

Understanding Early Childhood Brain Development

A Parent Guide for Children Under Three





**DURING THE
FIRST 3 YEARS
A CHILD'S BRAIN DEVELOPS
700 NEURAL CONNECTIONS
PER SECOND.**

What You'll Find:

- What are the basic parts of the brain and their functions?
- Exploring the nature/ nature debate on brain development.
- Critical periods/ sensitive periods- what you can do as a parent to ensure healthy experiences during this time.
- Does music affect your child's brain development?

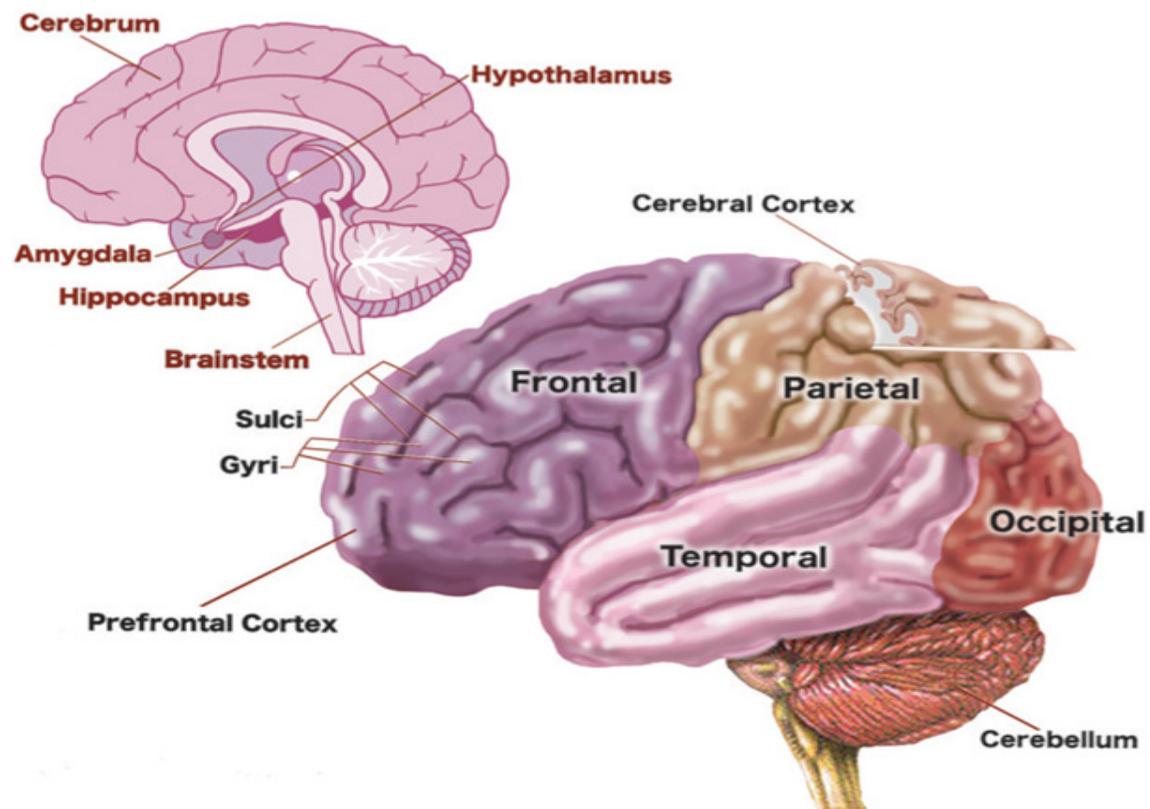
Introduction

The first three years of a child's life are truly remarkable. From helpless infant to walking, talking toddler, and then reading, critical thinking, and social interactions; the transformation is huge. Understanding how the brain develops in this critical time will help you to create a positive, stimulating, and supportive environment for your child. By doing so, you can support their development of emotional, social, and cognitive growth. This guide should better your understanding of brain development and the impact you can have as a parent on your child's future.

The Busy Beginning

Before birth, the basic structure of a child's brain develops, but as you can imagine, it is nowhere near complete. A newborn's brain is about 25% of its approximate adult weight, however by age 3, it will have grown rapidly by making billions of cells and hundreds of trillions of connections, or synapses, between these cells. These rapid connections are a result of sensory stimulation from the

infant's environment and experiences. The connections that are regularly used become stronger and more complex. Connections that are not used are considered, non-essential, and the brain eventually gets rid of them, a process known as pruning. Creating a nurturing and supportive environment will increase the synapses connections and ensure healthy brain development for your child.



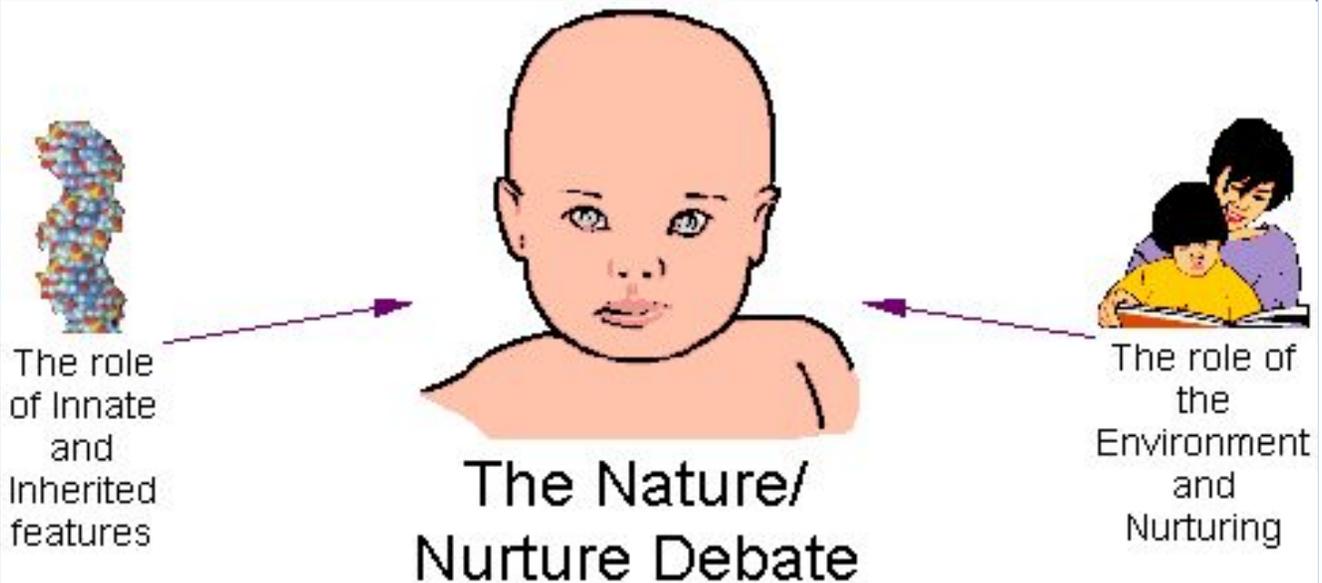
The Parts of the Brain

What are their individual functions?

- **Frontal Lobe:** located behind the forehead and is involved in critical thinking, problem solving, planning, reasoning, and decision-making.
- **Parietal Lobe:** located on the crown of the head and that processes sensory information for smell, taste and touch. An area at the front of the parietal lobe called the motor cortex is responsible for motor coordination.
- **Occipital Lobe:** this part of the brain is responsible for vision.
- **Cerebellum:** one of four major parts of the brain, it is responsible for initiating and timing movements and is important for balance, posture, and coordinating how muscles work together. The cerebellum begins developing after the brain stem, but before the parts of the brain responsible for conscious thought and action.
- **Brain Stem:** one of the four major parts of the brain, it monitors basic, vital functions such as heartbeat, body temperature, and digestion. The brain stem is the first part of the brain to develop.
- **Hippocampus:** part of the limbic system that processes emotions and memories.
- **Amygdala:** part of the limbic system in the brain; responsible for receiving and integrating emotions and emotional information. It works closely with the hippocampus.
- **Hypothalamus:** regulates hormonal interactions with the brain

Please visit this site for more information: <http://www.zerotothree.org/child->

Nature/Nurture Debate on Brain Development



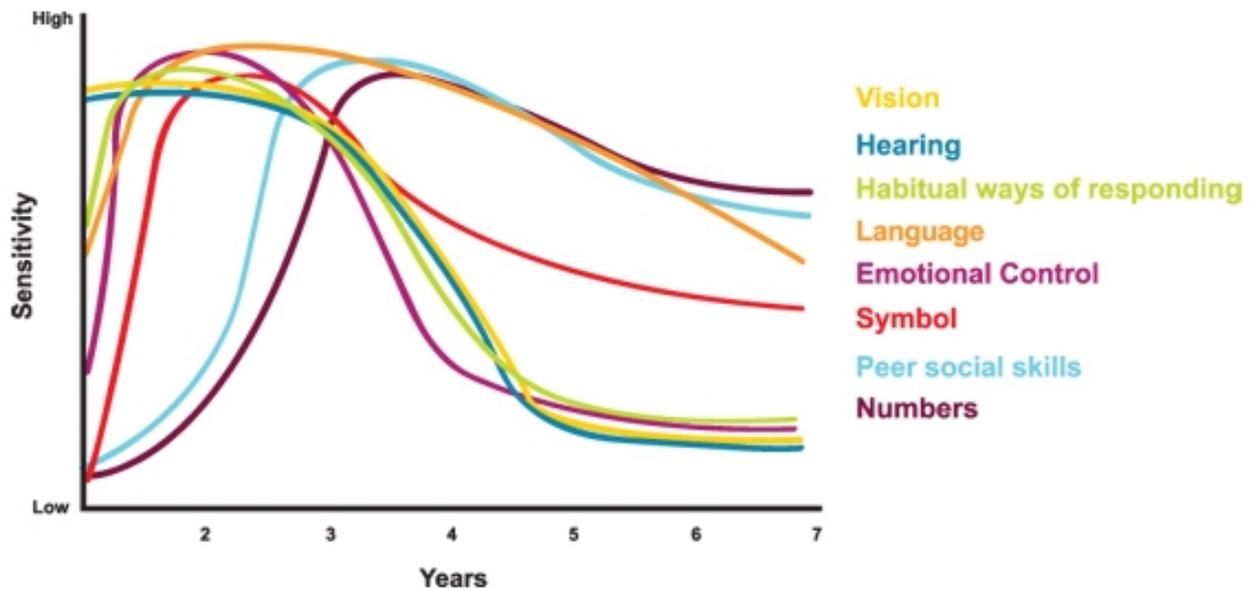
The brain does not exclusively rely on nature or nurture but instead, its development is based on a complex relationship between genes and the environment. To understand this somewhat better, we can use a plant analogy. Genes are like the seed that holds the potential to grow or develop - but without nourishment, it is only a seed. In the same way, a child's experiences and environment are like the soil, water, sunlight, and care that affect how the plant will grow. The genes regulate when specific brain circuits are ready to be formed (the timeline of development.) While at the same time, the child's environment determines how those circuits are formed and functions develop.

"Parents and caregivers play a central role in a child's environment. Adults who are responsive to a child and interact in appropriate ways foster positive development and the proper brain connections are formed. When adults respond inappropriately or are neglectful, then the right connections may fail to form which limits the brains later development."

- Alberta

As a child is exposed to new experiences and stimulants, the brain adapts and develops accordingly. So, a healthy and nurturing home environment helps the brain to form the correct connections necessary for healthy development. A negative environment can cause faulty connections, which hinder development.

Babies will naturally reach out for interactions through their first gestures like babbling, crying, and other signals. As a parent, responding to these gestures in a positive and nurturing way will ensure healthy development of your child. *Please visit this excellent resource for more information:* <http://www.bbbgeorgia.org/brainTimeline.php>



Provided by: <https://www.ecmap.ca/Early-Childhood-Development/Pages/How-the-Brain-Develops.aspx>

Critical Periods

There are several “critical periods” in the first three years of a child’s life. During these periods, critical brain functions go through a series of fundamental growth and development. For example, after an infant is born the critical period for the development of vision and hearing begins. The years between three and four are also critical for development of social skills, often learned at pre-school, daycare, and within families.

It is at these times, or critical periods, that the brain is most influenced, or sensitive to a child’s experiences and environment, both positive and negative. During this stage is the prime opportunity for affective healthy development. By providing an appropriate experience during these critical periods, you can help your child to develop to their full potential.

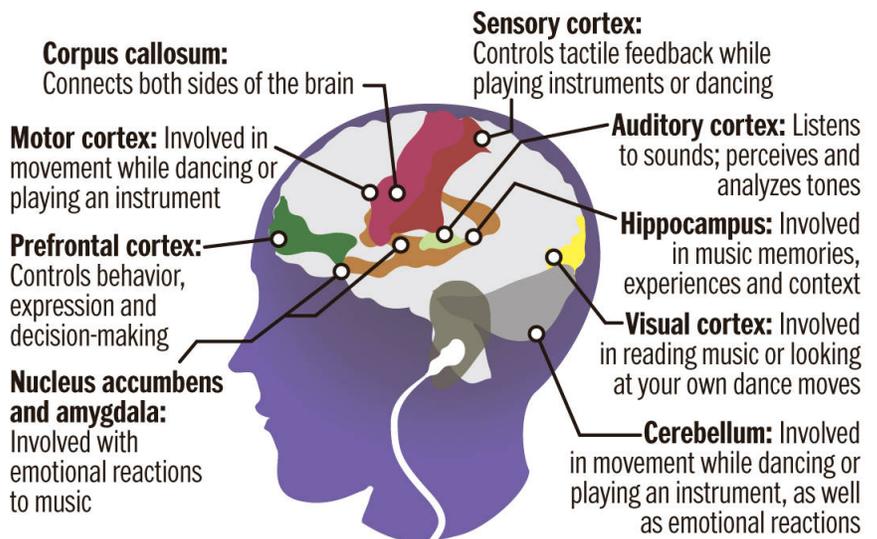
Keep in mind that the brain is built in a certain order, from a sort of “bottom up” aspect. If the lower-level brain circuits aren’t properly developed, then higher-level circuits will be faulty. Speech, for example, must be built on a pre-developed circuit of hearing, which was formed long before a child begins to talk.

Does Music Affect Brain Development?

With the help of cat scans and professional research, there is significant evidence to show what happens to the brain when we listen to music. Each component of music affects a different part of the brain. For example, a familiar song activates the left frontal lobe (memory,) timbre the right frontal lobe, and pitch the left posterior. While one side of the brain is processing the words, the other side is processing the music and beat, which activates the whole brain. By activating the whole brain, with just one activity, children are much more likely to remember or recall information. More specifically, consider the following: short-term memory only has the ability to hold seven pieces of information. If those pieces of information are fused together, like in a song, it can be processed as one whole piece. Thus, the brain is able to condense the information and receive more. Music can also be a critical influence to the development of language and many other developmental milestones.

Music and the brain

Playing and listening to music works several areas of the brain



SOURCE: Music for Young Children

DESERET NEWS GRAPHIC

For more information about music on brain development, please visit the following websites:

<http://www.pbs.org/parents/education/music-arts/the-benefits-of-music-education/>

http://www.earlychildhoodnews.com/earlychildhood/article_view.aspx?ArticleID=601

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