



Developmentally Appropriate

School Readiness for Infants and Toddlers? Really? Yes, Really!

Sandra Petersen

If it is true that “new discoveries in neuroscience suggest that school readiness interventions might come too late if they start after the child is three years old” (Lally 2010, 1), then the infant/toddler field *must claim* the concept of school readiness. The brain’s foundation for all later learning is created in the first three years of life.

As many researchers, practitioners, and policy makers have defined it, school readiness implies that by the time children enter kindergarten, they have achieved a level of development that makes it likely they will successfully adapt to the challenges of formal schooling (Ladd 2005). *School readiness* refers to “children possessing the skills, knowledge, and attitudes necessary for success in school and later learning in life” (Head Start 2012, 1). For infants and toddlers, school readiness means supporting and protecting the developing brain in such a way that the brain creates a strong physical foundation for learning. This well-constructed organ, the brain, can be curious, pay attention, remember earlier experiences, gather information, problem-solve, and persist through frustration. In other words, this brain has the foundation needed for lifelong learning.

Building a brain

How is it that some brains develop so able to learn and others do not? Well, early experiences matter (Hawley 2000). From good prenatal health care and nutrition through developmentally appropriate early experiences in relationships and in exploration, the young brain should be forming as a learner.

Genes hold the initial plan for the development of the brain’s circuitry (National Scientific Council on the Developing Child 2007). If the expectant mother supplies ample nutrients and a healthy hormonal environment, the pre-

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Practice for Infants and Toddlers

natal brain creates the 100 billion neurons, or brain cells, that make up the newborn brain (Shore 1997). The brain stem and spinal cord establish much of their circuitry before birth, allowing the newborn to breathe, move, and use the senses. In the months before and after birth, an “exuberant period,” the brain creates as many as two trillion connections, or synapses, per second between neurons (Hawley 2000), each capturing a moment of learning.

The foundations of learning

In infancy, foundations are set for later learning in each area of development—the language, motor, cognitive, and social-emotional domains. In language, the infant “computes” or maps out the patterns of sounds in her home language (Meltzoff et al. 2009) while babbling and practicing producing sounds for communication. In motor development, the infant moves from reflex responses to being able to balance, resist gravity, and move. Cognitively, in the first two years, infants and toddlers master concepts about cause and effect, object permanence, using tools, and understanding spatial relationships and number relations. Most important, in the social-emotional domain, infants and toddlers are developing a sense of what it is to be human, to be in relationships with others, to express and understand emotions, and to behave toward others in ways that match the values, beliefs, and behavior of their own culture (Wittmer & Petersen 2009). Each of these skills must be established in infancy to achieve proficiency throughout life in the four domains.

However, there are also skills that cross all domains. These are the ways we use our brains for learning throughout our lives, often called *foundations of learning or approaches to learning*. Effective, engaged learners are curious, focus attention, remember earlier experiences, gather information, solve problems, and persist even when they are frustrated by a difficult task. These skills, learned in infancy through relationships with responsive, invested adults, are the foundation for later skills and learning.

Curiosity

Infants are born with a strong desire to explore and learn. Their intrinsic motivations include curiosity and exploration, self-efficacy, competence, and mastery, which are recognized as biologically based (Papoušek 2011). Adults can encourage curiosity in infants in two developmentally appropriate ways:

- Create home and caregiving environments where an adult doesn’t need to say “No!” Instead, the adult offers a safe setting and encouragement, such as “Hey, buddy, you’re crawling everywhere. You’re finding things all over the place!” In early care and education programs, such an environment has a small group of children, a low child-to-teacher ratio, and furniture, toys, and materials arranged so they are readily available to children, with a clear eye to safety. An environment like this mostly requires supporting, rather than getting in the way of, children’s natural curiosity.
- Share the wonder and joy of discovery through your relationship with the infant or toddler. For example, say, “That little ball squeaks every time you squeeze it,” looking into the infant’s eyes and laughing with delight that matches his. When your words and expressions mirror a child’s feelings, you add depth to each experience.

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Attention

Infants are born reacting to their body's experiences of hunger, discomfort, fatigue, and cold. As infants slowly develop the ability to manage, or regulate, their reactions, they have increasingly longer periods of being alert and paying attention. Self-regulation is a necessary skill for learning. Adults can use developmentally appropriate practices to help infants and toddlers manage their reactions by

- tending to their physical needs promptly, with a caring attitude, and using words to describe the situation, such as "You're so tired, Little One. I'm going to help you fall asleep. Let's rock and I'll sing a lullaby."; and
- paying attention, with the infant or toddler, to what she is doing and finds interesting. An adult can extend a young child's attention by adding an interesting new element to the moment: "Oh, you've added another block, and another block, and even more! Is there something you could do with these little animals and those blocks?"

Memory

Infants as young as 3 months can reproduce an action up to two weeks after seeing it, if they have enough opportunities to practice (Rovee-Collier & Cuevas 2009). Memory allows infants to see their world as a predictable place and to store information so that they can build a more complex understanding of the world. Adults help infants develop memory by behaving in predictable ways themselves.

When adults use similar actions, emotional tones, and expressions throughout the day's repeated routines, an infant can create memories—and expectations. Returning toys, books, and clothing to specified areas helps toddlers develop memories. Seemingly endless repetitions of a story, song, or game are another way infants and toddlers build memories and store knowledge. On a child's second visit to the art table, an adult might say, "You want to use playdough again? You played with it before lunch today and many times yesterday. Playdough must be your favorite thing! Where do we keep the playdough?" By talking about things that have happened earlier in the day, adults not only enrich infants' or toddlers' day but also strengthen their ability to remember.

Information gathering

Infants gather information about the world by using both observation and their senses to try new ways to use materials (Meltzoff 2007; Pinkham & Jaswal 2011).

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Infants and toddlers are learning about everything all at once, and they use every skill in all domains to capture the information in "anything new, unexpected, or informative" (Gopnik 2009). This information is stored in the brain's circuitry, to be used for building increasingly complex concepts such as developing stories in pretend play.

Adults teach young children by accepting their strong feelings, giving children their attention, interacting with them, and keeping them safe while allowing them to explore. One developmentally appropriate practice is the use of meaningful language to describe feelings, actions, and objects. For example, when adults use words to describe activities, they encourage children to deepen their learning experience: "That's a big hole you're digging. You're working hard! You're using the shovel and the pail." Infants and toddlers need opportunities to explore on their own and during interactions with a caring adult.

Problem solving

Infants and toddlers encounter many confusing problems during their days. Fitting stacking cups together, sitting down after pulling up to stand, and getting food from the plate to the mouth on a spoon are just a few of the developmentally appropriate challenges they must figure out throughout the day.

Adults help infants and toddlers learn how to solve problems by allowing them time to find a solution, through trial and error or by using information from earlier experiences. When a child does need help, the adult offers just enough assistance for the child to take the next step.

Persistence through frustration

During the third year of life, most toddlers can regulate their feelings enough to continue working through an age-



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appropriate challenge such as finishing a three-piece puzzle or climbing a small structure. Adults support 3-year-olds in managing this control by helping them regulate their reactions, starting in early infancy: “You can do it! Come on, you’re

almost here.” Young infants need comforting when they are tired or hungry, mobile infants need encouragement when they fall, and toddlers and 2s need help negotiating with friends and navigating a world full of new experiences.

In summary

For young children, a well-constructed brain, able to use a variety of learning skills, depends on genetic make-up, the environment, and most important, the children’s relationships with adults who are attentive to them, care deeply about them, and support them through the massive amount of learning that occurs in the first three years of life. The infant/toddler field *owns* the concept of school readiness because we are devoted to having the enduring, nurtur-

ing relationships with young children that help create the healthy brain. We further support learning by implementing developmentally appropriate practice through experiences, interactions, and environments.

Curiosity about people, words, numbers, and how the world works makes primary grade students ready to succeed in learning. Primary teachers highly value children’s ability to pay attention to their projects and the teacher’s directions. Memory helps children build on knowledge they already have in order to understand more complex concepts and engage in elaborate play. Having problem-solving skills helps in learning academic skills and concepts and is very important for settling differences when children have conflicts. Finally, the ability to continue work on a problem or a project when it becomes frustrating is vital in elementary and secondary school—everyone has had a salt map that crumbles or an impossible math problem. We can support the development of children who maintain the wonder and skills for learning throughout their lives.

References

- Gopnik, A. 2009. “Your Baby Is Smarter Than You Think.” *New York Times*, August 15. www.nytimes.com/2009/08/16/opinion/16gopnik.html?_r=1&pagewanted=1.
- Hawley, T., with M. Gunnar. 2000. *Starting Smart: How Early Experiences Affect Brain Development*. 2nd ed. Washington, DC: ZERO TO THREE; Chicago: The Ounce of Prevention Fund. <http://main.zerotothree.org/site/DocServer/startingsmart.pdf?docID=2422>.
- Head Start. 2012. “Head Start Approach to School Readiness.” <http://eclkc.ohs.acf.hhs.gov/hslc/sr/approach/pdf/OHSApproach-to-sr-complete.pdf>.
- Ladd, G.W. 2005. “School Readiness: Preparing Children for the Transition from Preschool to Grade School—Comments on Love and Raikes, Zill and Resnick, and Early.” *Encyclopedia on Early Childhood Development*. www.child-encyclopedia.com/documents/LaddANGxp-Comments.pdf.
- Lally, J.R. 2010. “School Readiness Begins in Infancy.” *Phi Delta Kappan*. 92 (3): 17–21.
- Meltzoff, A.N. 2007. “Infants’ Causal Learning: Intervention, Observation, Imitation.” In *Causal Learning: Psychology, Philosophy, and Computation*, eds. A. Gopnik & L. Schulz, 37–47. New York: Oxford University Press.
- Meltzoff, A.N., P.K. Kuhl, J. Movellan, & T.J. Sejnowski. 2009. “Foundations for a New Science of Learning.” *Science* 325 (5938): 284–88.
- National Scientific Council on the Developing Child. 2007. “The Timing and Quality of Early Experiences Combine to Shape Brain Architecture: Working Paper No. 5.” www.developingchild.harvard.edu.
- Papoušek, M. 2011. “Resilience, Strengths, and Regulatory Capacities: Hidden Resources in Developmental Disorders of Infant Mental Health.” *Infant Mental Health Journal* 32 (1): 29–46.
- Pinkham, A.M., & V.K. Jaswal. 2011. “Watch and Learn? Infants Privilege Efficiency over Pedagogy during Imitative Learning.” *Infancy* 16 (5): 535–44.
- Rovee-Collier, C., & K. Cuevas. 2009. “Multiple Memory Systems Are Unnecessary to Account for Infant Memory Development: An Ecological Model.” *Developmental Psychology* 45 (1): 160–74.
- Shore, R. 1997. *Rethinking the Brain: New Insights into Early Development*. New York: Families and Work Institute.
- Wittmer, D.S., & S.H. Petersen. 2009. *Infant and Toddler Development and Responsive Program Planning: A Relationship-Based Approach*. 2nd ed. Saddle River, NJ: Pearson.

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