

CHAPTER 1

Developmental Science Across the Life Span

An Introduction

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Until the early 1960s, the study of human development was dominated by either descriptions of the behavioral or psychological phenomena presumptively unfolding as a consequence of genetically controlled timetables of maturational change (e.g., see the chapters by Hess and by McClearn in the 1970, 3rd edition of the *Handbook of Child Psychology*; Mussen, 1970), or by descriptions of the behaviors presumptively elicited in response to stimulation encountered over the course of early life experiences (e.g., see the chapters by Stevenson or by White in the same edition of the *Handbook of Child Psychology*). Framed within a Cartesian dualism that split nature from nurture (Overton, 2010; Overton & Müller, this volume), scientists studying development focused in the main on the generic human being (Emmerich, 1968) and on the earliest years of life or, at most, the years surrounding the stages of pubertal change. These periods were regarded as the portions of ontogeny wherein the fundamental processes of human development emerged and functioned to shape the subsequent course of human life (Brim & Kagan, 1980).

Today, the study of development has evolved from a field embedded within the domain of developmental psychology to an area of scholarship labeled developmental science (Bornstein & Lamb, 2010; Lerner, 2010a; Magnusson & Stattin, 2006). Substantively, developmental

science is a field that conceptualizes the entire span of human life as potentially involving developmental change. The possibility of developmental change across life exists because the basic process of development is seen as involving mutually influential relations between an active organism and a changing, multilevel ecology, a relation represented as individual $\leftarrow \rightarrow$ context relations (Lerner, 2006). These relations provide the fundamental impetus to systematic and successive changes across the life span (Brandstädter, 1998; Overton, 1973, 2010; Lerner, 2006).

Thus, the contemporary study of human development involves placing post, postmodern, relational models at the cutting-edge of theoretical and empirical interest (Overton, 2010; Overton & Müller, this volume). These models consider all levels of organization—from the inner biological through the physical ecological, cultural, and historical—as involved in mutually influential relationships across the breadth of the entire life course (Bronfenbrenner & Morris, 2006; Riegel, 1975, 1976). Variations in time and place constitute vital sources of systematic changes across ontogeny—even into the 10th and 11th decades of life—and, as such, human life is variegated and characterized by intraindividual change and interindividual differences (Baltes, Lindenberger, & Staudinger, 2006; Elder, 1980; Elder, Modell, & Parke, 1993; Elder & Shanahan, 2006). Accordingly, because ontogenetic change is embodied in its relation to time and place (Overton, 2010), contemporary developmental science regards the temporality represented by historical changes as imbued in all levels of organization, as

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coacting integratively, and as providing a potential for this systematic change, for *plasticity*, across the life span.

In short, as a consequence of the relational coactions of changes at levels of organization ranging from the biological, psychological, and behavioral to the sociocultural, designed and natural physical ecological, and through the historical (see Gottlieb, 1997; cf. Overton, 2006), processes of development are viewed in contemporary developmental science through a theoretical and empirical lens that extends the study of change across the human ontogenetic span and, as well, through generational and historical time (Elder, 1998; Elder, et al., 1993). The variations in the actions of individuals on their contexts and contexts on individuals integratively propel and texture the course of life (Baltes, Freund, & Li, 2005; Brandtstädter, 2006; Freund & Baltes, 2000; Freund, Li, & Baltes, 1999). As a result, the breadth of the life span and all levels of organization within the ecology of human development must be considered in order to fully describe, explain, and optimize the course of intraindividual change and of interindividual differences in such change (Baltes, et al., 2006; Baltes, Reese, & Nesselroade, 1977).

There exist both historical (Baltes, 1979, 1983; R. Cairns & Cairns, 2006) and philosophical and theoretical (Lerner, 1984; Overton, 1973, 1975, 2006) accounts of the nature and bases of the evolution of developmental science. These accounts document that the field changed from one dominated by psychological, environmental, or biological reductionist, split, and age-period restricted conceptions of human development processes to become a field focused on relational systems, and life-span developmental models (Lerner, 2010b; Overton, 2010). Edwin G. Boring (1950, p. ix) noted that Hermann Ebbinghaus once remarked that “psychology has a long past, but only a short history.” In many ways, the same statement may be made about the evolution of the study of human development across the life span; that is, of the history of the developmental science of human development.

A BRIEF HISTORY OF THE LIFE-SPAN STUDY OF HUMAN DEVELOPMENT

Wilhelm Wundt labeled the science he is typically credited with launching as *physiological psychology* (Boring, 1950). In turn, at the end of his career Wundt sought to understand the science he had launched within the frame of cultural anthropology (Misiak & Sexton, 1966). Even in its early history, then, psychology was a field whose individual-level scholarship was linked to phenomena at levels of organization either more micro or more macro than its own.

Often, however, mechanistic and reductionist models were used to conceptualize the relations among levels. For example, Homans’s (1961) social exchange theory used principles of operant learning to reduce dyadic relationships to psychogenic terms. Wilson (1975), in turn, reduced instances of (seemingly) moral behaviors (labeled as altruistic) to purported biogenic explanations (involving the concepts of inclusive fitness and gametic potential).

The field of developmental science emerged from this general approach in psychology. That is, the origins of developmental science lie in the field of developmental psychology or, even more narrowly, in the field of child psychology when, prior to the 1960s, the portions of the life span beyond early adolescence were markedly understudied by developmental psychologists (e.g., Baltes, 1983; R. Cairns & Cairns, 2006; Dixon & Lerner, 1999). Within these earlier approaches to development there was an orientation to explain the phenomena of one level of organization by reductive reference to terms associated with another level. Bijou and Baer (1961) attempted to explain all phenomena associated with psychological and behavioral development during infancy and childhood by reduction to the principles of classical and operant conditioning. Rowe (1994) sought to reduce parent-child relations and, in fact, all socialization experiences of childhood by reference to genetic inheritance, as represented by estimates of heritability.

The attempts by such developmental psychologists to portray the phenomena of one level of organization as primary, or “real,” and others as derivative, or epiphenomenal, were representative of a more general tendency among developmentalists to split apart the components of the ecology of human life and to treat the bases of development as residing in one or another component, for example, nature or nurture (Overton, 1973, 2006, 2010). Indeed, theoretical controversies and associated empirical activity revolved around whether nativist concepts or experiences associated with learning could explain the development of perception, cognition, language, intelligence, or personality (R. Cairns & Cairns, 2006; Dixon & Lerner, 1999). This split also is illustrated by the tendency to reduce human relationships to interactions among members of dyads, or individual interaction sequences. In addition, split conceptions of development framed debates about whether continuity or discontinuity characterized the course of life; for instance, a key issue was whether early experience, split off from subsequent periods of life, was integral in shaping the context of the person’s psychological-behavioral repertoire across ontogeny (Brim & Kagan, 1980).

Levels of Integration in Human Development

An old adage says that “standing on the shoulders of giants we can see forever.” For scholars of human development—especially contemporary developmentalists who eschew the split conceptions of the past—many of these giants came from the fields of evolutionary biology or comparative psychology (e.g., Gottlieb, 1983, 1997, 2004; Gottlieb, Wahlsten, & Lickliter, 2006; Ho, 2010; Jablonka & Lamb, 2005; Kuo, 1976; Lehrman, 1953; Maier & Schneirla, 1935; Novikoff, 1945a, 1945b; Schneirla, 1957; Tobach, 1981; von Bertalanffy, 1933; and see Hood, Halpern, Greenberg, & Lerner, 2010, for reviews). Through the cumulative impact of the theory and research of such scholars, by the early years of the 21st century scientists studying human development have come to view the reductionist and split conceptions that dominated conceptual debates in developmental psychology during the first seven to eight decades of the 20th century as almost quaint historical artifacts. The few contemporary remnants of these split conceptions (e.g., Plomin, 2000; Rushton, 2000; Spelke & Newport, 1998) are regarded as theoretically atavistic and as conceptually and methodologically flawed (e.g., see Garcia Coll, Bearer, & Lerner, 2004; Hirsch, 2004; Keller, 2010; Lerner, 2006; Overton, 2010; Overton & Müller, this volume; Partridge & Greenberg, 2010).

Within the context of the contemporary understanding of the theoretical flaws of past and, in some cases, present (e.g., see Ho, 2010; Jablonka & Lamb, 2005; Rose & Rose, 2000, for reviews), contemporary contributions to the literature of human development derive from ideas that stress that an integrative, reciprocal relation, fusion, or dynamic interaction of variables from multiple levels of organization provides the core process of development. These ideas—summarized in the concepts associated with relational developmental systems models of human development (Overton, 2010; Overton & Müller, this volume) and in the several instantiations of these models in contemporary developmental science (e.g., Ford & Lerner, 1992; Mistry & Wu, 2010; Sameroff, 2009; Thelen & Smith, 2006)—are found in the theoretical ideas associated with the work of the comparative psychologists and evolutionary biologists just noted.

To illustrate, the comparative work of Gilbert Gottlieb (1983, 1997; Gottlieb et al., 2006; and see Hood, et al., 2010, for reviews) has been a central influence on contemporary developmental psychology, providing a rigorous, compelling theoretical and empirical basis for viewing human development as involving changes in a person-context developmental system across the life span.

Gottlieb’s scholarship has documented the probabilistic epigenetic character of developmental changes; that is, alterations that result from variation in the timing of the integrated or fused relations—or the coactions—among levels of organization ranging from biology through the macroecological influences of culture and history. Using examples drawn from a variety of species—and involving, for instance, variation in morphological outcomes of development in the minute parasitic wasp; the emergence of enameled molar teeth resulting from chick oral epithelial cells being placed in contact with mouse cell mesenchyme; dominant frequencies in the vocalizations of mallard duck embryos and hatchlings; phenotypic variation in the body builds of human monozygotic twins reared apart; and secular trends from 1860 to 1970 in the age at menarche of European and United States females—Gottlieb (1997, 1999) provided evidence of a probabilistic epigenetic view of bidirectional structure-function development. This view (Gottlieb, 1997, 1999) may be summarized as:

Genetic activity (DNA \leftrightarrow RNA \leftrightarrow Protein) \leftrightarrow
Structural Maturation \leftrightarrow Function, Activity,
or Experience

Thus, Gottlieb’s (1983) theoretical work is coupled with rich and convincing empirical documentation that biology-ecology coactions provide a basis of plasticity—of the potential for systematic change—across the course of life (e.g., see Gottlieb, 1997).

Gottlieb’s (1997, 1999; Gottlieb, Wahlsten, & Lickliter, 1998) scholarship underscores the importance of focusing developmental analysis on the multilevel, integrated matrix of covariation—on the dynamic developmental system—that constitutes human development. Moreover, in forwarding a systems view of human development, this scholarship necessitates that developmental psychologists transcend a psychogenic view of their field. This scholarship leads developmentalists to embrace a perspective that includes contributions from the multiple—biological, behavioral, and social—sciences that afford understanding of the several coacting levels of organization integrated in the developmental system.

In a similar vein, scholars building on Vygotsky’s (1978) sociocultural perspective on human development also emphasized the need to transcend the boundaries of psychological science. Cole (1990, 1996) and Werstch (1985, 1991) explicated Vygotsky’s description of the genetic method for the study of human development,

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stating that a complete theory of human development must be able to explain development at the phylogenetic, sociohistorical, ontogenetic, and microgenetic levels. The assumption is that such an endeavor requires the integration of perspectives from biology, sociology, anthropology, history, and psychology.

In short, to understand human development, developmental psychologists became developmental scientists. They became multidisciplinary collaborators seeking to describe, explain, and optimize the changing interlevel relations that constitute the basic process of development within a relational developmental systems perspective (Lerner, 2006; Overton 2010).

Scholarly Products and Producers of Relational Developmental Systems Models

The work of Gottlieb, other comparative psychologists, and evolutionary biologists emphasizing epigenetics (e.g., Ho, 2010; Jablonka & Lamb, 2005; Rose & Rose, 2000) found a ready audience among many developmentalists across the last three decades of the 20th century. This period was a teachable moment in the field of developmental psychology, because many scholars were struggling to find a theoretically sound means to frame what were anomalous findings by the then-current split theoretical models (e.g., associated with either nature or nurture, mechanistic conceptions or predetermined epigenetic models; see Gottlieb, 1997; Lerner, 2002; Overton, 1973, 1998, 2010; Overton & Müller, this volume, for discussion of these split approaches).

For example, these findings pertained to cohort or time-of-testing effects on human ontogenetic change, to the role of later life events in altering (creating discontinuities with) the trajectories of individual development, and to the presence of plasticity across life—even in the aged years—regarding biological, psychological, and social functioning (e.g., see Baltes et al., 2006; Brim & Kagan, 1980; Elder, 1998; Elder & Shanahan, 2006; Lerner, 2006). These findings demonstrated that dynamic relations between individual characteristics and critical contextual events or nonnormative historical episodes shaped the character of change across the life span.

Several different relational developmental systems theories were developed in regard to such findings (e.g., Brandstädter, 2006; Bronfenbrenner & Morris, 2006; Csikszentmihalyi & Rathunde, 1998; Elder, 1998; Feldman, 2000; Fischer & Bidell, 2006; Ford & Lerner, 1992; Gottlieb, 1997, 1998, 1999; Lerner, 2006; Magnusson & Stattin, 2006; Overton, 2006, 2010; Thelen & Smith, 2006; Wapner &

Demick, 1998). Across these different formulations, there is a common emphasis on fused person-context relations and on the need to embed the study of human development within the actual settings of human life.

Such embeddedness may involve tests of theoretically predicated ideas that appraise whether changes in the relations within the system result in alterations in developmental trajectories that coincide with model-based predictions. Depending on their target level of organization, these changes may be construed as policies or programs, and the evaluation of these actions provides information about both the efficacy of these interventions in promoting positive human development and the basic, relational process of human development emphasized within relational developmental systems models.

As such, within contemporary, relational developmental systems theory, there is a synthesis of basic and applied developmental science. That is, by studying integrated person-context relations as embedded in the actual ecology of human development, policies and programs represent both features of the cultural context of this ecology and methodological tools for understanding how variations in individual-context relations may impact the trajectory of human life. Thus, the application of developmental science (through policy and program innovations and evaluations) is part of—is synthesized with—the study of the basic relational processes of human development.

The Contemporary Features of Developmental Science

As the decade of the 1980s ended, the view of developmental science that Paul Mussen (1970) had put forward at the beginning of the 1970s—that the field placed its emphasis on explanations of the process of development—was both validated and extended. Mussen alerted developmentalists to the burgeoning interest not in structure, function, or content per se, but to change, to the processes through which change occurs, and thus to the means through which structures transform and functions evolve over the course of human life. His vision of and for the field presaged what emerged in the 1990s as the cutting edge of contemporary developmental theory: a focus on the process through which the individual's engagement with his or her context constitutes the basic process of human development.

The interest that had emerged by the end of the 1980s in understanding the dynamic relation between individual and context was, during the 1990s, brought to a more abstract level, one concerned with understanding the

character of the integration of the levels of organization comprising the context, or bioecology, of human development (Lerner, 2006, 2010b). This concern was represented by reciprocal or dynamic conceptions of process and by the elaboration of theoretical models that were not tied necessarily to a particular content domain but rather were focused on understanding the broader developmental system within which all dimensions of individual development emerged (e.g., Brandstädter, 2006; Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006; Ford & Lerner, 1992; Gottlieb, 1997; Magnusson, 1999a, 1999b; Sameroff, 1983, 2009; Thelen & Smith, 2006). In other words, although particular empirical issues or substantive foci (e.g., motor development, the self, psychological complexity, or concept formation) lent themselves readily as exemplary sample cases of the processes depicted in a given theory (Lerner, 1998), the theoretical models that were forwarded within the 1990s were superordinately concerned with elucidating the character of the individual-context relational developmental system (Lerner, 2006; Overton, 2010).

During the 1980s and 1990s similar concerns with understanding the nature of the integration between individual development and cultural context led to the development of sociocultural perspectives on human development. As already noted, some scholars extended Vygotsky's (1978) sociohistorical theory to emphasize the study of human development as it is constituted in the sociocultural context (Cole, 1990, 1996; Rogoff, 1990; Wertsch, 1985, 1995). Others conceptualized culture as the meaning systems, symbols, activities, and practices through which people interpret experience (Bruner, 1990; Greenfield & Cocking, 1994; Goodnow, Miller, & Kessel, 1995; Markus & Kitayama, 1991; Mistry & Wu, 2010; Shweder, 1990).

By the end of the 20th century, then, the conceptually split, mechanistic, and atomistic views, which had been involved in so much of the history of concepts and theories of human development, had been replaced by theoretical models that stressed relationism and integration across all the distinct but fused levels of organization involved in human life. This dynamic synthesis of multiple levels of analysis is a perspective having its roots in systems theories of biological development (Cairns, 1998; Gottlieb, 1992; Kuo, 1976; Novikoff, 1945a, 1945b; Schneirla, 1957; von Bertalanffy, 1933); in addition, as noted by Cairns (1998), the interest in understanding person-context relations within an integrative, or systems, perspective has a rich history within the study of human development.

For example, James Mark Baldwin (1897) expressed interest in studying development in context, and thus in

understanding integrated, multilevel, and hence interdisciplinary scholarship (Cairns, 1998). These interests were shared as well by Lightner Witmer, the founder in 1896 of the first psychological clinic in the United States (Cairns, 1998; Lerner, 1977). Moreover, Cairns describes the conception of developmental processes—as involving reciprocal interaction, bidirectionality, plasticity, and biobehavioral organization (all quite modern emphases)—as integral in the thinking of the founders of the field of human development. For instance, Wilhelm Stern (1914; see Kreppner, 1994) stressed the holism that is associated with a relational developmental systems perspective about these features of developmental processes. In addition, other contributors to the foundations and early progress of the field of human development (e.g., John Dewey, 1916; Kurt Lewin, 1935, 1954; and even John B. Watson, 1928) stressed the importance of linking child development research with application and child advocacy—a theme of very contemporary relevance (Lerner, Fisher, & Weinberg, 2000a, 2000b; Lerner, Jacobs, & Wertlieb, 2003; Zigler, 1999).

The study of human development has in a sense come full circle in the course of a century. From the beginning of the last century to the beginning of the present one, the history of developmental psychology has been marked by an increasing interest in the role of history—of temporal changes in the familial, social, and cultural contexts of life—in shaping the quality of the trajectories of change that individuals traverse across their life spans. As a consequence of incorporating into its causal schemas about ontogenetic change a nonreductionistic and a synthetic conception about (as compared to a Cartesian split view of) the influence of context—of culture and history—the field of human development has altered its essential ontology. The relational view of being that now predominates in the field has required epistemological revisions in the field as well. Qualitative as well as quantitative understanding has been legitimated as scholars have sought an integrated understanding of the multiple levels of organization comprising the ecology of human development. In fact, relational perspectives embracing the developmental system stress the methodological importance of triangulation across quantitative and qualitative appraisals of multilevel developmental phenomena (Lerner, Dowling, & Chaudhuri, 2005).

In essence, then, as we pursue our scholarship about human development in this second decade of the 21st century, we do so with an orientation to the human life span that is characterized by (a) integrated, relational

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models of human life, perspectives synthesizing biological-through-physical ecological influences on human development in nonreductionistic manners; (b) a broad array of qualitative and quantitative methodologies requisite for attaining knowledge about these fused, biopsychoeological relations; (c) a growing appreciation of the importance of the cultural and historical influences on the quality and trajectory of human development across the course of life; and (d) a synthesis of basic and applied developmental science.

These four defining themes in the study of human development are represented in contemporary relational developmental systems theories, perspectives that constitute the overarching conceptual frames of modern scholarship in the study of human development. We believe as well that across the rest of this century the field will advance through the coordinated emphasis on a culturally and historically sensitive science that triangulates quantitative and qualitative appraisals of the relations among the multiple levels of organization fused within the developmental system.

In short, there has been a history of visionary scholars interested in exploring the use of ideas associated with relational developmental systems theory for understanding the basic process of human development and for applying this knowledge within the actual contexts of people to enhance their paths across life. Accordingly, the chapters in this volume reflect and extend the diverse theoretical perspectives that emphasize understanding dynamic and integrated developmental processes as they are situated in the varying contexts of people's lives and circumstances.

THE PLAN OF THIS VOLUME

Developmental science in the 21st century has become marked by an explicit integration of philosophy, theory, and method on the one hand and a synthetic understanding of basic developmental processes and applications designed to promote positive human development on the other (Lerner, 2006). In addition to the present chapter, Part I of this volume, "Foundations of Development Across the Life Span," includes a chapter by Overton and Müller.

This chapter elaborates a relational developmental systems approach that serves as the basis for integrating the range of concepts that are fundamental to understanding the integrative character of the developmental process, including variational and transformational change, nature and nurture, biology and culture, and explanation and interpretation. Overton and Müller identify the notions of person, action, and embodiment as core concepts of

relational developmental systems because these notions overcome the dichotomies that traditionally have characterized developmental theories.

The next five sections of the volume (Parts II through VI) provide evidence, within and across successive portions of the life span, of the rich scholarship conducted to describe and explain dynamic relations between developing individuals and their complex contexts. In Part II of the volume, titled "Infancy and Early Childhood," Colombo, Brez, and Curtindale summarize research in the last decade on the development of perception and cognition in preverbal infants. The chapter begins by placing the current state of the field in its historical context and covers the basic and predominant methodological techniques and paradigms used in the field. The major part of the chapter is spent summarizing progress in eight specific subtopics within the area: attention, learning, intersensory/intermodal processing, face processing, object perception, casual perception, quantitative processing, and categorization. In addition, two integrative sections explore how the study of the development of fundamental perceptual and cognitive functions relates to larger issues in developmental psychology. The first of these sections examines the developmental relationships between lower-order perceptual components and higher-order functions, such as language and executive function. A final section examines the incorporation of research on early perceptual and cognitive development in translational and applied research. These topics include the prediction of later cognition from early cognitive performance, the use of infant perceptual-cognitive measures as dependent or outcome measures in intervention research, and the use of early perceptual-cognitive indicators as markers of developmental delay and disability.

In turn, Easterbrooks, Dym Bartlett, Beeghly, and Thompson note that the study of "socioemotional" development reflects the intertwining nature of the processes of social and emotional growth. They focus on social and emotional development of infants and toddlers. They begin by outlining the contextual frames that inform their discussion: psychobiological, relational, and cultural. Emotions have been referred to as the "language of infancy," and the authors present a profile of early emotional development that focuses on several key aspects of emotions and how they shape, and are shaped by, social interactions; they include discussions of temperament, the importance of face-to-face social interactions, the role of social relationships in emotion regulation, and the growth of self-understanding. In the section that follows, they focus on attachment relationships between infants

and their caregivers, addressing central questions related to individual differences in attachment security, and the influence of infants' attachment relationships on later developmental functioning. The orientation they present highlights that the contours of emotional development in the early years both are informed by, and contribute to, social interactions and relationships.

In the next chapter in this section, Hostinar and Gunnar address the issue of the conditions under which stress exposure in childhood induces vulnerability and promotes resilience. They review what is known about the developmental psychobiology of stress systems and articulate the current state of knowledge. They review also the anatomy and physiology of stress systems and some of their complex interconnections, followed by a discussion of what is known about the ontogeny of these systems and the way individual differences in their activity might emerge. They discuss studies of stress reactivity and regulation during each major developmental period between prenatal life and adolescence, and, in turn, review findings related to temperamental, genetic, and caregiving factors that may underlie individual differences in stress reactivity. They conclude with some ideas about the need for basic research examining the development of stress systems at multiple levels of analysis—scholarship that will inform a comprehensive, biologically plausible model of stress and emotion across the life span.

In the final chapter of the “Infancy and Early Childhood” section, Tamis-LeMonda and Song examine the sociocultural context of infant development, with primary emphasis on parent-infant communicative interactions. They focus on the cultural context of development, as societies (and local communities) around the world have different sets of views and practices regarding raising children. They focus on infancy, as it involves rapid brain growth and impressive achievements in language and social communication. In addition, they focus also on parent-infant communicative interactions, because infants' social experiences occur primarily within the family setting and interactions with family members are a core conduit for sharing culture. The chapter presents five principles that guide the authors' thinking on cultural similarities and differences in parent-infant communicative interactions and show how the everyday settings and activities of families—referred to as daily routines—frame the types of communicative interactions that parents have with their young. They describe as well cultural variations in three aspects of parent-infant communicative interactions: modes of communication (i.e., language, gaze, touch, gesture), parents' communicative accommodations to infants

(i.e., support of infants' expressions and understandings), and the content of interactions (i.e., the functions and topics of communications). Finally, the authors point to next steps in the study of parent-infant interactions in cultural context.

The chapters in Part III, “Childhood,” present current perspectives on the dynamic processes of development and multiple influences of context in various domains of children's development. In the first chapter in this section, Wagner and Hoff review four major theoretical approaches to the study of language development: the Biological, the Linguistic, the Social Pragmatic, and the Domain-General Cognitive. Each approach is described and evaluated with respect to its strengths and weaknesses. Major issues from the field are discussed, including the critical period for language, the poverty of the stimulus argument, nativism, rule abstraction, and statistical learning. Evidence from the domains of phonological, lexical, and syntactic development are considered. The chapter argues that each approach has made important contributions, but none alone has so far been able to account for the entirety of the phenomenon of language acquisition.

In the following chapter, Feldman notes that in more than half a century of history, the field of cognitive development has been marked by several revolutionary influences that helped establish it as a distinct specialty. The cognitive revolution, the revolution in language acquisition, and the Piagetian revolution were the most powerful early influences. As the field evolved, Neo-Piagetians and sociocultural perspectives balanced the focus on individual development with contextual and educational contributions. The author notes that toward the end of the last century, efforts at integration of individual and context, biology and culture, and universal and nonuniversal development were the focus of the field. Vygotsky's sociocultural framework, with its emphasis on guidance and participation, was particularly influential. Finally, the author indicates that in recent decades, emerging trends in comparative studies with primates, dynamic systems frameworks that are grounded in biology, and brain research have invigorated and extended the field of cognitive development in children into new areas.

In turn, Cummings, Braungart-Rieker, and Du Rocher Schudlich note that a change in views about the roles of emotions in socioemotional development has taken place. Emotions were once viewed as experiential, intrapsychic events that occurred more or less secondarily, as by-products of more significant causal processes and phenomena. However, they note that, in recent years, research and theory on the study of emotions have placed much greater emphasis on the significance and role of emotions in social

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functioning and personality development. Accordingly, the authors review the state-of-the-art in seminal themes for understanding the role of emotions in children's development: what is known, what is being done, and future directions, including (a) individual differences in the development of emotion and personality in children, (b) relational influences, and (c) a developmental psychopathology perspective. Future directions are discussed for each of these themes of research and theory on emotions and personality development.

In the next chapter in this section, Grusec, Chaparro, Johnston, and Sherman point out that in middle childhood, peers become important as children spend more time away from home. Major improvements occur in children's ability to understand the perspective of others and in their inferences about the psychological attributes of others as well as of themselves. Social development continues to result from a complex interaction between genes and the environment in which children find themselves, and behavior geneticists have studied the role of genetic mediation in social development, and sought specific genes that are involved in various social behaviors. Different children respond to the same socialization intervention in different ways, depending on a host of factors including variables such as age, sex, temperament, and the cultural context in which the intervention takes place. As a result, effective socialization is a function of the way children perceive and respond to a given intervention, rather than a function of a specific action on the part of the socializing agent. Socialization goes on in a variety of domains, with each domain characterized by a different kind of relationship between agent of socialization and child, and the actions of the latter need to be appropriate to the relationship or domain that is currently activated. Although parents, peers, and siblings differ considerably in their characteristics relative to the child being socialized, they all, nevertheless, operate in the same set of domains or relationships.

The final chapter in this section, by Mistry, Contreras, and Dutta documents key scholarship in integrating culture and child development in the first decade of the 21st century. The authors argue that there is a twofold challenge for an integration of perspectives from cross-cultural, cultural, and developmental psychology: (1) to resolve continuing debates regarding the conceptualization of culture; and (2) to frame the central questions for culturally inclusive theories of development, such that each subdiscipline has something of value to contribute. To address these challenges, Mistry, Contreras, and Dutta highlight two specific areas of convergences that they view as representing the most significant advances in the integration of culture and

child development. First, they document emerging ideas about the mutually constitutive nature of individual development and culture. They then review constructs that integrate person and culture into a single unit of analysis and argue that these ideas are paving the way for empirical investigations that will advance the development of culturally inclusive theories of human development. Second, Mistry, Contreras, and Dutta argue that a common interest across all three subdisciplines in how developmental processes and changes are situated in context is triggering an integration of approaches. The authors illustrate how addressing the three goals for cultural developmental science—to describe, explain, and interpret the range of cultural variations in human psychological functioning—requires an integration of cross-cultural, cultural, and developmental psychology.

The chapters in Part IV, "Adolescence," all point to the multiple interrelated changes that mark this key transitional period. In the first chapter in this section, Susman and Dorn present a perspective on the role of puberty in psychological development. They discuss how puberty has intrigued scholars, artists, parents, and adolescents alike for centuries and note that cultures have ritualized puberty to varying degrees. The authors go on to note that puberty's biological basis has been described comprehensively in scientific journals in the last few decades and that its psychological significance continues to be of great scientific interest. Susman and Dorn consider the neuroendocrinology of puberty and the implications of these endocrine and morphological changes for psychological development. Beginning with a historical and theoretical perspective on the role of puberty in development, the authors then provide a review of the major neuroendocrine changes that occur at puberty and how these changes affect physical morphological characteristics. Then the authors summarize the literature to present an overview of the relations between pubertal status, pubertal timing, and psychological development. Finally, Susman and Dorn make research and intervention recommendations for the future.

Next, Eccles and Roeser note that considerable strides have been made in the past decade in recognizing the centrality of the cultural context of schooling to adolescent development. The authors adopt a relational developmental systems conceptualization of the context of schooling and focus on selected new research findings regarding how (a) teachers, curricular tasks, and classroom environments; (b) aspects of the school as an organization; and (c) district policies and practices can influence adolescents' intellectual and social-emotional development.

In the next chapter in this section, Schwartz, Donnellan, Ravert, Luyckx, and Zamboanga review what is known about adolescent and emerging adult identity—including both personal and cultural dimensions of identity. They discuss major approaches to personal identity, including Marcia's (1966) identity status model and other models that have been developed based on identity status. They also highlight the role of agency and self-direction in the development of identity and how the role of agency differs between Western and non-Western cultural contexts. The authors describe the embeddedness of identity within personality and within the self-narratives that individuals create to make sense of their lives. They discuss also acculturation and other cultural processes as manifestations of identity and highlight the need for integrative work between personal and cultural dimensions of identity given the rapidly increasing ethnic diversity in the United States and other Western nations. Finally, several fruitful areas for future research are reviewed.

In the succeeding chapter in this section, by Lerner, Bowers, Minor, Boyd, Kiely, Müller, Schmid, Napolitano, Lewin-Bizan, and Lerner, the tripartite conception of positive youth development (PYD) suggested by Hamilton (1999)—as a developmental process, a philosophy or approach to youth programming, and as instances of youth programs and organizations focused on fostering the healthy or positive development of youth—is used to review different theoretical models of the developmental process involved in PYD. In addition, the authors discuss the ideas for, and the features of, youth development programs aimed at promoting PYD and youth development programs seeking to enhance PYD among diverse youth. They note several conceptual and practical problems that must be addressed in order to advance the research, as well as applications pertinent to PYD.

In the final chapter in this section, Bornstein, Jager, and Steinberg describe adolescence and salient individual-difference characteristics in adolescents that are germane to their relationships with parents and friends/peers. In turn, the authors provide an analogous discussion of parents and parenting. Then they link adolescents and parents and discuss their special bidirectional, transactional relationships. Bornstein and colleagues then introduce adolescents' friends and peers, and the salient characteristics that are germane to their relationships with adolescents and adolescents' parents. They then link adolescents with friends/peers and discuss their special bidirectional, transactional relationships. Finally, the authors move beyond the two dyadic relationships involving adolescents to discuss triadic relationships and to delineate different ways

that dyadic relationships are influenced by or depend on other dyadic relationships and/or other contributors outside of the dyad.

The chapters in Part V, "Adulthood and Aging," attest to both the potentials for systematic change and, as well, the ways in which engagement of the individual with variables across the relational developmental system moderates transformational and variational change during this portion of the life span.

In the initial chapter in this section, Siegler, Bosworth, Davey, and Elias note that most of the ongoing research in developmental health psychology has been incremental, with the emphasis on qualitative changes most prominent at the start of adulthood. Fears about demographic transitions have increased as Baby Boomers (born between 1946 to 1964) began to turn 65 in 2011. Accordingly, the authors review new findings on centenarians, risk and prevention of cognitive decline, and management of multiple chronic disorders in the elderly. They note that major changes in the understanding of the bases of health among aged groups that may occur in the next 10 years will not necessarily come from psychology, but from other disciplines. If, for instance, there are advances in the treatment of Alzheimer's disease, such work will change later life and the health psychology of aging. In the absence of such advances, however, the authors believe that society will be faced with many dependent older persons with needs for long-term care.

In their chapter on cognitive development in adulthood Dixon, McFall, Whitehead, and Dolcos discuss five aspects of cognitive development in adulthood and aging. Specifically, the chapter includes attention to (a) foundational issues in the study of cognitive change over many years of adulthood; (b) two enduring cognitive topics in the field, namely, intelligence and memory; (c) the long-standing but under-studied roles that biological and health conditions play in cognitive aging; (d) the recent and novel topic of emotional and affective influences on cognition throughout adulthood; and (e) the historically intriguing question of whether and how sustained cognitive health can be detected or promoted in normal aging.

In the next chapter in this section, Bertrand, Kranz-Graham, and Lachman note that personality development in adulthood and old age has been the focus of considerable research over the last several decades, amassing a body of literature that is richly diverse in theoretical and methodological approaches. The authors define and examine the nature of personality in adulthood and old age from diverse perspectives and consider issues of stability, continuity, and change. They focus on the impact of individual differences

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in personality on health and well-being in multiple domains (e.g., cognitive functioning) throughout the life span and discuss the impact of variations in personality due to such factors as gender, culture, and the antecedents of personality change. In addition, they review theoretical approaches and present current major perspectives in the field, including traits, life-span developmental, contextual, self, and phenomenological approaches. Some of the major findings regarding subjective personality change and personality as a predictor of later life outcomes are discussed. They also examine specific aspects of the self-construct, such as identity, self-efficacy and control, well-being, and emotion regulation. Finally, the authors summarize the current state of the adult personality literature, especially the focus on identifying mechanisms.

In the final chapter in this section, Antonucci, Birditt, and Ajrouch trace scientific advancements made in the study of social relations across the life span and over the life course with a particular emphasis on adulthood and aging. The authors begin with attention to traditional social relations theories, including the Convoy Model of Social Relations. Next, Antonucci and colleagues consider empirical investigations to illustrate how increasingly sophisticated developmental theory and methods have led to expanded and more nuanced understandings of social relations in adulthood. Furthermore, the authors provide an overview of the most recent literature available on the convoy model, especially highlighting aspects of social relations that influence stress, health, and well-being. Finally, the authors identify future directions in the study of social relations.

The chapters in Part VI, "Applied Developmental Science Across the Life Span," point to the rich ways in which theory-predicated developmental science is being used to promote positive and healthy individual development, enhance the settings of human life, and further social justice. In the opening, and indeed, "keynote" chapter in this section, Fisher, Busch-Rossnagel, Jopp, and Brown focus on promising directions in applied developmental science in the next decade by charting recent contributions and future potential for new ways of thinking about how the field conceptualizes and optimizes development across the life course, the role of applied developmental science in public and private institutions, and obligations to promote a social justice agenda that contributes to social policies sensitive to diverse developmental challenges and is inclusive in its offering of opportunities for individuals from various cultural, economic, and social positions. This chapter brings together theoretical concepts and frameworks, methodological advances, and emerging themes and controversies that are redefining applied developmental science, highlighting

areas that warrant further exploration and focusing attention on critical issues that should be addressed in future.

In turn, Hauser-Cram, Cannarella, Tillinger, and Woodman provide a brief historical perspective on disabilities, followed by a discussion of contemporary issues regarding definitions and classification schemes. The authors include an examination of cultural views on disabilities, as such perspectives provide a wide-ranging understanding of the etiology of disabilities and the use of the term "typical." They consider theoretical models and empirical evidence emerging from current research on children with developmental disabilities within the network of family relationships. Because parents of children with disabilities often face unique challenges, they consider the processes of resilience in parental adaptation and the role of positive emotions in parental well-being. The authors conclude with a section on future research in which they provide suggestions for expanding the perspective on families of children with disabilities. They propose that several of the scientific endeavors undertaken to understand development in those with disabilities be poised to inform critical issues in developmental science.

In the next chapter in this section, Lamb and Malloy focus on three topics regarding which legal practice concerning youth has been at least somewhat responsive to input from developmental scientists. First, they discuss the ways in which research on parent-child relationships and on the effects of divorce can guide professionals making decisions about children's living arrangements when the children's parents divorce or separate. Second, they review research on the extent to which children are capable of providing detailed testimony about their experiences of child abuse and illustrate the ways in which developmentally appropriate forensic interview procedures improve the quality of information provided by victims. Third, they discuss the characteristics of alleged juvenile offenders that influence their vulnerability and culpability, highlighting implications for the legal system. The authors demonstrate that "basic" and "applied" research complement one another and that developmental processes can only be understood when we are able to examine youth in experimental, analog, and real-world contexts.

In their chapter on health and human development, Vondracek and Crouter note that living a long and healthy life is a universal human aspiration. In fact, in many parts of the world, life expectancies have increased dramatically, primarily due to great progress in the treatment and prevention of disease. This necessary focus on disease has not been accompanied, however, by a corresponding focus on health. Fortunately, there is growing evidence that this situation is

changing. Driving this change is an apparent convergence of theoretical frameworks used in human development, developmental psychology, and medicine around the idea that health and positive development are best addressed from a systems perspective that is capable of conceptualizing the whole person-in-context as the proper target of attention. Complementing this theoretical shift has been a vigorous new emphasis on positive psychology, which features an emphasis on personal and contextual strengths as assets that promote health and well-being. Accordingly, the authors review contemporary empirical research that examines these complex relationships. Their discussion confirms that a shift from a disease and deficit model of human development and health toward a more positive and strength-based approach is both timely and warranted (see J. Lerner et al., this volume). The authors note that these developments have important implications for researchers, practitioners, and policy-makers, although it is clear that the extent and precise nature of these implications are just beginning to be explored.

In the succeeding chapter in this section, Freund, Nikitin, and Riediger explain that, historically, life expectancy has only recently extended into old age and has dramatically increased over the past 100 years. Early accounts of aging have characterized this phase in life as one of more or less uniform decline and focused on the question of how people can react to and cope with the many losses they encounter. Although this question remains one of the topics of aging research, more recent approaches to the notion of “successful aging” also address the question how older adults proactively shape their own aging process. Accordingly, the authors review the state of research on the topic of successful aging. Early approaches focused on the question “what is successful aging?” by outlining general criteria for aging well. More recent approaches have shifted the focus to the question “how do people age successfully?” These models—e.g., the socio-emotional selectivity theory; the model of selection, optimization, and compensation; the model of assimilative and accommodative coping; or the model of primary and secondary control—emphasize the role of proactive emotional and motivational processes for aging successfully. By setting goals in accordance with one’s resources as well as age-related concerns (e.g., prioritizing emotional goals over the acquisition of information), by adapting goals and standards to the changing availability of resources (e.g., to health-related decline), and by disengaging from unavailable goals, older people can maintain high levels of functioning and subjective well-being. The authors indicate that they hope that the identification of

processes underlying successful aging will help to enhance the quality of older persons’ lives in the future.

In the final chapter in this section, Bers and Kazakoff note that new technologies (computers, social media) are having an impact on young people and we need more research to understand this impact. Young people use computers to communicate with friends, to listen to and exchange music, to meet new people, to share stories with relatives, to organize civic protests, to shop for clothing, to blog, to create videos, to find romantic partners, and to learn new things in new ways. Accordingly, the authors review the role of new technologies with regard to child and youth development. One of the constants of new technologies is that they will always be changing; there will always be newer and faster technologies. It is necessary to understand if and how these technologies support developmental milestones at different ages. Furthermore, due to the ever-changing nature of new technologies, a framework in which to evaluate these new technologies should be used. The authors focus on positive behaviors of children and youth that might be promoted by new technologies; at the same time, they also review potential harmful activities that might accompany or result from the use of these new technologies. The authors propose a framework of positive technological development (PTD) as a way of viewing and understanding this work.

In sum, the chapters in this volume contribute significantly to extending more than a third of a century of scholarship aimed at understanding the dynamic relations between individuals and contexts. The present volume brings this scholarship to both an empirically richer and a more theoretically nuanced level, one depicting—for multiple substantive foci of human development and both within and across the major developmental epochs of life—the nature of the reciprocal or dynamic processes of human ontogenetic change, of how structures function, and of how functions are structured over time.

The consistency across chapters in the demonstration of the usefulness of relational developmental systems thinking for theory, research, and application indicates that this frame for contemporary developmental scholarship is not tied necessarily to a particular content domain, but rather is useful for understanding the broader developmental system within which all dimensions of individual development emerge (e.g., Ford & Lerner, 1992; Gottlieb, 1998; Overton, 2010; Sameroff, 2009; Thelen & Smith, 2006). In other words, although particular empirical issues or substantive topics (e.g., perceptual development, successful aging, cognition and achievement, emotional behaviors, or complex social relationships) may lend themselves

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readily as emphases of developmental scholarship within or across developmental periods, the chapters in this volume attest to the importance of focusing on relational, integrative individual-context dynamics to understand the human developmental system.

CONCLUSIONS

The power of contemporary developmental science scholarship lies in its integrative character—across substantive domains of individual functioning (e.g., biology, emotional, cognition, and social behaviors), across developmental periods, across levels of organization (from biology through culture and history), and across basic and applied interests in regard to understanding and enhancing human life. As represented by the scholarship in this volume, contemporary developmental science is not limited by (or, perhaps better, confounded by) an inextricable association with a unidimensional portrayal of the developing person (e.g., the person seen from the vantage point of only cognitions, emotions, or stimulus-response connections). Today, the developing person is neither biologized, psychologized, nor sociologized. Rather, the individual is systemized; that is, his or her development is conceptualized and studied as embedded within an integrated, relational matrix of variables derived from multiple levels of organization.

This relational approach to developmental science is certainly more complex than its organismic or mechanistic predecessors (Lerner, 2006; Overton, 2010; Overton & Müller, this volume). However, a relational developmental systems approach is also more nuanced, more flexible, more balanced, and less susceptible to extravagant or even absurd claims (e.g., that nature, split from nurture, can shape the course of human development). Moreover, as elegantly demonstrated by the chapters in this volume, relational developmental systems offer a productive frame for rigorous and important scholarship about the process of human development and applications across the life span. Together, these advances in the scholarship of knowledge generation and knowledge application serve as an invaluable means for advancing science and service pertinent to people across the breadth of their lives. Ultimately, then, such applications of developmental science may contribute to the enhancement of social justice (Lerner & Overton, 2008).

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