

The success of community and economic development depends greatly on how a society invests in healthy child development. Proper child development in turn relies heavily on support provided by parents and other caregivers. Scientists, researchers, educators, and policy makers uphold different, but inter-connected theories about which types of support are most important for proper child development. Some research focuses on “nature,” such as the relationship between brain development, prenatal care, and early childhood experiences, while other studies examine “nurture,” focusing on the emotional and intellectual factors necessary for well-developed individuals.

### **Brain Development**

Initial brain development occurs prior to birth and continues, at varying rates, throughout life. The neural tube first develops 16 days after conception, fuses shut approximately 6 days later, and ultimately transforms into the brain and spinal cord of the embryo beginning 27 days after conception (Zero to Three, 2009). By 2 months after conception, the fetus produces approximately 250,000 neurons, or nerve cells, every minute (Herschkowitz & Herschkowitz, 2009). Neurons contain information which allow for sensing, feeling, thinking, learning, and remembering. At birth, a baby possesses approximately 100 billion neurons, and very limited nerve cell formation takes place after birth (Herschkowitz & Herschkowitz, 2009).

Neurons do not function in isolation; they send their information to the varying regions of the

brain through connectors called synapses. Together the neurons and synapses create the “wiring” of the brain and “the number and organization of these connections ... influence everything from the ability to recognize letters of the alphabet to facility at managing complex social relationships” (Hawley, 2000).

Unlike neurons, synapses are formed after birth during prescribed times, called critical periods, throughout the various regions of the brain. By 8 months old, babies can have over 1,000 trillion synaptic connections, more than they will need as adults (Hawley, 2000). As a result, the brain becomes more efficient during the childhood years by keeping the synaptic connections that are used and “pruning” away the unused connections. “Because the brain operates on the ‘use it or lose it’ rule, an ‘over-pruning’ of these connections can occur when a child is deprived of normally expected experiences in the early years. This leaves the child struggling to do what would have come more naturally otherwise” (Hawley, 2000).

### **Parenting and Brain Development**

Supporting healthy brain development begins in the prenatal period by keeping the mother healthy. “The immature brain is far more vulnerable to toxic exposures than that of an adult. Mature brains have a barrier of cells that restrict the entry of chemicals from the bloodstream into brain tissue, but that protective barrier is absent in the fetus and only reaches maturity in the first year after birth” (National Scientific Council on the Developing Child, 2006). Exposure to environmental hazards,

smoking, taking drugs and certain medications, drinking alcohol, lack of or improper nutrition, and certain illnesses (such as rubella or chicken pox) all have a negative effect on the developing brain of a fetus. In addition, when mothers do not receive prenatal care, the babies are three times more likely to be considered low birth weight and five times more likely to die (The National Women's Health Information Center, 2009).

### **Emotional Development**

Emotional development encompasses the ability to recognize and understand one's own feelings and the feelings of others, to handle and express strong emotions appropriately, to regulate behavior, and to create and sustain relationships. In addition, positive emotional development during a child's first few years sets the stage for healthy physical and intellectual development.

- Infants cannot control how they express negative and positive emotions. They cry when hungry, cold, wet, or uncomfortable and relax when fed, soothed, and held. Yet, they do begin to create an association between the availability and sensitivity of the caregiver and their negative and positive emotions.
- Toddlers and preschoolers acquire a larger range of emotions, making their emotional states more complex and dramatic. As they begin to understand the intricacies of what their caregivers do, they also learn how to manage and interpret their feelings.
- By the end of preschool, children can anticipate, talk about, and use emotions in everyday situations. They begin to experience pride, shame, guilt, and embarrassment, important to healthy development in a social society.

(National Scientific Council on the Developing Child, 2004).

The chart at the end of this research brief provides more milestones in the average child's emotional development from birth to age 5.

### **Parenting and Emotional Development**

Parents, family members, other caregivers, and a few peers represent young children's sole relationships. If that child is to develop

emotional health, those relationships must be secure, consistent, responsive, and physically and emotionally nurturing (Kagan, Britto, Kauerz, & Tarrant, 2005). Children who receive sensitive and attentive care are more likely to develop secure relationships as young adults that encourage emotional development and protect from stressful life situations. Those children are also more likely to experience success at school, in the community, and at the workplace as adults (National Scientific Council on the Developing Child, 2007).

On the other hand, "young children who grow up in homes that are troubled by parental mental-health problems, substance abuse or family violence face significant threats to their own emotional development. In fact, the experience of chronic, extreme, and/or uncontrollable maltreatment has been documented as producing measurable changes in the immature brain" (National Scientific Council on the Developing Child, 2004). In Texas during 2008, over 70,000 children were abused or neglected (Texas Department of Family Protective Services, 2009). Of those children, 50,310 were physically neglected, 14,858 were physically abused, 6,468 experienced sexual abuse, and 213 died as a result of their neglect or abuse.

### **Intellectual Development**

The young mind has an amazing capacity for language. At birth, infants have the ability to learn any language. However, at eleven months, infants focus on sounds in the language modeled by their parents and begin to lose the ability to distinguish between slight differences of sound in other languages (Public Broadcasting Service, 2001). In addition, the level of parental support and skill in developing reading proficiency, mathematical proficiency, expressive language ability, and fine and gross motor ability appears to influence children's overall intellectual development.

#### *Reading proficiency*

Research demonstrates a relationship between maternal education, poverty, and lower levels of child literacy (Brown et al., 2004). For example, kindergartners whose mothers did not finish high school recognized letters only 38%

of the time compared to 86% letter recognition in children whose mothers held a bachelor’s degree. The research also found that children who developed strong literacy skills early were likely to experience academic success throughout their lives.

*Mathematical proficiency*

Early mathematical skills, including counting, patterns, and spatial relationships, provide the basis for formal mathematics education provided in schools. Brown and his colleagues (2004) found that children of mothers without high school degrees were mathematically proficient in kindergarten 32% of the time, while 79% of mathematically proficient kindergartners had mothers with at least a bachelor’s degree.

*Expressive Language*

Expressive language ranges from an infant’s cooing to complex vocabulary and sentences spoken by children. Children who do not learn to speak expressively are at higher risk for social and academic challenges (Brown et al., 2004). This area of development varies widely from child to child; abnormal development in this area could require medical intervention.

*Motor Skills*

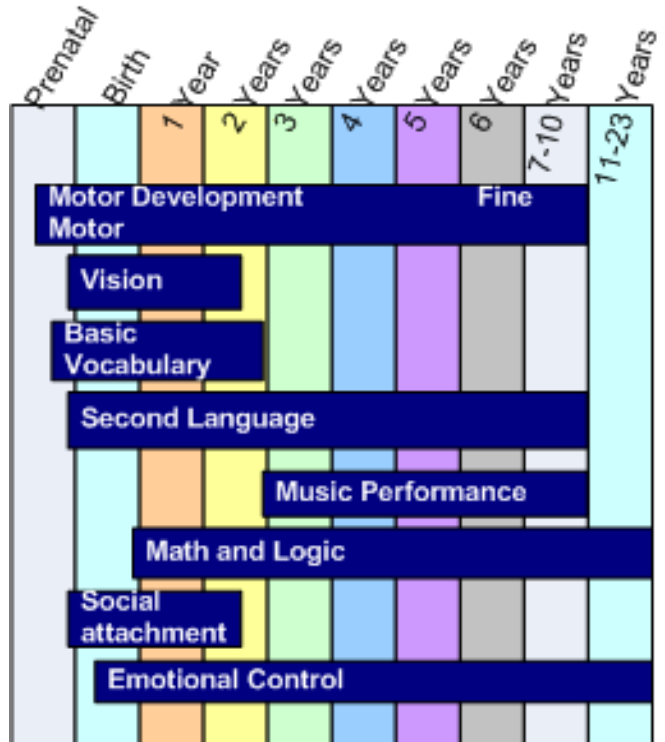
Motor skills can be classified as visual, fine, or gross. Visual motor skills are essential for developing reading ability. Fine motor skills are used for detailed tasks, such as drawing. Gross motor skills occur when balancing, hopping, and walking. Brown and his colleagues (2004) found that lack of normal motor skills results in potential academic challenges, lack of concentration, behavioral issues, lowered self-esteem, and improper social development. This research also showed that 31% of kindergarten boys received low gross motor skills assessments, compared to 22% of their female peers.

The chart at the end of this research brief provides average milestones in a child’s intellectual development from birth to age 5.

**Parenting and Intellectual Development**

After birth and throughout childhood, parents must receive education that shares the critical periods for their child’s intellectual

development. They can then be taught to provide experiences that facilitate these specific types of learning. The chart below illustrates some of the most sensitive periods in which parents can influence their child’s brain.



(Piwowarczyk, 2006)

Brown and his colleagues (2004) supplied research-based suggestions to improve children’s intellectual skills. Reading proficiency improves when parents read regularly to their children, provide books, and model reading behavior. Concrete methods for improving mathematical proficiency include engaging toddlers and preschoolers in counting, sorting, identifying shapes, and measuring. Expressive language is improved when mothers spend more time speaking to their children; research showed particular benefits when speaking to children as they dressed and ate. Motor skills are improved through active practice, with minimal television viewing recommended. Fine motor skills are enhanced using crayons, blocks, and puzzles, while gross motor skills progress through plenty of running, dancing, and jumping.

Average Child Development	
Emotional/Social	Intellectual/Physical
<p><b><u>Birth to 1 month:</u></b> Generalized Tension</p>	<p><b><u>Birth to 1 month:</u></b> Sensory Capacities: makes basic distinctions in vision, hearing, smelling, tasting, touch, temperature, and perception of pain</p>
<p><b><u>2 to 3 months</u></b> Delight Distress Smiles at a Face</p>	<p><b><u>2 to 3 months</u></b> Sensory Capacities: color perception, visual exploration, and oral exploration. Motor Ability: control of eye muscles, lifts head when on stomach.</p>
<p><b><u>4 to 6 months</u></b> Enjoys being cuddled</p>	<p><b><u>4 to 6 months</u></b> Sensory Capacities: localizes sounds Motor Ability: control of head and arm movements, purposive grasping, rolls over.</p>
<p><b><u>7 to 9 months</u></b> Specific emotional attachment to mother. Protests separation from mother.</p>	<p><b><u>7 to 9 months</u></b> Motor Ability: control of trunk and hands, sits without support, crawls about.</p>
<p><b><u>10 to 12 months</u></b> Anger Affection Fear of strangers Curiosity, exploration</p>	<p><b><u>10 to 12 months</u></b> Motor Ability: control of legs and feet, stands, creeps, apposition of thumb and fore-finger. Language: says one or two words, imitates sounds, and responds to simple commands.</p>
<p><b><u>1 to 1 ½ years</u></b> Dependent Behavior Very upset when separated from mother Fear of Bath</p>	<p><b><u>1 to 1 ½ years</u></b> Motor Ability: creeps up stairs, walks (10-20 min), and makes lines on paper with crayon.</p>
<p><b><u>1 ½ to 2 years</u></b> Temper tantrums (1-3yrs) Resentment of new baby</p>	<p><b><u>1 ½ to 2 years</u></b> Motor Ability: runs, kicks a ball, and builds 6 cube tower (2yrs) Capable of bowel and bladder control. Language: vocabulary of more than 200 words</p>
<p><b><u>2 to 3 years</u></b> Fear of separation Negativistic (2 ½ yrs) Violent emotions, anger Differentiates facial expressions of anger, sorrow, and joy. Sense of humor (Plays tricks)</p>	<p><b><u>2 to 3 years</u></b> Motor Ability: jumps off a step, rides a tricycle, uses crayons, builds a 9-10 cube tower. Language: starts to use short sentences controls and explores world with language, stuttering may appear briefly.</p>
<p><b><u>3 to 4 years</u></b> Affectionate toward parents. Romantic attachment to parent of opposite sex (3 to 5 yrs) Jealousy of same-sex parent. Imaginary fears of dark, injury, etc. (3 to 5 years)</p>	<p><b><u>3 to 4 years</u></b> Motor Ability: Stands on one leg, jumps up and down, draws a circle and a cross (4 yrs) Self-sufficient in many routines of home life.</p>
<p><b><u>4 to 5 years</u></b> Responsibility and guilt Feels pride in accomplishments</p>	<p><b><u>4 to 5 years</u></b> Motor ability: mature motor control, skips, broad jumps, dresses him or herself, copies a square and a triangle. Language: talks clearly, uses adult speech sounds, has mastered basic grammar, relates a story, knows over 2,000 words (5 yrs)</p>
<p>(Child Development Institute, 2009)</p>	

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