condition is determined to be chronic and interfering with academic success at school.

There are no known studies of prognostic factors associated with ataque de nervios at this time. Clinicians working with students with this syndrome will need to be alert for culturally competent assessment and intervention methods in the school setting.

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ATARAX

Atarax (hydroxyzine hydrochloride) may be used for short-term symptomatic relief of anxiety and tension and as an adjunct in organic disease states in which anxiety is manifested. It also may be used as a sedative; the most common manifestation of overdosage is extreme sedation. Other uses include treatment of pruritis owed to allergic conditions such as chronic urticaria and dermatoses. Although not a cortical depressant, its action may be due to suppression of activity in certain key regions of the subcortical area of the central nervous system with the effect of relaxing skeletal muscles (Konopasek, 2004). Adverse reactions may include dryness of mouth and drowsiness, with the possibility of tremor, involuntary motor activity, and convulsions reported in cases where higher than recommended doses have been used.

A brand name of Roeris Pharmaceuticals, it is available in tablets of 10, 25, 50, and 100 milligrams, and as a syrup. The recommended dosage for children under 6 years of age is 50 mg daily in divided doses, and for children over 6 years of age 50 to 100 mg daily in divided doses. When used as a sedative, dosage is recommended to be 0.6 mg/kg (milligram per kilogram of body weight) at all childhood ages, and 50 to 100 mg for adults.

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See also **Antihistamines; Benadryl**

ATAXIA

Ataxia is a type of cerebral palsy caused by the loss of cerebellar control. It is characterized by an unbalanced gait. An ataxic gait is often referred to as a drunken gait, as it resembles the walk of someone who is intoxicated.

According to Batshaw and Perret (1981), "The cerebellum coordinates the action of the voluntary muscles and times their contractions so that movements are performed smoothly and accurately" (p. 163). That is, the cerebellum senses where the limb is in space (based on input to the cerebellum), estimates where the target is, integrates the information, and then carries out the infinitesimal corrections necessary to compensate for inaccuracies in motor output, thereby maintaining fluid movement.

A child whose primary diagnosis is ataxia has poor righting and equilibrium reactions, and a staggering, lurching, irregular, and broad-based gait (Brown, 1973). According to Connor, Williamson, and Siepp (1978), the child has difficulty sustaining posture, as well as shifting posture in a coordinated manner. He or she often stumbles and falls. This postural instability may make the child overly cautious. The child may stiffen his or her trunk abnormally in order to increase stability. When walking, the child may visually fix on an object in the environment in an effort to maintain postural control. According to Walsch (1963), when an older child attempts purposeful reaching, he or she often overshoots the mark because of the presence of a distal, wavering tremor. Nystagmus is often present. The causes of ataxia are many. Extensive pediatric neurology texts such as Swaiman and Ashwal (2006) note ataxia in many common and rare disorders and diseases.

It is important that physical therapy begin as early as possible. According to Connor et al. (1978), early intervention should concentrate on the development of proximal control and stability. Repetition and reinforcement of movement is necessary so that responses become reliable. Activities that increase tremors or stiffening must be avoided. However, because children with ataxia demonstrate variations in their movement behavior, individual program planning is necessary.

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***See also* Cerebral Palsy; Cerebellar Disorders**

ATAXIA, FRIEDREICH

Friedreich ataxia is one of a set of inherited diseases resulting in degeneration of the spine and cerebellum. Friedreich ataxia is the most common of the hereditary ataxias (Evidente, Gwinn-Hardy, Caviness, & Gilman, 2000), with an estimated incidence of 1 in 20,000 and a prevalence of 1 in 50,000 people (Evidente et al., 2000). It is inherited in an autosomal recessive pattern, and the carrier rate, based on molecular data, is estimated at 1:60–1:90. The incidence of the disease in Asians and in those of African descent is low (Delatycki, Williamson, & Forrest, 2000). It affects males and females equally (Zoghbi & Swaiman, 1999).

Characteristics

1. Clinical manifestations are usually evident by late childhood. Mean age of onset is 10.52 years (Delatycki et al., 2000), with progression to loss of ambulation occurring at a mean age of 25 years.
2. The initial manifestation of the disease is most often progressive difficulty with gait, including widening, wavering, slowing, and gait disorganization.
3. Deep tendon reflexes in legs are absent.
4. There is progressive dysarthria (decreased pace, slurring, and rapid, uncontrolled changes in volume of speech) and a reduction in or loss of vibratory sense and proprioception.
5. Scoliosis and evidence of cardiomyopathy are common.
6. Bladder dysfunction may occur.
7. Diabetes mellitus is associated with Friedreich ataxia.
8. Higher cortical functions are generally intact, although auditory dysfunction is common, and limited eye movements, hand deformities, slow processing speed, and dysarthria progressing to ineffective speech may make school performance problematic.
9. Death occurs after progression, with an average age of death, most often related to cardiomyopathy, of 37.5 ± 14.4 years.
10. There is clinical variability in the presentation of the disease, even within sibships (Delatycki et al., 2000; Pandolfo, 1999; Zorghbi & Swaiman, 1999).

The symptoms are secondary to cellular damage and death, thought to be caused by mitochondrial iron accumulation, although the mechanism of damage continues to be debated (Evidente et al., 2000). Cellular death occurs primarily in the dorsal root ganglia, posterior columns of the spinal cord, corticospinal tracts, and the heart. There is mild cellular loss in the cerebellum (Delatycki et al., 2000). The disease is due to a genetic alteration that maps to Chromosome 9q13. In most cases the abnormality associated with Friedreich ataxia is a large expansion of a normal guanine-adenine-adenine (GAA) repeat. There is variability in the size of the expansion, with larger expansions associated with earlier onset and more severe pathology. The abnormality is unstable, and transmission from parent to child is accompanied by change in the size of the genetic abnormality. Maternal transmission may result in either a larger or smaller area of abnormality, whereas the GAA repeat size is generally diminished in paternal transmission (Delatycki et al., 2000). The abnormality causes a reduction in frataxin, a mitochondrial protein (Pandolfo, 1999).

There is currently no treatment for Friedreich ataxia, although identification of and cloning of the gene have offered new hope (Delatycki et al., 2000). The role of antioxidant therapy is being evaluated, and the results are said to be promising. Scientists have found that residual frataxin is present in all patients with Friedreich ataxia. This suggests that gene therapy may play a role in management of Friedreich ataxia, as the therapy could be delivered without the complications of an adverse immunologic response (Delatycki et al., 2000).

Few recent studies have looked at cognitive functioning in patients with Friedreich ataxia, and these have been conducted with adult populations. Patients with Friedreich ataxia appear to have a disturbance in the speed and efficiency of information processing, and this is independent of motor abnormalities. There is no consistent evidence of global cognitive impairment (Botez-Marquard & Boetz, 1993; Hart, Kwentus, Leshner, & Frazier, 1985).

Educational services to children with Friedreich ataxia should recognize the progressive nature of the disease,

the sensory abnormalities that may develop, and the need for assistive technology. These children will require help with motor performance in all domains. They should be provided with alternative modes of response, such as dictation. Simple accommodations for the mildly affected, such as additional sets of books to decrease the need to carry, which makes ambulation yet more difficult, can help in the early stages of the disease. Additional time between classes is imperative. Allowances for bathroom breaks should be included in the individual education plan, or other educational plan. Teachers should be alerted to the need for extra processing time.

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ATAXIA, HEREDITARY

Hereditary ataxia is a designation for inherited disorders that involve incoordination of voluntary muscle movements as the result of spinocerebellar degeneration. There are several forms of hereditary ataxia, which are delineated according to how they are manifested genetically. Autosomal recessive forms of hereditary ataxia are expressed by means of a mutated recessive gene. For the disease to be expressed, children must inherit two affected genes, one from each parent (Evidente, Gwinn-Hardy, Caviness, Gilman, 2000). There are several identified autosomal recessive ataxias with heterogeneous etiologies and clinical features; however, the most common ataxia is Friedreich ataxia. Friedreich ataxia has a prevalence of 1 in 50,000 persons. Onset of the disorder is usually before 20 years of age, and progression is continuous (Evidente et al., 2000). Late onset of Freidreich ataxia (this includes individuals older than 20 to 25 years) is characterized by a more benign course and lower incidence of skeletal deformities (Evidente et al., 2000).

Characteristics

Note: Symptoms for these disorders vary widely according to each specific disorder. The following are some common characteristics.

1. Incoordination of speech muscles and ataxia of all four limbs and of gait
2. Impaired eye movements
3. Sensory loss
4. Dementia
5. Swallowing difficulties
6. Motor neuron degeneration manifested as lack of coordination or muscle control
7. Skeletal abnormalities

Symptoms of Freidreich ataxia include gait and limb ataxia, dysarthria, absent muscle stretch reflexes in lower limbs, sensory loss, and skeletal abnormalities (Evidente et al., 2000). Diabetes and cardiac disease are also fairly common in persons with this disorder. Freidreich ataxia is thought to be the result of the expansion of a DNA trinucleotide repeat (guanine-adenine-adenine) that disrupts the normal assembly of amino acids into proteins (Evidente et al., 2000). This disruption eventually leads to cellular degeneration.

The autosomal dominant cerebellar ataxias (ADCAs) are the result of a mutated dominant gene. These disorders have been labeled as spinocerebellar ataxias (SCAs) and have been assigned numbers according to their chromosomal localization (Woods, 1999).

The incidence of ADCAs is 5 in 100,000 persons. Onset of these disorders occurs in childhood in only 10% of the cases, and progression is continuous. However, childhood onset is associated with a more rapid course. Similar to the autosomal recessive ataxias, genetic testing is required in order to diagnose ADCAs (Woods, 1999). Characteristics of the ADCAs differ according to genetic localization and are heterogeneous between and within affected families (Woods, 1999). In general, however, symptoms indicate involvement of peripheral nerves, spinal cord cell groups and tracts, cranial nerve nuclei, and basal ganglia (Evidente et al., 2000). These symptoms may include limb and gait ataxia, impaired eye movements, extrapyramidal tract and motor neuron degeneration, dementia, sphincter

disturbances, and swallowing difficulties (Evidente et al., 2000; Woods, 1999). The ADCAs are thought to be caused by expansion of the DNA trinucleotide repeat (cytosine-adenine-guanine) that codes for polyglutamine (Woods, 1999).

The third type of hereditary ataxia is referred to as X-linked SCAs. These disorders are less common and have a heterogeneous presentation. Currently, they are not well characterized, and there is little genetic or molecular data (Evidente et al., 2000).

Presently, there is no cure for the hereditary ataxias and no effective treatments to slow the progression of the disease (Woods, 1999). Treatment may be focused on management of the symptoms and concomitant disorders such as diabetes and cardiac disease (Evidente et al., 2000). Physical therapy may prolong the use of the arms and legs.

Although inherited ataxias lead to tremendous loss of physical abilities, there is usually no impairment of cognitive functioning (Stevenson, 1987). For children enrolled in schools, special education programs should focus efforts on modifying the environment to accommodate the child's physical and emotional needs. This may involve providing close supervision, special seating arrangements, and devices such as a wheelchair or railings to increase safety for the child. Occupational, physical, and speech therapists may need to provide extensive support for the child, teachers, and family to maintain optimal functioning as long as possible. As children grow they gain insight into the progressive nature of their disease and may become vulnerable to significant depression and anxiety. Psychological counseling can be offered within the educational setting as a means of addressing these issues (Stevenson, 1987). Often, family therapy may also be warranted.

Future research will likely focus on determining the genetic and molecular substrates of these disorders as a means of developing methods of diagnosis, prevention, and treatment (Evidente et al., 2000).

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ATAXIA, MARIE'S

Ataxia is a disorder that involves incoordination of voluntary muscle movements. Marie's ataxia is a designation for hereditary conditions expressed through dominant genes and characterized by spinocerebellar degeneration. These conditions normally occur in adulthood, although the time of onset varies widely. The clinical features of Marie's ataxia are heterogeneous within and between families, so diagnosis and classification are difficult (Harding, 1982).

Marie's ataxia is thought to be a very rare condition, but there is little agreement as to its prevalence. Schoenberg (1978) estimated the prevalence of all inherited ataxias to be less than 6 cases per 100,000 people. The etiology of Marie's ataxia is thought to involve the expansion of an exonic DNA trinucleotide repeat (cytosine-adenine-guanine) that codes for polyglutamine (Woods, 1999).

Characteristics

1. Incoordination of speech muscles and ataxia of all four limbs and of gait
2. Most individuals becoming nonambulatory within 15 years of onset
3. Increased or decreased tendon reflexes
4. Impaired eye movements
5. Sphincter disturbances
6. Swallowing difficulties
7. Dementia
8. Optic atrophy

The presence of Marie's ataxia can be determined through genetic studies. Genetic counseling may allow people to prepare for the symptoms of the disease. However, at this point there is no effective treatment to reverse or halt its progression (Woods, 1999).

Early onset of Marie's ataxia can necessitate numerous environmental and educational modifications. This disorder may manifest itself as a physical handicap or as a health impairment. Special education programs need to modify the environment to accommodate the child's physical needs. This may include special seating arrangements, safety devices such as railings, and increased supervision. Occupational, physical, and speech therapists may provide support for the child, teachers, and family to maintain optimal functioning as long as possible. In addition, as children gain insight into the progressive nature of their disease, they become more vulnerable to significant anxiety and depression. Psychological counseling within the educational setting can be offered as a means of addressing these issues (Stephenson, 1987). Often, family therapy may also be warranted.

Marie's ataxia has a poor prognosis, as it is a progressive degenerative disease. With effective management of symptoms there may be 10 to 20 years of productivity following onset (Stephenson, 1987). Future research will likely focus on etiology, classification, and treatment.

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ATAXIA-TELANGIECTASIA (LOUIS-BAR-SYNDROME)

Ataxia-telangiectasia (A-T) is an autosomal recessive neurodegenerative genetic disorder characterized by progressive ataxia due to cerebellar degeneration, oculocutaneous telangiectasia, immunodeficiency with recurrent sinopulmonary infections, significant sensitivity to ionizing radiation, and increased risk of cancers, especially lymphoma and leukemia. Incidence is estimated as 1 in 40,000 births, although this may be an underestimate due to early deaths prior to diagnosis. There are between 500 and 600 cases of A-T in the United States. Occurrence has shown no bias on racial, gender, geographic, or other lines. It is estimated that 1% of the general population is a carrier for one of the mutated A-T genes, and carrier status itself is associated with lower than normal tolerance for radiation and an increased risk of cancer for both genders. For females, it is estimated that A-T carriers comprise approximately 6–9% of all breast cancer cases, and carrier status is associated with a 3- to 5-times greater risk of developing breast cancer (Lavin, 1998). Thus, this disorder carries health implications for both homozygote patients as well as heterozygote parent carriers. Well siblings have a two-thirds chance for being carriers.

Patients may appear normal at birth, and even though there may be early signs of cerebellar ataxia at infancy (e.g., abnormal swaying of the head and trunk) and later in toddlerhood (e.g., wobbly gait, clumsiness), the diagnosis is typically not established until ages 4 to 6. The appearance of telangiectasia may occur early but usually appears around age 4 or 5. A common early misdiagnosis because of the ataxia is cerebral palsy, and other children are often born into the family before an A-T diagnosis is established and genetic counseling is provided for the parents.

Earlier detection may occur with the use of routine serum alpha-fetoprotein testing in children with persistent ataxia, where elevated levels often distinguish A-T from other ataxia and immunodeficiency syndromes (Cabana, Crawford, Winkelstein, Christensen, & Lederman, 1998). Less established, but offering possible earlier diagnostic assistance, is the use of magnetic resonance imaging to pick up leukodystrophic changes in the brain that may predate the appearance of many clinical symptoms (Chung, Bodensteiner, Noorani, & Schochet, 1994).

Characteristics

1. Progressive cerebellar ataxia, with early signs such as head swaying, trunk instability, and clumsiness; by age 4 to 6 more apparent balance, coordination, and gait difficulties; use of a wheelchair typically by age 10
2. Related ocular ataxia, dysarthria, dysphagia, dystonia, choreoathetosis, and tremor
3. Reddish lesions on skin, mucosa, and conjunctivas (oculocutaneous telangiectasia)
4. Sensitivity to ionizing radiation
5. Immunodeficiencies, associated with recurrent sinopulmonary infections
6. Increased risk for cancers of all types, but especially lymphoma and leukemia
7. Normal range intelligence
8. A characteristic "sweet breath" in some cases
9. Abbreviated life expectancies, with most succumbing to cancer or respiratory illness before age 20
10. Elevated radiosensitivity and increased risk of cancers, including breast cancer, in single A-T gene carriers

A-T is not associated with intellectual disability. One study did report lower verbal IQ scores in A-T children

(although this may be due to the indirect effects on learning from the symptoms of the disorder rather than direct effects limiting innate cognition) as well as reduced ability for judging duration of time intervals in A-T children (Mostofsky, Kunze, Cutting, Lederman, & Denckla, 2000). Cerebellar dysfunction has previously been linked to duration judgment deficits, and salient cognitive effects in A-T children may be identified as more is learned about the cerebellum's general role in cognition.

Nevertheless, the intelligence range of children with A-T is commensurate with that of the general population; thus, most A-T children should be appropriate for regular education classes, provided that appropriate accommodations related to their physical limitations and needs are made available. These would typically include speech, occupational, and physical therapies, as well as the use of classroom aids for handwriting, note taking, and even reading as progressive ocular apraxia can make reading functionally inadequate.

Although there is some variation in presentation of the disorder, progression of the ataxia is inexorable and prognosis is poor, typically leading to use of a walker by age 8, loss of writing ability by 8, wheelchair use by age 10, and loss of functional reading ability due to difficulties coordinating eye focus (e.g., fixation nystagmus). Death due to cancer or respiratory failure occurs frequently by age 20, although some patients may live into their 30s and very rarely into their 40s. Although there is no cure or treatment yet to correct the disorder, interventions have been directed toward the symptoms. These include neurorehabilitative oriented physical, occupational, and speech-swallowing therapies. Some symptoms can be managed to some degree pharmacologically (e.g., drooling with anticholinergics, basal ganglia–related movement disorders with dopamine agonists or antagonists as appropriate, weakness or fatigue with pyridostigmine; A-T Children's Project, 2000). Some benefits from nutritional supplements and diet changes for reducing symptoms have been reported.

A-T is a rare disorder. Research includes gene therapy and stem cell transplantation, as well as areas of nutrition and diet. For example, supplementation with myoinositol has shown some positive initial effects in improved coordination in some patients. B vitamins, fatty acids, antioxidants and coenzyme Q10 are also being investigated, as is an alcohol-avoidance diet, which may reduce the ataxic symptoms in some patients through avoidance of the ethanol and methanol in many foods and beverages (National Organization to Treat A-T, 2000).

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ATHETOSIS

Athetosis is a central nervous system disorder characterized by slow, writhing movements, most notable in the extremities. These involuntary muscle movements have been described also as wormlike or snakelike. The actual movements consist of alternating flexion–extension and supination–pronation of the limbs, and are usually associated with increased, though variable, muscle tone (Chow, Durard, Feldman, & Mills, 1979).

Athetosis is most commonly a form of cerebral palsy (CP) in childhood accounting for approximately 15% to 30% of children with that diagnosis; however, the overall incidence rate is declining, probably because of improved neonatal intensive care (Batshaw & Perret, 1981). The condition, also known as choreo-athetoid CP, often occurs in conjunction with other forms of CP, especially spasticity. As a form of cerebral palsy, athetosis is one of a group of nonprogressive neuromotor disorders caused by earlier brain damage. Unlike other common forms of CP, the athetoid type presents a problem of controlling movement and posture rather than a difficulty in initiating voluntary movement. The uncontrolled, purposeless, involuntary movements associated with athetosis are not evidenced during sleep. Although the precise nature of the central nervous system insult is often indeterminable, among known causes may be various prenatal factors (e.g., anoxia, blood group incompatibilities, excessive radiation dosage during gestation, physical injuries, various maternal infections); perinatal factors (e.g., prematurity,

head trauma, asphyxia, kernicterus); and postnatal factors (e.g., head trauma, hemorrhage, infections of the brain or cranial linings). In the United States, one to two children per thousand may be affected by CP, including athetosis or mixed cerebral palsy with athetosis. It is believed that in the more pure athetoid type of CP, the site of lesion is generally in the basal ganglia or extrapyramidal track (Kandel, Schwartz, & Jessell, 1991; Vaughan, McKay, & Behrman, 1979).

Secondary problems important to the special educator frequently accompany athetosis. Early difficulties may be observed in sucking, feeding, chewing, and swallowing. Special techniques to deal with these problems may come from speech/language pathologists, occupational therapists, physical therapists, or physicians. Speech articulation is often impaired and drooling may be present. In addition, hearing loss, epilepsy, and intellectual disability may exist simultaneously. However, careful assessment of cognitive functioning is essential because both speech and motor skills are affected.

Little, if any, in the way of curative action is successful with cerebral palsy. Early intervention, special education, and vocational rehabilitation will be important, but the exact nature of the treatment approach will depend largely on the presence, nature, and degree of concomitant disorders. As many as 70% of children with the athetoid type of CP may function in the intellectually disabled range, so educational and habilitative services must take into account the child's developmental limitations. Because facial muscles are involved in athetosis, vision disorders, especially of the eye-muscle imbalance type, may be present in more than 40% of the affected group (Black, 1980). Hearing loss is also common, though less so than vision problems, necessitating early and continuous audiometric evaluations and the possible provision of amplification devices. Physical therapy, including bracing and splinting to help maintain balance and to control involuntary movements, may be indicated in many cases. Orthopedic surgery and neurosurgery, though sometimes helpful with other forms of CP, have not yet shown promise for children with athetosis (Kutz & Semrud-Clikeman, 2003).

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See also **Central Nervous System; Cerebral Palsy**

ATRIOVENTRICULAR SEPTAL DEFECT

Atrioventricular septal defect (AVSD) is a congenital heart defect (present at birth). It is also known as cor biloculare. Additionally, there are several subdivisions depending on the size and location of the defect. Specifically, these subdivisions are atrial and septal and small ventricular septal defect, atrial septal defect primum, complete atrioventricular septal defect, incomplete atrioventricular septal defect, large atrial and ventricular defect, and transitional atrioventricular septal defect.

The heart is composed of four chambers, two atria and two ventricles. The atria are separated by a wall called the atrial septum, and the ventricles are also separated by a septum. The right atrium and right ventricle are connected by valves, as are the left atrium and ventricle. In the case of the presence of atrioventricular septal defects, the septa or valves either are not fully formed or are fully developed but are deformed. This causes the septa or valves to malfunction and blood to leak between chambers or be moved in incorrect directions within the heart. The severity of the defect ranges from mild, as in a cleft mitral valve, to severe, in which there are several deformities within both the valves and the chambers of the heart. The severity of the defect is categorized into three forms: cleft mitral valve, partial atrioventricular septal defect, and complete atrioventricular septal defect. The type of defect determines the symptoms and the type of medical care needed. However, medical care and surgery are almost always going to be needed in infancy. It is interesting to note that approximately half the cases of this defect occur in children with Down syndrome.

Depending on the type of defect, atrioventricular septal defects in infants can cause different types of irregular movement of blood within the heart. This can be as straightforward as left to right movement of blood (as opposed to vertical movement) or as complicated as movement of blood between the left ventricle and right atrium.

Infants with this defect are in danger of congestive heart failure at 4–12 weeks old because of abnormal blood flow levels. Infants whose hearts are able to function despite irregular movement of blood in the heart are at

risk of pulmonary vascular obstructive disease at ages of less than 1 year. Defects must be repaired surgically, a difficult procedure because of the size, age, and lack of immunities in an infant. In some cases, surgeons may opt simply to stabilize the situation and fully correct the condition at a later date when the child is larger; however, this requires two surgeries and may also further deform the heart in the process.

Characteristics

1. Malformed septa or valves in heart
2. Inability to maintain blood flow through heart efficiently
3. Risk of congestive heart failure
4. Risk of pulmonary vascular obstructive disease

Because almost all cases of atrioventricular septal defect must be corrected in infancy (Kwiatkowska, Tomaszewski, Bielinacuteska, Potaz, & Ericinacuteski, 2000), surgical procedures are not likely to interrupt the life of a school child with this defect. However, this child may still need to be examined regularly and may not be able to participate in all activities that strain the heart or lungs. Many support, resource, and educational groups are available both locally and online, and it may be beneficial for a child with atrioventricular septal defects and his or her family to participate actively in one of these groups.

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ATTACHMENT DISORDER

Attachment disorder derives from Bowlby's theoretical and process theory of attachment to caregivers or significant others in the course of normal development, a theory that also provides psychologists and special educators a framework for investigating atypical patterns of attachment in life (cf. Bowlby, 1982). Bowlby proposed that *attachments* (a) referred to a *pattern* of organized behavior within a relationship, not a static trait infants and children simply possessed. Attachments were not immutable and not independent of experience; (b) are framed by early experience, but are also transformed by later experience in life. This proposition is now referred to as a *dynamic systems theory of psychopathology*, based on the complex interactions experienced over life development; and (c) in early life (i.e., infancy or toddlerhood) often play a role in the developmental dynamic that produces pathology; however, this complex role depends on a surrounding context of sustaining environmental supports. Early experience influences later life outcomes, but the quality of those later life relationships also depends on the sustaining or supporting context in which those relationships are expressed (Carlson & Sroufe, 1995; Sroufe, Carlson, Levy, & Egeland, 1999).

If the developmental pathway model of attachment theory is conceptualized as a tree, then (a) there are more branches in the broad center of the large array of overall branches (i.e., owing to considerable diversity of experiences); (b) starting on any major trunk allows a large number of possible outcomes due to the complex number and diversity of subsequent branchings (i.e., due to circumstances, one can potentially and probabilistically deviate to the outward smaller branchings or continue along the main, normally developing branch); and (c) the longer the deviating offshoot branches are followed from the main branch, the more unlikely will there be a return to the main or central branch. Change or adaptations in attachments are more likely during infancy and toddlerhood, but if development continues to go awry well into adolescence, a return to a more healthy and organized form of attachment in relationships is viewed as quite difficult (Bowlby, 1973; Speltz, DeKlyen, & Greenburg, 1999; Sroufe et al., 1999). It must be kept in mind that Bowlby and his (and others') research does not support or suggest a linear pathway from early disruptions in attachment to later psychopathology; rather, (developmental) psychopathology will be the product of ongoing difficult challenges in life and the cumulative maladaptations to those challenges (Sroufe et al., 1999).

Assessment and Individual Differences in Quality of Attachment

Assessment of early dyadic relational patterns between infant and caregiver are drawn from (a) Ainsworth's Strange Situation procedure, developed from cross-cultural field research and home observations and used with most 12- to 18-month-old infants or toddlers; (b) the Attachment Q-Set; and (c) direct observations and perceptions of teacher-child relationships (Ainsworth, Blehar, Waters, & Wall, 1978; Carlson & Sroufe, 1995; Howes & Ritchie, 1999).

In the Strange Situation procedure, eight increasingly stressful analog episodes are presented: (1) caregiver

and infant are introduced to an unfamiliar, sparsely furnished room containing a variety of attractive, age-appropriate toys; (2) the infant is allowed to explore with the caregiver present, seated in a chair; (3) a stranger enters, sits quietly, converses with the caregiver, then initiates interaction with the infant, taking cues from the baby; (4) the caregiver leaves; (5) the caregiver returns, and the stranger leaves unobtrusively; (6) the caregiver leaves the infant alone; (7) the stranger enters, attempts to comfort the infant if needed; and (8) the caregiver returns. The coder or observer seeks to classify behavioral organization during reunion episodes, those of proximity seeking, contact making, contact resistance, and avoidance (Ainsworth et al., 1978; Main & Solomon, 1990).

Based upon the outcome of the Strange Situation procedure, patterns of behavior are classified as either (a) *secure attachment*, where infants readily separate from caregivers and easily become absorbed in exploration. When wary of a stranger, threatened, or distressed by separation, the infant seeks contact and consolation until he or she is calm again. The infant's emotional regulation is considered to be smooth and well integrated; (b) *anxious/avoidant attachment*, which occurs when the caregiver's presence does not reduce distress or promote exploration. Such infants show little affective interaction with caregivers, show little suspicion of strangers, and are generally upset only if left alone. When the caregiver returns, such infants do not actively initiate interaction and are unresponsive to the caregiver's interactive attempts. As stress increases, so does avoidance of the caregiver. Emotional regulation for this type of infant is considered to be overly rigid; (c) *anxious/resistant attachment*, where infants show impoverished exploration and play and are wary of strangers and novel situations. They may cry even before being separated from the caregiver (i.e., are clingy), and upon reunion with the caregiver, they have tremendous difficulty settling down as if not reassured by their mother's presence or comforting. The emotional regulation of such infants is thought to come from intermittent caregiver responses to stress, producing a constant state of arousal in them. In their constant vigilant state, these infants may actually heighten their distress in order to elicit caregiver responses; and (d) *disorganized/disoriented attachment*, seen when infants and caregivers have no coherent relational strategies. There may be inconsistent or unusual behaviors such a hand-flapping, freezing, and other stereotypies that indicate seemingly undirected (disorganized) behavioral patterns to strange situations. It is hypothesized that incomprehensible or frightening caregiver behavior has interfered with the formation of coherent attachment strategies. For such infants, the caregiver serves as both a source of fear and a biologically based source of reassurance. No effective emotional regulation is thought to occur among these infants (Bowlby, 1973, 1980, 1982; Carlson & Sroufe, 1995).

The Strange Situation procedure used to arrive at these attachment classifications has been criticized for its lack of discriminant validity due to limited assessment ecology and restricted use with infant- or toddler-age children (Howes & Ritchie, 1999). The Attachment Q-Set (AQS; Waters & Deane, 1985), which has good validity with the Strange Situation procedure, is a viable alternative (Howe & Ritchie, 1999) because it can be used with a broader age range and is based on direct observations in the child's natural home environment. The AQS yields a continuous score, representing the degree of attachment security and now has subscales aimed at capturing the attachment organizations of insecure (avoidant or ambivalent or resistant) or secure (seeking comfort, proximity, and harmonious interactions). Speltz et al. (1999) also describe an observation coding system called the Preschool Attachment Assessment System (PAAS) for evaluating brief separation and reunion episodes between children and parents. The PAAS measures approach and avoidance behaviors as well as codes the content and affectivity of the child's verbal and nonverbal communication to the parent.

There is growing research support for the use of observations of teacher-child relationships in child care settings as well as gathering elementary school teacher perceptions of the teacher-child relationship. Research findings from both of these literature bases suggest that teachers can be successful in developing teacher-child relationships that are wholly different in quality from what they experience at home (Howes & Ritchie, 1999).

Bowlby's (1973, 1980, 1982) theory suggests that for individuals with impaired attachments, their stressful style of responding to others, themselves, and the environment might provide the basis for developing specific disorders. Expanding on these theoretical claims, Carlson and Sroufe (1995) explain that for individuals adopting an *avoidant/dismissing* strategy (because of insensitive or unpredictable parents), symptomatic behavior might include attempts to minimize attachment behavior and feelings. They might not only mask their own emotional expressions to avoid being hurt, but they may also view others as untrustworthy and overidealize attachment relationships to the point that when these ideals go unrealized, anger, resentment, and aggression are displayed. Conduct Disorders and antisocial personality styles are often associated with this pattern of emotional regulation and behavior (cf. Speltz et al., 1999), sometimes leading to depression because of continual failed relationships. Concerning individuals with *resistant/preoccupied* strategies of attachment, relational anxiety reduces exploration and increased attachment behavior (e.g., enmeshed, clingy relations). Such individuals have difficulty managing anxiety, manifest phobias and Conversion Disorders, and are preoccupied with personal suffering (Bowlby, 1973; Carlson & Sroufe, 1995) to the point of exaggerating their emotions and negative beliefs about themselves,

which keep them confused about relationships. Bowlby (1973) further notes that a child's school refusal, psychosomatic symptoms, or phobias are often connected to family attachment patterns where the child is anxious about the availability or well-being of the parent(s). For individuals with *avoidant/dismissing* and *resistant/preoccupied* relationship strategies, death or major separations only serve to confirm their worst nightmare about the psychological availability of the attachment figure, leading to intense despair and anxiety (Bowlby, 1980). As a result, if one has a history of avoidant attachment behavior, mourning may be delayed for months or years, irritability and strain will be exhibited, and depression may occur long after the loss or separation was experienced. Resistant attachment issues may lead individuals to express intense anger or self-reproach with depression that lasts much longer than normal (Carlson & Sroufe, 1985).

Attachment disorders are best viewed as relational problems triggered as a result of dysfunctional or impaired parent-child transactions, which then become absorbed as part of the individual's unique psychological identity and functioning (Carlson & Sroufe, 1995; Sroufe et al., 1999). Considerable research has been conducted to examine the circumstances that affect or strain attachment relationships in infancy and toddlerhood as well as to investigate conditions in which maladaptive attachment patterns impact or effect psychological adjustment later in life. Such research issues related to attachment are commonly found in investigations of infant colic, infant failure to thrive, Feeding Disorders (e.g., Pica, Rumination Disorder, posttraumatic feeding problems), sleep disorders, Posttraumatic Stress Disorder, and Reactive Attachment Disorder. In addition, direct and collateral research on later psychiatric functioning has covered issues related to autism, Oppositional Defiant Disorder, Conduct Disorder, depression or anxiety, maltreatment, borderline and Dissociative Disorders, and adult pathology (cf. Carlson & Sroufe, 1995; Lyons-Ruth, Zeanah, & Benoit, 2003; Sroufe et al., 1999). As Carlson and Sroufe (1985) point out, a careful analysis of the current and longitudinal research on attachment in early care and later pathology supports a transactional multidetermined view of the development of psychopathology. What is less clear is the exact relationship between attachment and stressful life experiences, most likely due to variations in research design and methodology.

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See also **Emotional Disorders; Emotional Lability**

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common disorders found among children. Children with ADHD exhibit more attention difficulties or hyperactive-impulsive behaviors than their same-age peers (American Psychiatric Association, 2000). Individuals with ADHD experience problems with sustained attention (i.e., maintaining attention to tasks with little intrinsic value) or selective attention (i.e., filtering essential from nonessential details), exhibit excessive motor movement, and demonstrate behavioral disinhibition (i.e., difficulty adjusting behavior to situational demands; Barkley, 1998). According to Barkley,

behavioral disinhibition, overactivity, and inattention are the primary characteristics of ADHD.

Prevalence rates of ADHD among the school-age population have varied widely from about 1% to 9% (Bird, 1996), with 3% to 7% being the most common prevalence estimates reported among experts in the field (American Psychiatric Association, 2000). Attention-Deficit/Hyperactivity Disorder is reported to be more prevalent in males than in females, with the proportion of males to females manifesting the disorder ranging from 2:1 to 9:1 (American Psychiatric Association, 2000).

From a historical perspective, the conceptualization of ADHD and the terms used to describe the disorder have undergone a series of revisions. In the 1940s and 1950s, restless, impulsive, distractible, and inattentive behaviors currently associated with children with ADHD were attributed to brain damage. The term *Minimal Brain Damage* (MBD) was used during this period of time to describe these children whose greatest difficulty was their excessive activity levels (Strauss & Lehtinen, 1955). A lack of clear evidence supporting the link between organic impairment and excessive activity levels resulted in a change in terminology in the early 1960s. The term *Minimal Brain Damage* was replaced with a new label, *Minimal Brain Dysfunction*. Several years later, the term *minimal brain dysfunction* was replaced with a new label, *Hyperkinetic Reaction of Childhood*. The term *Hyperkinetic Reaction of Childhood* first appeared in the revised nomenclature of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders—Second Edition* (*DSM-II;* American Psychiatric Association, 1968). The primary feature of this disorder in the *DSM-II* was hyperactivity. Controversy surrounded the use of the *Hyperkinetic Reaction of Childhood* label in the late 1960s and 1970s because of the seemingly incompatible symptom presentation of this disorder. Some children with the disorder exhibited hyperactivity-impulsive behaviors, while other children with the disorder experienced attention difficulties (Wilmshurst, 2005). Along with the controversy, a shift in focus occurred during this period of time as inattentiveness was viewed as the most salient feature of this disorder (Douglas & Peters, 1979). As a result, the term and the description of the disorder changed from *Hyperkinetic Reaction of Childhood* to *Attention Deficit Disorder* (ADD) in the third revision of the *DSM*, the *DSM-III* (American Psychiatric Association, 1980). The *DSM-III* also recognized two distinct subtypes of ADD, Attention Deficit Disorder with Hyperactivity and Attention Deficit Disorder without Hyperactivity. Children with Attention Deficit Disorder with Hyperactivity exhibited inattention and hyperactive behavior, whereas children with Attention Deficit Disorder without Hyperactivity experienced only attention problems. Later in the 1980s, the *DSM* was revised again. In the *Diagnostic and Statistical Manual of Mental Disorders*, third edition, revised (*DSM-III-R;* American Psychiatric Association, 1987), the subtyping was eliminated and Attention Deficit Disorder with Hyperactivity became known as Attention-Deficit Hyperactivity Disorder. In contrast, Attention Deficit Disorder without Hyperactivity was removed as a subtype.

The current conceptualization of ADHD and terms used to describe the disorder appear in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, text revision (*DSM-IV-TR;* American Psychiatric Association, 2000). In the *DSM-IV-TR*, three subtypes of ADHD are recognized, Attention-Deficit/Hyperactivity Disorder, Combined Type, Attention-Deficit/Hyperactivity Disorder, Predominately Inattentive Type, and Attention-Deficit/Hyperactivity Disorder, Predominately Hyperactive-Impulsive Type. These three subtypes are identified based on the degree to which a child exhibits the core features of ADHD (Wilmshurst, 2005). The three core features of the disorder include hyperactivity, impulsivity, and inattentiveness. The commonly seen, especially in lay publications, but unfortunately also in some professional publications, designation of ADD is archaic and no longer considered a valid diagnosis.

Children who meet the criteria for the most common subtype of ADHD, Attention-Deficit/Hyperactivity Disorder, Combined Type, display both inattentive and hyperactive-impulsive behaviors. Children with the Combined Type exhibit at least six of nine symptoms in the inattentive category (makes careless mistakes or does not attend to details in work, has problems sustaining attention, does not seem to listen, does not follow through on instructions or does not complete work, has problems organizing tasks, forgets things, is easily distracted, loses things, and is reluctant to engage in activities requiring mental effort) and at least six of nine symptoms in the hyperactive-impulsive category (fidgets with hands or feet or squirms in seat, has difficulty remaining seated, runs and climbs excessively in inappropriate places, has difficulty playing quietly, is extremely active, talks excessively, blurts out answers, has difficulty taking turns, and interrupts others; American Psychiatric Association, 2000). In contrast, children with Attention-Deficit/Hyperactivity Disorder, Predominately Inattentive Type exhibit at least six of nine symptoms in the inattentive category and less than six of nine symptoms in the hyperactive-impulsive category (American Psychiatric Association, 2000). These children experience attention difficulties, but they do not meet the diagnostic criteria for hyperactivity-impulsivity. Many children with the Predominately Inattentive type have concentration and academic difficulties and suffer from internalizing disorders such as depression or anxiety (Weiss, Worling, & Wasdell, 2003). Children with Attention-Deficit/Hyperactivity Disorder, Predominately Hyperactive-Impulsive Type exhibit at least six of nine symptoms in the hyperactive-impulsive category and less than six of nine symptoms in the inattentive category. Children with the Predominately Hyperactive-Impulsive Type demonstrate hyperactive-impulsive behaviors, but

they do not meet the diagnostic criteria for inattentiveness (American Psychiatric Association, 2000). Many children who are diagnosed with this subtype experience social and academic problems due to their impulsive nature (Wilmshurst, 2005). The symptoms associated with the three subtypes of ADHD must (a) be present for at least 6 months, (b) cause significant impairment in social or academic functioning, and (c) occur across two or more settings (e.g., home and school). In addition, some of the symptoms associated with the different subtypes of ADHD must have been present before age 7 (American Psychiatric Association, 2000).

Most children with ADHD begin to exhibit symptoms of the disorder in early childhood. Around the age of 3 or 4, hyperactive-impulsive behaviors are first observed in children with ADHD. Hyperactive-impulsive behaviors are thought to come before inattention (Green, Loeber, & Lahey, 1991). Attention difficulties among children with ADHD are typically not detected until these individuals begin school (Wilmshurst, 2005) and experience learning difficulties (Applegate et al., 1997). When children with ADHD reach adolescence, many of these individuals display fewer hyperactive-impulsive behaviors and show improvement in their attention span (Hart, Lahey, Loeber, Applegate, & Frick, 1995). However, behavioral problems and cognitive difficulties persist with some of these individuals. In adulthood, many individuals with ADHD have reported an overall reduction in both hyperactive-impulsive and inattention symptoms (Shaffer, 1994), but for many, the disorder lasts a lifetime (Weiss & Hechtman, 1993).

Comorbid disorders are common among children with ADHD. According to Barkley (1998), more than 50% of children with ADHD have one or more co-occurring disorders. The most prevalent comorbid disorders are Conduct Disorders and Oppositional Defiant Disorders. Approximately 50% of children with ADHD have a Conduct Disorder, and 35% to 60% have an Oppositional Defiant Disorder (Szatmari, Boyle, & Offord, 1989). Other common, but less prevalent, comorbid disorders include Bipolar Disorders, Major Depressive Disorders, Anxiety Disorders, Learning Disorders, and Communication Disorders. Some children with ADHD have a Tic Disorder. However, the co-occurrence of a Tic Disorder occurs less frequently in children with ADHD (American Psychiatric Association, 2000).

Many children with ADHD have poor interpersonal relationships. Approximately 50% of children with ADHD experience peer rejection and have difficulty establishing and maintaining friendships (Landau, Milich, & Diener, 1998) due to their bossy, impulsive, intrusive, and argumentative nature. Some of these children demonstrate aggressive behavior toward peers because they misinterpret social cues from their environment (Barkley, 1998), which, in turn, leads to peer rejection. Few or no friends put these individuals at risk for future socioemotional problems. Relationships with adults are also problematic for many of these children. Children with ADHD are less compliant to teacher and parent requests and receive more reprimands and punishment from significant adults in their lives (Barkley, 1998).

Besides poor interpersonal relationships, many children with ADHD experience academic and cognitive problems. Evidence suggests that children with ADHD score on average nine points below their peers on standardized measures of intelligence (Frazier, Demaree, & Youngstrom, 2004). Frazier and colleagues meta-analyzed 137 studies and found a statistically significant difference in overall cognitive ability between individuals with ADHD and controls. The weighted mean effect size was .61. According to the authors, this finding suggests that individuals with ADHD may have mild global cognitive inefficiencies or multiple specific deficits. Children with ADHD may also experience academic problems, with 30% of these children retained at least once in their academic careers (Barkley, 1998). Because many of these children struggle in the academic arena, approximately 30% will not finish high school (Barkley, 1998). Many students with ADHD struggle in a number of academic areas, including reading, mathematics, spelling, and writing (Barkley, 1998). Students who experience academic difficulties may qualify for special education and related services under the learning disability (LD) or other health impairment (OHI) category of the Individuals with Disabilities Education Act (IDEA) or for accommodations in the regular education classroom under Section 504 of the Rehabilitation Act. Approximately 30% of children with ADHD participate in special education programs (Barkley, 1998).

Significant controversy exists regarding the exact cause of ADHD (Wilmshurst, 2005), with a number of different etiologies offered to explain the disorder. However, neurobiological factors have received substantial empirical support in recent years as the greatest contributors to ADHD (Barkley, 1998). With modern technology, functional resonance imaging (FMRI) and single photon emission computed topography (SPECT) scans have revealed different activity levels in different regions of the brain of children with ADHD in comparison to children without ADHD. Children with ADHD have less activity in the frontal region of the brain and more activity in the cingulate gyrus than children without ADHD. The frontal region of the brain and the cingulate gyrus are responsible for executive functioning and focused attention, respectively (Wilmshurst, 2005). Another plausible explanation for the disorder is heredity (Edelbrock, Rende, Plomin, & Thompson, 1995). ADHD runs in families, with 50% of children with ADHD having a parent who also has the disorder (Biederman et al., 1995). Low levels of neurotransmitters have also been identified as a possible cause of ADHD. Research has shown that children with ADHD have lower levels of dopamine, epinephrine, and norepinephrine than children without ADHD and that

these neurotransmitters are associated with attention and motor activity (Wilmshurst, 2005). Barkley (1997) cogently argued that deficits in the behavioral inhibition system provide an explanation for the disorder and the cognitive, behavioral, and social deficits observed in children with ADHD. Other possible neurological etiologies include prenatal and perinatal complications, exposure to environmental toxins, and infections. Environmental factors such as poor parenting, parental characteristics, chaotic home environment, and lower socioeconomic background have also been suggested as possible etiologies for the disorder. However, these factors have received little empirical support as causes of ADHD (Anastopoulos, Klinger, & Temple, 2001).

A multimethod approach in the assessment of children with ADHD has been recommended (Bradley & DuPaul, 1997). A multimethod assessment approach involves obtaining information from multiple informants (e.g., parent, teacher, child), measures, and settings (home, school) to pinpoint problematic areas of concern. Once the problematic areas are identified, intervention strategies are developed based on the assessment results to address these areas of concern.

A comprehensive evaluation of a child with ADHD in a clinical setting includes clinical interviews with the parent, teacher, and child; a medical examination consisting of a medical interview and a physical examination; and completion of behavioral rating scales by the parent, teacher, and child if applicable (Barkley & Edwards, 1998). Popular behavioral rating scales used in the assessment of children with ADHD includes the *Achenbach System of Empirically-Based Assessment* (ASEBA; Achenbach & Rescorla, 2001), the *Behavior Assessment System for Children–Second Edition* (BASC-2; Reynolds & Kamphaus, 2004), the *Brown Attention-Deficit Disorder Scales* (Brown ADD Scales; 2001), the *Conners' Rating Scale–Revised* (CRS-R; Conners, 1997), and the *Behavior Rating Inventory of Executive Function* (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000). Additional behavior rating scales may be included to address other areas of concern. Behavioral observations, intelligence and academic achievement measures, neuropsychological tests, personality measures, and projectives may also be included to assess cognitive impairments or to aid in differential diagnosis (Gordon & Barkley, 1998).

Assessment of children with ADHD in a school setting may be conducted within a problem-solving model (see Hoff, Doepke, & Landau, 2002 for a discussion on the use of a problem-solving model in the assessment of children with ADHD). As part of the prereferral process, interviews with the parent, teacher, and child are conducted; behavior observations are performed; and behavior rating scales are completed by the parent, teacher, and child if applicable. A functional behavior assessment may also be performed to address behavioral concerns and curriculum-based measures may also be administered to assess academic problems. Based on these assessment results, intervention strategies are selected and implemented to address the issues of concern. If the intervention strategies prove to be ineffective, a comprehensive evaluation may be conducted and include standardized measures of intelligence and academic achievement and other measures, depending on the referral and information obtained in the assessment process. Based on the results of this comprehensive evaluation and a discussion among members of a multidisciplinary team consisting of school personnel, parents, and possibly the child, a child may be eligible for special education and related services under IDEA or for accommodations in the regular education classroom under Section 504 of the Rehabilitation Act (Lowe, 2005).

Many factors must be considered when providing treatment to children with ADHD. Because of the cross-situational pervasiveness of the disorder, comorbid and associative features, and symptoms, a multimodal approach has been used with many of these children (Anastopoulos et al., 2001). Medication, behavior modification techniques, counseling, and parent training have received empirical support (Pelham, Wheeler, & Chronis, 1998).

Stimulant medication has been reported to be the most effective single treatment in reducing the core symptoms of ADHD (MTA Cooperative Group, 1999). The rationale for the use of medication in the treatment of ADHD rests on the assumption that low levels of catecholamines (i.e., dopamine, epinephrine, and norepinephrine) are the cause of the disorder. Stimulant medication in current use to treat ADHD includes Ritalin, Concerta, Focalin, Metadate, Methylin, Adderall, Dexedrine, Dextrostat, and Cylert (Wilmshurst, 2005). Antidepressant medication has also been used to treat ADHD, including Imipramine and Wellbutrin. Antidepressant medication has been prescribed in many cases to reduce or eliminate motor tics, which can be a side effect associated with the ingestion of stimulant medication or to elevate a child's mood. A new nonstimulant medication, Strattera, received Food and Drug Administration (FDA) approval for use in the treatment of children with ADHD in 2003 (Wilmshurst, 2005). Collaboration among medical professionals, school personnel, and parents is needed to ensure thorough monitoring of the medication that an optimal dose is prescribed to children with ADHD.

Although medication has been effective in reducing hyperactive-impulsive behaviors and increasing attention in children with ADHD, there are side effects associated with the use of medication. Short-term side effects of stimulant medications include stomachaches; weight, height, and appetite suppression; and sleeping difficulties. Long-term side effects of stimulant medications include dysphoria, insomnia, increase in heart rate and blood pressure, and loss of appetite. The side effects associated with the long-term use of these medications across the life span are not known at the present time.

Nonpharmacological interventions have also been used in the treatment of children with ADHD. Parent training has been shown to be effective in reducing children's noncompliant behavior and increasing adults' parenting skills (Sonuga-Barke, Daley, Thompson, Laver-Bredbury, & Weeks, 2001). Parent training involves training adults in behavior modification techniques. Through training, parents learn ways to reduce their child's inappropriate behavior and to increase their child's appropriate behavior. A positive side effect of this training has been reduced levels of stress among parents (Sonuga-Barke et al., 2001).

Behavior modification techniques are effective intervention strategies to increase appropriate behavior and decrease inappropriate behavior among children with ADHD (Pfiffner & Barkley, 1998; Wilmshurst, 2005). Behavior modification strategies involve the manipulation of antecedents to modify the environment or task characteristics associated with a child's difficulties or the delivery of positive or negative consequences contingent upon the type of behavior demonstrated by the child. Modifications in the environment may include reducing the noise level in the classroom or moving a child's desk closer to the teacher and away from distractors to increase a child's attention. Praising or giving a child a tangible reward after the child sits quietly and completes his or her class work or taking away a privilege after a child runs around the classroom are examples of behavior modification strategies in which appropriate behavior is rewarded and inappropriate behavior results in negative consequences.

Home-school contingencies represent another group of behavioral strategies effective with children with ADHD (Pelham et al., 1998). Home-school contingencies represent one of the most widely used strategies with these children (Pfiffner & Barkley, 1998). The effectiveness of home-school contingencies is dependent upon collaboration between the home and school. An example of a home-school contingency is a daily report card that goes back and forth between the home and the school. Consequences are delivered in the home environment based on the child's behavior or academic performance in the school setting. Ratings of the child's behavior or academic performance are recorded on the report card, and the child carries the report to and from school on a daily basis. With home-school contingencies, generalization and maintenance of desired behavior are more likely to occur because the behavior is being addressed in two settings.

Peer strategies are a fourth group of strategies effective with children with ADHD. Peer tutoring and classwide peer tutoring have been effective in improving academic performance and classroom behavior of children with ADHD (DuPaul & Henningson, 1993). Peer tutoring strategies are most effective when children with ADHD are paired with peers who serve as good role models (Pfiffner & Barkley, 1998).

Social skills training is another popular strategy used with children with ADHD. Many children with ADHD experience poor interpersonal relationships. The purpose of social skills training is to promote social competence. However, research has suggested that social skills training has not been extremely effective with high incidence populations, including children with ADHD (Gresham, Sugai, & Horner, 2001). Gresham and colleagues' meta-analysis revealed a weak effect for social skills training in improving the social competence of high incidence populations and problems with skill maintenance and generalization.

Self-management strategies have also been used with children with ADHD. Self-management strategies emphasize the development of self-control. Self-management strategies include self-instruction, self-monitoring, self-reinforcement, and problem-solving strategies. Overall, these strategies have fallen short of initial expectations (Braswell et al., 1997).

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See also **Attention Span; Ritalin; Stimulant Drugs; Traumatic Brain Injury**

ATTENTION SPAN

Adequate attention span requires optimal arousal, selection of task-relevant information, maintenance of attention long enough to get a task done, and central processing of the task (Cohen, 1993; Posner & Boies, 1971). Arousal is assessed by heart rate, respiration, or other indicators of autonomic arousal, and there is a level that is optimal for learning. At very low levels of arousal, learning is inefficient and attention to environmental stimuli is diffuse; at very high levels, attention is narrowed but learning becomes inefficient, particularly for complex tasks. Teachers can increase arousal by increasing the novelty of classroom activities, by asking students questions to generate curiosity (Berlyne, 1960), by rotating students in and out of the "action zone" (the T-shaped front-row-and-center region of the classroom; Piontrowski & Calfee, 1979), or by directing questions to students outside the action zone.

Attention span in children can be negatively affected by sleep deprivation, attention-deficit disorder, depression, and many other disorders. Selective attention is assessed most frequently by use of incidental learning tasks. The child is instructed to recall a specific set of items (e.g., pictures of animals), but other incidental items (e.g., household items) are actually paired with the target (central) items during presentation. After being given tests of recall for central items, the child is tested for recall of the central-incidental pairs. The assumption is that only items that are attended to will be recalled. Recall for central items increases steadily from preschool age through adolescence, while memory for incidental items remains stable. The correlation between central and incidental recall becomes increasingly negative between ages 6 and 13 in normal children, indicating an increasing ability to screen out distractions with age. Adolescents and adults appear to screen out distractors by rehearsing central stimuli (Hagen & Stanovich, 1977). Hallahan et al. have found selective attention deficits to be common in children with learning problems. They also found that these children can be trained to improve their attention to central stimuli by using task-relevant self-talk and by being reinforced for recall of central items (Hallahan & Reeve, 1980).

Maintenance of attention can be assessed by observation, by interviewing, by self-monitoring, or through formal testing (see Reynolds & Bigler, 1997, 1994; Rossman, 2006). In observational methods, eye contact with assigned task materials, with the teacher during instruction, or during task-relevant interaction with peers, is scored as engaged (on-task); other activities are scored as nonengaged (Piontrowski & Calfee, 1979). Observed engaged time is related to achievement; for example, Leach reports that 58% of the variance in primary mathematics achievement is accounted for by academic engaged time (Leach & Dolan, 1985). Observed on-task attention increases from ages 5 to 11 (Higgins & Turnure, 1984), although students may become more adept at appearing to maintain attention with development (Hudgins, 1967). Self-monitoring of "paying attention" improved observed engaged time among second graders, and reinforcement for self-monitoring accuracy improved engaged time more than self-monitoring alone (Rooney, Hallahan, & Lloyd, 1984).

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See also **Attention-Deficit/Hyperactivity Disorder; Hyperkinesis; Test of Memory and Learning**

ATTRIBUTION RETRAINING

Many pupils with disabilities perceive themselves to be incompetent in a variety of school-related activities. While these self-perceptions may accurately reflect limited skills in these areas, they may also affect youngsters' willingness to engage in learning tasks. When presented with school tasks, even tasks in which they have evidenced recent success, many pupils will state that they cannot do the work and as a consequence will not even try. To address the learning needs of their students, special education teachers need to focus on their students' cognitive and motivational characteristics. An intervention procedure entitled attributional retraining has been used to influence pupils' self-perceptions and their subsequent motivation to learn.

Attribution retraining may be defined as a systematic set of procedures designed to influence individuals' perceptions concerning the causes of their performance on tasks. Many of the procedures are derived from research in the area of cognitive behavior modification. In attributional retraining the focus is on modifying learners' thoughts concerning why they have succeeded or failed on a task. Although attributional retraining procedures have been used in treatment programs for a variety of problems including alcoholism, anxiety, depression, and diet management, the focus, here, will be on the use of these procedures with youngsters who evidence severe learning problems.

Most of the attributional retraining programs focus on the role of effort on student achievement. This emphasis is due, in part, to the fact that pupils can choose to change their levels of effort. In addition, high achieving students tend to attribute successes to their ability and effort and ascribe their failures to lack of effort. When students perceive that increased effort will result in success, they persist; this, in turn, enhances their performance. In contrast, children who have learning problems frequently attribute their failures to lack of ability, and fail to persist on academic tasks.

One of the first attributional retraining studies was conducted by Dweck (1975). In this investigation, children identified as learned helpless were asked to solve arithmetic problems. One group of pupils was given math tasks in which they continually succeeded; another group was given tasks that they occasionally failed at. When pupils did not correctly respond on an arithmetic task, they were given attributional feedback indicating that they should have tried harder. All the youngsters in the study were subsequently given difficult math problems. Pupils who received the attributional feedback maintained or improved their performances after failure, whereas the performances of children who continually succeeded deteriorated if they failed on a math problem. Chapin and Dyck (1976) and Fowler and Peterson (1981) subsequently reported that persistence on academic tasks was jointly affected by reinforcement procedures and attribution retraining. Fowler and Peterson also reported that reinforcement/attribution retraining that involved direct attributional feedback to pupils was more effective in increasing reading persistence than other treatment procedures. Recently, educational researchers have reported that attribution training procedures may influence students' use of learning strategies (Johnson & Winograd, 1985; Palmer & Goetz, 1984). Attribution training may affect both pupils' achievement outcomes and how they learn.

Related to the attributional retraining research, Decharms (1976) developed a two-part program to help teachers enhance personal causation of elementary-aged children. The project was designed to influence pupils' goal planning and ultimately produce a person who is in control of his or her achievements. The experiment involved two groups: one consisted of motivation-trained teachers using an experimental curriculum; a control group had untrained teachers and the regular curriculum. The first step involved a personal causation training course for all teachers in the experimental group, followed by a year-long implementation of a number of classroom exercises. Personal causation training did appear to affect pupil's self-confidence and their academic achievement scores. Four years later, a semi-structured interview revealed higher personal goals and responsibility orientation for those children in the trained group over those in the untrained group. Five years later, it was found that more pupils from the trained group had graduated. While there were a variety of components to the training program, one of the crucial elements was teaching the pupils that they had control over their achievement outcomes.

Although additional research is needed to determine how and when to most effectively use attributional retraining procedures, it appears that teachers' direct attributional feedback to children does influence students' willingness to learn and their school achievement. Teachers' systematic feedback to their pupils that effort is important in determining their successes or failures may affect youngsters' persistence on school tasks and ultimately their achievement.

Teachers who influence the class climate for assisting peers giving positive feedback to children with disabilities can positively affect attributions about self efficacy (Altermatt & Pomerantz, 2003). Siblings can also be utilized in this manner (Gnaulati, 2002). Praise from others (teachers, siblings, or peers) can have significant positive effects as long as it is directed to controllable causes and is perceived as sincere (Henderlong & Lepper, 2002).

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See also **Learned Helplessness; Motivation**

ATTRIBUTIONS

By definition, many special education pupils experience a history of failure prior to being referred and ultimately placed in special education classes. It is this background of failure, current achievement problems, and the recognition that other pupils are doing well on classroom assignments that leads to perceptions of lack of competence. In turn, these perceptions concerning lack of ability influence pupils' expectancy for future performance and their willingness to try new tasks and persist on difficult ones.

Recently there has been considerable interest generated concerning the consequences of repeated academic failure and its effect on the motivation and achievement of special education children. The repeated academic failure experienced by these students may cause them to doubt their abilities and reduce their persistence and effort when exposed to novel or familiar tasks. Researchers have found that learning-disabled (LD) children are less likely than nondisabled children to attribute their failures to insufficient effort and more likely to attribute their failures to their own inabilities. LD pupils also have exhibited less persistence on achievement tasks than nondisabled pupils. Investigators have found that LD pupils' tendency to attribute failure to ability is negatively related to persistence. It has also been reported that when LD children succeed at a task, they are less likely to attribute the success of their abilities and more likely to attribute the success to luck or ease of the task. These children appear to blame themselves when they fail and not give themselves credit when they succeed. Low levels of persistence and effort often result in additional failures, and the special education student, more frequently subjected to these difficulties, is caught in a vicious downward spiral of motivation and performance (Licht & Kistner, 1986). Measures of children's attributional styles are now included on several widely used assessment devices (Reynolds & Kamphaus, 1992).

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See also **Locus of Control**

ATYPICAL CHILD SYNDROME

Atypical child syndrome is a term borrowed from the medical profession and is no longer in common usage. The current term referring to this group is exceptional children. An exceptional child is one who deviates from the norm and could be categorized on the basis of a set of physical and/or behavioral characteristics. There are a variety of specific disorders in the area of special education that use the term syndrome as a part of the classification.

Hunter syndrome, Down syndrome, Turner syndrome, Lesch-Neyhan syndrome, Cornelin deLange syndrome, Sturge-Weber syndrome, and Klinefelter's syndrome are but a few that are discussed in the special education literature.

A wide range of disabilities contribute to the atypical child's condition. That condition may range from mild to severe, physical to intellectual, educational to social, or any combination of those conditions. It is difficult however, to fit an individual into a category. Disability classifications are set up according to the characteristics of the children that deviate from the average or normal child and were used to help educational programs meet the individual's needs. Kirk (1972) described five categories: (1) communication disorders (learning disabilities and speech handicaps); (2) intellectual deviations (gifted and disabled); (3) sensory handicaps (auditory and visual); (4) neurological, orthopedic, or other health problems; and (5) behavior disorders. Although these categories have been used by psychology, sociology, physiology, and the medical profession, they will be briefly addressed from the educational standpoint of this time period for historical purposes.

Learning disabilities was a classification for those individuals that have language difficulties, visual or auditory-perceptual problems, and memory or other cognitive disabilities. Learning problems sometimes contribute to behavior problems resulting from frustration with academic task demands. Although definitions have related these dysfunctions to the central nervous system (Clements, 1966), remediation is dealt with through educational intervention with a focus on academic, social, and emotional adjustment.

Intellectual disability involves below average intellectual functioning with social and behavioral deficits. Grossman (1973) describes five levels of individuals with intellectual disability, all of whom have IQs below 85 and engage in behaviors inappropriate for their age group. Using the terms from that time period to reflect his categories: individuals with borderline retardation (from 85 to 70 IQ) are frequently referred to as slow learners. Individuals with mild retardation (the educable mentally retarded) range from 69 to 55 IQs and have some potential to master basic academic skills. These individuals can live as independent or semi-independent adults. Moderately or trainable mentally retarded individuals with IQs of 54 to 40 have potential for learning self-help, social, and communication skills and simple occupational tasks. Severely mentally retarded individuals range from 39 to 25 IQs and need continual monitoring. They may be taught simple self-help skills, work tasks, and some type of communication system. The profoundly retarded, with IQs below 25, are totally dependent and require close supervision. Some may be able to perform self-help skills. Educational programs for the intellectually disabled have made great gains. Educational programs range from fully inclusive scheduling to self-contained classrooms to special schools and employ a great many management and instructional techniques (Snell, 1978). Generally speaking goals of access to the general curriculum, functional skills, and independence are prioritized.

Sensory disabilities range greatly from minimal visual defects and hard of hearing to blindness and deafness. Education can range from no special programming, to special part-time instruction from an itinerant teacher, to special schools. Focus in the public schools is on auditory and visual perception training.

Behavior disorders interfere with a child's growth and the development of relationships with others. Hewett and Jenkins (1945) defined three types of behavior disorders involving those having unsocialized aggression (participating with peers in misdemeanors and crime) or overinhibition (overdependent and withdrawn). All involve social maladjustments and emotional disturbances. Although they are dealt with through the mental health fields, education has taken on prevention and treatment. The interventions of the day, whether through resource rooms, itinerant teachers, special classes, special or residential schools, or hospitals, included psychodynamics, behavior modification, and developmental, ecological, or psychoeducational strategies (Kirk, 1972).

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AUDIOGRAM

An audiogram is a standardized graphic representation of hearing thresholds to discrete pure tones (American National Standards Institute [ANSI], 1996). The abscissa of the audiogram shows frequency in Hertz (Hz) from 25 to 8000 Hz. The ordinate shows hearing level (HL) in decibels (dB) from –10 to 120 dB. Audiometric zero was derived by taking an average of 100 healthy youths over a frequency range from 20 Hz to 10 KHz from 1971 to 1973 under the laboratory conditions (International Standards Organization [ISO], 1998). Air conduction thresholds are represented by a circle for the right ear and an *X* for the left ear. Air conduction thresholds reflect the integrity of the whole of the auditory system. Brackets represent bone conduction thresholds. Traditionally, the right ear was also represented by the color red and the left by the color blue, but this is less common now due to black-and-white copies, scanners, and printers (Katz, 2000).

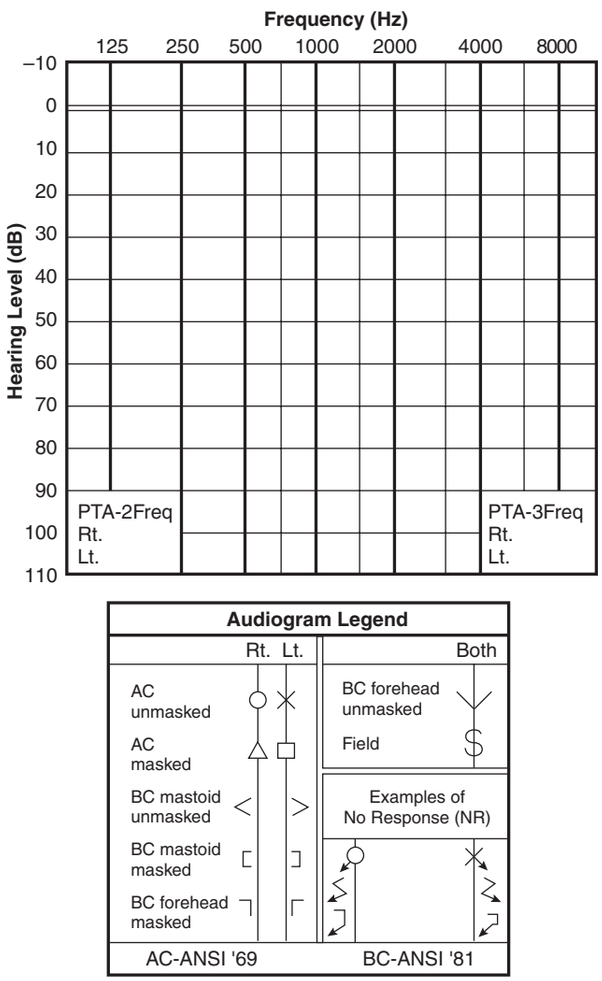

Figure A.5. Audiogram form and symbols.

Bone conduction bypasses the middle ear system and reveals the integrity of the auditory system at its most basic level. Sound presented at high enough intensity will cross over to the other ear, and another sound must be used to mask that ear. The level of 40 dB is the lowest signal known to cross, and this is the level where masking is to be implemented, for air conduction and masking should always be used for bone conduction (ANSI, 1996). In practice, it is not necessary to mask bone conduction thresholds if there is no difference in air conduction thresholds and the bone conduction scores and there is no air-bone gap (Katz, 2001). There are seven categories of hearing levels that are usually used: normal or no impairment, –10 to 15 dB; slight or minimal loss, 16 to 25 dB; mild loss, 26 to 30 dB; moderate loss, 31 to 50 dB; moderate or severe loss, 51 to 70 dB; severe loss, 71 to 90 dB; and profound loss, 91 dB or greater (VA National Center for Health Promotion and Disease Prevention, 2004).

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See also **Auditory Discrimination; Auditory Perception; Deaf**

AUDIOLOGY

Raymond Carhart (1947, as cited in Rintlemann, 1985) is credited with coining the term *audiology* for the new profession of hearing science. Soldiers returning from World

War II with service-connected hearing losses caused the rapid development of the field of audiology. Originally intended just to provide rehabilitation services, the scope of practice has increased to include the nonmedical management of hearing and balance disorders in children as well as adults such as tinnitus management, hearing aids, cochlear implants, assistive devices, hearing conservation programs, ototoxic drug management, interoperative monitoring, central auditory processing assessment, and cerumen removal.

Entry-level educational requirements for professionals in audiology include a master or doctoral degree. Licensure to practice audiology is required in all 50 states. The practice of audiology encompasses a comprehensive array of professional services related to the prevention of hearing loss and the audiological identification, assessment, diagnosis, and treatment of persons with impairment of auditory and vestibular function and to the prevention of impairments associated with them (American Academy of Audiology, n.d.). Audiologists serve in a number of roles, including clinician, therapist, teacher, consultant, researcher, and administrator (Martin & Greer, 1999).

Audiologists serve populations ranging from neonates to the geriatric populations. Audiologists can be found in diverse settings from private practice, schools, hospitals, universities, medical centers, and rehabilitation centers to government health care facilities (Martin & Greer, 1999).

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See also **Auditory Processing; Deaf**

AUDIOMETRY

Audiometry encompasses several techniques and procedures that effectively assess hearing. Routine and accurate calibration of the audiometer, a device used in the assessment of hearing, is critical in identifying hearing impairment. An audiological evaluation typically entails the use of pure-tone and speech audiometry in addition to acoustic immittance measurements, which assess the function of the middle ear, and otoacoustic emissions, which assess outer hair cell functioning.

Pure-tone audiometry requires an individual to respond to tones that are presented at various frequencies in order to determine threshold levels. There are two types of pure-tone measures: air conduction and bone conduction. Classification regarding the degree and type of hearing loss for each ear is possible by integrating the results of both measures. Air-conduction testing involves delivering a tone through the entire auditory pathway (outer, middle, and inner ear) by means of a headphone or insert transducer. Bone-conduction testing requires the use of a bone-conduction transducer, a vibrating device placed on the skull in order to stimulate fluids of the inner ear. Therefore, bone-conduction testing bypasses the outer and middle ear. The specific procedures for pure-tone audiometry have been specified by the American National Standards Institute (1997).

There are two types of speech audiometry: those that assess threshold and those that determine speech discrimination ability. Speech detection threshold is determined by measuring the lowest level at which an individual can detect speech sounds, while speech recognition threshold is determined by measuring the lowest level at which the individual can both hear and correctly identify the speech stimulus. Speech recognition tests use spondaic words, two syllable words that contain equal stress on each syllable (i.e., baseball). Speech discrimination tests present phonetically balanced speech stimuli at a comfortable listening level in order to assess speech comprehension. The aforementioned tests are applicable for populations capable of responding behaviorally (middle childhood and older).

Acoustic immittance measurements, a battery of techniques that may be performed on individuals of all ages, requires the use of a specific device termed an *immittance bridge*. This device is not capable of measuring hearing and instead allows for measuring the physical volume of the external auditory canal and the compliance of the tympanic membranes (ear drums) by recording a tympanogram. In addition, most immittance devices allow for measurement of the acoustic reflex contraction, a stapedial reflex that is elicited in response to loud stimuli.

Otoacoustic emissions is a relatively new and noninvasive technology that has been adopted into the general audiometric test battery. Similar to acoustic immittance, otoacoustic emissions are not a measure of hearing. Instead, they objectively assess the functioning of outer hair cells that reside on the cochlea. Otoacoustic emissions are particularly useful for individuals who are unable to respond behaviorally to air-conduction, bone-conduction, or speech audiometry tests, including newborns, malingerers, and individuals with physical or cognitive disabilities. Adequate identification and assessment of hearing impairments can be achieved through the application of various audiological techniques.

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See also **Auditory Abnormalities**

AUDITORY ABNORMALITIES

Auditory abnormalities or abnormalities that manifest as hearing loss may be sensory, neural, or both and may arise from differing causes. Although half of all auditory abnormalities are considered to be genetic in origin, 90% of all people with a congenital hearing loss have normal hearing parents, suggesting that this is a recessive trait (Toriellos, Reardon, & Gorlin, 2004). Karlsson, Harris, and Svartengren (1997) also found that 50% of all late onset hearing loss, or hearing loss in people over the age of 65, has a genetic component. Further, genetic conditions seem to have equal prevalence in all types of hearing loss.

Although hearing loss is usually associated with only the ear, auditory abnormalities can occur in any location through the entire auditory system. Hearing losses in the past have been classified using the interchangeable terms as *sensory-neural, sensorineural*, or *neurosensory*. Advances in clinical equipment and testing technique is allowing a more precise diagnosis and allow for the terms to be split. Otoacoustic emissions give us an indication of how the cochlea is functioning. Auditory brainstem response testing allows us to check the neural pathways to the auditory cortex. Acoustic reflexes check the auditory pathways to the level of the superior olivary complex. Impedance measures check the integrity of the middle ear system. Pure-tone testing checks the integrity of the whole of the system. Central auditory tests give us a glimpse of how the processing centers are working. With these advances, four main types of hearing loss can occur depending on location of the lesion. These types are conductive, sensory, neural, and vestibular.

Conductive hearing losses are caused by structural abnormalities such as atresia, otosclerosis, middle ear effusion, and eustachian tube dysfunction. This type of auditory abnormality accounts for the most common problem in children, with three out of four children having experienced an ear infection by the time they are 3 years old, and has the most educational significance (National Institute on Deafness and Communication Disorders [NIDCD], n.d.). Frequent ear infections put the child at risk for not only speech and language deficits but also for central auditory processing difficulties. Conductive hearing losses can be remediated medically and surgically.

Sensory auditory abnormalities are those caused by problems in the cochlea or auditory sense organ. Inner and outer hair cells can be damaged by ototoxic medications, excessive noise, obesity, and vascular problems that deprive the cochlea of blood supply and oxygen as well as by genetic conditions. Treatment options for this type of auditory abnormality include hearing aids and cochlear implants (NIDCD, n.d.).

Neural abnormalities are those that occur above the level of the cochlea in the auditory system. Acoustic neuromas, auditory neuropathy, and central auditory processing disorders are examples of neural abnormalities. Hearing aids are not usually the first choice of remediation for these types of difficulties but can be helpful in some instances. Remediation is dependent on the site of lesion and may include surgical options in the case of a tumor or auditory rehabilitation in the case of auditory processing difficulties (NIDCD, n.d.).

Vestibular disorders often are overlooked when thinking of auditory impairments. The vestibular system is located in the inner ear. Approximately 42% of the population will seek medical treatment for dizziness in their lifetime, and the majority of the causes will lie within the inner ear (Vestibular Disorders Association, n.d.). Causes of vestibular disorders include blows to the head; ototoxic medications, such as high-dose or long-term antibiotics; ear infections; or stroke. In many cases, however, cause of damage to the vestibular system cannot be determined. Treatment options include vestibular rehabilitation, mediation, and surgery (Vestibular Disorders Association, n.d.).

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See also **Auditory Discrimination; Auditory Perception; Deaf**

AUDITORY DISCRIMINATION

Auditory discrimination is the ability to determine the differences between the speech sounds and sequencing. Auditory discrimination is the middle rung in the processing of sound. An acoustic signal must first be perceived, then discriminated, and, finally, processed. These three terms (*perception, discrimination, processing*) often are used interchangeably.

It has been demonstrated that speech discrimination scores cannot be predicted from pure-tone thresholds alone (Rintlemann, 1985). Speech discrimination scores give us an understanding of a higher level of processing than pure tones alone. Meaning can be attached to the different signals. Temporal processing or frequency, duration, and ordering must take place in order to understand the speech signal. In addition, auditory closure must take place in order to integrate the preceding information.

Discrimination tests conducted as part of a comprehensive audiological evaluation usually refer to speech discrimination testing. Generally, this is performed by presenting a standardized monosyllable word list like the NU6 or the CID W22 through headphones. Individuals may be asked to repeat words or may be asked if two words are the same or different. Monosyllabic words are used as they offer the least redundancy. The percentage correct is given as the speech discrimination scores. Difficulties at the discrimination level will lead to difficulties recognizing and using the prosodic aspects of speech, reading, and subtle changes in meaning as a result of prosodic changes (Bellis, 1996). Auditory discrimination of phonemes (single speech sounds) and tones has been linked to reading ability and disability (Lachmann, Berti, Kujala, & Schröger, 2005). Similarly, discrimination training has been found to result in better phonological processing in children (Moore, Rosenberg, & Coleman, 2005).

Auditory discrimination is a neural response and current research is looking into electroacoustic testing to help diagnose problems with discrimination. Electroacoustic testing is currently being used to calculate hearing thresholds in the infant and hard-to-test population, but it has been very difficult to determine discrimination abilities within this group as traditional testing has involved language and reasoning requirements. The Mismatched Negativity Test is one such electrophysiological test being studied (Cheour, Lappaenen, & Kraus, 2000).

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See also **Auditory Perception; Developmental Dyslexia; Dyslexia; Reading Disorders**

AUDITORY PERCEPTION

Auditory perception is the ability to identify, interpret, and attach meaning to sound to make it meaningful phenomena (Garstecki & Erber, 1997). These abilities rely on several intact neurological processes such that sound must be heard and transmitted to appropriate structures within the brain. When these processes are not intact, difficulties in auditory perception occur.

Auditory perception follows a developmental trajectory (Moore, 2002; Boothroyd, 1997). Children at 6 months of age demonstrate the beginnings of auditory perception by contrasting phonemes, phoneme recognition, recognition of speech in noise, selective attention, and the use of linguistic content (Boothroyd, 1997). Complete maturation of the auditory system is not complete until later childhood—ages 5 to 12 years (Moore, 2002).

The terms *auditory perception* and *auditory processing* often are used interchangeably in the literature. Children with auditory perceptual problems and auditory processing disorders often exhibit language and learning disabilities (Garstecki & Erber, 1997). Auditory perception problems are found concomitantly with or misdiagnosed as Learning Disorders. Standard pure-tone and speech-discrimination evaluations are not sufficient to rule out an auditory perceptional problem (Katz & Wilde, 1985).

Fisher (1976) developed a checklist of 25 warning signs for which a child should be evaluated for an auditory perceptual problem. These included saying "what" in the absence of a hearing loss, inattentiveness, frequent middle ear infections, asking for repetitions, poor fine-motor coordination, difficulty following directions, poorer verbal than performance scores on intelligence tests, and inconsistencies in academic subjects.

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***See also* Auditory Discrimination; Auditory Processing**

AUDITORY PROCESSING

Although the terms *auditory perception* and *auditory processing* often are used interchangeably in the literature, auditory processing (or central auditory processing [CAP]) is the area we are most concerned about when we are dealing with children who are experiencing language and reading problems. In this context, *auditory processing* is an umbrella term used for the complex task of taking in all the auditory information and making it salient to the task at hand. According to the American Speech-Language-Hearing Association (ASHA; 1996) auditory processing involves mechanisms responsible for sound localization, lateralization, auditory discrimination, auditory pattern recognition, temporal aspects of audition, and auditory performance with competing acoustic signals. Given the multiple components, there is no wonder that Phillips (2002) concluded that "Central Auditory Processing Disorders (CAPD) are probably as idiosyncratic as the individuals they affect" (p. 256).

Due to the complexity of auditory processing, a multidisciplinary approach is recommended for assessment and management of auditory processing disorders (APDs). The team should include, but is not limited to, a speech language pathologist, audiologist, psychologist, parents, physicians, and classroom and special education teachers (Bellis & Ferre, 1996). Management of APD should focus on the range of listening and learning deficits experienced by the individual child. Recommended intervention is a combination of "auditory training, metalinguistic and metacognitive strategies designed to increase the scope and use of the auditory and central resources" (Wertz, Hall, & Davis, 2002, p. 282). Management also is focused on improving signal-to-noise ratios, improving listening skills, and the auditory behaviors of difficult listening situations for those with APD.

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***See also* Auditory Discrimination; Auditory Perception; Central Auditory Dysfunction; Learning Disabilities**

AUDITORY–VISUAL INTEGRATION

Auditory–visual perceptual integration is poorly understood; therefore, it is seldom measured and described in the psychoeducational diagnostic process. Instead, beginning in the 1920s with German psychology, and later (1930s) in clinical work, the focus fell almost solely on visual–motor perceptual development. Indeed, psychology in general, and Gestalt psychology in particular, drew heavily from the easily administered, easily scored visual motor tests. Bender's (1938) *Visual-Motor Gestalt Test*, an extension of Wertheimer's (1923) laboratory instrument, soon became the most commonly administered psychological test. Early on, these easily administered tests showed substantial correlations with intelligence (Armstrong & Hauck, 1960) as a diagnostic test for brain damage (Shaw & Cruickshank, 1956), academic achievement (Koppitz, 1958), emotional difficulties (Clawson, 1959), and perceptual development (Koppitz, 1962).

Auditory perception, which in many respects appears to be a sensory–perceptual corollary of visual perception, remains relatively unexplored. The reason may be that the auditory perceptual structures are less well understood

than visual perception, and more difficult to ascertain. For example, it is difficult to identify precisely where auditory sensorial function stops, perception begins, auditory perception ends, and receptive language begins.

The result has been that psychologists and special educators have generally limited the theoretical scope to an explanation of auditory–visual perceptual integration as an operational construct important to human learning. However, that fact also conveys a certain ambience, as remedial educators have been tenacious about the importance of auditory–visual integration within the reading process. They believe that reading would be a slow, awkward instructional process in the absence of integrating perceptual symbolic information from the primary sensory channels. Many reading experts are convinced that perceptual integration is critical to early learning of letters and letter phonemic symbolism. For example, the visual perceptual system may neurally code a "B" and a "D" as distinct symbols based on luminancy differences. A "B" uses a different neuronal subsystem than a "D" because it draws on lateral inhibition and activation associated with on-center neurons; "D" draws on off-center neurons. Symbolic clarity in the visual perceptual realm may be influenced by these factors, all of which have been well investigated: extent and organization of retinal area activities; transformation of receptive-field organization; and estimates of size of receptive field.

In reading, as in most visual tasks, the eye gathers information during the pauses between saccadic movements. Ultimately, stimulus letters are recognized; that is, an appropriate subvocal or auditory response (saying a letter) occurs. The recognition (perceptual) memory can hold at least three letters for a period of about 1 second, until they have been rehearsed.

A scan component is needed to transform the visual information in very short-term visual perceptual memory into motoric information, and then auditory information. Actually, the visual scan component has at least three distinguishable functions: deciding which areas of the visual field contain information; directing processing capacity to the locations selected by the prescan ("attention"); and converting the visual input from the selected locations into the forms of motor memory units and ultimately auditory information.

In principle, although not in detail, the auditory scan is exactly analogous to the visual scan. The auditory scan selects some contents of auditory memory (e.g., the sound representation of one letter) and converts them into motor information. A street address is remembered by placing it into auditory–perceptual memory. By means of this short-term loop, information can be retained in auditory short-term memory. Subvocal rehearsal, the subvocal output of the rehearsal component, is entered into the auditory short-term memory just as though it had been a vocal output. Once that occurs, visual imagery results. The importance of visual–auditory or auditory–visual perceptual integration becomes paramount when confronting remedial reading difficulties. Critchley (1964) noted that children with so-called congenital word blindness failed to develop visual perceptual memory, while their auditory perceptual memory was unaffected.

A great deal of literature from the mid and late 1960s suggested a close interrelationship between the short-term storage mechanisms of vision and audition. Conrad (1959) showed that subjects frequently make substitution errors when recalling lists of visually presented letters in which the letter substituted (e.g., ANQT) sounds similar to the correct letter (e.g., ANQE). Although these letters are highly dissimilar in appearance, they sound similar when spoken aloud. Thus, visual material, Conrad suggests, must have been translated and encoded in auditory storage.

Murray (1968) reported extensive studies of short-term storage for visual and auditory items. His results showed how the similarity of sounds affected recall of the list (acoustic similarity). In Murray's experiment, conditions enabling the auditory system to assist in the coding and storing of incoming information tend to produce superior performances; this may indicate that the auditory mechanism is generally superior to the visual mechanism in this respect. Such a superiority has also been demonstrated by Murdock (1968).

Wickelgren (1965) has demonstrated that the presence of acoustic elements in visually presented material can influence the accuracy of recall. Subjects listened to four random letters. Next, eight letters were visually presented and copied by the subject. Finally, a test of the first four aural letters was administered. Even though the interpolated material had to be copied rather than spoken, if the eight letters were similar in sound to the aural letters, performance on auditory recall was poorer than when the visual letters were quite dissimilar in sound.

Ross (1969) developed a logical test of the audio–visual interaction in short-term storage by measuring the retention of simple symbols (+ and −) either organized in patterns (e.g.,−++−+−+−) or unpatterned (e.g., +−+ +−+−−+). Blanton and Odom (1968) found a superiority in seeing and hearing children over deaf children in terms of the span of digits that could be recalled. However, this result may reflect greater experience with numbers on the part of the normal children.

In short, an integration of information from the visual and auditory perceptual channel seems to be occurring. How else, in fact, could a person read graphics, or listen to others read, and write the graphic symbol being received aurally? Reading is a dual process that, except for the learner with disabilities who may be missing one of the sensory channels or have perceptual deficits, is an integrated function. Current research is going toward a dual model of working memory that includes separate visual and auditory channels. On some tasks learners can integrate words and pictures more easily if the words

are presented auditorily rather than visually (Mayer & Romano, 1998). With infants, for example, the synchronicity of visual and auditory stimuli are not as important as with older children and adults indicating developmental trends in integrating auditory and visual information presented at the same time (Lewkowicz, 1996).

In summary, auditory–visual integration would appear to be the internal stimulation of the opposite modality, for instance, visual perceptual information is received and a signal system translates the meaning to the auditory perceptual modality in reading. Information on the assumed trait is limited, and awaits much research. It does seem likely that this function holds promise as a predictor of what modality may be used as a unisensory or multisensory receiving mechanism in planning an intervention (Movellan & McClelland, 2001).

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See also **Auditory Perception; Auditory Processing; Visual Perception and Discrimination**

AUGMENTATIVE AND ALTERNATIVE COMMUNICATION

Augmentative and Alternative Communication (AAC) is a specialized area of research and clinical practice within the broader field of Speech-Language Pathology (American Speech-Language-Hearing Association, 2004). AAC research focuses on a range of issues related to the uses and effects of using nonspeech modes of communication by individuals with severe communication impairments. Clinical practice in AAC focuses on assessing individuals' communication needs, recommending AAC systems, and supporting effective use of AAC. Clinical practice in AAC also includes providing direct intervention to enable persons to communicate successfully through AAC.

AAC is often used by individuals with temporary or permanent speech impairment due to congenital or acquired conditions, such as acquired brain injury, cerebral palsy, severe aphasia, intellectual disability, and autism spectrum disorders (Beukelman & Mirenda, 2005). In cases where the condition results in unintelligible or dysfluent speech, AAC is primarily intended to augment the person's existing speech and language. In cases, where speech has largely failed to develop, AAC provides an alternative mode of communication. For individuals with autism spectrum disorders, AAC is most often indicated as an alternative mode of communication and is prescribed in cases where the individual has failed to acquire any appreciable amount of speech. This situation is usually found among individuals with the more severe symptoms of autistic disorder.

A range of alternative communication modes has been developed for individuals who require AAC. The various modes are typically classified as either aided or unaided (Beukelman & Mirenda, 2005). Aided AAC systems involve external materials, such as pictures, photographs, miniature objects, and electronic speech-generating devices. Unaided AAC options consist of sign language, manual signs, and formal or informal gestures.

The most commonly used AAC modes in communication interventions for individuals with autism spectrum disorders are manual signs, speech-generating devices and picture-exchange (Mirenda & Iacono, 2009). There is considerable debate as to which of these systems is best suited to individuals with autism spectrum disorders (Mirenda, 2003). However, research data show that all three modes have been successfully taught to individuals with autism spectrum disorders. In addition, comparative studies indicate few major or consistent differences in how quickly and easily individuals can learn to use each of these three AAC options (Wendt, 2009; Schlosser, Sigafoos, & Koul, 2009). Furthermore, the use of AAC does not appear to inhibit the emergence of speech and can have a moderately facilitative effect on speech development for some individuals (Millar, 2009). AAC intervention has also been associated with improvement in problem behavior (e.g., aggression, self-injury, extreme tantrums) associated with autism spectrum disorders (Sigafoos, O'Reilly, & Lancioni, 2009).

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AUSTRALIA, SPECIAL EDUCATION IN

Historical Background and Context

The early 19th century in Australia saw the introduction of education for privileged children, as well as a very limited number of schools and institutions for some children (mainly boys) who were illiterate, those who were delinquent, and the destitute (Ashman, 2005). *The National Education Act of 1848* meant that some very few children with learning difficulties and intellectual disabilities began to be provided for (Ashman, 2005), and the first special schools for students with a hearing impairment were founded in Sydney and Melbourne in 1880 (Sweetman, Long & Smyth, 1992).

In 1901 a federation of states known as the Commonwealth of Australia was created. However, education remained a state responsibility with each jurisdiction developing its own Education Act with its own policies and programs related to compulsory education. During this time there was a increase in the provisions for children with mild intellectual disabilities (who were referred to as "educationally backward"), but other children, for example, those who were referred to as "educable" or "trainable" were not taught in public schools, although they may have been educated in private schools established by parents or charities (Ashman, 2005, Loreman, Deppler & Harvey, 2005). After World War II the terms educable and ineducable were discontinued, and some educational opportunities were offered to these children with disabilities in separate schools or classes, although many children received little additional support (Ashman, 2005).

From this point in time educational provisions for students with disabilities in Australia can be traced as movements from segregated schools for students with disabilities to mainstreaming to integration to inclusion. The negative responses to special schools and classes that were dominant in the United States in the 1960s also emerged in Australia, with calls for students with disabilities to be integrated into regular classrooms (Ashman, 2005). Children with disabilities were often placed in a special class in a regular school and participated occasionally

in the mainstream setting (Forlin, 2006). Unlike their counterparts in the United States, students with learning difficulties (learning disabilities) in literacy and numeracy in Australia, historically, have not been enrolled in separate classes, but have participated in models of support in which they were withdrawn for one or more class lessons per week provided by a remedial, resource, or support teacher.

The movement toward inclusive education has been particularly apparent since the 1970s when there was a focus on the rights of people with disabilities and inclusive education was actively promoted at the Commonwealth, state and territory levels, especially following the Salamanca Statement (UNESCO, 1994). While there is still debate in Australia about what constitutes inclusive education (Graham & Slee, 2008), in general today there is a strong policy commitment to inclusive education in all states and territories and in all school systems, that is, in the government and nongovernment (specifically Catholic and Independent) systems. However, this commitment to inclusive education does not mean that the practices in the various educational systems are always consistent with their declared polices.

Commonwealth (Federal) Government Legislation and Initiatives

There are several pieces of Commonwealth (that is, federal) legislation that seek to protect the rights of Australia's citizens. One of the most important laws with respect to Australia's citizens with disabilities is the *Disability Discrimination Act 1992* (DDA) (Commonwealth Government, 1992). The DDA makes it unlawful to discriminate on the basis of disability. The DDA defines disability broadly (see Disability Discrimination Act 1992 (Cth), section 4, Commonwealth Government, 1992). Under the DDA students with various forms of disability (now referred to as impairment) have the same rights to education as nonimpaired students and they should be educated in the least restrictive environment possible.

The *Disability Standards for Education 2005* (Australian Government, Department of Education, Employment and Workplace Relations, 2005) were developed under the *Disability Discrimination Act 1992 (DDA)* and point to the obligations of education and training providers to ensure that students with disabilities can access and participate in education without discrimination (see Guthrie & Waldeck, 2008 for a discussion of the Standards and inclusiveness in education). The Standards also state that a range of measures must be used to identify children with disabilities and that these students must also receive specialised support.

Financial support for parents, carers and families of children with disabilities is provided for a range of services by the federal, state and territory governments. (See for example some of the funded services provided by the federal government [Australian Government, Department of Families, Housing, Community Services and Indigenous Affairs, 2011a]). Additional financial support is offered through new government initiatives from time to time. For example, funding for early intervention is provided for children under 6 years of age who have been diagnosed with Down syndrome, cerebral palsy, Fragile X syndrome, or a moderate or greater vision or hearing impairment, including deaf-blindness under the *Better Start for Children with Disability (Better Start)* initiative. The financial support can be used to access professionals such as speech pathologists and occupational therapists (Australian Government, Department of Families, Housing, Community Services and Indigenous Affairs, 2011b).

Consistent with the move toward inclusion, *The National Disability Strategy* launched in March 2011 refers to the vision of "an inclusive Australian society" (Australian Government, Department of Families, Housing, Community Services and Indigenous Affairs, 2011c). Amongst its six priority areas, in the coming years, the Strategy which will guide public policy at federal, state, and territory levels to develop an inclusive and high quality education system that is responsive to the needs of individuals with disabilities.

As part of bringing about a high quality education system, a national curriculum has been developed, with the Foundation to Year 10 Australian Curriculum for English, mathematics, science, and history available for use in schools (Australian Curriculum, Assessment and Reporting Authority (ACARA), 2011a). Other curriculum areas (e.g., geography) and other sections of the curriculum (e.g., for the senior years—Years 11 and 12) are being developed. This curriculum has been designed with the same objectives for all students and so schools and teachers can create programs that are inclusive of every learner. For a small percentage of students, especially those with a significant intellectual disability, a draft curriculum is being developed. This curriculum will allow the achievement of these students who are progressing to the Foundation level English and mathematics to be described in four overlapping and interrelated phases of learning progression, specifically Responsive, Exploratory, Active, and Purposeful (Australian Curriculum, Assessment and Reporting Authority, 2011b). In addition, ACARA is responsible for developing and administering national assessments and for analysing and reporting student assessment data in order for students' performance to be compared across the country (Australian Curriculum, Assessment and Reporting Authority, 2011c).

The Commonwealth government's initiative *Literacy, Numeracy and Special Learning Needs* (Australian Government, Department of Education, Employment and Workplace Relations, 2011) is an initiative that provides state and territory education systems with additional repources to support better learning outcomes in these two domains for students with special needs. These funds

are typically distributed by education systems so schools and teachers can develop unique targeted programs in literacy and numeracy.

The Australian government also reaches out to other countries in the region. For example, underpinned by such documents as the *United Nations Convention on the Rights of Persons with Disabilities* (United Nations, 2006), the Commonwealth government is involved through its aid programs in supporting the governments of countries such as Samoa, Indonesia, and Papua New Guinea. In particular it is offering support as these governments move toward removing some of the barriers to education for students with disabilities, to developing initiatives to achieve universal primary education, and to creating policies and programs for inclusive education (Australian Government, AusAid, 2010).

Current State of Inclusive and Special Education

Eighty-nine percent of students in Australia with a diagnosed impairment between the ages of 5 and 14 attend regular schools, and only a small percent attend special schools (Australian Institute of Health and Welfare [AIHW], 2009). In particular, in 2010, there were 9468 schools in Australia, 416 of these were special schools and of those 332 were government schools and 84 were nongovernment schools (Australian Bureau of Statistics, 2011). An examination of trends in the proportion of students with a disability in Australian schools from 2000 to 2009 by Dempsey (2011) revealed an increase in the number of students with a disability and a more rapid increase in the identification of students with a disability in government than in nongovernment schools. In general the increase is due to enhanced professional awareness of various disabilities and school access to financial support for these students (Dempsey, 2011). However, there is no agreed-upon national definition of disability and this leads to some students being counted as having a disability in some states but not in others. Rather, the definition of disabilities is related to whether or not a child receives special education services and thus schools are responsible for assisting these students (Dempsey, 2011). Special educational services are determined through a process of appraisal that is undertaken at the school. The appraisal process determines the level of resources needed to make the adjustments for the students to access and participate in the educational programs and school activities.

All of Australia's state and territory departments of education provide a range of educational services and settings for students from around 3 years of age to school leaving age (in most states and territories this is around 18 years of age). As indicated earlier these government systems support and promote the enrollment of students in inclusive school settings. However, where special provisions are permitted under the *Disability Standards for Education 2005* (Australian Government, Department of Education, Employment and Workplace Relations, 2005), this may include placement (where parents/carers and professionals agree that such placements are in the best interests of the students) in special schools or special or support classes/units. Indeed some authors criticize the policies and practices of inclusive education in Australia, arguing that they represent a restructuring of the identification systems and of the roles of specialist staff. Instead they argue that what is needed is a rethinking of what is meant by disability, difference, and inclusion (Bourke, 2010, Graham, 2006). In addition, recent analyses of the data in some states (e.g., New South Wales) have revealed evidence of an increase in the enrollments of students with disabilities in segregated settings and in particular an increase in the numbers of students with emotional or behavioral difficulties who have been labeled and excluded from regular schools (Graham & Sweller, 2011).

In all states and territories, individual learning plans (ILPs), also known as individualized education plans (IEPs), are used to document the education programs of students with disabilities. These are typically written by a multidisciplinary assessment team that includes a student's parents, the teachers and an educational psychologist, guidance officer, or support teacher. The ILP/IEP identifies the adjustments that will be made to a student's curriculum, programs and activities in order for the student to be with his or her same age peers to the greatest extent possible. The adjustments most often refer to adjusting the curriculum and instruction, resources and the environment. With respect to curriculum, various means are used to make it more inclusive and meet the students' needs. For example, lessons are created using the principles of Universal Design for Learning and adapted using differentiated instruction (van Kraayenoord, 2007). Teachers are encouraged to develop a repertoire of practices that are inclusive and responsive and to use teaching adaptations and technology to support learning (Croser & Bridge, 2012; Shaddock, Giorcelli, & Smith, 2007a; van Kraayenoord & Elkins, 2012). The resources include both physical and human resources. For example, students with vision impairments who are typically in a regular classroom receive support from both the classroom teacher and an itinerant support teacher or advisor with expertise in vision. Each school's Special Needs Team or similar group monitors the educational progress of the student and in an ongoing way coordinates and reviews the support, as well as the review process itself. ILPs/IEPs are also formally reviewed annually. These reviews are to ensure that the programs and instruction offered are effective and appropriate. Indeed, increasingly, the effectiveness of the instructional programs that all students receive is becoming a priority area for schools and education systems in Australia (Rowe, 2007; van Kraayenoord, 2010).

Continuing Challenges

As schools strive to meet the needs of all students it has become apparent that particular groups of students fare less well than others. Providing culturally and linguistically appropriate and responsive education to Australia's indigenous students, including indigenous students with disabilities is a very serious challenge (de Courcy, 2010; Munro, 2012; Ministerial Advisory Committee: Students with Disabilities, 2003; Power & Hyde, 2002). In addition, Australia's geography has meant that students in rural and remote areas face isolation (Forlin, 2006), and rural and remote schools have difficulties attracting and retaining high-quality teachers (Reid, Green, Cooper, Hastings, Lock, & White, 2010). Thus meeting the needs of students with disabilities in rural and remote areas is also an ongoing challenge.

The issue of developing well-qualified teachers to work in inclusive contexts is a challenge for teacher preparation programs in Australian universities. There are a number of different approaches that tertiary educators use to prepare preservice teachers and the efficacy of these different approaches is still a topic for research (Forlin & Chambers, 2011; Furlonger, Sharma, Moore, & Smyth King, 2010). Nevertheless, it is important for both graduating teachers and for existing teachers to develop the appropriate knowledge and skills to work with students with disabilities and be able to develop supportive classroom environments. Some useful resources have recently been developed to meet this purpose (see Shaddock, Giorcelli, & Smith, 2007b).

Despite these challenges Australian teachers are striving to meet the needs of the diverse learners in their classrooms. With curricula, instruction, and assessment that is inclusive, responsive, and appropriate, the education that students with disabilities will receive will have a positive impact and will mean that these students lead fulfilling lives and make a valuable contribution to our country.

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AUTISM

Autism, or autistic disorder, is one of five pervasive developmental disorders (PDD) and is usually diagnosed before 3 years of age (American Psychiatric Association, 2000). Diagnostic symptoms include: qualitative impairment in social interaction (e.g., failure to develop peer relationships), delays in the development of communication (e.g., limited or total lack of spoken language), and restrictive interests and/or repetitive body movements (e.g., rocking torso back and forth; American Psychiatric Association, 2000). In addition to the diagnostic symptoms, autism is also often associated with delays or difficulties in cognitive functioning, learning, attention, and sensory processing (Hess & Matson, 2010; Matson, Hess, Daniene, Mahan, & Fodstad, 2010). The term "spectrum" is often used to describe the heterogeneity within the population, because the symptoms associated with autism may range from mild to severe. The term "autism spectrum disorders" (ASD) has

been used as an umbrella term to refer to all five PDDs (i.e., Rett syndrome, childhood disintegrative disorder, autistic disorder, Asperger syndrome, and Pervasive Developmental Disorder–Not Otherwise Specified [PDD-NOS]) or to refer only to autism, Asperger syndrome, and PDD-NOS (Lang, Regester, Rispoli, & Camargo, 2010). The function and validity of the term "ASD" and the practice of differentiating between the subtypes autistic disorder and Asperger syndrome are current subjects of debate (Matson, 2007; Sigafoos, O'Reilly, & Lancioni, 2009). The next revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) will likely clarify this issue.

Historical Overview

Although many historical accounts of individuals with autism have been subsequently identified (e.g., Koegel, 2008; Rutter & Schopler, 1978), Leo Kanner was the first to recognize autism as a unique diagnosis. In 1943, Kanner described the difficulty developing relationships, unusual or absent speech, unimaginative and repetitive play behaviors, and an insistence on sameness within their routines. Kanner also noted the absence of physical abnormalities and the presence of symptoms early in life. Kanner called the disorder "early infantile autism." Kanner used the word "autism," which was derived from the Greek word "auto," which means "self" to describe the state of extreme aloneness. However, the use of the word "autism" initially created confusion because the term had previously been used to refer to a withdrawal into fantasy by people with schizophrenia (Wing, 1976). Autistic disorder first appeared in the DSM-III in 1980. The diagnostic characteristics for autism have changed multiple times since Kanner's initial description.

Prevalence

The number of children diagnosed with ASD (i.e., autistic disorder, Asperger syndrome, and PDD-NOS) has increased substantially over several decades, and may be as high as 1 in 110 to 1 in 150 children (Fombonne, 2003; Rice, 2009). ASDs are 3 to 4 times more common in boys than in girls and 20 to 50 times more common in siblings of children with autism than in the general population (O'Roak & State, 2008). Currently, the cause of the increase in prevalence is being debated and researched (Matson & Kozlowski, 2010). Factors such as changing and broadening the diagnostic criteria (i.e., the inclusion of higher functioning individuals within the autism spectrum), increased awareness of autistic symptoms by pediatricians, diagnoses given earlier in life, recognition that ASD is a lifelong condition, and improved diagnostic methods account for at least some degree of the reported increase (Matson & Kozlowski, 2010). Another major contributing factor known to influence the prevalence of autism is diagnostic substitution (Coo et al., 2008). Specifically, as the prevalence of autism increases, the number of other developmental disabilities seems to be decreasing, suggesting that diagnosticians may prefer to diagnose children with autism instead of with other disorders, such as intellectual impairments, or that children diagnosed with other disorders are having their diagnoses changed to autism. For example, in a study of school children in British Columbia, the prevalence of students with autism increased from 12.3 per 10,000 in 1996 to 43.1 per 10,000 in 2004. One-third of this increase was attributable to children originally given a different special education classification that were then reclassified as having autism (Coo et al., 2008). Currently, given the confounding variables listed above, the true increase in the prevalence of ASD is not known.

Etiology

The etiology of autism is also currently unknown. However, recent evidence supports a genetic cause (O'Roak & State, 2008). Several incorrect hypotheses regarding autism's etiology have been widely propagated before they were adequately researched (Metz, Mulick, & Butter, 2005; Offit, 2008). These etiological hypotheses have in some cases caused pain or damage to children with autism and their families (Baxter & Krenzelok, 2008; Metz et al., 2005; Offit, 2008). For example, in the 1960s it was widely believed that children with autism intentionally withdrew from social interaction because their mothers (i.e., "refrigerator mothers") had been cold and unloving (Bettelheim, 1967). This hypothesis was later discounted (Rutter, & Schopler, 1978). More recent etiological theories have involved potential gastrointestinal causes (i.e., a leaky intestinal wall allows wheat and dairy proteins to interrupt brain function; Mulloy et al., 2010), the presence of the measles virus in the blood stream introduced via the measles, mumps, and rubella (MMR) vaccine, and poisoning from Thimerosal (a mercury-based preservative) present in vaccines (Offit, 2008). However, repeated large-scale, scientifically rigorous research has not found sufficient evidence to support any of these theories (Offit, 2008).

Early Warning Signs of Autism

Treatment for autism is most effective early in life; therefore, early diagnosis is very important. The National Institute of Mental Health (2010) lists the following indicators as warning signs that a child might have autism.

- Does not babble, point, or make meaningful gestures by 1 year of age
- Does not speak one word by 16 months of age
- Does not combine two words by 2 years of age
- Does not respond to name

- Loses language or social skills that had previously developed
- Poor eye contact
- Does not play with toys
- Excessively puts objects in a line
- Is excessively attached to one particular toy or object
- Does not smile often
- May seem to be hearing impaired

Treatment

Many approaches to treatment are available to families of children with autism (Green et al., 2006). However, the majority of these treatments have not been rigorously evaluated by research and many make unsubstantiated claims to "cure" autism (Jacobson, Foxx, & Mulick, 2005). There is currently no known cure for autism (National Institute of Mental Health, 2010). However, intensive early intervention may result in significant improvements in language, socialization, and cognition for some children (Howlin, Magiati, & Charman, 2009; National Research Council, 2001; Reichow & Woolery, 2009).

Early intensive behavioral intervention should focus on teaching developmentally appropriate pivotal skills using instructional strategies based upon applied behavior analysis (ABA; Department of Health and Human Services, 1999; Howlin et al., 2009; National Research Council, 2001; Reichow & Woolery, 2009). Numerous ABA variations and procedures have been developed, for example, ABA interventions can be delivered systematically in a highly structured and controlled environment (e.g., discrete trial training: Lovaas, 1987) or embedded in play routines and delivered within the natural environment (e.g., Pivotal Response Training: Koegel, Koegel, Harrower, & Carter, 1999). ABA interventions target a wide variety of skills such as teaching functional communication via alternative and augmentative communication methods (e.g., Picture Exchange Communication System; Bondy & Frost, 2001), reducing challenging behavior (e.g., Functional Communication Training; Carr & Durand, 1985), increasing prosocial behaviors (Matson, & Swiezy, 1994), improving adaptive and self-help behaviors (Anderson, Jablonski, Thomeer, & Knapp, 2007), and improving academics (Dunlap, Kern, & Worcester, 2001). Additional skills targeted during early intervention include joint attention, play, and functional skills (e.g., toileting and dressing; Koegel, & Koegel, 2006; Lang, Machalicek, Rispoli, & Regester, 2009; National Research Council, 2001; Vismara & Rogers, 2008).

The National Research Council (2001) and the Department of Health and Human Services (1999) recommend that early intensive intervention begin as soon as possible. Treatment should occur between 25 and 40 hours per week and should involve direct instruction and reinforcement, occur within the child's natural environment (e.g., home and school), and involve parents and families in designing and implementing intervention.

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See also **Controversial and Noncontroversial Autism Treatments; Interventions for Autism Spectrum Disorders; Kanner, Leo**

AUTISM BEHAVIOR CHECKLIST

The Autism Behavior Checklist (ABC) was originally published as one of five components of the Autism Screening Instrument for Educational Planning (ASIEP; Krug, Arick, & Almond, 1980). The ABC was designed as a screening instrument for use in educational settings with individuals ranging from 2 years, 0 months to 13 years, 11 months. The ABC has undergone two revisions since 1980, most recently in 2008 as part of the publication of the third edition of the Autism Screening Instrument for Educational Planning (ASIEP-3; Krug, Arick, & Almond, 2008). It has been used extensively in schools as a tool for universal screening assessments (Miranda-Linne & Melin, 2002).

The ABC is presented in a checklist format with a list of 47 observable, behavioral characteristics of autism, such as, "echoes (repeats) questions or statements made by others," and "has strong reactions to changes in routine or environment." The rater places a check next to each item that applies to the child. The ABC includes separate rating forms for parents and teachers, to enable comparison of behaviors in different settings and by different observers (Krug, Arick, & Almond, 2008).

Scoring the ABC is a relatively simple process. Individuals qualified to score the ABC include parents and educators, such as the school psychologist, teacher or speech-language pathologist. The previous version of the ABC included item weighting, however this has been removed in the most recent revision of the ASIEP-3 (Krug, Arick, & Almond, 2008). The current dichotomous scoring system (check or no check) has been found to enhance

reliability. The Total Raw Score is computed by summing the number of checked items. The raw score is then converted into a standard score and a percentile rank. Standard scores are based on chronological age groups. Autism index scores are also provided to estimate the probability of the client having autism; probability designations include: very likely, possible, or unlikely (Krug et al., 2008).

The ABC parent forms were normed using a sample that included 342 children with autism in 21 states (Krug, Arick, & Almond, 2008). The teacher forms were normed based on a sample of 386 children with autism in 21 states (Krug et al., 2008). The sample was found to be representative of the population of school-age children as reported in *the Statistical Abstract of the United States*, except for gender distribution. The ASIEP manual reports satisfactory estimates of reliability and validity (Krug et al., 2008). The coefficient alpha was reported to be .88 with an SEM of .06. The test-retest reliability was reported as .99 for teacher raters and .76 for parent raters. The correlation for parent and teacher ratings is .55. Examination of construct validity indicated that the instrument satisfactorily discriminated between individuals with autism and those not diagnosed with autism. Additionally, the construct validity was found to be robust to differences in age or gender and ethnic group status (Krug et al., 2008). However, given the recent publication of the ASIEP-3 there is a need for further independent evaluation of the most recent edition of the assessment.

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AUTISM DIAGNOSTIC INTERVIEW—REVISED

The Autism Diagnostic Interview—Revised (ADI-R; Rutter, LeCouteur, & Lord, 2003) is a semistructured interview for use in the diagnosis of autism spectrum disorders. It is referred to as the gold standard for a clinical interview related to autism for individuals with a mental age of 18 months or higher (Constantino et al., 2003), particularly when combined with the Autism Diagnostic Observation System (ADOS; Lord, Rutter, DiLavore, & Risi, 2001, 2008). The comprehensive interview provides information related to language and communication, reciprocal social interactions, and restricted/repetitive/stereotyped behaviors and interests. It includes 93 items, 37 of which are included in the diagnostic algorithm. Depending on the individual being assessed and the caregiver, the interview takes about 2 hours to complete (Rutter & LeCouteur, 2004; Rutter et al., 2003). Use of the ADI-R requires not only experience with the population and basic interviewing skills, but also training specific to the ADI-R. Responses are scored and interpreted based on either a diagnostic algorithm, current behavior algorithm or both, depending on the purpose of the assessment (Rutter et al., 2003). ADI-R does not have prescribed descriptive classifications; results are intended to provide information that would support the diagnosis of autism spectrum disorders and to identify needs of children and adults for intervention planning. The ADI-R is available in 11 languages and is used worldwide (Lord & Corsello, 2005).

Psychometric properties of the ADI-R are adequate; with appropriate training, interrater reliability for the scoring of the interview has been reported to be acceptable to excellent (.90 or higher; Constantino et al., 2003; de Bildt et al., 2004; Lecavalier et al., 2006). Statistical analysis was used in setting cut scores for the ADI-R (Lord et al., 1997). Discriminant evidence is provided in the manual. Bishop and Norbury (2002) concluded that results of the ADI-R were consistent with the child's actual diagnosis. Additional support for discriminant validity from the research literature was found for the ADI-R (e.g., Gray et al., 2008; Noterdaeme, Mildenberger, Sitter, & Amorosa, 2002). At the same time, Bishop and Norbury (2002) found a low level of agreement for the ADI-R and other parent interview information with the other specific measures of characteristics of autism. They concluded that this was in part because of the extent to which pragmatic language issues and age confound diagnosis. Recently, Matson, Hess, Mahan, and Fodstad (2010) also found a low level of agreement with current diagnosis, but did find a high level of agreement with another measure. In a study comparing the ADI-R with diagnostic decisions, de Bildt et al. (2004) found adequate agreement, but noted age effects.

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See also **Autism; Autism Diagnostic Observation System**

AUTISM DIAGNOSTIC OBSERVATION SYSTEM

The Autism Diagnostic Observation System (ADOS; Lord, Rutter, DiLavore, & Risi, 2001, 2008) is a measure used in the assessment of autism spectrum disorders that combines direct observation in contrived situations, or "presses," with information obtained from parent interview. The assessment is semistructured and the activities provide opportunities to observe a range of social and communication behaviors. The ADOS has gained acceptance worldwide as the gold standard for assessment of autistic spectrum disorders (Lord & Corsello, 2005), particularly when administered in conjunction with the Autism Diagnostic Interview—Revised (ADI-R; Rutter, LeCouteur, & Lord, 2003).

The ADOS consists of four modules; the individual is administered the module that is best aligned with their overall language functioning from nonverbal to fluent and one module is designed for administration with adolescents and adults. Each of the modules is estimated to take 35 to 40 minutes; only one module is administered to each client. The activities and skills covered by the ADOS are intended to have direct implications for intervention (Lord et al., 2008). Although not appropriate for nonverbal adolescents or adults with autism, the ADOS is intended for use with all others who may have autism. Use of the ADOS requires experience, skills, and practice (Lord & Corsello, 2005); workshops are available on a regular basis to learn appropriate administration.

Following the observations, the results are considered in relation to cut-scores for autism and the general category of autism spectrum disorders (Lord et al., 1997). Psychometric properties (e.g., interrater reliability, internal consistency, temporal stability) are good (e.g., Lord et al., 2000). Content is appropriate for diagnosis with coverage of three domains essential for diagnosis of autistic spectrum disorders—communication, social behavior, and repetitive motor/stereotypy—included in each module. Discriminant evidence is provided in the manual, and supports the use of Modules 1, 2, and 3; less evidence is provided for Module 4. Additional support for discriminant validity from the research literature was found as well (e.g., de Bildt et al., 2004; Noterdaeme, Mildenberger, Sitter, & Amorosa, 2002).

In an effort to improve the diagnostic validity of the ADOS, Gotham, Risi, Pickles, and Lord (2007) developed revised algorithms for the ADOS, particularly Modules 1 through 3, to improve the sensitivity and specificity of the ADOS. In particular, the original ADOS algorithm does not include repetitive behaviors or restricted interests, although these behaviors are coded if they are observed (Lord et al., 2001). The revised algorithm includes a Social Affect factor (social and communication skills), a Restricted and Repetitive Behavior factor; these are then combined with differing cut-offs for autism and autism spectrum disorders, and differing algorithms for children

younger and older than age 5 in Module 2. The revised algorithms have been validated in multiple studies (de Bildt et al., 2009; Gotham et al., 2008; Gray, Tong, & Sweeney, 2008; Noterdaeme et al., 2002; Oosterling et al., 2010; Overton, Fielding, & Garcia de Alba, 2008). There are indications of improved balance between sensitivity and specificity with the revised algorithms, but additional research is needed in this area.

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***See also* Autism; Autism Diagnostic Interview—Revised**

AUTISM SOCIETY OF AMERICA

The Autism Society of America (ASA) was founded in 1965 to help parents, family members, professionals, and caregivers learn about autism and how to effectively deal with the disability. ASA has over 24,000 members joined through a network of 225 chapters in 46 states across the country. The mission of ASA is to promote lifelong access and opportunities for persons within the autism spectrum and their families to be fully included, participating members of their communities through advocacy, public awareness, education, and research related to autism. ASA believes that each person with autism is a unique individual, and its policies promote the active and informed involvement of family members and those with autism in the planning of individualized, appropriate services and supports.

The ASA provides current information about autism through distribution of free packets of materials on a variety of topics; a comprehensive, bimonthly newsletter, the *Advocate*; and an annual national conference each July. An extensive library of information on issues affecting children and adults with autism, Pervasive Developmental Disorder—not otherwise specified (PDD-NOS), Asperger's, or other related disorders is maintained by the Society. In addition, ASA furnishes national legislators and government agencies with information about the needs of people with autism and their families and promotes medical research in the field.

Local chapters help families find trained professionals and service providers in their communities and organize parent support groups. Some chapters also host presentations by autism experts and advocate at the state level for improvements in programs and services specific to the disability.

A variety of information packets are available from the ASA national office, including materials dealing with general information about autism, facilitated communication, insurance, medications, education, and adult issues. Information provided assists families in appropriately matching the unique needs and potential of individuals with autism to treatments or strategies likely to be effective in moving the person closer to normal functioning. The Society promotes treatments supported by research while asserting that no one treatment exists which is equally effective for all persons. In doing so, they focus on important areas to consider when formulating a treatment plan, including social skill development, communication, behavior, and sensory integration. Additional information may be found at: Autism Society, 4340 East-West Highway, Suite 350, Bethesda, Maryland 20814. Tel.: (301) 657-0881 or (800) 3AUTISM (800-328-8476), website: http://www.autism-society.org/.

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AUTISM SPEAKS

History

Founded in 2005 by Bob and Suzanne Wright, Autism Speaks is currently the United States' largest science- and advocacy-focused autism organization. The Autism Speaks organization was created in response to the founders' grandchild's diagnosis of autism. Funding research to increase knowledge regarding the causes, prevention, treatments, and possible cures for autism is the organization's priority. Autism Speaks also serves as a resource for family and friends of those diagnosed with autism. Awareness and advocacy efforts are at the forefront of the organization's activities.

Mission

The mission of Autism Speaks is to improve the future for all who struggle with autism spectrum disorders. Dedicated to funding global biomedical research into the causes, prevention, treatments, and cure for autism; to raising public awareness about autism and its effects on individuals, families, and society; and to bringing hope to all who deal with the hardships of this disorder (Autism Speaks Inc., 2011).

Fundamental values reflected in the mission of Autism Speaks include "(1) recognition that individuals with autism spectrum disorders and their families are struggling, which inspires a sense of urgency and (2) commitment to discovery through scientific excellence; and the belief and commitment that parents are partners in this effort" (Autism Speaks Inc., 2011).

Services Provided

The services provided by the Autism Speaks organization include: information regarding the diagnosis of autism, legislation and rights for children in the public education system, early intervention services, and special education services. Autism Speaks also refers families toward community agencies, counseling services, and family services to address issues commonly dealt with by the autism community. Autism Speaks does not provide services that involve medical or legal advisory; rather, general information about community resources is promoted. The organization's website provides the following: information regarding the diagnosis, symptomology, basic facts, and child rights as they relate to Autism; policy statements, research initiatives, and news related to scientific findings; family services such as tool kits, resource libraries, community connections, grants, and projects for the future of Autism; advocacy related legislation, news, and ways to get involved; as well as opportunities to donate to the organization.

Contact Autism Speaks at the following addresses: New York office, 1 East 33rd Street, 4th floor, New York, NY 10016. Tel.: (212) 252-8584, fax: (212) 252-8676. Princeton, New Jersey office, 1060 State Road, 2nd floor, Princeton, NJ 08540. Tel.: (609) 228-7310, fax #1: (609) 430-9163, fax #2: (609) 430-9505. Los Angeles office, 5455 Wilshire Boulevard, Suite 2250, Los Angeles, CA 90036. Tel. (323) 549-0500, fax: (323) 549-0547.

E-mail: General Information: contactus@autismspeaks.org, website: http://www.autismspeaks.org/

Family Services: www.autismspeaks.org/community/family_services

All information retrieved on August 11, 2001, from: www.autismspeaks.org

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AUTISM SPECTRUM RATING SCALES (ASRS)

The Autism Spectrum Rating Scales (ASRS; Goldstein & Naglieri, 2009) is intended to provide a brief assessment that measures behaviors associated with autism spectrum disorders (ASD) in children and adolescents ages 2 to 18 years old based on a questionnaire form completed by parents or teachers. The ASRS was designed to be used for diagnostic decision-making, progress monitoring, and in treatment evaluation. It is available in a short and

full-length form, each with one version for children aged 2 to 5 and another for children and youth aged 6 to 18. All versions can be administered using either a pencil-and-paper method or through the ASRS Online Assessment Center.

The ASRS Short Form was designed to serve as a brief tool for screening purposes. This form contains a subset of 15 items from the full-length version of the ASRS and consists of just one form to be completed by both parents and teachers. Goldstein and Naglieri (2009) indicate that items included on the Short Form version differentiate between youth diagnosed with an ASD and those in the general population. The authors report a strong association between scores on the short and full-length version. They recommend use of the Short Form version in initial screenings of ASD and for progress monitoring. The full-length ASRS form provides a more comprehensive evaluation of ASD characteristics. This version includes 70 items for children aged 2 to 5 and 71 items for children aged 6 to 18. Separate parent and teacher rating forms are provided for each age group. The full-length ASRS provides a total score, separate scores for each of the ASRS scales, a score for the DSM-IV-TR scale, and treatment scale scores. For children aged 2 to 5, there are 2 ASRS scales, including Social/Communication and Unusual Behaviors. For children aged 6 to 18, there are three ASRS scales, including Social/Communication, Unusual Behavior, and Self-Regulation. Treatment scale scores provide information regarding specific items that pertain to treatment utility. The authors recommend use of the full-length ASRS in initial evaluations and full re-evaluations.

The ASRS was standardized and normed using a sample of 2,560 ratings from the general population and over 1,600 ratings from clinical samples (Goldstein & Naglieri, 2009). The clinical samples included approximately 700 ratings from individuals with an ASD diagnosis and over 500 ratings from individuals with other clinical diagnoses. The sample utilized a diverse group of individuals, found to be representative of the U.S. general population in relation to key demographic variables. This allows an assessor to compare an individual's standard score on the ASRS to his or her norm group. The authors report satisfactory reliability and validity regarding the psychometric properties of the scales. However, because the ASRS is a recently published instrument, there is limited research regarding the efficacy of this assessment tool; further independent evaluation is needed.

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AUTISM: THE INTERNATIONAL JOURNAL OF RESEARCH AND PRACTICE (JOURNAL)

Autism: The International Journal of Research and Practice is an international, interdisciplinary, peer-reviewed research journal published six times per year. This interdisciplinary journal publishes interdisciplinary research on issues related to individuals with autism spectrum disorders. The journal spans the fields of medicine, education, psychology, neuroscience, epidemiology, and family services. Types of articles *Autism* publishes include research reports, research review articles, and letters to the editor. Manuscript submissions are accepted online and undergo double-blind peer review by at least two reviewers. *Autism's* 2010 Impact Factor was 2.606 (2010 5-year Impact Factor = 3.138) as determined in the *Journal Citation Reports*® (JCR), published by Thomson Reuters (formerly ISI). The current editor-in-chief of *Autism* is Dermot Bowler (City University, London, UK) and the editors are Dougal Julian Hare (University of Manchester, UK), David Mandell (University of Pennsylvania School of Medicine, USA), and Sarah Spence (Children's Hospital, Boston, USA). Individual and institutional subscriptions are available. The journal's website is: http://aut.sagepub.com/.

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AUTOCORRELATION

In many types of research we think of our observations as independent such that one observation does not predict the next. For example, if we randomly sample 20 students we wouldn't expect the time on task of one randomly sampled student to predict the time on task of the next randomly sampled student. With time series data, however, we may expect one observation to be somewhat predictive of the next. For example, consider observing a student's time on task 20 days in a row. If we observed a relatively low time on task one day we may predict that student will have a relatively low time on task again the next day. It may be, for example, that the child is sick and that sickness impacts multiple observations in a row leading to greater similarities among observations that are close together in time. If so we would say the time series data are serially dependent, as opposed to independent. Autocorrelation is an index of the amount of dependence and is standardized like a correlation coefficient so that the possible values range from –1.0 to 1.0.

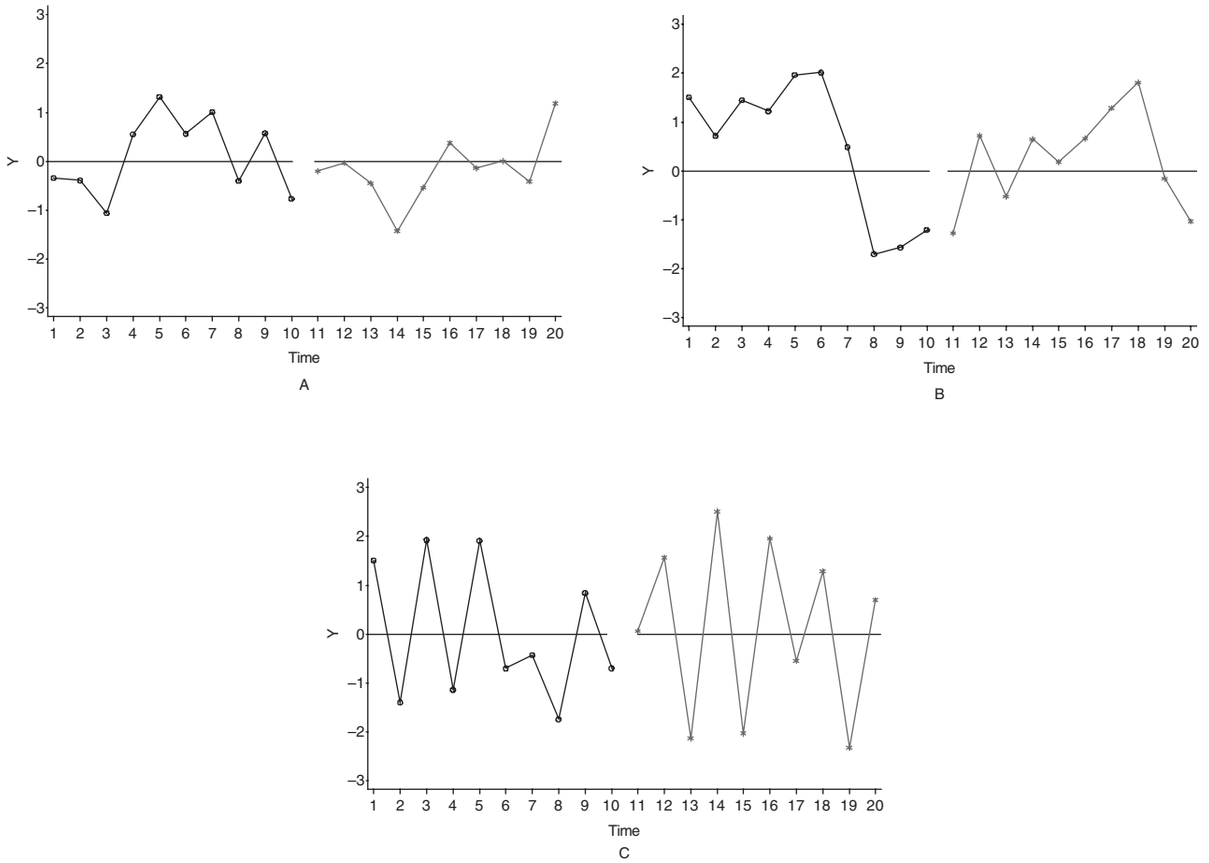

Figure A.6. Time series generated with a mean of 0 and no trend where errors were (A) independently sampled, (B) generated with positive autocorrelation, or (C) generated with negative autocorrelation.

Figure A.6 shows the data from three interrupted time series. In each panel the data from both the A and the B phase were generated from a process where the mean value was 0 and there was no trend. The panels differ from each other in the process used to generate the errors, which are the deviations from the trend line. In Panel A the errors were independently sampled, and thus the generation process had no autocorrelation. In Panel B the errors were generated to have positive autocorrelation ($\rho =$ .70). Notice in this graph the observations that are close together tend to be more similar. For example, points 1 to 7 are on one side of the trend line, which indicates these points are more similar than typically seen in an independent process. In Panel C the errors were generated to have negative autocorrelation ($\rho = -.70$). In this time series we see the observations next to each other tend to be dissimilar and thus we see them jump back and forth across the trend line with great regularity than one would expect in an independent process (see points 1 to 6 as an example).

Given that time series data may be autocorrelated, several approaches have been developed for estimating the amount of autocorrelation. An estimate can focus on the correlation between errors that differ by one point in time (first-order autocorrelation), or the correlation between errors that differ by two points in time (second-order autocorrelation), or more generally the correlation between errors spaced by n points in time. In addition there are multiple approaches for estimating an autocorrelation parameter (ρ) from the observed time series (see Huitema & McKean, 1991 for more information). The standard approaches are known to be biased (Huitema & McKean, 1991) and the bias is known to be more substantial when the series is short and the time series model complex (Ferron, 2002). In addition, estimates of autocorrelation tend to be imprecise with short series (Busk & Marascuilo, 1988), which makes it difficult to pinpoint the amount of autocorrelation in behavioral studies. Several surveys, analyses, and reanalyses have led to different conclusions about the amount of autocorrelation that is typical of behavioral time series, but small levels of positive autocorrelation seem plausible (Busk & Marascuilo, 1988; Matyas & Greenwood, 1997, Sideridis & Greenwood, 1997). Of interest, even small levels of autocorrelation have ramifications for analyses.

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AUTOCORRELATION EFFECTS IN SINGLE-CASE RESEARCH

Positive autocorrelation makes observations that are close together in time more similar than independently sampled observations. Consequently, a positively autocorrelated time series is more likely to appear to have a trend or shift than a time series resulting from an independent process. Negative autocorrelation makes observations close together more dissimilar than independently sampled observations, and thus makes it less likely to see chance trends or effects. With autocorrelation, visual analyses of time series become more difficult (Matyas & Greenwood, 1990). Specifically, positive autocorrelation makes it more likely to incorrectly conclude that an effect is present.

Researchers applying traditional ANOVA or regression models to interrupted time series data (e.g., data from AB, or ABAB type designs) assume the errors are independent. If the errors are positively autocorrelated the Type I error rates are inflated making it too likely that the researchers will falsely conclude there was a treatment effect (Toothaker, Banz, Noble, Camp, & Davis, 1983). If the errors are negatively autocorrelated the Type I error rate is decreased. This same pattern (i.e., an increase in Type I errors with positive autocorrelation and a decrease with negative autocorrelation) is seen if a permutation test is used to analyze the interrupted time series data. With the permutation test, significance is not determined by referring to a theoretical distribution (i.e., t or F) derived under assumptions of independence, normality, and homogeneity, but rather by referring to an empirical distribution built by considering all possible permutations of observations into two groups (A and B). The statistical validity of this nonparametric approach is based on an exchangeability assumption, which is violated by autocorrelation.

An alternative nonparametric approach is offered by randomization tests. With these tests the researcher has to incorporate random assignment into the design. As with a permutation test, the researcher determines significance by comparing a test statistic to an empirically built distribution, but unlike the permutation test the randomization test limits the permutations considered to those that could have arisen from the random assignment. Randomization tests control the Type I error rate regardless of the level of autocorrelation (Edgington, 1980), but the autocorrelation impacts the power of these tests (for discussion of how power is impacted see Ferron & Ware, 1995).

Parametric alternatives to traditional regression models include time series models, which allow researchers to model autocorrelation. Complex time series models are known to be problematic with short series, however, there are short series alternatives including a double bootstrap procedure (McKnight, McKean, & Huitema, 2000) and a procedure that cleanses the autocorrelation and then bootstraps (Parker, 2006). Another option that is receiving increased attention is multilevel modeling (or hierarchical linear modeling), which is used to analyze interrupted time series data from multiple cases (Van den Noortgate, & Onghena, 2003). Multilevel models are flexible enough to model the autocorrelation and early studies have shown that when degrees of freedom are estimated using the small sample Kenward-Roger approach that confidence intervals for the average effect and for individual effects are accurate and thus Type I error rates can be controlled, at least for relatively simple interrupted time series models (Ferron, Farmer, & Owens, 2010). Although there currently is not agreement on which analysis method is best, there is agreement that autocorrelation complicates the analysis of single-case data.

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AUTOMATICITY

Automaticity is an aspect of perceptual and motor processing that occurs outside of conscious awareness. Factors such as stimulus novelty and response practice have been found to be related to automaticity in cognitive functioning (Neiser, 1976). When aroused by a novel or difficult stimulus, extensive cognitive processing occurs, forcing the event into conscious awareness. However, a habitual response elicited by an expected stimulus may be performed at an automatic level requiring little or no attention.

Humans have a limited attention capacity, therefore automatic functions add to the efficiency of the information processing system (Kutas & Hillyard, 1980). Many simple perceptual processes are innately automatic, while even complex activities such as reading can become automatic with sufficient practice. In fact, Hancock and Byrd (1984) state that reading efficiency is dependent on the extent to which decoding skills become automatized, and Garnett and Fleischner (1980) have related automatization to basic math facts acquisition.

Learning disabilities and intellectual have been discussed in terms of deficient automatization processes. Children with learning disabilities often take longer to produce acquired math facts than their nondisabled peers (Garnett & Fleischner, 1980). Their inability to perform this well-drilled task at an automatic level suggests that children with learning disabilities thinking processes are more circuitous and attention demanding. Severely disabled readers often demonstrate difficulty processing letters within words, while less impaired readers, who have automatized letter recognition, read whole words in a controlled, attention-demanding manner (Hancock & Byrd, 1984). Other research (Hurks et al., 2005) suggests that children with ADHD have no impairments in automatic preparations for visuomotor tasks but have great difficulty in visuomotor tasks that require planning and preparation.

Other researchers have suggested that automatic functions may be available to learning-disabled and intellectually disabled students, but that other factors impede their effects. Thus, children with disabilities have been found to perform as well as their nondisabled peers on a measure of perceptual memory automatization (Stein, Laskowski, & Trancone, 1982). The children with disabilities, however, had more difficulty organizing new skills, thereby preventing the automatization of more complex processes. In another study, learning-disabled children were found to produce the correct definitions of familiar words at a rate equal to that of nondisabled children, but showed a rapid decline in rate and accuracy when unfamiliar words were introduced (Ceci, 1983). As more purposeful processing was required, the learning-disabled students failed to decode the words, and instead substituted words that could be processed at an automatic level. Other skills must also become automatic and can be assessed in kindergarten (Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004).

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***See also* Cognitive Strategies; Conditioning; Transfer of Training**

AUTOMUTISM (*See* Elective Mutism)

AUTONOMIC REACTIVITY

The autonomic nervous system consists of the sympathetic nervous system and the parasympathetic nervous system. The sympathetic nervous system, known as the fight-or-flight system, increases heart rate, adrenal secretions, sweating, and other responses that prepare the body for vigorous activity. The parasympathetic nervous system increases salivation, digestion, and other vegetative responses while antagonizing many effects of the sympathetic nervous system. Both systems are active at all times, although one or the other may predominate at the moment. The adrenal glands, sweat glands, muscles that erect the hairs, and muscles that constrict blood vessels receive only sympathetic input and no parasympathetic input.

Pain, sudden loud noises, and other intense stimuli activate the sympathetic nervous system, as do events that one interprets as threatening. People vary substantially in how strongly they react, and twin research indicates that much of the variation has a genetic contribution (Lensvelt-Mulders & Hettema, 2001). To a large extent, reactivity is consistent over time. Infants with an "inhibited" temperament react vigorously to novel sights and sounds. Most of them become shy children and anxious adults, showing a greater than average amygdala response to photographs suggesting fear (Schwartz, Wright, Shin, Kagan, & Rauch, 2003). Children with anxiety disorders tend to show greater-than-average sympathetic nervous system responses to loud noises, and most of their unaffected siblings do also, suggesting that the autonomic reactivity is a precursor to anxiety disorders, rather than a consequence (Bakker, Tijssen, van der Meer, Koelman, & Boer, 2009). In addition to the apparent influence of a biological predisposition, life experiences also influence autonomic reactivity. People who have endured a highly stressful experience show a temporarily increased sympathetic reactivity, and people with posttraumatic stress disorder show a more prolonged effect (Grillon, Morgan, Davis, & Southwick, 1998).

Although very high sympathetic reactivity correlates with anxiety, very low reactivity is not ideal, either. Low levels have been linked to impulsiveness, poor emotional regulation, and outbursts of anger and violence (Murray-Close, 2011; Stifter, Dollar, & Cipriano, 2011). Low reactivity correlates with antisocial behavior in both children and adults (Herpetz et al., 2007). The best level of reactivity varies across settings and situations, but is usually in an intermediate range.

Autonomic reactivity correlates with many behaviors. Researchers asked people a series of questions about their support for use of military and police powers, and their ownership of a gun. People with strong autonomic reactivity tended to endorse more use of force to combat possible threats (Oxley et al., 2008). Presumably they support strong interventions partly because of their strong fear of danger.

The sympathetic nervous system is generally most reactive in childhood (Shields, 1983). In old age, the resting level of the sympathetic nervous system increases, resulting in high blood pressure, but the reactivity of the system to change decreases (Hotta & Uchida, 2010). That is, reactivity and flexibility are greatest in the young, and least in the old.

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AVERSIVE CONTROL

Aversive control employs the use of aversive stimuli to control behavior. Avoidance and punishment are two types of instrumental conditioning in which aversive stimuli are used. Avoidance procedures involve specific responses to prevent aversive stimuli. Punishment involves the use of aversive stimuli after a response is given (Domjan & Grau, 2009). The use of aversive stimuli to control behavior is one of the most controversial techniques employed by teachers, researchers, psychologists, therapists, and others. Applied research and those in clinical service must follow ethical guidelines in the use of less aversive interventions (Doughty, 2007). The effectiveness of this procedure is defined by its effect on behavior: It suppresses the behavior that it follows. This definition is similar to that for punishment. Indeed, aversive control is one form of punishment.

The controversy surrounding the use of aversive control is illustrated by Wood and Lakin (1982). They indicate that, although most states approve of the use of moderate corporal punishment, it is specifically forbidden by statutes in others (e.g., Maine and Massachusetts).

The use of aversive consequences for behavior control generally is viewed as a technique to be used only when other techniques have not been successful. Snell (1983) indicates that:

> Aversive conditioning using strong primary aversion (such as electric shock and slapping) to eliminate behavior is very defensible in two general instances: when the behavior is so dangerous or self-destructive that positive reinforcement and extinction are not feasible and when all other intervention methods (reinforce competing response, extinction, milder punishment forms) have been applied competently and have been documented as unsuccessful. (p. 140)

Despite the reservations that have been expressed regarding the use of aversives, aversives have been used to control behavior, particularly self-injurious behavior (SIB). Lemon juice (Sajwaj, Libet, & Agras, 1974), noxious odors (Baumeister & Baumeister, 1978), and electric shock are examples of aversive methods that have been used.

At times and under certain conditions, aversive procedures have been found to be the treatment of choice. However, aversive control should be reduced or eliminated when the desired behavior change has occurred or when the target behavior responds to less severe techniques. Suppression, and not elimination, of targeted behavior may result from using this technique. Unexpected and unintended results often occur whenever a punishment procedure is used; it is possible that similar side effects may occur when aversive control is used.

The use of aversives to control behavior raises many ethical questions. The basic rationale for the use of aversives is that other methods have failed, the child is at risk, and the aversive to be used is not as harmful as the behavior that is targeted for change.

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***See also* Operant Conditioning; Punishment**

AVERSIVE STIMULUS

Aversive stimuli are stimuli that function as punishers. An aversive stimulus whether unconditioned (e.g., bright lights) or conditioned (e.g., a frown or gesture) is "an unpleasant object or event" (Mayer, Sulzer-Azaroff, & Wallace, 2011) that can be used to decrease or increase a behavior. When presented as a consequence of, or contingent on,

a specific behavior, it may be used to reduce or eliminate the rate of that behavior. However, when an aversive stimulus is removed contingent on the emission of a behavior, it may increase the rate of that behavior. In any case, an aversive stimulus is typically referred to as a punisher.

The application of aversive stimuli to effectively reduce or eliminate severe self-destructive behaviors and/or severe chronic behaviors has been demonstrated by several researchers including Lovaas and Simmons (1969), Risley (1968), and Rush (2011). However, the many disadvantages of applying aversive stimuli to reduce behaviors (e.g., withdrawal, aggression, generalization, imitation, negative self-statements; Mayer, Sulzer-Azaroff, & Wallace, 2011) seem to outweigh the advantages. Aversive stimuli to reduce behaviors should be reserved for serious destructive behaviors and employed only when other less aversive procedures have been tried. A more detailed presentation of the use of aversive stimuli may be found in Mayer, Sulzer-Azaroff, and Wallace (2011).

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See also **Behavior Modification; Punishment**

AVEYRON, WILD BOY OF (*See* Wild Boy of Aveyron)

AYLLON, TEODORO (1929–)

Teodoro Ayllon obtained his PhD in clinical psychology in 1959 at the University of Houston. His special areas of interest are in behavior and condition therapy and applied behavior analysis. His major field of interest is in clinical psychology. He has done extensive research in behavioral analysis and management and has published articles and books concerning this subject. He is currently working on a book on children and their families.

Some of his principal contributions include "Eliminating Discipline Problems by Strengthening Academic Performance," "The Elimination of Discipline Problems Through a Combined School-Home Motivational System," and "Behavioral Management of School Phobias." In these articles, Ayllon discusses a procedure in which discipline problems and school phobias can be remedied by having parents support the child with positive reinforcement to increase motivation to go to school and improve performance. Ayllon and Azrin (1968) wrote *The Token Economy: A Motivational System for Therapy and Rehabilitation*, which provides a glimpse into a system that often changes challenging behavior in both adolescents and adults and continues to be an implemented practice today.

He continues his research in clinical psychology and behavioral management and remains involved in the field of psychology. Ayllon's work has been recognized with honors. He retired as a professor of psychology and special education in the psychology department at Georgia State University in 1997. He is currently Professor Emeritus at Georgia State University and maintains offices in Atlanta and Duluth. Dr. Ayllon's current interests include problem-orientated, solution-focused, and time-limited behavioral family therapy for children and adolescents. Dr. Ayllon also serves on the board of advisors for the Cambridge Center for Behavioral Studies.

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AYRES, A. JEAN (1920–1988)

A. Jean Ayres died on December 16, 1988 at the age of 68. Ayres obtained her BS in 1945 and MS in 1954 in Occupational Therapy, and went on to earn her PhD in 1961 in Educational Psychology from the University of Southern California. She worked as an occupational therapist in several California rehabilitation centers, and between 1955 and 1985, she taught and conducted research at the University of Southern California in the Departments of Occupational Therapy and Special Education, achieving the rank of emeritus professor after her retirement in 1985. Ayres was also in private practice in occupational therapy from 1977 to 1984.

Occupational therapy, particularly as related to perceptual and sensory integrative dysfunction and neuromuscular integration, was the focus of her work. From 1964 to 1966, she was a postdoctoral trainee at the University of California, Los Angeles Brain Research Institute, which led to her discovery of sensory integration dysfunction, a neurological disorder of the senses characterized by learning and behavioral problems as well as pain associated with the performance of even simple daily tasks. Ayres had struggled with learning problems similar to those caused by the disease, ultimately identifying an inefficient organization of sensory information received by the nervous system as its cause. Perhaps her greatest contribution was the development of sensory-integrative therapy, a neurologically based treatment for learning disorders widely used among occupational therapists. She is also credited with devising the Southern California Sensory Integration Tests and the Sensory Integration and Praxis Tests, tools used for identifying the disorder.

Distinguishing her work from others, Ayres (1972) used a neurological as opposed to an educational or psychodynamic approach to learning and behavior disorders, emphasizing the normalization of the sensory integration process in the brain stem while not excluding cortical integrative processes. Her research found that students with certain identifiable types of sensory integrative dysfunctions who received occupational therapy specifically for the integrative dysfunction, showed greater gains in academic scores than those who received an equal amount of time in academic work.

During her distinguished career, Ayres published over 50 tests, articles, and films. She was the recipient of the Eleanor Clarke Slagle Lectureship and the Award of Merit, the highest honors conferred by the American Occupational Therapy Association, and she was named to the 1971 edition of *Outstanding Educators of America*. Ayres was a charter member of the honorary Academy of Research of the American Occupational Therapy Association.

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See also **Occupational Therapy; Sensory Integrative Therapy**