# Chapter 1
# Persisting Speech Difficulties



Many young children with early speech difficulties receive intervention that brings about rapid and long-lasting normalization of their speech. For this group of children, intervention is a brief and usually positive episode in their young lives, easily forgotten as they move forward with normal language, speech and literacy attainments. Speech and language therapists often find working with these children a rewarding experience as they are quickly able to see positive evidence of their input.

However, not all children with speech difficulties will fall into this group. Ruscello (1995) described children who do not respond to intervention and whose speech difficulties persist through the school years and often into adulthood. Wood and Scobbie (2003) refer to children who receive many years of therapy and are either very slow to resolve or are eventually discharged with residual errors. Woodyatt and Dodd (1995, p. 199) note:

> Whereas children with articulation difficulties and delayed acquisition of phonology are often referred to community speech pathology clinics, they would not be considered difficult cases for treatment by most experienced practitioners. The literature, then, rarely addresses the treatment of children whose speech disorder appears severe and resistant to therapy.

This volume aims to redress this imbalance by focusing on children whose speech difficulties are severe and resistant to intervention. There are a large number of children with speech difficulties that have persisted. Estimates suggest that approximately 5% of primary school children have speech difficulties (Weiss, Gordon and Lillywhite, 1987) and that 48 000 children per year in the UK present with primary speech difficulties (Broomfield and Dodd, 2004). We aim to explore and discuss ways of maximizing the effectiveness of intervention with children with persisting speech difficulties (PSDs). Let us start by con-

sidering what is meant by the term persisting speech difficulties in Activity 1.1.

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**ACTIVITY 1.1**

Consider what you understand by the term persisting speech difficulties. List any features of persisting speech difficulties or PSDs you can think of. How would you know if a child of school-age has a speech difficulty?

See Key to Activity 1.1 at the end of this chapter for some of the words you may have written down, then read the following account of how we see persisting speech difficulties.

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## What are Persisting Speech Difficulties (PSDs)?

Persisting speech difficulties are exactly that. They are difficulties in the normal development of speech that do not resolve as the child matures or even after they receive specific help for these problems. There are similar terms used to describe the same sort of difficulties. Shriberg, Gruber and Kwiatkowski (1994) refer to children with 'residual phonological errors'. Wood and Scobbie refer to 'intractable speech disorders,' and define these as:

> systematic speech production errors that are judged not to have responded to conventional clinical intervention, or those in children who are 10 years or older but who have not been referred to speech therapy until very late.
>
> (Wood and Scobbie, 2003, p. 1)

We favour the term persisting speech difficulties since it covers a broad range of speech problems and causal factors. As we use it, the term may include both articulation and phonological difficulties as well as fluency difficulties. It does not imply that the child has a specific medical diagnosis, although in some cases they may have been given a diagnostic label such as childhood apraxia of speech, dyspraxia or dysarthria. As for the previous books in this series, in this volume the term 'speech difficulty' is used to refer to children who have difficulties with producing speech segments in isolation, single words or in connected speech regardless of origin of difficulty. Whatever term we choose to refer to these speech difficulties, those who have investigated them are broadly agreed on the basic characteristics of this client group. PSDs are usually identifiable through the

- child's age;
- primary nature of the speech difficulties;
- associated problems.

Each of these points is discussed in greater detail below.

## Child's Age

By definition, PSDs are found in older children in their school years, typically age 5 or 6 years and beyond. These hard-to-treat children make slow progress so that their difficulties will typically not have resolved by the time they enter formal education. Bishop and Adams' (1990) critical age hypothesis suggests that 5;6 years, i.e. the age around which most children are receiving formal schooling in the UK, is the critical point at which a child's risk increases for other associated problems, e.g. literacy, if their speech difficulties have not yet resolved. Clearly this exact age will vary in other parts of the world. Shriberg, Austin, Lewis, *et al.* (1997) use the term 'residual speech difficulties' to refer to children whose difficulties remain beyond the age of 9. Between 6 and 8;11 years they prefer the term 'questionable residual difficulties'.

Research has attempted to distinguish between children who do and do not resolve their speech difficulties by the time they start school. When a young child is referred for a speech assessment for the first time, the practitioner may wonder whether therapy will prove a relatively straightforward and short-term exercise, or whether the child's difficulties will persist with more long-term sequelae and require ongoing intervention and support. Until fairly recently, the only way of answering this question was to carry out intervention and evaluate the progress made by the child. However, longitudinal studies have indicated some early predictors which might distinguish between the two groups. Nathan, Stackhouse, Goulandris and Snowling (2004a) investigated 47 children aged 4–7 years who had primary speech difficulties. They examined possible clinical markers for identifying children at risk for PSDs and associated literacy problems. Approximately 25% of the children with speech difficulties in their study resolved their speech difficulties by the end of the study when the children were aged approximately 7 years. Those children who had PSDs generally had more severe speech difficulties; speech input processing problems (auditory discrimination difficulties) and delayed language skills. The persisting speech difficulties were associated with poorer literacy development.

## Primary Nature of the Speech Difficulties

Some children with PSDs may have an identifiable aetiology, e.g. cleft lip/palate or hearing impairment. Many others have speech difficulties with no known cause. Irrespective of whether aetiology has been identified or a diagnosis made, the nature and severity of PSDs varies widely and it is generally held that children with speech difficulties are a heterogeneous group (e.g. Dodd, 1995, 2005; Stackhouse, 1996). For all children with PSDs, speech problems can result from difficulties with the following:

- input processing, e.g. auditory discrimination of sounds;
- lexical representations, e.g. imprecise knowledge is stored about the sounds comprising a word;
- speech output, e.g. assembly of sounds needed for speech.

Stackhouse and Wells (1997) conceptualize these three aspects of potential difficulty in a simple speech processing model shown in Figure 1.1. The basic tenets of a psycholinguistic approach to understanding children's speech difficulties are encapsulated in this figure; difficulties in speech processing occur as a result of breakdown at some point or points along this processing path.

In Book 1 of this series, Stackhouse and Wells (1997, p. 3) reviewed different approaches to classifying speech problems in children. They outlined medical approaches that use diagnostic labels to group children; linguistic approaches which use linguistic terminology to describe children's difficulties; and psycholinguistic approaches which attempt to understand children's speech difficulties in terms of individual profiles of strengths and weaknesses and in terms of underlying points of breakdown in a speech processing chain or model. Using the medical approach, we might describe a child as having childhood apraxia of speech should they meet the cluster of symptoms typically linked to this label, e.g. see Ozanne, 2005. That same child's speech difficulty might be described in linguistic terms of a series of phonological processing rules, e.g. they exhibit cluster reduction word initially and finally, as well as metathesis in multi-syllabic words.

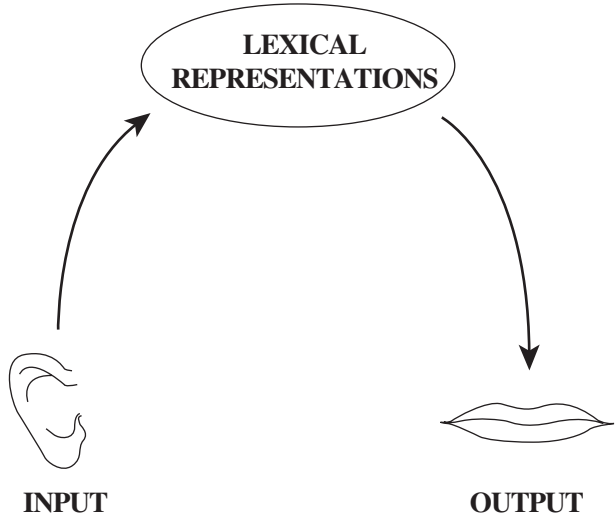


**Figure 1.1:** The speech processing chain: A simple speech processing model (reproduced by kind permission of Whurr Publishers from Stackhouse and Wells, 1997, p. 9).

Shriberg, Austin, Lewis *et al.* (1997) devised an aetiological classification system for children's phonological difficulties. This classification system relies on causal sub-groups among developmental phonological disorders and includes (1) unknown origin, possibly genetic, (2) otitis media with effusion (OME), (3) developmental verbal apraxia, (4) developmental psychosocial involvement, and (5) special populations such as those with craniofacial and sensory motor involvements. However, in many cases a detectable aetiology is not always present, and some children fall into more than one of Shriberg's classifications. Fox, Dodd and Howard (2002) attempted to classify 66 children according to Shriberg's system and found that around half could not be readily classified.

There are many different ways of describing children's speech difficulties. We are likely to select these and use these in ways which reflect our own background and training. Our choice of labels or descriptors is likely to vary depending on the settings in which we work and the practical demands of the situations in which we find ourselves. Diagnostic medical labels can be useful in obtaining support for children with severe speech difficulties, e.g. through the statementing process in the UK whereby the needs of children with specific educational difficulties are legally acknowledged. However, labels such as childhood apraxia of speech, dysarthria and hearing impairment may convey a set of assumptions about where the breakdown is occurring in the speech processing system that may not represent the whole picture. For example, Ebbels (2000) investigated the speech and language processing skills of a 10-year-old child with a hearing impairment. Specific points of breakdown for individual phonological contrasts were identified, with detailed input and output phonological analyses interpreted within a broader psycholinguistic framework. The results of the investigation showed that for this child there was not merely one level of breakdown with hearing, but rather there were multiple levels of difficulty with specific phonological contrasts implicated at particular levels.

A child with PSDs will have areas of weakness in his/her speech processing chain. To compliment this psycholinguistic perspective, we can use linguistic descriptive terms to describe the difficulties observed in speech output. The paper by Susan Ebbels effectively shows how the psycholinguistic and linguistic (in this case phonological) perspective can be combined. For some children with PSDs individual speech sounds may be affected. Shriberg, Gruber and Kwiatkowski (1994) suggest that in English the fricative and liquid sound classes are most vulnerable. In school-age children the most common and persisting speech sound difficulties are:

- /θ/ produced as /f/, e.g. THIN → [fɪn]
- /ð/ produced as /v/, e.g. THEN → [vɛn]
- /r/ produced as /w/, e.g. RUN → [wʌn]

In some local accents these sound substitutions are the norm, and if this is the case then they should clearly not be labelled as speech errors. Nevertheless, Stackhouse cautions, 'The child's production should be compared with the peer group at school as well as with other members of the family' (1996, p. 27). While we know that PSDs can be manifested in problems with individual sound production, this is not always the most striking characteristic. For some children, connected speech – the production of longer strings of sounds beyond the single word – poses real challenges. Children's speech may be unintelligible to unfamiliar listeners because of difficulties not only at a segmental level but also with prosody, timing and the 'glue' that joins words together. Shriberg, Austin, Lewis *et al.* (1997) refer to 'imprecise speech'. By the time a child starts school he or she should be using a full range of sounds and should be intelligible for most of the time. By 7 years of age, the child should not have noticeable speech problems. Sadly, this is not the case for children with PSDs. Moving beyond the production of individual sounds means that it can sometimes be difficult to pinpoint the reasons for a child's low intelligibility. Single word assessments may suggest that the child has no difficulties. Wood and Scobbie (2003) describe a 10-year-old girl with a repaired cleft of the soft palate. This child had received 6 years of regular speech therapy targeting the production of a range of speech sounds. At 10 years of age she was now able to articulate velars at word level but was unable to transfer this to other levels. The authors used the instrumental technique of electropalatography (EPG) to arrive at this conclusion.

## Associated Problems

Persisting speech difficulties place children at increased risk for experiencing other associated problems. The impact of PSDs on other aspects of the children's development should not be underestimated. Research has shown that these children are at increased risk of having difficulties in the normal acquisition of literacy, and that their psychosocial development may also be affected, e.g. having low self-esteem and being at increased risk of bullying. We explore these two associated problems in the following sections.

### *Literacy Acquisition*

It is known that children with PSDs can face an increased risk of experiencing problems in the acquisition of literacy. However, the relationship between speech and literacy is not a straightforward one. It is important to consider the nature of the speech difficulties when making predictions about literacy and long-term outcomes. There are shared phonological underpinnings for speech processing and literacy. If a child's speech difficulty reflects problems with phonological processing then it is likely that

the foundation for developing literacy will not be a firm one. Children with PSDs may be at risk for later spelling difficulties due to poor phonological awareness and difficulties in phonological coding in verbal memory. Volume 1 of this series emphasized the links between speech and literacy (Stackhouse and Wells, 1997, p. 3) and the need for children to have an intact speech processing system in order to acquire literacy in the normal way.

Speech difficulties assume greater importance for literacy outcomes when they co-occur with language difficulties. Bishop and Clarkson (2003) reported that their group of children with both speech and language disorders were the poorest performers in their study, and the results from a longitudinal study by Nathan, Stackhouse, Goulandris and Snowling (2004a) confirmed this finding. Bishop and Adams (1990) contrasted literacy outcomes for two groups of 8-year-old children: a group whose speech difficulties had resolved, and a group whose speech difficulties remained. They found that a significant number of the children with persisting speech problems had literacy difficulties, while their resolved counterparts did not. Their critical age hypothesis suggests that children whose speech difficulties have not resolved by 5;6 face an increased risk of experiencing difficulties with literacy as they get older.

Children with PSDs are at particular risk of being poor spellers due to the shared phonological underpinnings for speech and spelling (Lewis, Freebairn and Taylor, 2002). A study by Clarke-Klein and Hodson (1995) revealed that children with histories of speech difficulties made more phonologically deviant misspellings than their normally developing peers. Speech sound errors do not necessarily map directly onto spelling errors (McCormack, 1995), but rather difficulty with speech may result in imprecise phonological representations of words in the lexicon (Treiman, 1985; Stackhouse, 2006), resulting in inconsistent erroneous spellings. Bishop and Clarkson (2003) observe that spelling skills are frequently overlooked when evaluating children with speech and language difficulties. These authors note that literacy research has tended to focus more on reading than spelling, and that it is often argued that spelling performance can be deduced from reading performance since the two are typically highly correlated. They argue that spelling offers an important window into the developing speech and language system since it is a late-acquired and complex skill. Children with speech difficulties, indicative of underlying speech processing problems, are not likely to be able to progress in their literacy development with the ease of their normally developing classmates.

However, it is also important to note that a child whose speech difficulty comprises an isolated articulatory difficulty arising from a physical abnormality may be no more likely to develop literacy difficulties than a child with normally developing speech (Stackhouse, 1982). Studies of children with motor speech difficulties, e.g. dysarthria, have found that such speech difficulties are not linked to spelling problems (Bishop and

Robson, 1989). Similarly, children with articulation difficulties are not at an increased risk of having literacy problems provided that they have good language skills and the articulation difficulties are not severe (Bishop and Clarkson, 2003). Literacy difficulties in children with PSDs are discussed in greater detail in Chapter 10.

*Psychosocial Development*

Given the importance of speech in everyday communication, it is not hard to imagine the psychosocial impact of having PSDs. Rebecca, a girl aged 11;3 with PSDs emphasizes the social importance of communication:

> talking is important because . . . if you couldn't use another way, would be no other way people could connect . . . you wouldn't make friends, then wouldn't get married and wouldn't be any kids

Children with PSDs are at increased risk of experiencing psychosocial difficulties, and a fairly large body of research attests to this fact. Hadley and Rice (1991) found that children with communication difficulties were more likely to be ignored by peers and not invited to join in with social interactions, and it is known that even minor speech errors may be negatively perceived by peers (Crowe Hall, 1991). The psychosocial impact of PSDs varies from minor to severe, and is not necessarily correlated with the severity of the speech problem. For some children, minor speech difficulties assume great psychosocial significance, while other children seem better able to cope with the impact of more severe speech difficulties. Psychosocial difficulties – whether resulting from mild or severe speech difficulties – need to be addressed.

A study carried out by Knox and Conti-Ramsden (2003) investigated 100 children diagnosed with specific language impairment (SLI) who were attending school in a variety of settings, e.g. mainstream schools and special schools. They found that these children faced significantly higher risks than the general population for being bullied, and that educational placement had no significant impact on this risk, i.e. it did not matter if the children were in a mainstream or special school as the risk of being bullied remains the same. Conti-Ramsden and Botting (2000) found that children with severe communication difficulties may also be at risk for behaviour problems and higher incidence of attention deficit hyperactivity disorder (ADHD). These authors along with others such as Nash, Stengelhofen, Toombs, et al. (2001) and Nash (2006) describe a cycle of disadvantage in which poor communication skills reduce peer interaction, which results in fewer friends, increased risk of victimization and low self-esteem.

Lindsay, Dockrell, Letchford and Mackie (2002) investigated the self-esteem of 69 children with specific speech and language difficulties in Years 6 and 7, i.e. aged approximately 10–11 years. Results revealed that

these children not only had educational difficulties, but that they also had lower estimates of their own academic ability and their competence in peer relationships. Bryan (2004) carried out speech and language screening of young offenders in a British prison. Forty-seven per cent of the offenders were rated as having moderate speech difficulty with over half of this group reporting that they had a stammer or that they had been told they stammered. While this does not mean there is a causal link between crime and PSDs, the data speak to the psychosocial difficulties that some individuals with PSDs may face. The studies presented in this section are sobering for anyone involved with children with PSDs.

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**ACTIVITY 1.2**

By now you should have a clearer idea of what is meant by PSDs. In this activity, consider the reasons why some children's speech difficulties persist. List any reasons you can think of.

See Key to Activity 1.2 at the end of this chapter for some of the reasons you may have written down, then read the following account of how we would answer this question.

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## Why Do Some Children's Speech Difficulties Persist?

There are different ways in which this question might be considered. On the one hand, responses may focus on 'nature' looking to the medical literature on speech disorders and transmission of genes. On the other hand, one might suggest that 'nurture' is the key factor with the nature of intervention and social circumstances giving rise to the difficulties. The answer most likely varies from child to child with both nature and nurture contributing in different measures. We outline some of the factors which may contribute to the persisting nature of speech difficulties.

### Medical Diagnoses and Genetics

Experience and research with some client groups has suggested that the prognosis for developing normal speech is limited. Some children with conditions such as cerebral palsy, hearing impairment, Down and other syndromes may never acquire intelligible speech. These children may be severely limited by their cognitive skills, motoric skills or sensory–perceptual skills. However, for most medical conditions there is a range of outcomes. Many children with Down syndrome cope in mainstream classrooms and go on to achieve speech that is intelligible. For some children with hearing impairment, speech outcome assumes less significance as the child develops successful communication through signing and

written communication. Pascoe, Stackhouse and Wells (2005) described the speech processing profile of a 6-year-old girl, called Katy, diagnosed with ataxic cerebral palsy. Contrary to initial assumptions based on her diagnosis, her difficulties were not limited to peripheral articulatory difficulties but included both output and input levels of the speech processing profile. The progress she made as a result of the intervention was perhaps greater than many would think given the prognosis typically associated with that condition. Katy is discussed in greater detail in Chapters 7 and 8 of this volume.

Childhood apraxia of speech (CAS) (also sometimes called developmental verbal dyspraxia) is a controversial diagnosis but usually one that is given to children who are unable to perform the coordinated movements required for speech. Diagnoses of CAS do not necessarily inform intervention planning: in many cases, only when children fail to respond to traditional phonological intervention, are they labelled as 'apraxic', thus intervention can give rise to the diagnosis, rather than vice versa. It is well documented however that such children typically respond extremely slowly to intervention (Shriberg, Aram and Kwiatkowski, 1997a, b).

There is further information about the nature of childhood apraxia of speech/developmental verbal dyspraxia from gene studies. PSDs are sometimes observed to run in families. Vargha-Khadem and her co-authors (e.g. Vargha-Khadem, Gadian, Copp and Mishkin, 2005) describe the discovery of a mutation in a gene known as FOXP2, which is thought to give rise to apraxia in those with the affected gene. Investigations of the speech and language skills of the so-called KE family, half of whose members have CAS, have suggested that this mutated gene gives rise to the cluster of deficits associated with apraxia. This type of study is extremely useful in shedding light on the neural mechanisms involved in speech. While it informs our knowledge about why some children have conditions such as apraxia, it does not tell us why these difficulties persist or how they might be addressed. There is a great deal of further work to be done in considering how genes and environment interact.

## A Psycholinguistic Perspective

Using a psycholinguistic approach can help explain why some children have PSDs. Psycholinguistic approaches consider that speech processing involves successive levels of input processing, stored representations and output. Such models can be simplistically represented as in Figure 1.1. Children with persisting difficulties are thought to have multiple, and often severe, levels of breakdown throughout the system. Difficulties in one part of the system can affect processing in other parts, and it is a challenge for intervention to tap into the appropriate level and at the same time to take account of how the different levels affect each other. Psycho-

linguistic models are useful in helping us understand the nature and extent of a child's underlying speech processing difficulties. Once this is understood more fully, beyond surface speech errors or diagnostic labels, it may not be entirely surprising that a child is only capable of making slow progress with their speech processing.

Returning to childhood apraxia of speech, Ozanne (1995, 2005) and Stackhouse and Wells (1997, 2001) suggest that children diagnosed with CAS have a multi-deficit disorder: they are likely to have difficulties in devising new motor programs (i.e. templates or blueprints of how to produce a word), but they may well also experience difficulties with other aspects of speech processing such as motor planning (i.e. the actual realization of the template in connected speech) and auditory discrimination. These levels of processing are discussed in Chapter 2. Such multi-deficit conceptualizations can account for the fact that children with CAS often present with severe difficulties, and also the fact that intervention typically yields slow results, since intervention is unlikely to tap into all deficit areas at one time in what Ozanne (1995, p. 109) terms a 'sabotaging effect'.

### Social Circumstances

Communication takes place in social settings, and it is clear that for some children environmental circumstances have a role to play in the outcome of speech difficulties. Locke, Ginsborg and Peers (2002) investigated the spoken language skills of pre-school children being raised in poverty. They found that more than 50% of the 240 children participating in the study had spoken language skills significantly delayed for their age. They discuss the implications of this in terms of the critical age hypothesis and the likely outcome on the children's literacy achievement.

Broomfield and Dodd (2004) investigated the socio-economic status of pre-school children referred to their local paediatric clinic. They found that the distribution of speech disability across socio-economic status was similar to that of the local population. There were, however, slightly more children from affluent backgrounds referred with articulation difficulties and phonological delay. Affluent parents may find it easier to bring children to the clinic and access the referral system. Some children with PSDs have not been able to access the support and intervention needed to address their difficulties.

### Intervention Itself

Thus far the question of 'Why do some children's speech difficulties persist?' has been answered mainly in terms of the children themselves, and the characteristics that seem to distinguish them from their normally developing or readily-resolving peers. However, phonological intervention

is a complex process and there are a great many factors that can affect outcome. These include:

- the child: the nature and severity of the difficulties; personality; learning style, motivation and previous experience of intervention;
- the assessment;
- the intervention procedure and process;
- the child's communication partners and opportunities for communicating.

It is clear that intervention has an important part to play in outcome, although there are a great many questions unanswered about its contributions. For example, it might be asked whether the difference between the resolved and unresolved groups of children is due to the nature and type of intervention that they receive. Do the children with resolved difficulties receive more or better intervention than their unresolved peers? Research suggests that this is not the case, although few studies have used methodologies that would be appropriate for investigating this question. Nathan *et al.* (2004a) included detailed questionnaires for speech and language therapists in their longitudinal study of children with PSDs, asking about the frequency and type of intervention that each child was given. They found that the children who went on to have the PSDs, had on average received more intervention than the other children. This suggests that intervention is given where it is most needed but despite getting larger intervention dosages than their resolving peers, these children's intractable difficulties remain. Their limited progress and persisting problems suggest to practitioners that further intervention is warranted. Nathan *et al.* (2004a) found no substantial difference in the type of therapy that was delivered to the children who did or did not resolve their difficulties.

Bernhardt (2004) describes studies in the United States that she and her colleagues carried out to evaluate the effectiveness of phonological therapy with 22 pre-school children. At the end of the study the participating speech and language therapists completed questionnaires about their own education, confidence in the therapy approaches, and treatment style. The only factor linked to outcomes was whether the therapist had specific and advanced training in linguistics in addition to their Speech–Language Pathology qualification. Children who were treated by therapists who had linguistics degrees in addition to their Speech–Language Pathology qualification made more rapid gains in word structure development (CV, CVC, CCVC) and acquired more segments accurately. Bernhardt concluded:

> There is much yet to learn about practitioner training and intervention outcomes, . . . [and] the effects of the interactions between participants

> in the intervention process, for example, between practitioners and child, between the teacher and the speech and language therapist.
>
> (Bernhardt, 2004, p. 197)

We have outlined some of the ways in which children's persisting speech difficulties might be explained and accounted for. For most children the answer to the question, 'Why do speech difficulties persist?' will be answered by drawing on a combination of the factors suggested above. A combination of medical, genetic, psycholinguistic or social reasons may help us answer that question for any individual child. We should also remember that children with PSDs are a diverse group and no two children will present with the same difficulties or the same background history. There are always children who do not fit in with the general pattern. Some children are resilient. Despite difficult social circumstances they seem to cope better with their persisting speech difficulties, and their PSDs do not seem to affect their literacy or social success, or do so only in very limited ways. The concept of resilience is an interesting one that has been little researched in relation to speech and language. Some authors (e.g. Werner and Smith, 1982) have attempted to profile resilient children, looking at factors which seem to predispose at-risk children to cope with their particular environment and difficulties in a positive way. Although the focus of this research is not specifically on speech and language, findings have suggested that autonomous children with good social skills are ones who are likely to cope best with difficulties faced.

## What Do We Know about Intervention for Children with Speech Problems?

### A Historical Perspective

In the 1960s speech therapy was heavily influenced by behaviourism with speech regarded as a specialized behaviour that could be modified by altering the environment and its associated precedents and consequences (e.g. Gray and Fygetakis, 1968; Sloane and MacAulay, 1968). In the 1970s the influence of linguistics became more strongly felt. A shift was seen from articulatory approaches concerned with individual segments (e.g. Van Riper, 1963) to phonological therapy (e.g. Ingram, 1974, 1976), which focused on targeting phonological processes as a more effective way of carrying out therapy. Phonological approaches – like their articulatory predecessors – have the ultimate goal of improving a child's speech production and of helping a child to become more intelligible. In addition, phonological intervention has the goal of 'facilitating cognitive reorganisation of the child's phonological system and his [or her] phonologically-oriented processing strategies' (Grunwell, 1985, p. 99). There are many

different approaches to phonological intervention based on these broad principles. These include:

- Minimal pair contrast therapy or 'meaningful minimal pairs'. Children's attention is drawn to the distinct meanings associated with words that differ by only one feature such as the voicing contrast in GATE and KATE. The particular contrasts are selected based on the child's specific difficulties. See Weiner, 1981; Dodd and Bradford, 2000.
- Maximal pair contrast therapy or maximal opposition approach. Children's attention is drawn to the distinct meanings associated with words that differ on several features, e.g. PIN and GIN differ in the word initial consonants in terms of place, manner and voicing. The particular contrasts are selected based on the child's specific difficulties. See Gierut, 1991, 1992.
- Multiple opposition contrasts. Children's attention is drawn to a set of words and the focus is on developing contrasts between all words in the set. The particular contrasts are selected based on the child's specific difficulties, e.g. the set of words addressed in intervention might include TWO, SHOE, CHEW, SUE for a child who produced /tu/ for targets TWO, SHOE, CHEW, SUE. See Williams, 2000a, b.
- Metaphon and other metaphonological approaches. The child is made explicitly aware of the sound properties that need to be contrasted in order to improve their speech, e.g. if a child has difficulty with the voicing contrast then intervention would focus attention on the concepts of 'noisy' (voiced) and 'quiet' (voiceless). See Howell and Dean, 1994.

Baker and McLeod (2004) review a range of phonological intervention approaches. They emphasize that evidence-based practice is about selecting and applying the right approach with the right type of child. Each of the approaches above would be most appropriate with particular types of children. For example, for the metaphonological approach to be effective the child needs to have the cognitive skills to understand the concepts being taught (e.g. noisy and quiet) and be able to apply these concepts to their own speech. The multiple oppositions approach is best for children with severe phonological difficulties, and those who have sufficient semantic knowledge to keep track of the entire word set, e.g. TWO, SHOE, CHEW, SUE. Joffe and Serry (2004) provide a useful longitudinal perspective of speech and language therapy in the phonological domain. These authors, in describing the shift from articulation to phonology therapy in the 1970s, suggest that discarding articulation frameworks 'had the unfortunate consequence of throwing the baby out with the bath water' (p. 259).

There may of course be children for whom an articulatory approach is required. The *Diagnostic Evaluation of Articulation and Phonology*

(*DEAP*) (Dodd, Hua, Crosbie, *et al.*, 2002) specifically distinguishes between phonological and articulation difficulties. This assessment is based on Dodd's (1995, 2005) work in which children are grouped into categories based on the nature and underlying cause of their speech problems. The sub-groups outlined by Dodd include:

- Articulation. Children who are not able to produce acceptable versions of particular phones. The difficulties are at the level of the mouth (see Figure 1.1)
- Phonological delay. Children whose phonology resembles that of a younger child. They show normal speech processes exhibited by younger children. The entire speech system (shown in Figure 1.1) is slow in developing.
- Consistent deviant phonology. Children who show non-developmental errors and unusual processes, and are consistent in their application of these rules. These children have difficulties with their phonological knowledge, the lexical representation shown in Figure 1.1.
- Inconsistent deviant phonology. These children may show delayed and non-developmental errors, but in addition they show significant variability in their speech production which does not reflect a maturing system.

Undoubtedly, however, the contribution of linguistics to speech and language therapy has been considerable, and has enabled therapists to develop a more comprehensive understanding of the complexities of communication beyond that of articulation. Linguistic contributions are not limited to phonology. Gallagher (1998) observes the wide-ranging influence of pragmatics and metalinguistic knowledge in the 80s and 90s, and the increased attention given to functional and psychosocial aspects of communication. These are aspects that have influenced the way in which all speech and language interventions are carried out, including phonological therapy. In terms of service delivery there have also been considerable changes since the early years of the profession. Bowen and Cupples (1998) comment on the increasing role of parents – and other involved parties – in the therapeutic process. The effectiveness of different types of phonological therapy and its delivery has been evaluated to varying degrees, and this is discussed in subsequent sections.

## An Eclectic Approach for Children with Persisting Speech Difficulties

Faced with children with PSDs, we need to 'pull out all the stops' to maximize the success of intervention. Using an eclectic approach may offer the best chance of success with these hard-to-treat children. A psycholinguistic approach is a useful starting point in that it may:

> . . . provide a framework for explaining the descriptive or symptomatic information about impaired phonological systems derived from linguistic-based assessments by attempting to identify the level at which speech processing is disrupted.
>
> (Baker, Croot, McLeod and Paul, 2001, p. 686)

However, psycholinguistic models have inherent limitations, and even if further refined, it is doubtful if they could ever shape the therapy process in isolation. Psycholinguistic approaches need to be integrated with linguistic and other knowledge in order to be effective. The psycholinguistic approach is useful in answering the question: 'How?' – How is intervention going to work, i.e. how is change to be brought about in the individual's speech processing system? Knowledge from linguistics, in this case phonology, enables us to answer the more specific 'what?' question, i.e. what is the content of intervention?, e.g. what are the stimuli that will be used in the activities? We also need to consider social and psychosocial aspects since all children will bring their own personality, likes and dislikes, and network of support to intervention.

Many single case studies have relied mainly on linguistic theory and phonological analyses (e.g. Weiner, 1981; Monahan, 1986; Saben and Ingham, 1991; Bernhardt, 1992; Barlow, 2001) in planning and evaluating interventions, and this body of knowledge should be brought to bear alongside a psycholinguistically-oriented approach. Edwards, Fourakis, Beckman and Fox (1999) outline the evolution of representation-based approaches to understanding children's phonology, and suggest that characterizing children's phonological competence in terms of representations and the constraints acting on them allows for a richer conceptualization of phonological development than traditional derivational and normalizing approaches. A further reason for careful investigation of underlying phonological representations and phonological processing ability is because of the close relationship between these skills and reading and spelling abilities. The association between phonological processing difficulties and reading and spelling problems has been shown in a number of single case studies (e.g. Campbell and Butterworth, 1985; Snowling, Stackhouse and Rack, 1986) and experimental investigations comparing children with dyslexia with normally-developing readers (e.g. Wagner and Torgeson, 1987). For school-age children with persisting speech difficulties, understanding of the child's underlying difficulties can have important implications for speech, language and literacy support. This is discussed further in Chapter 10. Again, we need to be careful not to wholly discard the more traditional linguistic approach.

Waters, Hawkes and Burnett (1998) combined psycholinguistic and phonological factors, as well as consideration of the 'child as learner' in their intervention with a child called Alan aged 5 years, with unintelligible speech. They suggested that while phonological analysis and psycholin-

guistic assessment are essential for a principled approach to intervention, they may not always be sufficient: children's attitudes, behaviours and preferred learning styles also need to be taken into account (see also Waters, 2001).

There are other model-based intervention case studies that have attempted to couch phonological intervention within an explicit psycholinguistic framework. Bryan and Howard (1992) described intervention for a five-year-old child with severe phonological difficulties. The child's speech processing difficulties were investigated through a series of psycholinguistically-motivated tasks and interpreted in the light of current models of speech and language processing. In addition a phonological analysis of the child's surface speech errors took place, with both sets of data used to inform intervention planning. This paper emphasises many of the key aspects emphasized in this book, e.g. the need for levels of analysis which vary in terms of sensitivity, and the importance of understanding the difficulties underlying surface speech errors. Although this volume emphasizes the application of phonological intervention in a psycholinguistic framework, it is acknowledged that psychosocial and emotional interventions have an important role to play in the overall management of children with PSDs.

Medical and educational approaches are also part of the eclectic perspective used with children with PSDs. A medical approach can suggest long-term prognosis. Children with cleft lip and palate, and physical conditions such as cerebral palsy may continue to receive medical and surgical monitoring or intervention related to their condition. As they develop and grow, different interventions may become more or less appropriate. We have noted previously that children with PSDs are by definition of school-age, and will spend a great deal of time in school. Therapists working with this client group will typically be seeing the child in school and working together with school staff to meet the needs of children with PSDs and support them in accessing the school curriculum.

## Outcomes Research

Speech and language therapy for children is generally held to have positive outcomes (Nye, Foster and Seaman, 1987; Gierut, 1998b; Law, Boyle, Harris, *et al.*, 1998; Goldstein and Gierut, 1998; Law and Garret, 2003). It is in the area of speech difficulties that much of the outcomes research in speech and language therapy has focused, and shown generally positive results (e.g. see Shriberg and Kwiatkowski, 1994; Law and Garret, 2003).

There are a great many challenges associated with intervention research with children. Enderby and Emerson note 'there is no other client group . . . that demonstrates so many challenges to the researcher' (1995, p. 35).

**ACTIVITY 1.3**

Consider the quote from Enderby and Emerson above. Make a list of reasons why children, in general, pose enormous challenges to researchers. Consider the population of children with PSDs specifically, and the challenges they pose for intervention researchers. See Key to Activity 1.3 page 24 for some of the reasons you may have written down, then read our account of these challenges below.

Intervention research with children with PSDs is a challenge for the following reasons:

- Children with PSDs are a heterogeneous group. A range of different diagnostic and classification systems are used and can make comparisons between outcomes studies difficult.
- A range of different outcomes measures are used to evaluate the effectiveness of intervention, again making comparisons between studies a challenge.
- Intervention outcomes depend on wide-ranging factors such as the child, practitioner, intervention.
- Children's development is dynamic. They are constantly changing and developing anyway.

Despite these challenges, intervention research is important for a number of reasons. There is the obvious need to serve individual clients in ways that are effective and efficient. Children with PSDs face an increased risk of social, literacy and academic difficulties and it is imperative to address their difficulties as soon as possible to prevent any more widespread negative academic and social consequences. In addition, there is a need to demonstrate the value of speech and language therapy services within a broader setting. If the profession aims to develop and grow, it needs to be able to show its benefit in demonstrable, scientific ways. Current professional concerns in healthcare and education have continued to necessitate more evidence of knowledge-based practice to underpin service delivery and development (Byng, Van der Gaag and Parr, 1998; Baker and McLeod, 2004). The rationale for evaluating effectiveness of therapy lies not only in accountability, but is also important to direct in therapy planning, and to enhance work satisfaction (Dodd, 1995).

## Evidence-based Practice: Theory and Therapy Together

Intervention planning can be a complex process. When therapists are faced with children with a range of surface speech errors and underlying processing deficits, it may be difficult to know where to begin and how to structure intervention. The psycholinguistic framework, combined

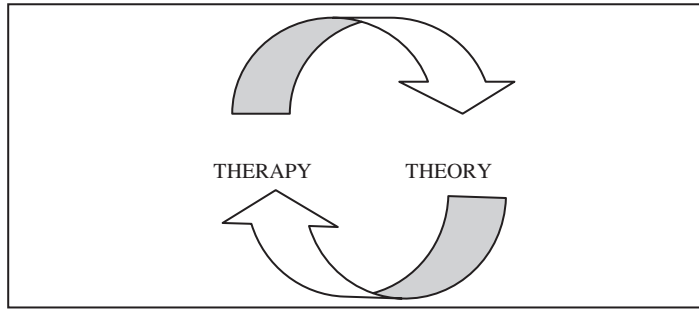


**Figure 1.2:** The cyclical and symbiotic relationship between theory and therapy (based on Reilly, 2004, p. 12).

with knowledge of linguistic theory, can help to make the process more transparent and explicit. If intervention is carefully targeted at an individual's specific point of breakdown, and carried out with an awareness of the strengths and weaknesses that underlie the individual's speech processing system, then it seems more likely that (a) intervention will be successful in bringing about change in the speech processing system, and (b) if intervention is *not* successful then it is possible to isolate the level of the speech processing system that therapy tasks were tapping, and make appropriate revisions. For some children, generalization is minimal and progress is limited to specific targeted segments. Monitoring the extent of generalization and patterns that occur, informs decision-making as well as our knowledge of how the speech processing system works.

Reilly describes the theory–practice gap: 'Often, tensions exist between practitioners who fear that research will become the sole driver of clinical practice and academics who value basic science over clinically relevant research' (2004, p. 12). One of the aims of this volume is to show that both views are vital and can be knitted together. Figure 1.2 outlines the cyclic, symbiotic relationship between theory and therapy (based on Reilly, 2004). Aspects of the intervention process such as generalization are shown in each chapter to be key to evaluations of efficiency as well as for the way in which they inform our theoretical knowledge.

## Towards a Theory of Therapy

Sometimes therapists are reticent to discuss the content of their therapy. A likely reason for this is the perceived mismatch between theory and practice: theoretically-motivated work from a variety of viewpoints has provided detailed analyses of the deficits underlying some difficulties. Compared with these sophisticated analyses, many therapists' treatment

techniques used in day-to-day practice appear very simple; therapists may not feel that they do justice to the complexity of the problem. Howard and Hatfield (1987) relate this to the fact that there is no 'metatheory' available which explicitly relates a deficit analysis to the process of treatment. What is a metatheory? What should it contain? And how close are we to devising one?

A metatheory or 'theory of therapy' is an account of intervention that involves systematically relating an analysis of the client's strengths and weaknesses to the process of treatment. The development of a metatheory is a prerequisite for the development of specific and motivated therapy methods with decisions taken at each step being conscious and explicit. Only if we know exactly how a particular treatment task is meant to affect what ability and why it does so, can therapy progress. The results of intervention can support or refute hypothetical answers to these questions; but until these hypotheses are put to empirical test, we will have no means to improve our treatments. Stackhouse and Wells' (1997, 2001) psycholinguistic framework goes some way towards providing a theory of therapy. Therapists adopting this approach may be carrying out games and activities that seem simple on the surface. Yet, if they are carried out with an awareness of the parts of the child's speech processing system that are being tapped, and why this is important in terms of their overall profile, then there is no mismatch between theory and therapy. Nevertheless there is further work to be done in developing a theory of therapy using this approach, e.g. what are the mechanisms for bringing about change, and how does the interaction between therapist and child affect therapy outcomes? Horton and Byng's (2000) ATICS is a system used to examine interactional aspects in adult treatment which might have application to children.

Bunning (2004) attempts to elucidate intervention by applying theoretical frameworks drawn from sociological, medical and psychological literature to speech and language interventions. One of Bunning's aims is to draw together the range of specialisms within the speech and language therapy field, and highlight commonalties they share in terms of intervention. This is philosophically interesting, but ultimately the frameworks may be too broad to account for the complex, highly-specific difficulties encountered by different client groups, e.g. children with PSDs. Bunning's frameworks may be helpful in carrying out a retrospective analysis of what occurred in an intervention episode, but would not be able to effectively inform intervention planning, for example, for the children presented in this book.

Evidence-based practice offers guidelines for decision-making. Reilly (2004) emphasizes the disparity that exists between clinical practice and research evidence, suggesting that in some cases although evidence exists it is not applied in clinical situations. She cites the example of Rousseau, Onslow, Packman and Robinson (2001) who investigated the Lidcombe

programme for addressing stammering in young children. Only about 50% of practitioners were using the programme in the recommended way with most making compromises in terms of dosage to suit service delivery constraints, and selecting parts of the programme that they felt were relevant. This was despite published evidence from Onslow, Packman and Harrison (2001) that the programme is most effective when employed in a particular way. Rousseau *et al.* (2001) concluded that those therapists not using the prescribed programme were almost certainly carrying out interventions for which there is as yet no evidence of effectiveness. This finding, surely not specific to the area of dysfluency, raises some important issues.

1. Speech and language therapy is a relatively young profession. Thus it is not surprising that the academic underpinning of the work is limited.
2. Demands for services and clinical priorities mean that academic underpinnings are often seen as added extras for the workforce rather than fundamental. Clearly, there is a need for theoretical underpinnings and this is something which needs to be strongly emphasized in undergraduate training courses and throughout professional development. Howell and Dean have suggested that speech and language therapists are in a unique position to synthesize knowledge from a variety of fields including that of clinical practice to 'create a viable theoretical underpinning for rehabilitation' (1994, p. 2).
3. Evidence-based practice guidelines do not necessarily define best practice since the evidence may be weak or insufficient to make that determination. The evidence-base needs to be critically judged and continually re-evaluated in the light of new evidence.

## What Can We Do?

This volume aims to discuss the challenges of intervention for practitioners working with school-age children with persisting speech difficulties: It includes how to select appropriate stimuli for intervention and in what ways to target these; how to obtain maximum generalization; how to measure and understand intelligibility; how to make links with literacy; and how to evaluate intervention in clinical and research settings. We are not able to supply definitive answers for all these questions. We aim to share the intervention we have carried out with some children with PSDs, and discuss the outcome of this and how the process might have been handled differently. The book has three key themes.

1. Using an eclectic approach will maximize our chances of successfully understanding and treating children with intractable speech difficulties. In the case studies we present of children with PSDs,

we typically use a psycholinguistic approach as a starting point in investigating the child's difficulties and then combine this with other perspectives.
2. Practitioners should carry out their intervention with strong and explicit theoretical underpinnings. Theory should drive our therapy, but in turn the results of the intervention should be used to inform our theory.
3. Evaluation of outcomes is essential and can be achieved in routine practice with minimal extra effort. Intelligibility and connected speech are key outcomes measures for children with PSDs.

There is a great need for intervention case studies, especially those that have school-age children with speech and literacy problems as their focus. Dorothy Bishop suggests:

> It is time for researchers to recognize that intervention studies are not just an optional, applied adjunct to experimental work, but that they provide the best method available for evaluating hypotheses and unconfounding correlated factors . . . Intervention studies . . . generate excitement.
>
> (Bishop, 1997a, p. 240)

There is a great deal to be gained from outcomes measurements for the individual client and therapist, and also for the profession and its knowledge base more generally.

In this book you will meet several children. The book was inspired by intervention that took place with school-age children with PSDs. The children and their difficulties, interventions and outcomes are referred to throughout this book. The children's names and identifying details have been changed, and parental permission has been obtained to publish their therapy stories.

## Summary

This chapter has described the population of children that form the focus of the book: school-age children with persisting speech difficulties. The key points are as follows.

- PSDs are characteristic of children in their school years whose speech difficulties have not resolved.
- Core speech difficulties include difficulties with individual speech sounds and/or connected speech.
- Difficulties with literacy and psychosocial issues are common associated factors for these children.

- Children with persisting speech difficulties form a heterogeneous group.
- The group of children with PSDs may include children who have been given a diagnosis such as childhood apraxia of speech, or have a cleft-lip and palate, or whose speech difficulties are not linked to any identifiable condition or cause.
- Children with PSDs pose a challenge for practitioners and require long-term management.
- In order to maximize our chances of successful intervention, an eclectic approach to intervention may be the most helpful.
- A psycholinguistic approach can suggest what aspects of speech processing should be treated, while the linguistic (phonological) approach suggests how this should be done, i.e. what specific stimuli should be used.
- The management of psychosocial factors such as self-esteem is vitally important for these children.
- Medical and educational perspectives are also key aspects of the eclectic management approach.
- Intervention studies with children with PSDs are challenging, but important in adding to the evidence base.
- Evaluations of intervention should be done not only in research settings, but also in routine therapy situations where it can have important impacts on clients, therapist and the profession more generally.
- Access to effective intervention can contribute to positive long-term outcomes for children with PSDs.

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**KEY TO ACTIVITY 1.1**

You may have written down some of the following words to describe persisting speech difficulties:

ongoing problems;
don't respond to intervention;
don't spontaneously resolve as child matures;
speech problems that occur regularly, i.e. not 'one-off' errors;
errors may be systematic rather than random;
help is needed to address the speech difficulties;
individuals cannot correct their own speech errors;
stuttering/stammering;
problems with specific speech sounds or words;
'mumbley' speech;
slurred speech.

You may have written down some of these points about identifying school-age children with PSDs:

avoidance behaviours/child is hesitant to speak in front of class;
child cannot correct his or her own speech errors;
child is shy and withdrawn;
child is reluctant to participate in group activities;
child's speech problems affect reading and spelling;
child's speech differs markedly from others in classroom;
other children draw attention to the child's speech.

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**KEY TO ACTIVITY 1.2**

You may have written down some of the following as reasons for persisting speech difficulties:

The child hasn't had intervention (or cannot access intervention).
Parents or school staff do not recognize the problem or know what to do about it.
The child has:

- a hearing impairment
- cleft lip or palate
- learning difficulties
- emotional/psychiatric problems.

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**KEY TO ACTIVITY 1.3**

You may have written down some of the following reasons that children are challenging for intervention researchers:

lack of cooperation especially in younger children;
if children have input problems they may not understand the task;
children change and grow all the time;
may lack motivation, especially if older child who has had a lot of therapy;
older children may be withdrawn or embarrassed;
intervention is complex. It's hard to pick apart what is bringing about change;
hard to know if children would have matured and got better anyway, without intervention.

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