13

Research patterns from the past three decades and several current directions of research are used to describe emerging trends in the study of cognitive development. These trends are discussed as moving the field into new areas, particularly biology, learning, and social context, and contributing to a more integrated understanding of psychological development.

With Eyes to the Future: A Brief History of Cognitive Development

Mary Gauvain

Predicting the future, even the near future, of theory and research in cognitive development is a formidable task. To do so in a relatively short chapter allows one to hit the highlights and forgo the all-too-important details, which makes the task a bit less daunting. To help set the stage for this chapter, a brief account of the recent history of the field is provided. Then the discussion turns to several areas of current research that follow up on some important themes in this history, specifically the biological bases of cognitive development (particularly in relation to emotional functioning), learning and cognitive development, and the contribution of the social context to intellectual growth.

This chapter has two aims. The first is to point out how some current areas of research are bringing together ideas about cognition and its development that have been percolating in the field for a while. The second is to suggest that these areas of research hold much promise for advancing our understanding of development in a way that integrates the cognitive, social, emotional, and biological aspects of growth. Such integration stands as a goal of the field at large, and it appears that research in cognitive development may play a central role in this formulation.

A Brief History

The past three decades have been witness to burgeoning interest in cognition and its development, which is clearly evident in one of the main sources in the field, the *Handbook of Child Psychology*. In the 1970 two-volume edition,

Carmichael's Manual of Child Psychology (third edition), there are twelve chapters on cognitive development; in the remaining seventeen chapters, there is scant mention of cognition. If we fast-forward to the 1983 four-volume set, the *Handbook of Child Psychology* (fourth edition), we find an entire volume devoted to cognitive development, and the discussion is largely restricted to this volume (save a few chapters on infant cognition that appear elsewhere). The most striking feature of this edition for our purposes is in the volume on social development: the subject index has nine brief entries pertaining to cognition, with a total of twenty-three pages on this topic out of the almost eleven hundred pages in the volume.

However, one chapter in the volume on cognitive development, on "Learning, Remembering, and Understanding" (Brown, Bransford, Ferrara, & Campione, 1983), is a harbinger of things to come. As the title of the chapter suggests, Brown et al. were more concerned with the processes of thinking than its products, a concern that has been increasingly central to the field since the chapter was written. Those authors were also prescient in their view that the field needs to move away from "academic cognition," in which thought and intelligent action are conceptualized as "relatively effortful, isolated, and cold" (p. 78) and therefore separate from other psychological states, toward examination of "hot cognition," in which thinking is connected to emotions, social processes, and other factors that compose the fabric of everyday functioning. Finally, Brown et al. encouraged researchers "to move this knowledge from the domain of laboratory lore to the domain of theory" because, as they cautioned, "if we do not, we may be ignoring some of the most important influences on development that exist. The emotional cannot be divorced from the cognitive nor the individual from the social" (p. 150).

If we fast-forward once more to the 1998 edition of the *Handbook* (fifth edition), a different picture of the field emerges. Coverage across the volumes is far less distinct than it was in the previous editions; most notably, cognition and cognitive development are all over the place. As in the 1983 edition, one volume is dedicated entirely to cognitive development, and all the traditional areas are represented (memory, perception, problem solving). However, now there are two chapters that concentrate on so-called hot cognition, one by Rogoff on "Cognition as a Collaborative Process" and the other by Flavell and Miller on "Social Cognition." Still other, even more dramatic changes appear in the three volumes that are not about cognitive development. In fact, every one of these volumes includes chapters on cognitive development. The volume on theories has chapters on knowledge development, cognitive science and the origins of thought, dynamics of action and thought, and culture and mind. The volume on practice has chapters on applications of research in cognitive development, including literacy, science and mathematics learning, and child testimony. Yet the most impressive change is found in the volume on social development, where four of the sixteen chapters are centrally concerned with cognitive processes, specifically

emotional development and understanding, self-representations, motivation to succeed, and socialization processes, which includes cognitive perspectives on socialization such as parental beliefs and ethnotheories. The remaining chapters on social development all deal with cognition to some extent. As Eisenberg, the volume editor, notes in the Introduction: "cognitive processes of many sorts are being integrated into theory and research on diverse aspects of social and emotional development. This trend has resulted in richer conceptualizations of children and their social and emotional development, as well as of the socialization process" (p. 9).

The next edition of the *Handbook* is imminent, and according to the Table of Contents this trend will continue. Coverage of cognition and cognitive development is well ensconced throughout the volumes.

This brief look at history recounts two major trends in the field that are shaping current (and undoubtedly future) research. The first, more general, trend is increasing coverage and integration of cognition in all aspects of psychological development. The second, more specific, trend pertains to the relation of social and emotional processes and cognitive development, in terms of the cognitive nature of social and emotional behavior as well as the social and emotional nature of cognitive functioning. These trends have the potential to further a more integrated understanding of psychological development than existed just a decade ago. So, what are some current areas of research that reflect these particular trends? Let me highlight three broad directions of research that hold promise along these lines.

Three Current Research Directions

The first area of research concerns the biological underpinnings of cognitive functioning. There are several ways in which biology and cognitive development are currently studied: developmental cognitive neuroscience (Johnson, Munakata, & Gilmore, 2002), behavioral genetics (Plomin, DeFries, McClearn, & McGuffin, 2001), comparative and ethological approaches (Gottlieb, 1992), and evolutionary developmental psychology (Bjorklund & Pelligrini, 2002). Collectively, this research has offered (and will continue to offer) insight into basic cognitive functioning as well as how this functioning may relate in fundamental ways to the development of behavioral and social patterns and to the human evolutionary course. For instance, the social biases that have been revealed in research on face recognition in infancy (Pascalis, de Haan, & Nelson, 2002) and the emotional components of information processing in adolescence (Spear, 2000) illustrate how biologically based research may point directly to the intricate relation among the social, the emotional, and the cognitive over the course of development.

One area of biologically based research that seems especially promising for cognitive development focuses on the neural bases of emotions and how emotional development and regulation relate to the nature and course of

cognitive growth (Davidson, 2000; Davidson, Jackson, & Kalin, 2000). Children's emotionality and regulatory capabilities help organize and support thinking and learning from the first year of life in a range of cognitive abilities (attention, behavioral inhibition, goal-directed planning, memory, and problem solving; Bell & Wolfe, 2004; Ruff & Rothbart, 1996). Research also suggests that emotions are important to learning in social context. Social learning situations that involve partners with strong emotional ties—such as parents and children, siblings, and friends—increase arousal, which in turn can enhance learning and memory. It is also known that adults adjust the support they give children on cognitive tasks according to some conception of the child's needs, which may reflect a perception of the child's abilities or emotionality. For example, research has shown that how parents approach instruction depends on their child's temperament or emotional state, part of which is the ability to regulate emotions in a new or stressful situation (Dixon & Smith, 2003; Perez, 2004). In short, emotional development and expression may regulate many of the opportunities for learning and cognitive development when children work on their own and with others.

A second promising area of study is learning. Although learning is a traditional topic in cognition, research on it has ebbed and flowed over the years as various learning theories have come into and fallen out of favor. As a result, many questions about learning and cognitive development remain to be answered. Fortunately, a resurgence of research on learning over the past decade has appeared in studies of problem solving, strategy development, and reasoning. For example, research on strategy development indicates that with age children have more strategies available, they develop more sophisticated strategies, and they use more efficient strategies that are adapted to the problem at hand (Siegler, 1996). There has also been extensive research on how children learn such academic subjects as mathematics, science, and reading, which has been vital to evaluating and revising educational practice (Bransford, Brown, & Cocking, 1999).

Despite increases in research on learning, the relation between learning and cognitive development—a topic that was of much interest to Piaget (1964) and Vygotsky (1978)—is still unclear. Many of the advances in the study of learning have relied on new techniques, notably microanalytical methods and computer simulations (Siegler, 2004). These techniques may prove useful for clarifying this relation. To this end, it is also important that research on learning is no longer restricted to the learning of laboratory-based cognitive tasks and academic skills. Learning approaches are increasingly seen in research on social development (as in the learning of social skills) and emotional development (such as the learning of display rules). Thus the process of learning is seen as a central mechanism by which children become competent cognitive, social, and emotional beings. Along these lines, the use of research techniques, especially the microgenetic method, to study processes of social and emotional development may be an important next step for research in this area. In addition, understanding of learning has

stretched beyond the individual as researchers identify social processes that promote children's learning: observational learning, the social regulation of attention in infancy, deliberate efforts to transfer knowledge from more to less experienced partners, and social coordination during joint cognitive activity. This research suggests that social opportunities for children's learning appear in many forms and that cultures determine the frequency and manner with which these processes occur during childhood. A social approach to learning leads directly into the final area of research discussed, the social context of cognitive development.

A third promising area of research points to the social context as a critical component of cognitive development. The social context contributes to cognitive development in two ways. First, it determines what children think about and how children practice and adopt thinking. Second, it is the primary system through which children learn about the world and develop cognitive skills. In other words, cognitive development is an emergent property of social experience. During social interaction and other inherently social processes, such as participation in cultural practices (Rogoff, 2003), children have opportunities to participate intellectually in the world in a way that they cannot generate on their own (Vygotsky, 1978). These experiences lead to fundamental changes in how children think.

Older and more experienced members of society help shape intellectual development through the social interactions they have with younger, less experienced members, through the arrangements for learning that they furnish for children, and through the means of understanding the world that they reveal to children in social transactions. More experienced societal members also pass onto children the practices, skills, values, and goals of the community in which development occurs. Thus the process of cognitive development relies on the inherent link between the larger sociocultural context of development and the more immediate circumstances of individual growth. In other words, the sociocultural context is instantiated in local situations in how people interact, in the areas of mental functioning that are stressed and rewarded, and in the practices in which people engage. Accordingly, social processes organize the developing mind in a way that fits with the needs and aspirations of the community in which growth occurs.

This approach to cognitive development is functional in its theoretical orientation. It considers cognitive development as a socially mediated process creating an understanding of the world that enables a person to carry out meaningful and goal-directed actions. It also connects the individual mind with the minds of others (Nelson, 1996). For example, research has shown that adult-child conversation about past and current events supports cognitive development, especially memory development (Nelson & Fivush, 2000). This conversation is highly motivating because it is often about the children themselves and involves people who are familiar to the children. It communicates to children which events are worth learning and remembering (Snow, 1990) and therefore enhances children's attention to and

memory for particular types of information and experience. It often relies on narrative structure, which influences how memories are constructed and recalled (Haden, 2003). Finally, conversation of this kind serves as a form of rehearsal (Hamond & Fivush, 1991). Children play an active role in this process of memory development. Research has shown that children's memory for an event is better when the event is talked about by the child and another person, such as the mother, than when the event is only talked about by another person or not discussed (Haden, Ornstein, Eckerman, & Didow, 2001). Research has also demonstrated that children use memory strategies in conversation with an unfamiliar adult similar to what was previously used with their mothers (Lange & Carroll, 2003), suggesting that parent-child conversation has implications for when children remember events on their own.

Concluding Thoughts

For developmental psychology as a whole to benefit from these three promising directions of research, it will be necessary to put findings from this research into a coherent understanding of psychological development. This effort will clearly need to be interdisciplinary. Each area of study is technical, requires mastery of a large literature, and deploys its own research techniques and levels of analysis. At present, there are some theoretical approaches, ones that emphasize interactive processes of change, that may be useful in this effort: dynamic systems theory (Thelen & Smith, 1994), ecological views (Bronfenbrenner & Morris, 1998), and sociocultural approaches (Rogoff, 2003).

The twenty-first century has barely begun, and the potential for understanding many of the questions that have been at the heart of developmental psychology for decades is enormous. The techniques of study, the sophistication of theories, the interdisciplinary nature of the field, and an abiding interest in asking hard questions about the human psychological experience will continue to serve the field well. The pitfalls are essentially the same ones developmentalists have faced all along: reductionism, overgeneralization of findings, theoretical orthodoxy, and limited representativeness of the participants or activities we study. Developmentalists have struggled with these issues for a long time, and though we will continue to do so we have the ability to spot them when we see them and try to confront them directly. The vexing issue of how to study and account for cognitive change remains a central concern. Understanding the processes or mechanisms that underlie cognitive development is a primary goal of the field and researchers will continue to strive to achieve this goal. The primary candidate for a mechanism of change that will surely receive attention over the next decade is the transaction between the biological and the social or experiential processes that promote and lead cognitive development.

It seems clear, given the brief history and areas of current research described here, that a cognitive approach will play an increasingly promi-

nent role in the study of psychological development. Therefore, many of the advances in the near future will result from attempts to integrate biological foundations, processes of learning, and social experiences into some unified account of how children develop the enormous range of cognitive competencies that are characteristic of and essential to the species.

About a decade ago, there was a symposium at the Society for Research in Child Development titled Whither Cognitive Development? The concern expressed by the presenters was that the contribution of cognitive development to the field at large was in flux, perhaps even in jeopardy. Now, with a decade of hindsight on our side, it seems clear that the study of cognitive development has not "withered," but it definitely has transformed. The study of cognitive development has gotten more complex as well as increasingly integrated with the field as a whole. In this transformation lies great promise.

References

Bell, M. A., & Wolfe, C. D. (2004). Emotion and cognition: An intricately bound developmental process. *Child Development, 75,* 366–370.

Bjorklund, D. F., & Pelligrini, A. D. (2002). *The origins of human nature: Evolutionary developmental psychology*. Washington, DC: American Psychological Association.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (1999). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.

Bronfenbrenner, U., & Morris, P. A. (1998). The Ecology of developmental processes. In W. Damon (Gen. Ed.) & R. M. Lerner (Vol. Ed.), *Handbook of child psychology, vol. 1: Theoretical models of human development* (pp. 993–1028) (5th ed.). New York: Wiley.

Brown, A. L., Bransford, J. D., Ferrara, R. A., and Campione, J. C. (1983). Learning, remembering, and understanding. In P. H. Mussen (Series Ed.) & J. H. Flavell & E. M. Markman (Vol. Eds.), *Handbook of child psychology, vol. 3: Cognitive development* (pp. 77–166) (4th ed.). New York: Wiley.

Damon, W. (1998). *Handbook of child psychology* (5th ed.). New York: Wiley.

Davidson, R. J. (2000). Affective style, psychopathology, and resilience: Brain mechanisms and plasticity. *American Psychologist, 55,* 1196–1214.

Davidson, R. J., Jackson, D. C., & Kalin, N. H. (2000). Emotion, plasticity, context and regulation: Perspectives from affective neuroscience. *Psychological Bulletin, 126,* 890–906.

Dixon, W. E., & Smith, P. H. (2003). Who's controlling whom? Infant contributions to maternal play behavior. *Infant and Child Development, 12,* 177–195.

Eisenberg, N. (1998). Introduction. In W. Damon (Gen. Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology, vol. 3: Social, emotional, and personality development* (5th ed.). New York: Wiley.

Flavell, J. H., & Miller, P. H. (1998). Social cognition. In W. Damon (Gen. Ed.) & D. Kuhn & R. S. Siegler (Vol. Eds.), *Handbook of child psychology, vol. 2: Cognition, perception, and language* (5th ed.). New York: Wiley.

Gottlieb, G. (1992). *Individual development and evolution: The genesis of novel behaviors*. New York: Oxford University Press.

Haden, C. A. (2003). Joint encoding and joint reminiscing: Implications for young children's understanding and remembering of personal experiences. In R. Fivush & C. A. Haden (Eds.), *Autobiographical memory and the construction of a narrative self: Developmental and cultural perspectives* (pp. 49–69). Hillsdale, NJ: Erlbaum.

Haden, C. A., Ornstein, P. A., Eckerman, C. O., & Didow, S. M. (2001). Mother-child

conversational interactions as events unfold: Linkages to subsequent remembering. *Child Development, 72,* 1016–1031.
Hamond, N. R., & Fivush, R. (1991). Memories of Mickey Mouse: Young children recount their trip to Disneyworld. *Cognitive Development, 6,* 433–448.
Johnson, M. H., Munakata, Y., & Gilmore, R. O. (2002). *Brain development and cognition: A reader* (2nd ed.). Oxford, UK: Blackwell.
Lange, G., & Carroll, D. E. (2003). Mother-child conversation styles and children's laboratory memory for narrative and nonnarrative materials. *Journal of Cognition and Development, 4,* 435–457.
Mussen, P. H. (1970). *Carmichael's manual of child psychology* (3rd ed.). New York: Wiley.
Mussen, P. H. (1983). *Handbook of child psychology* (4th ed.). New York: Wiley.
Nelson, K. (1996). *Language in cognitive development.* Cambridge, UK: Cambridge University Press.
Nelson, K., & Fivush, R. (2000). Socialization of memory. In E. Tulving & F.I.M. Craik (Eds.), *The Oxford handbook of memory* (pp. 283–295). London: Oxford University Press.
Pascalis, O., de Haan, M., & Nelson, C. A. (2002). Is face processing species-specific during the first year of life? *Science, 296,* 1321–1323.
Perez, S. M. (2004). Relations among child emotionality, mother-child planning, and children's academic adjustment and achievement in the first grade. Unpublished doctoral dissertation, University of California, Riverside.
Piaget, J. (1964). Development and learning. In R. E. Ripple & V. N. Rockcastle (Eds.), *Piaget rediscovered: A report of the conference on cognitive studies and curriculum development* (pp. 7–20). Ithaca, NY: Cornell University Press.
Plomin, R., DeFries, J. C., McClearn, G. E., & McGuffin, P. (2001). *Behavior genetics* (4th ed.). New York: Worth.
Rogoff, B. (1998). Cognition as a collaborative process. In W. Damon (Gen. Ed.) & D. Kuhn & R. S. Siegler (Vol. Eds.), *Handbook of child psychology, vol. 2: Cognition, perception, and language* (5th ed.). New York: Wiley.
Rogoff, B. (2003). *The cultural nature of human development.* New York: Oxford University Press.
Ruff, H. A., & Rothbart, M. K. (1996). *Attention in early development: Themes and variations.* New York: Oxford University Press.
Siegler, R. S. (1996). *Emerging minds: The process of change in children's thinking.* New York: Oxford University Press.
Siegler, R. S. (2004). Learning about learning. *Merrill-Palmer Quarterly, 50,* 353–368.
Snow, C. E. (1990). Building memories: The ontogeny of autobiography. In D. Cicchetti & M. Beeghly (Eds.), *The self in transition: Infancy to childhood* (pp. 213–242). Chicago: University of Chicago Press.
Spear, L. P. (2000). Neurobehavioral changes in adolescence. *Current Directions in Psychological Science, 9,* 111–114.
Thelen, E., & Smith, L. B. (1994). *A dynamic systems approach to the development of cognition and action.* Cambridge, MA: MIT Press.
Vygotsky, L. S. (1978). *Mind in society: The Development of Higher Psychological Processes.* Cambridge, MA: Harvard University Press.

MARY GAUVAIN is professor of psychology at the University of California at Riverside. Her research focuses on cognitive development (in particular, planning skills and spatial thinking) in social and cultural context.