

Brain Facts

Information for this report was obtained from the Families & Work Institute, An Ounce of Prevention Fund, Dr. Dorothy Routh of Florida State University, and the national I Am Your Child campaign. Center for Early Education and Development

Added Notes: During the first year of life the **limbic** (emotional) part of the brain develops rapidly. The **cortex** (the part of the brain that controls logical thinking) is mostly inactive at birth but is actively developing by the end of the first year, thus laying the groundwork for abstract learning and thinking.

Compiled by Diane Gordon for Children, Nature and You (www.childrennatureandyou.org) and Hooked on Nature (www.hookedonnature.org). Diane, a former preschool/kindergarten teacher is director of Children, Nature and You.

MAKING CONNECTIONS

A child is born with over 100 billion neurons or brain cells. That's enough neurons to last a lifetime, since no more neurons will develop after birth. These neurons form connections, called synapses, which make up the wiring of the brain.

EARLY EXPERIENCES

At age eight months an infant may have 1,000 trillion synapses. However, by age 10 the number of synapses decrease to about 500 trillion. The final number of synapses is largely determined by a child's early experiences, which can increase or decrease the number of synapses by as much as 25 percent.

"USE IT OR LOSE IT!"

The brain operates on a "use it or lose it" principle: only those connections and pathways that are frequently activated are retained. Other connections that are not consistently used will be pruned or discarded so the active connections can become stronger.

DEFINING LANGUAGE SKILLS

When an infant is three months old, his brain can distinguish several hundred different spoken sounds. Over the next several months, his brain will organize itself more efficiently so that it only recognizes those sounds that are part of the language he regularly hears. During early childhood, the brain retains the ability to relearn sounds it has discarded, so young children typically learn new languages easily and without an accent.

THE POWER OF THE SPOKEN WORD

The power of early adult-child interactions is remarkable. Researchers found that when mothers frequently spoke to their infants, their children learned almost 300 more words by age two than did their peers whose mothers rarely spoke to them.

However, mere exposure to language through television or adult conversation provided little benefit. Infants need to interact directly with others. Children need to hear people talk to them about what they are seeing and experiencing, in order for their brains to fully develop language skills.

THE LOVING TOUCH

Warm, responsive care giving not only meets an infant's basic, day-to-day needs for nourishment and warmth, but also responds to their preferences, moods and rhythms. Recent research suggests that this kind of consistent care giving is not only comforting for an infant; it plays a vital role in healthy development. The way that parents, families and other caregivers relate and respond to their young children, and the way they respond to their children's contact with the environment, directly affects the formation of the brain's neural pathways.

CREATING ONE STABLE BOND

Researchers who examine the life histories of children who have succeeded despite many challenges, have consistently found that these children have had at least one stable, supportive relationship with an adult early in life.

Glossary of Brain Terms

Neurons - brain cells which are rapidly developed before birth, but are no longer formed after birth

Plasticity - the brain's ability to develop and change in response to the demands of the environment

Synapse - a neuron connection made depending on the stimuli or signals from the brain

Wiring - the architectural design of the brain; the network of connections which allows thinking and learning

Pruning - the elimination of excess synapses or connections that creates a more powerful and efficient system of connections or pathways; pruning also allows the remaining synapses to function at a higher level

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