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Want Success in School? Start with Babies!

by J. Ronald Lally

To optimize the probability of success in later life, we must pay far greater attention than we have, traditionally, to the care of children under two. Consider the author's recommendations and imagine what early childhood education could be.

A baby's brain at birth is 25 percent of the size it will be in adulthood, and by age three it is 85 percent of adult size (Dekaban and Sadowsky 1978). The structural development of the brain starts in the womb, continues at a fast pace throughout infancy and toddlerhood, then gradually slows as we age. As we grow older, we still learn and change, but it becomes difficult to rewire brain structures developed earlier.

Throughout life, there are periods when certain experiences are crucial to optimal brain development. If these experiences are absent—or if they are replaced by experiences not congruent with the needs of that sensitive period—development can be thwarted. In the womb, for example, starting at conception and during the first eight weeks of development, organs form. During this period, a fetus that has had the benefit of a mother's good nutrition, healthy constitution, and a limited stress pregnancy will have a high probability of developing strong and healthy organs. A fetus bombarded by drugs, alcohol, cigarettes, and high levels of stress: far less so. This information is understood by most.

What isn't as widely understood is that during the first two years of life, because the brain is not fully formed, the same type of reaction to enrichment or assault that happens in the womb continues as the unfinished brain develops. If we, in the United States, are serious about obtaining better student outcomes, it is imperative that we spend more time and resources building positive experiences and environments for children well before they start school.

Much of what gets in the way of learning in elementary, middle, and high schools has to do with lessons missed, skills undeveloped, and experiences in the world that have shaped the early development of the brain. Neuroscience tells us that early experience, even experience in the womb, is the soil in which the young brain grows and that early experience influences the way the brain is physically constructed (Spence, Shapiro, and Zaidel 1996). Lessons recently learned from genomics, molecular biology, and neuroscience show that, based on early experiences, the brain grows bigger and more capable as it wires itself for expected future experiences. If strong structures are built in the earliest stages of development, the baby's brain

adequately prepares itself for future functioning and the building of additional structures.

Conversely, if strong structures are not built in infancy, the odds are that later in life, future development will take place on shaky ground. Research has shown that the foundations of competence in numeracy, literacy, communication, critical thinking, social interaction, and emotional regulation are built through the experiences infants have with those who care for them in the early years (Spence et al. 1996; Schore 2003; Lally 2009). Yet few of us—including parents and educators—pay as much attention to infants' development of learning capacity as we do to that of 3rd or 4th graders. Instead, we depend largely on luck to deliver children with suitably well-structured brains to the schoolhouse door. If we expect children to be successful in school, we must ensure that their brains are developed adequately in their earliest years of life.

I do not suggest that infancy is the most important period of life. Nor do I propose that attending appropriately to the infancy period will create inoculation—making children invulnerable to later adverse experiences. My argument is that building the right foundations during critical developmental periods early in life optimizes the probability of successful functioning later in life. We must pay far greater attention than we have, traditionally, to the care of children under two. And we have a societal obligation to redirect national resources for that purpose.

Human Development

Given that we humans develop as we do, it is imperative that we start "education" very early in life. Both David Hamburg, the past president of Carnegie Corporation, and Carl Sagan have taught us that the human infant is quite different from infants in other species. And what babies experience during their first two years of life turns them into a special kind of learner (Hamburg 1995; Lawson 2010). After human infants are born, they go through a period of extra-uterine gestation—their brains continue to grow outside the womb. Understanding the role of extra-uterine gestation in human learning is key to understanding why this period of life is so critical to the success of humans throughout their lives.



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Once hatched, a duck can quickly go about its business, while a human infant is completely dependent on adult caregivers for about two years. Hamburg (1995), who describes this time of human development as “prolonged helplessness,” says that—rather than being a weakness—this helplessness is one of humans’ greatest strengths. Beginning when they are born and continuing to about 24 months of age, when the brain takes on an adult-like appearance, individual brains are prepared for successful functioning in the particular society/culture/family into which they are born. Different and more adaptable than the duck, we grow better equipped to function in the world *after* we come out of the womb. It is during this period of life that babies shape their brains by learning from others how to operate.

The human is born with a small brain and dependent on others for a reason. Our helplessness forces us to be dependent on those who care for us and to learn from them while our brain is being structured. Therefore, we can adapt the brain—generation by generation. By having a brain not fully formed at birth, humans are able to adjust to changing conditions, cultures, and technologies. We wire our brains to survive and prosper in the world into which we are born. What is built in infancy steers our future learning. The early development of our brains is truly “school readiness” activity.

Educators Are Getting It

When I share with educators the following example about how early development helps or hinders later success, they nearly always find its lessons relevant to circumstances in their own schools and districts. This is the (true) story: “David,” a young child in a San Francisco daycare center, was about to be expelled for hitting and kicking nearly all other children who came within close proximity. As a last measure, the program director requested help from an early childhood mental health consultant.

Puzzled by David’s behavior, the mental health consultant requested a home visit and found that this 20-month-old child had been badly tormented by two older brothers. Ever since he was a baby, they pushed him around, took his things, and tormented him—so that his

expectations of interactions with young children were shaped by these early experiences with his brothers. Because he had so many bad experiences, he came to expect them; and sure enough, when his brothers came near him, his expectations were validated again and again. So, for his own safety, his brain was wired to anticipate that if a child came near him, he was about to be attacked and needed to defend himself. When he got to child care, he took this piece of learning with him and, even when children were not attacking him, his early experience convinced him that an attack was commencing. He perceived attack and defended himself. His interactions with other children had clearly been shaped by his experiences with his brothers. David had learned to defend himself against any other approaching child.

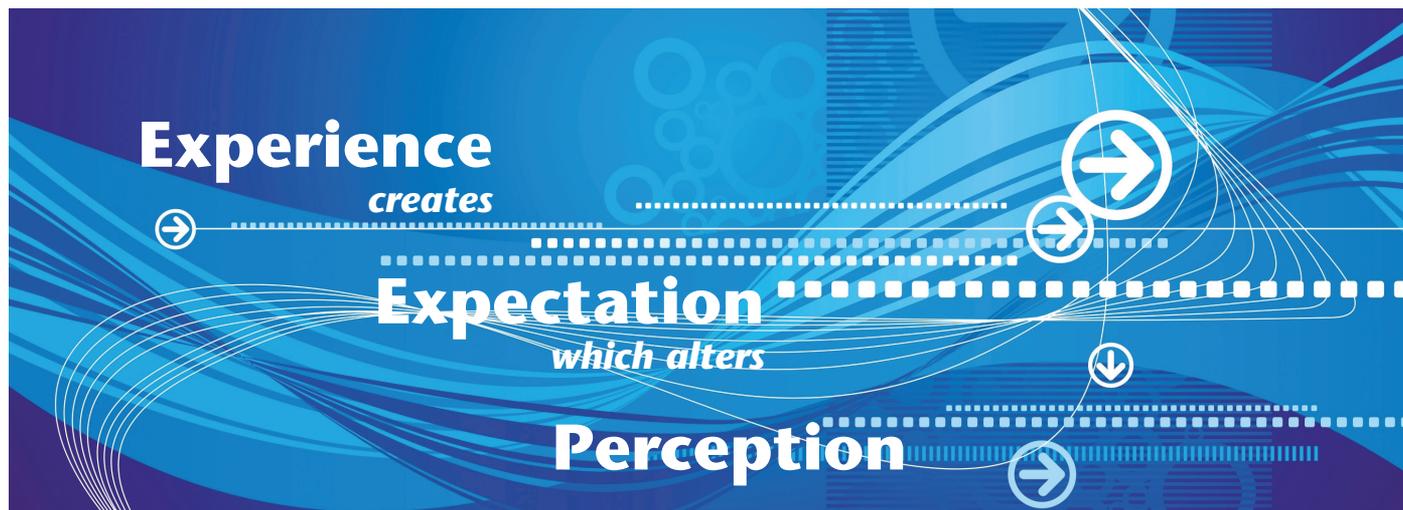
Experience created expectation, which, in turn, altered perception (see Figure 1). Such shaping is a common way the brain gets wired, and many children come to school with all sorts of perceptions that can interfere with learning.

David’s story ends well. The early childhood mental health consultant was able to help correct his perception problem through steps we might view as “rewiring.” She began to sit close to the young boy, inviting other children with easy temperaments to sit next to her, but not directly next to David. She carefully placed her own body between the two children, placing toys of possible interest in front of her—providing psychological and physical safety so that David could play with protection.

She taught the child-care providers this approach, which they then used until it was possible to gradually withdraw from the play experience without David fearing attack. Within three months, this child was able to play with other children in child care without attacking them. His perceptions of the experience and his expectations had been, in effect, rewired.

I ask educators who hear this story what David’s later school behavior might have been had this intervention in child care not taken place. Many describe children in their schools who have issues related to impulse control and self-regulation, as well as those who seem unable to stay focused on schoolwork or develop positive peer relationships. They also frequently bemoan

Figure 1. A Common Way the Brain Gets Wired



(Lally 2008)

the extensive attention their teachers must devote to classroom management.

These educators often report frustration because student-teacher ratios make the kind of intervention David received prohibitive, while, at the same time, they express interest in finding ways to prevent behavioral problems before children enter school. What I often suggest is that they advocate for specific supports for children during four especially sensitive periods of early development.

Period 1: Brain Cell Creation, Migration, and Connection *(Conception through Delivery)*

Because critical components of brain development occur during pregnancy, the healthy development of the child while in the womb needs to be supported. Expectant mothers (and the babies' fathers) need counseling about the negative effects of environmental toxins, prolonged stress, and other assaults on the developing brain. For fetuses developing in mothers who are in families exhibiting the preceding conditions, special protective services by nurse practitioners, doulas, and mental health specialists should be available.

Recommendation: Prenatal health-care coverage for all families, regardless of income, universally accessible professional/paraprofessional support and counseling during pregnancy, and intervention services for at-risk pregnancies.

Period 2: Bonding *(Birth to 9 months)*

During the earliest months of life, parents must be accessible to young babies for optimal development to occur. At birth, human babies instinctively seek out someone who will care for them. There is a built-in, natural survival mechanism, designed to ensure that they receive their basic needs for food, shelter, safety, and protection. Even this early in life, the brain wires itself to prolong quality care or deal with the stress of not getting it (Belsky and Cassidy 1994; Sroufe 1996; Honig 2002). If babies don't get these early needs met, they will die. If they are met erratically and unpredictably, their brains are shaped to operate in a high-stress environment.

These first relationship experiences, positive or negative, influence the child's participation in future relationships. Early communication and connection activities serve as the base for future learning. Specifically, the quality of the care babies receive from their primary caregivers influences the baby's ability to successfully or unsuccessfully attach to other human beings (Sroufe 1996).

Research suggests that the attainment of an attachment bond is the first step in the development of complex cognitions (Schoore 2001; 2005). Crucial brain structures are built during this period of life—pathways for future emotional and social activity and the foundational bedrock for later language and intellectual development.

Stanley Greenspan (1990) has postulated that it is the pleasure and delight that babies get from interaction with people that drive them to relate to people more frequently and more skillfully.

Based on reactions to behaviors they have attempted that successfully got their needs met, babies develop primitive communication styles and intellectual strategies to keep them connected to and receiving care. So, it is important at this time that: 1) babies have parents present so that they can form strong attachments; and that 2) parents have professional services available to them during the bonding period to both assist them through the attachment process and to identify, treat, and refer when the attachment experience is in jeopardy of being derailed.

Recommendation: Paid parental leave for all families with a newborn for the first six to nine months of the child's life; visits to the homes of all newborns for the first 18 months by trained professionals that include guidance for parenting and healthy development, developmental screenings to identify physical and behavioral needs with referral, and special services for families in crisis.

Period 3: Supported Exploration (7 to 15 months)

As babies get a little older, they grow in both their physical and mental abilities. They crawl off to explore the world. They learn, for example, about differences and similarities and build their brains, through their explorations, to develop groupings of hard things, soft things, sticky things, and fuzzy things. And in order to do all of this, they rely on their caregivers to provide safe and interesting environments for exploration. Remaining very dependent on them for care protection, they look back from time to time to see whether their caregiver is checking on them. If so, they feel safe enough to continue exploration. If not, they interrupt exploration and concentrate on regaining connection, or become upset and stop exploring. When things get a little scary, they may crawl back to their caregiver to make physical contact and then, once emotionally charged, go out and explore some more. They also try to share their discoveries, showing those who care for them what they have discovered, looking to

them to share their excitement of learning, and seeking validation.

During this period of life, babies become more confident in their short-term independent excursions if they are assured that they have not been abandoned (Raikes 1993, 1996; Raikes and Edwards 2009). Research has shown that early emotional security is the foundation for early intellectual activity. As Allan Schore (1996, 59) has written:

During the first and second years of life, the infant's affective experiences, especially those embedded in the relationship with the primary caregiver, elicit patterns of psychobiological alterations that influence the activity of subcortically produced trophic biomines, peptides, and steroids that regulate the critical period growth and organization of the developing neocortex.

As babies go through these early interactions, they learn all kinds of things and use their early learning as the base for future learning. Their brains are being readied (or not) for school.

At about 13 months of age, babies use these trusted connections to learn even more about how to act successfully in the world. Newly mobile babies are wired to watch those around them for tips on how to act in relation to environment—such as foods, animals, locations. They observe how others act to learn which situations to avoid or fear and train their brains to alert them to do the same (Knudsen 2004; Thompson 2009) and, in doing so, the brain grows. At this time they are building an understanding of the world from the back-and-forth exchanges they have with those who care for them.

Also, during this period, the brain starts shaping a sense of self. Babies start out innocent, trusting, and unguarded and take in messages from those who care for them (Belsky, Spritz, and Crnic 1996; Honig 2002). In reaction to day-to-day experiences, they gradually form perceptions of how they are regarded, and what they are allowed and expected to do. By 20 months they have developed a preliminary understanding of themselves that will influence future experiences, expectations, and perceptions. They come to incorporate feelings like:

The Role of Early Interaction and Care in the Growth of Brain Structure

- Early brain growth is dependent on social/emotional experience and influenced by social interaction.
- The self-organization of the developing brain occurs in the context of relationships with other selves, and other brains.
- Early brain growth is fueled by emotional communication and motivated by pursuit of an attachment bond.
- Input from social interactions embedded in early attachment relationships sculpts the cellular architecture of the cerebral cortex.
- The maturation of the neural mechanisms involved in self-regulation is experience dependent, and embedded in the attachment relationship.
- The early building of crucial structures and pathways of emotional functioning serve as the fundament for future emotional and social functioning and as the bedrock for language and intellectual development that follows.
- The construction of a child's first "sense of self" occurs through perceptions gained from caregiver/child interaction.

- I am protected *or* I am not.
- Mostly my needs are met *or* they are not.
- How I express my emotions is accepted *or* it isn't.
- I am listened to *or* not.
- I am liked *or* not.
- I am allowed to explore *or* I am not.
- What I choose to do is valued *or* it isn't.

For many children these important first notions of self are built on relationships with inadequately trained (and lowly paid) child-care providers. Currently only 10 percent of American infant care is rated as high quality, while 40 percent is rated as harmful (Cost, Quality, and Child Outcomes Study Team 1995; Vandell et al. 2010). For babies to get the type of care that nourishes their brains, their teachers must be educated in early childhood development and brain development and know how to provide appropriate care during the various sensitive periods, and their parents need guidance during this sensitive period.

Recommendation: Strong infant-toddler child-care regulations need to be put in place to ensure that care is provided in safe, interesting, and intimate settings. Children must have the time and opportunity to establish and sustain secure and trusting relationships with knowledgeable caregivers who are responsive to their needs and interests. Infant-toddler child care must guarantee small groups, low adult-to-child ratios, personalized care, trained caregivers, and continuity of infant/caregiver relationships. Compensation for infant and toddler teachers should be at the same level as school teachers. To ensure high-quality care, either programs or parents need partial child-care subsidies. In the United States, families pay 80 percent of child-care costs (NACCRRRA 2010,

9); in Europe 20 percent (HM Revenue & Customs 2011, 45).

Primary and preventive services for parents should be continued through this period, along with counseling on facilitating early emotional, social, language, intellectual, and perceptual/motor development.

Period 4: Self in Relation to Others (15 to 30 months)

Toddlers need role models and guides for appropriate behavior, help with the development of self-regulation skills, rich language interactions, and interesting environments and intellectual challenges. The ability of parents and infant-toddler teachers to provide appropriate guidance through consistent, sensitive, responsive care is crucial to the development of the "executive function" (working memory, inhibitory control, and mental flexibility) skills crucial to successful school functioning. At this age, young children are moving from dependence on and need for external behavioral controls supplied by their caregivers to the development of internal controls.

At the same time, they are experiencing an explosion in expressive language abilities and the ability to form and test hypotheses. They look to the adult for help in all these areas. By the time they are 15-months old, they are starting to get messages from those who care for them about appropriate social behavior. They are starting to learn from the modeling and mentoring of those around them which of their behaviors they need to regulate and in what situations regulation has to occur (Spence et al. 1996; Shonkoff and Phillips 2000; Bornstein et al. 2008). They take in the ways they are treated as examples of how the world works and how to act in it. This is the way people express emotions; these are the things

people get yelled at for; these are the ways to approach people; and, this is how inborn curiosity is accepted.

By 20 months of age, toddlers are actively looking to their caregivers for information about the “rules of the road” of their society, learning lessons about self and about self in relation to others. As they move toward the age of two, they use their relationships as models for accepted ways to communicate and appropriate ways to engage others socially. Through positive interactions with those who care for them, imitation of appropriate behaviors, assistance with emotional regulation, and the provision of healthy language and intellectual exchanges, the child brain builds strong structures that ready it for future learning (Spence et al. 1996; Shonkoff and Phillips 2000).

By 24 months of age, emotional grounding, social skills, character traits, and assumptions about learning—all crucial to success in school—have formed. They will continue to be shaped throughout life, but will be revised from this early developed base. Babies come to their third year of life with varied strengths in the following areas (Thompson 2009):

- Quality of attachment to others.
- Ability to regulate impulses.
- Skills for communicating with others.
- Confidence to engage in the challenge of learning.
- Ability to persist while learning.
- Alacrity to use adult models for learning.
- Ability to retain some information while attending to something else (working memory).
- Ability to switch attention or mental focus (cognitive flexibility).

Recommendation: Same as for previous period.

A Unique Opportunity

We, in the United States, are at a period of historic education reform when parents, child-care providers, educators, and policymakers can look to basic research for clear direction on the best ways to prepare children for school. And recent research on the early development of the brain is quite clear:

start early, with attention to the period of life when brain development moves at its most rapid pace. 

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