

# Brain Development and Learning Problems in the Classroom

Newsletter for Educators

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## *How Does Brain Development Occur?*

The purpose of this newsletter is to provide educators with valuable information on brain development and learning problems.

When a child is born, they have about 100 billion brain cells or neurons, which is the amount of they will have for their entire life. But these cells have not yet established a pattern or connection between them. When brain cells want to make a connection the dendrite of one neuron attaches to the axon of another neuron. The place where they are connected is called a synapse. For more clarification see Figure 1.1.

Once this connection is made it is never destroyed. A good amount of these connections are done within the first year of life and are shaped by experiences of the child.

When a connection is used repeatedly in the early years, it becomes permanent, and if it not used repeatedly it will be eliminated.

The interactions between educators assisting with a child's environment is what increases the growth and pattern of brain connections. As an educator, you have the power to help a child increase brain development. This newsletter will take a look at four factors: genetics, environmental stimulation, nutrition, teratogens, that affect brain development so that you can identify and accommodate to these factors.

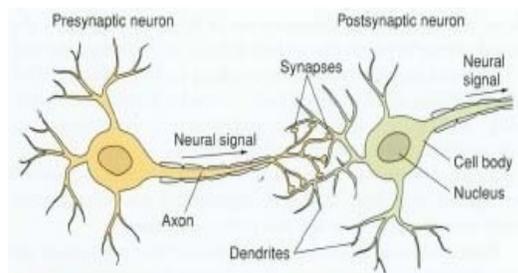


Figure 1.1—Humanillnesses.com

### Useful Resource Section—

[National Center for Infants, Toddlers, and Families](#)

[Mental Health Matters](#)

[World Health Organization](#)

### *Special points of interest:*

- *When a child is born, they have about 100 billion brain cells or neurons.*
- *Some children's brains are already predestined to not have adequate cells and synapses to have normal brain development.*
- *Environmental stimulation and malnutrition can have different effects on brain structure depending on when it occurs in development.*
- *Malnutrition can have different effects on brain development, depending on the time in the student's life when it occurs.*

## ***Factor 1: Genetics and Brain Development***

Genetics plays a role in the brain development process because it controls the way that the cells will turn out. This contributes to learning problems because some children's brains are already predestined to not have adequate cells

and synapses to have normal brain development. In addition, certain genes can cause problems by making the brain smaller and less developed, having less complex patterns of connectivity, reducing levels of myelin, and

abnormal apical dendrites. These abnormalities interfere with brain development during the processes of proliferation, synaptogenesis, and myelination, which therefore causes learning problems in the child.

## ***Factor 2: Environmental Stimulation and Brain Development***

Mental representations must be formed that match students experiences in order to respond to their environment. Research has shown that environmental stimulation can have different effects on brain structure depending on when it occurs in development. For example, if a child does not have environmental stimula-

tion or experiences when they are very young. This could be from not having someone talk to them, read to them, doing learning activities, watching or participating in learning programs, or having social interactions with other children. These activities help to stimulate the synaptic connections to cells which create more con-

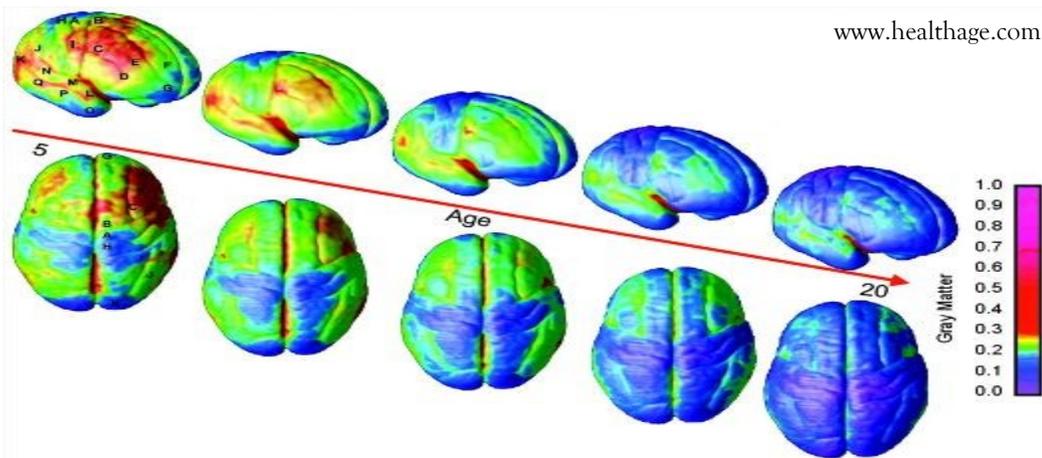
nections in the brain which would increase brain activity during the thinking process as they get older. If children do not have these activities, it will cause a decrease in synaptic connection and brain activity which will decrease brain activity as they get older and therefore increase learning problems.

## ***Factor 3: Nutrition and Brain Development***

Malnutrition can have different effects on brain development, depending on the time in the student's life when it occurs. Nutrition primarily affects proliferation and myelination which are two aspects

of brain development. If these activities are affected in the child, it will slow the proliferation process early in life and later in life, which will cause a decrease in neuron cell development and a decrease in brain

activity. Learning problems can be attributed to the mother's diet during pregnancy; this can have a tremendous impact of the learning levels of the child.



## ***Factor 4: Teratogens and Brain Development***

Teratogens are drugs or viruses which are a foreign material that causes the embryo or fetus to have abnormalities. Not only do teratogens affect the child during development but also during their teenage years. During the teenage years is when the brain is most vulnerable and it is also the time when teen-

agers experiment with drugs. This has a lasting impact on the brain development for the rest of their life. Viral infections have a more permanent effect if it occurs when the cells are proliferating, migrating, or differentiating. Drugs and toxic substances, such as alcohol, marijuana, cocaine, caffeine, nicotine, and aspirin are also teratogens. These

substances have a substantial affect on brain development if the child is exposed to them during the mother's pregnancy. The affects of these teratogens can causes serious learning problems in the child after birth because of the damage to the brain during the pregnancy by alcohol consumption of the mother.