

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 interconnected 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 upon 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 sixteen days after conception, fuses shut approximately six days later, and ultimately transforms into the brain and spinal cord of the embryo beginning twenty-seven days after conception (Zero to Three, n.d.). Neurons contain information which allow for sensing, feeling, thinking, learning, and remembering. At birth, a baby possesses approximately 100 billion neurons, with limited nerve cell formation taking place after birth (You&Me, n.d.).

Neurons create the basic wiring plan of the brain but how they communicate, or connect, is dependent upon use. Synaptic connections are made between neurons to carry information. Connections that are used frequently become fixed while those that are infrequent, or are

never made, eventually disappear. This process is often referred to as “pruning” and is influenced by every experience the child has (Zero to Three, n.d.).

Synaptic connections are formed throughout various regions of the brain after birth during prescribed times. “The cerebral cortex produces most of its synaptic connections after birth, in a massive burst of synapse formation known as the exuberant period. At its peak, the cerebral cortex creates an astonishing two million new synapses every second. With these new connections come a baby's many mental milestones, such as color vision, a pincer grasp, or a strong attachment to his parents. By two years of age, a toddler's cerebral cortex contains well over a hundred trillion synapses. This period of synaptic exuberance varies in different parts of the cerebral cortex: it begins earlier in primary sensory regions, like the visual cortex or primary touch area of the cortex, while it takes off somewhat later in the temporal and frontal lobes, brain areas involved in higher cognitive and emotional functions. Nonetheless, the number of synapses remains at this peak, over-abundant level in all areas of the cerebral cortex throughout middle childhood (4-8 years of age). Beginning in the middle elementary school years and continuing until the end of adolescence, the number of synapses then gradually declines down to adult levels” (Zero to Three, n.d.).

The brain becomes more efficient during the childhood years by keeping the synaptic

connections that are used and “pruning” the unused connections. Because brain development is activity-dependent, every experience, or lack thereof, influences which neural connections remain active. Although pruning is generally a good thing, a lack of experiences can result in over-pruning, which can lead to developmental delays throughout childhood (Zero to Three, n.d.).

#### **PARENTING AND BRAIN DEVELOPMENT**

Supporting healthy brain development begins in the prenatal period by keeping the mother healthy. A child’s developing brain is more sensitive to environmental toxins than the brain of an adult. Exposure to environmental hazards, smoking, taking drugs and certain medications, drinking alcohol, lack of or improper nutrition, and certain illnesses all have negative effects upon the developing brain of a fetus. Prenatal care provides expecting mothers relevant information so that they may avoid an unhealthy pregnancy. When mothers do not receive prenatal care, babies are three times more likely to have a low birth weight and are five times more likely to die (U.S. Department of Health and Human Services, Office on Women’s Health, 2017).

#### **EMOTIONAL DEVELOPMENT**

Emotional development involves “learning what feelings and emotions are, understanding how and why they happen, recognizing one’s own feelings and those of others, and developing effective ways of managing them” (Kids Matter, n.d.). In addition, positive emotional development during a child’s first few years helps to establish healthy physical and intellectual development.

- Infants cannot control how they express positive and negative emotions. They begin to form relationships with those around them from birth and will respond positively or negatively depending on the type of stimulation. They display positive emotions and are comforted by familiar people, and they generally respond negatively when interacting with unfamiliar people.
- Toddlers and preschoolers begin to understand and control their emotions, as

well as begin to show awareness of others’ feelings. They acquire a larger range of emotions, making their emotional states more complex and dramatic.

- By the end of preschool, children can anticipate, talk about, and use emotions in everyday situations. They begin to experience a broader range of emotions (i.e., jealousy, excitement, fear, embarrassment). They are able to handle a difficult task involving control of a negative emotion for a longer period of time.

(Children’s Therapy & Family Resource Centre, n.d.a,b&c)

The appendix provides more milestones in the average child’s emotional development from birth to age five.

#### **PARENTING AND EMOTIONAL DEVELOPMENT**

Parents, family members, caregivers, and a few peers comprise babies’ and young children’s sole relationships. These relationships are paramount, as they provide “the loving context necessary to comfort, protect, encourage, and offer a buffer against stressful times” for the baby (Zero to Three, 2010). Parents particularly influence a child’s emotional development. Children with more emotionally involved parents will have higher emotional competence and regulation. This emotional investment from the start of the child’s life will positively impact the quality of the child’s future relationships. Parents should “foster secure attachment in order for [their] children to grow into emotionally stable adolescents and adults” (Murphy, 2014).

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; they are at-risk of developing social, emotional, and/or behavioral problems as a result (Healthy Place, 2017). In Texas during fiscal year (FY) 2017, CPS conducted and completed 289,796 investigations of child abuse/neglect, and 63,657 reports of child abuse/neglect were confirmed. Of those children, 9,119 were removed from their homes and placed in substitute care as a result

of a child abuse/neglect investigation (Texas Department of Family and Protective Services [DFPS], n.d.). Children who are abused or neglected in their early years often suffer damage that stays with them their entire lives. The implications of the maltreatment of infants are far reaching and surpass the implications of the same treatment later in life, because the brain is still growing and producing connections. Abuse and neglect during this time will change the way the brain develops and the way it reacts to various situations. In FY 2017, 21,751 children under the age of 2 years were confirmed victims of child abuse/neglect (DFPS, n.d.).

### **INTELLECTUAL DEVELOPMENT**

The young mind has an amazing capacity for language. All of the world's languages together comprise around 800 sounds, and a baby is capable of discerning the difference between all 800 sounds. Therefore, infants have the ability to learn any language. However, as they age, children begin to focus on sounds in the language they are exposed to and lose their ability to distinguish between foreign language sounds (Ramirez, 2016). In addition, the level of parental support and skill in developing reading proficiency, mathematical proficiency, expressive language ability, and motor ability appears to influence children's overall intellectual development.

#### *Reading proficiency*

While older research indicates a parent's educational level determines a child's reading level, a study by van Bergen, van Zuijen, Bishop, and de Jong (2016) expanded upon these findings to include a genetic aspect. The study found a correlation between a child's reading proficiency and masked genetic effects, that is, "children inherit from their parent both a genetic tendency for a certain reading level and the home environment they are exposed to." Additionally, van Bergen et al. (2016) found a purely environmental factor: the number of books in the home tends to increase a child's reading skill.

#### *Mathematical proficiency*

Early mathematical skills, including counting, patterns, and spatial relationships, provide the basis for formal mathematics education provided in schools. While mathematics test scores have steadily increased over the past two decades between fourth and eighth grade, there remains a parental education gap. In 2015, eighth graders whose parents were college graduates scored 29 points higher than students whose parents did not have a high school diploma (Child Trends, 2015).

#### *Expressive language ability*

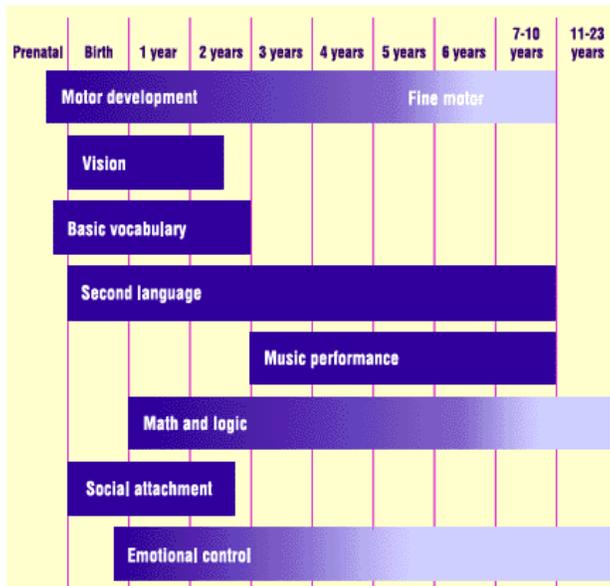
Expressive language ranges from using words, sentences, gestures, and writing to convey messages to others, ranging from an infant's cooing to complex vocabulary and sentences spoken by children. This area of development varies widely from child to child; abnormal development in this area could require medical intervention (Kid Sense, n.d.).

#### *Motor ability*

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 develop while balancing, hopping, and walking. A study at Ohio State University (2010, as cited in ScienceDaily) found that a child who lacks normal motor skills may face academic challenges, behavioral issues, lowered self-esteem, and improper social development. Furthermore, the study found that 86% of disadvantaged preschool children scored below the 30<sup>th</sup> percentile of children nationwide, which is considered developmentally delayed.

### **PARENTING AND INTELLECTUAL DEVELOPMENT**

Parents should receive education that explains the critical periods for their child's intellectual development after birth and throughout childhood. They can then be taught to provide experiences that facilitate specific types of learning. The following chart illustrates some of the most sensitive periods in which parents can influence their child's brain.



(You&Me, n.d.)

Reading proficiency improves when parents read regularly to their children, provide books, and model reading (Family Education, n.d.). Concrete methods for improving mathematical proficiency include engaging toddlers and preschoolers in counting, sorting, identifying shapes and numbers, and measuring (Uscher, 2016). Parents can help to improve their child's expressive language ability by communicating directly to them as early as possible; a child simply overhearing speech does not have the same effect as direct communication (Cary-Stanford, 2013). Fine motor skills are enhanced with activities that practice hand and finger coordination such as using crayons, play dough, and puzzles, while gross motor skills are enhanced by running, jumping, and hopping (Extension, 2015).

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APPENDIX

Average Child Development	
Emotional/Social	Physical/Intellectual
<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 Can be soothed by rocking</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 Recognizes mother</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 Enjoys playing “peek-a-boo”</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: feeds self, creeps up stairs, walks (10-20 min), and makes lines on paper with crayon Language: Repeats a few words</p>
<p><b><u>1 ½ to 2 years</u></b> Temper tantrums (1-3yrs) Resentment of new baby Does opposite of what told (18 months)</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 Facial expressions of anger, sorrow, and joy</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 along with “I”, “me” and “you” and explores the world with language, stuttering may briefly appear</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) Cooperative play with other children</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 Language: Uses “we”</p>
<p><b><u>4 to 5 years</u></b> Responsibility and guilt Feels pride in accomplishments Prefers to play with other children</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>
(Child Development Institute, n.d.)	

