



Nurturing Developing Brains, Minds, and Hearts

By Ross A. Thompson, Ph.D.

When the history of popular beliefs about childhood is written, the last years of the 20th century will be seen as an important turning point for two reasons. First, this was the period when discoveries about early brain development came to public attention. Drawing on years of research in cognitive neuroscience and developmental biology, the “I Am Your Child” campaign, launched in 1997, acquainted caregivers with the foundations of brain development during the first five years of life. Second, this was the period when school readiness became an important public and policy concern. When the National Education Goals Panel urged in 1997 that “all children shall enter school ready to learn,” it focused attention on how the cognitive achievements of the preschool years provide a foundation for school success.

Taken together, these events helped to transform everyday thinking about early childhood development. Having always been viewed as a period of carefree play and warm, nurturant relationships, early childhood now became regarded as a period when the foundational achievements of brain and mental development establish lifelong potential and, thus, a “window of opportunity” for early stimulation.

Parents and teachers naturally sought to obtain guidance from brain research about how to ensure that infants and toddlers get a good early start. They received plenty of advice from the media, toy manufacturers, and even developmental scientists. Because brain development begins with a proliferation of neural connections followed by their selective retention, many caregivers concluded, for example, that it is important to provide rich, diverse stimulation in the early years to ensure that many neural networks are created, helping to ensure the brain’s developmental potential. Indeed, the “use it or lose it” principle by which early experiences determine which neural connections are strengthened and which are lost convinced many caregivers that young children should be exposed to different languages, letters and num-

bers, and problem-solving challenges in an early developmental curriculum to ensure that relevant brain areas would be strengthened. The recommendation of the “I Am Your Child” campaign that parents should regularly talk, sing, and play with their young children fit well with the school readiness concerns that literacy, numeracy, and reasoning skills should be trained early. Not surprisingly, a small industry emerged to market toys designed to stimulate brain development, with provocative names like “Baby Einstein” to remind parents of their important responsibility to support brain development and thus give their offspring a good early start to school success.

Parents’ and teachers’ interest in enhancing early brain development is reminiscent of what Piaget used to call “the American question.” He was regularly asked by parents in the United States: How can we use research on cognitive development to accelerate children’s mental growth? Piaget argued that this was the wrong question to ask because mental development must unfold according to its own natural timetable. Beyond this, caregivers’ desire to enhance cognitive competence and school readiness through enhanced early stimulation

may be misguided. A deeper understanding of how minds develop. Indeed, when viewed in light of research on early brain and cognitive development, the young mind and its capabilities are some new and exciting to learn, with practical implications.

Here are some

The developing brain: active, capable

It grows through everyday experience

about cognitive development. This metaphor is filled with information. It shows that as minds grow, knowledge and skills are gained. This is one of the developmental milestones waiting to be met. Active organisms and understanding of the world confirm what we have shown: children’s explanations to interpret experiences and knowledge, skills,

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may be misguided unless it is based on a deeper understanding of how brains and minds develop in the early years. Indeed, when we consider carefully what research on early brain development and cognitive growth tells us about the young mind and its development, there are some new and surprising lessons to learn, with practical value.

Here are some of those lessons:

The developing brain is remarkably active, capable, and self-organizing.

It grows through its own activity in everyday experience. When we think about cognitive growth, our intuitive metaphor is filling up a container (the mind) with information. Children’s minds grow as they acquire greater knowledge and experience. But research shows that this metaphor is the wrong one for the developing mind. Young children’s minds are not passive containers waiting to be filled; they are instead active organisms in pursuit of novelty and understanding. Neuroimaging studies confirm what experimental studies have shown: children do not wait for explanations to be provided; they strive to interpret experience in light of prior knowledge, spontaneously posing ques-

tions and drawing inferential conclusions — and mentally growing in this manner. “Use it or lose it” describes the importance of the brain’s activity to strengthening neural networks, not only the need for external stimulation to provoke brain growth. Learning is not primarily a matter of imparting knowledge, but rather of the child’s active construction of understanding from experience. No inorganic metaphor, even a computer, is adequate to portray the self-initiated activity and self-organization of early brain development.

Viewed in this light, what are the best experiential catalysts to the developing brain? Developmental research shows that they are most likely to occur in an infant’s social interaction with a responsive adult. More than any toy, CD, or video, a sensitive social partner can respond appropriately to what has captured the child’s interest (and is thus the stimulus of brain activity), provoke new interests and exploration, calibrate shared experiences to the child’s readiness for new learning, and accommodate the child’s unique temperamental qualities (which may, for some, require gradual rather than fast-paced stimulation). Sensitive social interaction simultaneously captures multiple senses in activity that is

both predictable and unexpected, and it involves give-and-take that involves the child as an active, thinking participant. When parents and teachers interact with infants and toddlers in this relaxed, responsive manner, without a superordinate agenda or instruction to impart, they are likely to provide the kinds of experiences that stimulate the developing brain and mind.

Cognitive, social, and emotional development are deeply integrated in the developing brain. Despite the tendency of child experts to divide the developing child into domains of language, social, cognitive, and emotional development, or to refer to certain brain regions as the “language area” or “association area,” brain functioning is far more deeply integrated and interconnected. Thinking, feeling, communicating, socializing, and other capacities draw on multiple interrelated brain areas. Brain structures primarily devoted to memory and thinking influence (and are affected by) structures primarily governing emotion and stress. The maturation of brain regions associated with self-regulation has simultaneous effects on the growth of attentional focus, reasoning strategies, and emotional self-regulation. It is thus

mistaken to consider developing thinking and reasoning skills without taking into consideration the influence of the young child’s emotions or the social context within which cognitive growth occurs. This is especially apparent in the early years of life.

One reason why social interaction is so provocative of early brain growth is that it engages both the mind and the heart as infants and caregivers share new discoveries. Early learning is motivated by infants’ emotions: their natural curiosity, their delight in confirming expectations about what will happen, their frustration at impediments to problem-solving, and the pleasure of achieving goals. These emotional dimensions of cognitive growth are enhanced by an adult’s curious questioning, empathic pout, resonant sounds of effortful striving, and congratulatory applause. In later years, children’s motivation to achieve and pride in accomplishment derives from parental evaluations of their performance. Viewed in this light, school readiness is both a matter of acquiring relevant cognitive skills and of developing the social and emotional readiness to benefit from learning experiences in classroom groups and other socially

shared experiential development. The emotions energize new

Chronic, unrelenting stress is hard to the good

The integration of cognitive, emotional, and social experiences helps to create a potential for a child’s development. As profiled by Mary McPherson, animal studies show that stress is associated with social and emotional difficulties in learning. Although it is needed to urge children through childhood, the evidence that children can have similar experiences. This is because of the children’s emotional development. Child psychologists have found that childhood depression is associated with the chronic stress of the environment. The impact of

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shared experiences. This reflects how mental development is deeply tied to the emotions and social experiences that energize new learning.

Chronic, uncontrollable stress is a hazard to the growth of minds and brains.

The integration of young children's cognitive, emotional, and social experiences helps to explain why stress is such a potential hazard to early learning. As profiled by Megan Gunnar in this book, animal studies show that chronic early stress is associated with problems in social and emotional functioning and difficulties in learning and retaining information. Although much more research is needed to understand its effects in early childhood, there is accumulating evidence that chronic, uncontrollable stress can have similar effects with young children. This is especially concerning because of the vulnerability of young children's emotional lives. Developmental scientists have discovered that early childhood is not a period of carefree play for all children, and in troubled families young children sometimes show signs of depression, anxiety disorders, post-traumatic stress reactions, and the emergence of conduct disorders that reflect the impact of family stress. The same

children may have difficulties controlling their emotions and getting along with other children in child care settings, as well as having difficulties concentrating and learning.

High-quality learning environments for infants and toddlers look very different from high-quality educational programs for older children.

In light of what we have learned about brain development and mental growth, it should not be surprising that the experiences that stimulate cognitive development will vary for children of different ages. By middle childhood, brain maturation ensures that children are capable of attentional and cognitive self-control, and this is reflected in their pleasure in mental challenges that can consume their interest for hours at a time. Children of this age can benefit from formal learning settings involving a teacher-driven agenda in which children work quietly for sustained periods by themselves on complex tasks. There has been a natural tendency to expect that such formal learning settings should be a model for educational environments for younger children as well. But research has confirmed that if young children are put into the kinds of formal classroom settings in

which older children thrive, they become less interested in learning, expect less of themselves, and are more stressed and less cooperative. The reason is that their developing brains and minds require different kinds of learning environments. As reflected in research on developing brains and minds, these environments have the following qualities:

- ❖ They are child-oriented rather than teacher-driven, building on the naturally emerging interests that motivate cognitive growth.
- ❖ They provide young children with choices from among a variety of age-appropriate activities, capitalizing on the mind's activity as a spur to mental development.

- ❖ They involve considerable social interaction between children as well as adult-child interaction because of the social catalysts to new learning and the benefits of a language-rich environment.
- ❖ They include predictable routine and manageable demands, recognizing the incompatibility between chronic stress and intellectual discovery.

With the realization that developing brains and minds in the early years require support, research in developmental neuroscience and developmental psychology has provided helpful ideas for how to provide that support in homes and child care settings. The challenge for a wise society is to thoughtfully enlist that knowledge into caregiving practices that nurture brains, minds, and hearts of the next generation.