



Center for Early Education and Development

Questions About Kids

What's Going on in My Baby's Brain?

A father tickles his four-month old each night while they play. One day, the baby laughs in response to his father's tickling. A six-month old plays with brightly colored toys every day. He picks up a rattle, pleased with the familiar sound it makes when it moves.

An eight-month old is looking for her mother. When she spies her entering her bedroom, she lets out a yelp and a huge smile crosses her face.

From the moment they are born, babies are learning. So, why all the fuss about early brain development and how babies learn? Thanks to new technologies, scientists are able to learn more about how the brain develops and functions. They are hopeful that, over time, they will be able to help children who have brain damage or developmental difficulties.

With all the public excitement around the brain development information, the current limits of the information have been pushed. Much of what we know is based on studies done with animals. While that information give us insight into what might be happening in the human brain, scientists still have to see if it holds true for human brains. Right now, scientists are trying to find out what parts of the brain are responsible for certain behaviors.

The brain is complicated, and it will take a long time until its mysteries are solved. There's a lot to learn, but we do know that —

- **The window of opportunity doesn't shut at age 3.** You may wonder if the very first years of your baby's life are really the most important for your baby's brain development. While many important developments occur in the brain during the first

few years of life, they don't stop when a child turns three. For the most part, the "window of opportunity" for learning doesn't shut when children are that young. Brain development and learning are life-long processes, and there are many important times. If a developmental problem does emerge, address it as soon as possible.

- **The brain develops in different ways.** Both genes and experience influence the way a brain develops. During pregnancy, genes play the major role in determining the way the brain gets "set up" and how it will work. This is the "hard wiring." During pregnancy and after birth, the experiences a baby has help change, or modify the brain. This is what happens when learning occurs. Changes in the brain are the result of learning.

Three kinds of changes may occur when the brain "learns" from experience. The structure of the brain may change, such as the addition or deletion of connections between brain cells. The amount of brain chemicals used in sending messages through the brain may change. And, a particular area of the brain may become more active. Changes are the result of expected maturation and experience.

- **Different experiences have different effects.** Like babies, the brain doesn't choose its experiences; it responds to both negative and positive experiences. Negative experiences may hinder brain development and behavior. Research conducted mainly on animals shows that exposure to stress (while in utero or after birth) has damaging effects on animal babies' brain structure and functioning. For example, baby rats deprived of contact with their mothers had emotional and social difficulties.



Positive experiences may promote healthy brain and behavioral development. Research conducted with human mothers and babies shows that babies who receive warm, supportive care from their mothers are better able to handle everyday stresses than babies who receive erratic or insensitive care from their mothers.

- **Brain development influences children's behavior.** Although you can't see changes in the brain itself, you can see new behaviors. So when your baby smiles for the first time upon recognizing your face, or stops crying when you pick him or her up, you can assume that your baby is learning and that his or her brain is changing accordingly, although we don't know if the change is permanent. The brain is uniquely flexible, and adapts to the world around it. The experiences children have as babies and throughout childhood teach them and their brains how best to think, feel, behave, and negotiate situations in their particular world.
- **There are limits to stimulation.** Although research suggests that stimulation has an influence on the brains of rats, it doesn't mean that lots of stimulation is what's best for babies' brains. In fact, we know that babies can only handle a certain amount of stimulation before they get overloaded. It's hard to know how much stimulation is enough, but your baby is the best guide. Watch and see how your baby responds to different amounts and kinds of stimulation. Your baby will tell you when he or she has had enough!

What can parents do? What kinds of experiences will be promote healthy brain development in the first years of life? As research on brain development in humans is in its infancy, and because each baby is an individual, it is not possible to specify one, or even two, particular experiences a baby "should" have. No studies tell us that special videos, books, or television shows build the perfect brain or the perfect baby.

As a parent, you should focus on supporting the healthy development of your baby. Promote positive experiences and protect your baby from significant negative ones. Keep your baby healthy and happy, feed your baby well, and respond to his or her needs for love, comfort, and play.

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For More Information

For more information about infant brain –development, go to <http://www.zerotothree.org> or <http://www.macbrain.org>

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Questions About Kids is on the Web at:

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