

## Children's Brain Development

Children's brains are a work in progress. How they develop is related to the experiences they have in their early years. How children's brains develop depends upon how the genes they're born with (nature) interplay with the experiences they have (nurture). There are prime times for acquiring different kinds of knowledge and skills called *critical windows*. These critical windows are when certain parts of the brain can learn the best.

## How Children's Brains Develop

Each child is born with about 100 billion brain cells, which is ten times the number of stars in the entire Milky Way. At birth, the connections between the cells are not very fast. But, the more the brain is stimulated, the faster and stronger these connections become. These connections then become a part of the permanent structure of the brain. But if the brain is not stimulated, the connections between cells dry up. Simply put, the more connections between the brain cells the better because these connections are forming the structures that will allow a child to learn.



## Parts of the Brain

The brain is made up of five major parts:

The **Brainstem** is fully developed at birth. The brainstem is responsible for functions such as blood pressure, heart rate, and body temperature. The brainstem must be fully functional at birth in order for an infant to survive.

The **Cerebellum** controls a person's automatic movements and balance. Dancing, kicking a football, or bringing a cup to the lips to drink are all coordinated by the cerebellum. If a child's cerebellum is damaged, the brain cannot coordinate movement.

The **Midbrain** controls sleep, arousal responses, appetite and motor movements (such as running and skipping). The midbrain is very important for moving.

The **Limbic System** controls emotions and long-term memories. The limbic system can override rational thoughts and parts of the brain controlled by the brainstem such as blood pressure. Stress will cause blood pressure to go up. A part of the limbic system is involved in attaching emotions to memory. So, every time we remember an event, the

emotion comes along with it. Another part of the limbic system converts information from learning and working into long-term memory. It checks new information against stored experiences in order to establish meaning.

The **Cortex** is the “executive branch” of the brain. It regulates decision-making and makes judgments about incoming information. The different regions of the cortex are responsible for processing our vision, touch, hearing, speech, language development, and problem solving, and allows us to plan and rehearse our future actions.

### **Brain Development**

Not long ago, people believed that the human brain quit developing by the time a child was between 6 to 7 years old. Because our brain is about 95% of its adult size around 7 years of age, people naturally thought that size equaled content.

New research has proven that there is a second period of rapid brain development around 11 years of age for girls and 12 to 13 years of age for boys that lasts until the early 20's. ***Pre-teen and teen brains are undergoing more changes and reshaping more during this time than any other time except just after birth.*** The biggest changes are occurring in the prefrontal cortex, which is located just behind the forehead. This part of the brain is responsible for the ability to use logic, make sound decisions and size up potential risks. And because it's still under construction that explains why preteens and teens sometimes show good judgment and sometimes let their emotions take over and make really dumb choices.

For example: Teens know not to drink and drive. But sometimes when they're with their friends, they don't want to be called names, so their brain goes on vacation and their emotions take over. The part of the brain that controls immediate or gut reactions is getting more playing time than the part that controls logic.

The good news is that by about the age of 16 to 17, teens not only survive but flourish! In spite of all these changes. It's estimated that about 80% of teens grow into happy and healthy adults who live productive lives.

## Stages of Brain Development

The preschool period in a child's life is an exciting time. During this time, the child reaches out to the world beyond their home. For them, the world is an exciting place with many things to do, to touch, to experience, and to eat. Although the preschool child may not read or write, or compute logical processes, the quest for knowledge overrides any developmental limitations. The preschool years set the stage for experiences, friends, and accomplishments.

Between the ages of 7 and 10 years, children have gained control of their physical and social behavior and language. They can express themselves easily and take care of many of their own needs. Children have new experiences and new friendships that are outside the family. Socially children should have broken the strong dependency ties with mom/dad in order to achieve more satisfying relationships.



Children learn during this period how to deal with success and failure, how to defend themselves from bullies, and how to interact with other adults. Although these years are socially, intellectually and emotionally rewarding, children face many seemingly insurmountable and catastrophic crises.

Between the ages of 10 and 12 years, children are more sophisticated in their communication patterns, many children will share their experiences if the parents are willing to listen. The abilities acquired before age 6 are now put to new use. Establishing friends in school largely depends on previous learning and interactions with parents in early childhood. Socially children should have broken the strong dependency ties with mom/dad in order to achieve more satisfying relationships.



Children learn during this period how to deal with success and failure, how to defend themselves from bullies, and how to interact with other adults. Although these years are socially, intellectually and emotionally rewarding, children face many seemingly insurmountable and catastrophic crises. One would be hard pressed to find a period of growth and development as challenging as the developmental period of adolescence. Life as a two-year-old toddler probably comes the closest, but

adolescence is by far and away the number one most disruptive, confusing, frustrating, yet engaging period of life. Adolescence is a period of time when everything known to be true is challenged, discarded, or modified. All old ideas, beliefs, morals, and values are looked upon with suspicion. Experimentation is the way of life for an adolescent, along with numerous feelings of success and failure. Rules and expectations are both valued and shunned at the same time. Rules are limits and put a curb on experimentation. However, life without rules or expectations would be too scary and overwhelming for any adolescent.

### **What Every Child Needs**

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| <b>Interaction</b>          | Consistent, long-term attention from caring adults actually increases your child's capacity to learn.               |
| <b>Gentle Touch</b>         | Holding, hugging, and caressing do more than just comfort your child – touch helps his/her brain grow!              |
| <b>Stable Relationships</b> | Relationships with parents and other caregivers buffer stress that can harm your child.                             |
| <b>Safe Environment</b>     | Environments should be free of unsafe materials (like lead paint, sharp objects and other hazards) and loud noises. |
| <b>Self-Esteem</b>          | Self-esteem grows with respect, encouragement and positive role models from the beginning.                          |
| <b>Quality Care</b>         | Quality care from trained professionals when you can't be with your child.  |
| <b>Play</b>                 | Play helps your child explore her/his senses and discover how the world works.                                      |
| <b>Communication</b>        | Talking with your child builds his verbal skills.   |
| <b>Music</b>                | Music expands your child's world, teaches new skills, and offers a fun way to interact with your child.             |

## Reading

Reading to your child from the earliest days of his/her life shows its importance and creates a lifelong love of books, and helps grow a healthy brain!

