

## Bright Beginnings #5

# Keys to Enhancing Brain Development in Young Children

FS-611, JULY 2005

**Sean Brotherson**, Family Science Specialist, NDSU Extension Service

---

*Think of young children in your life and imagine what they might become one day- doctor, teacher, astronaut, father, engineer, homemaker, farmer, mother. The world is open to each child, and parents and other caring adults hold the keys to opening the doors of learning and growth for children.*

Childhood is all about learning. The development of the brain and the learning connections within the brain are at the heart of learning for young children. How can parents and other caregivers foster a child's healthy brain development and enhance a child's learning?

## Laying the Foundations of Learning - a Safe and Secure Environment

Establishing a safe, secure and predictable environment for children is the best way to create the foundations of learning in infancy and childhood. This is the first basic rule of building a child's brain development. What are some practical guidelines for creating such an environment?

### **1. Respond warmly and quickly to a child's cues for support and attention**

Infants in particular need close, positive relationships with adults. Babies experience their parents' love and the love of others through reassurance and responses to their needs for food and comfort. Respond to a baby's cues.

Infants can't use words to communicate their moods, needs or wants, but they send signals: the sounds they make, the way they move, facial expressions, or even the way they seek or avoid contact. For example, babies might cry shrilly if they need a diaper change, an infant may look away when done playing, or toddlers might hold up their arms to be picked up.

Children become securely attached when parents and other caregivers read these signals and try to respond with sensitivity. Being responsive to children's signals for support or attention helps the children trust the world around them and does not spoil the children. An adult's positive responses allow children to become comfortable in interacting with others and their environment. So, by responding warmly and quickly, you are putting in place the connections in children's minds that let them trust and explore the world around them. Key aspects in responding to children's signals are:

- **Sensitivity** - Learn to be aware of children's signals. Watch for their signals and how you can respond.
- **Timing** - Respond quickly to children's signals rather than waiting for extended periods of time.
- **Warmth** - Be gentle and caring with children when responding to cues, which helps them feel trust.
- **Appropriateness** - Try to give the right response to children's needs for support or attention. For example, watch a child to see if your response is what the child wanted.

Research suggests that children's development improves when parents follow a child's lead to provide appropriate responses. Parents and caregivers need to learn how to respond in ways that encourage continued learning that is matched to the child's capabilities and interests.

### **Example of application**

*When reading to a toddler, choose books with pictures that the child enjoys. Read only as long as the child seems interested, and involve the child by asking open-ended questions.*

## **2. Hold, touch and snuggle with your child**

Touch is a fundamental and important source of security to a child. If you deprive an infant of touch, the body and brain will stop growing in a healthy manner. Physical stroking helps premature babies gain weight more quickly and helps healthy babies digest food better. Babies cry less

when they are held and carried regularly. Touch is an infant's lifeline to security, attachment and reassurance.

Touch also is important for growing young children, such as toddlers or preschoolers, who need the reassurance that comes from a hug, touch on the hand or "high-five." Children who do not receive caring, physical touches miss out on the affection that helps them form a sense of trust with others. Hold children on your lap or between your legs, put your arm around them, hug them or snuggle with them. Give them the affection they need.

### **Example of application**

*Carry an infant in a carrier that provides physical contact, snuggle with children each night before bed or hug your children several times a day.*

## **3. Beware of overstimulating your child**

Some parents are so concerned with a child's brain development that they buy expensive educational toys, videos, computers and language tapes. What does research suggest? Save your money. Too many new experiences or too much stimulation can cause stress and hinder a child's development. Children need freedom to explore on their own terms and not be exposed constantly to high levels of stimulation, such as watching television.

The brain develops through hands-on experience during a lifetime, but stress can inhibit this development. Watch your children's signals to see when they are feeling overly stressed or stimulated. They will avoid, turn away, cover their face with their hands, hiccup, cry, become upset or become frustrated. Then take steps to reduce the stimulation and calm your child.

### **Example of application**

*Engage children by tickling or playing together. Watch their face. Do they stop smiling or laughing, become upset or turn away? These actions may be signals of overstimulation, and then you should slow the interaction down and make it more gentle.*

## **4. Create a safe environment and reduce your child's stress by removing any physical threats (i.e., unsafe toys, abusive people, etc.).**

Brain research has shown that too much stress early in life can affect development negatively. For example, stress and trauma can cause elevated levels of cortisol, a brain chemical, to be released in the brain. This can make the brain vulnerable to processes that destroy brain cells,

reduce the number of connections in certain parts of the brain, and cause regions of the brain that regulate emotional response and attachment to be smaller than normal.

Children who experience high stress or abuse may develop adaptive responses characterized by fear, high arousal and anxiety, and have difficulty developing emotional responses that are more calm and controlled. Parents and caregivers should take steps to create a safe environment by:

- Providing safe toys and play environments and checking them for safety.
- Giving comfort to children who are sick or experiencing other types of stress.
- Reducing their own personal stress and being gentle with children.
- Monitoring children to ensure that they are protected from interactions with potentially abusive individuals.

### **Example of application**

*Children who are sick with a fever may become agitated and anxious. Instead of making them sleep alone, move the children to your own room or next to your bed if necessary and provide medicine, comfort and care as needed. Reassure the children that things will be OK and help them feel secure.*

**Research has shown that experiences with new kinds of activity or stimulation can generate growth in the brain within only a few hours after the experiences begin.**

## **Opening the Windows of Learning - an Enriched Learning Environment**

An enriched learning environment is the second cornerstone of a child's brain development in infancy and childhood. Parents, grandparents and caregivers can do a number of things to open the windows of learning for children. Some key ideas to practice are included below.

## **1. Provide an interesting variety of brain-building activities and experiences on a regular basis**

Children need simple, hands-on experiences for their brains to develop, such as rolling a ball on the floor, touching a cat or dog, turning the page of a book or reaching to grasp a spoon. These experiences include touching, talking, listening, tasting, smelling, playing, singing, looking and running. All of these varied activities build young children's brains.

Because infants and young children are primed to learn from birth, the key is to provide a variety of interesting experiences over time. Exposing your child to new things helps the brain strengthen old connections and form new connections. Think of one new activity or experience that you can introduce to your child every couple of days.

### **Example of application**

*With babies, provide something interesting whenever they are awake or alert, such as a new picture to look at or some time to wiggle on the floor and grasp a noisy toy. Limit the time that toddlers spend with television or preprogrammed mechanical toys and encourage them to explore.*

## **2. Give time each day to practice and encourage repetition of songs, stories and other experiences**

Provide lots of time and opportunities for practice and repetition. Few things build a child's brain and open opportunities for learning more than consistent repetition of healthy activities or experiences. Telling the same stories and singing the same songs over and over may feel boring to you, but it is not boring to children.

Children learn through repetition. Repetition of an experience tends to set neural connections. For example, the pathways in the brain dealing with emotions are built and strengthened when parents respond day after day to a newborn's smiles by smiling back or picking up the child.

Have you ever noticed that children, especially young children, like to repeat certain routines? For example, a child may prefer a certain bedtime routine each night. Or, a toddler may ask you to read a particular book over and over and over again.

Why? It is because a young child's brain is "wired" to encourage repetition of sounds, patterns or experiences that provide security, and thus develop strong neural pathways in the brain that become the highways of learning. Such repetition is good for your children and a practical, easy approach to helping your child's growth and learning.

### **Example of application**

*Children whose parents have read to them for 10 minutes a day from age 6 months on have a brain that has received more than 300 hours of this type of stimulation by kindergarten. Read stories or show pictures to your young children over and over and over again.*

### **3. Talk, laugh, sing, play peek-a-boo - children need to hear language**

The key to language development in a child's brain is hearing language - lots of it. Children need to hear language from birth, long before they can speak. Toddlers whose mother talked with them when they were infants have bigger vocabularies and a solid basis for later communication. Ways you can expose your children to language include:

- Play rhyming games together.
- Read aloud.
- Sing songs.
- Speak directly to your child and ask open-ended questions, not "yes" or "no" questions.
- Play a variety of music from different types of instruments, cultures or genres.

Music and language not only introduce children to words, but help them learn rhythm, sequences, and spatial and math skills.

#### **Example of application**

*Make up stories with a toddler, listen to classical or other music, read books and ask the child questions about the story as you go. Talk and listen some more.*

### **4. Provide opportunities that challenge and stretch a child's abilities**

Young children learn most efficiently when they're provided with some opportunities to work slightly above their current ability with the assistance of an adult. For example, you may help young children learn to catch a ball by first tossing a soft plastic ball to them lightly and then slowly moving a little farther away over time as you toss the ball. Play games with children that help them learn new skills and provide a little

challenge for them.

### **Example of application**

*Provide a low table for children to hold onto as they learn to walk until they are confident enough to take their first few steps. As they begin taking steps, help the children walk by having them hold onto your fingers. Occasionally let go slightly to help the children take a step on their own. Then watch for smiles of pride!*

## **Questions and Answers on Brain Development**

Parents and caregivers may have a variety of questions about brain development in children. The following common questions and answers can help provide guidance as you seek to understand and enhance brain development in children:

### **Question - How much of the "wiring" in a child's brain develops based on genetics versus influences from the environment?**

**Answer** - The connections between brain cells in a child's brain are developing constantly. Current thinking suggests that about 30 percent to 60 percent of our brain's wiring depends on heredity, while about 40 percent to 70 percent develops based on interactions with the environment, including parents. A parent's care and guidance are much more likely to influence certain aspects of the brain.

### **Question - Do my interactions actually have much impact on what's happening in a child's brain?**

**Answer** - The brain literally is growing new connections on a constant basis. Research has shown that experiences with new kinds of activity or stimulation can generate growth in the brain within only a few hours after the experiences begin. Activities such as exercise, listening to music or throwing a ball actually cause different areas of the brain to grow new neural connections, develop stronger connections or become more active. Frequent new learning experiences and challenges are like "nutrients" to the brain that enhance growth.

### **Question - How do a child's food habits and nutrition affect brain development?**

**Answer** - Some of the foods that aid in brain functioning include proteins, unsaturated fats, vegetables, complex carbohydrates and sugars. Some of the specific foods that children should eat more of to stimulate brain function and growth are leafy green vegetables, fish (e.g., salmon), nuts, lean meats, fresh fruits and dairy products. Vitamin and mineral supplements also can be helpful. Be careful if your child has particular food allergies.

In addition, drinking lots of water is helpful in learning, and children should be taught to drink water throughout the day to help them maintain energy levels and attentiveness.

**Question - What are the most important ingredients in creating an enriched learning environment for children?**

**Answer -** Research on brain development has shown that two key components enrich the learning environment that stimulates brain development.

First, children must have a continuous flow of new information and experiences that are challenging and allow them to solve problems. Too much or too little challenge leads to problems. Children should experience a variety of ways to learn, either by being introduced to new material, which adds levels of difficulty to a learning situation, or by new learning techniques.

Second, children should be given feedback about how they are learning. Feedback to children should be specific and given soon after an experience. Parents should allow children to explore with them and give constructive feedback that allows a child to make changes and improve over time.

**Question - Can a child overcome the effects of insufficient care or stimulation during the early years of life?**

**Answer -** Although the early years of a child's development are tremendously important, research also has shown the brain is capable of overcoming many negative effects. During the first 12 to 14 years of life, a child's brain has considerable opportunity to bounce back from negative experiences and develop capacities that were not nurtured in the early years.

For example, children who did not receive much exposure to language early on still can make up much ground if they receive more intensive exposure to language and reading between the ages of 4 and 10. Sometimes, children need to receive care or stimulation that is more intensive and specialized if they have a particular deficit in motor skills, language development or other areas that the brain affects.

Most children are able to make significant progress in developing skills or abilities that did not fully develop in earlier years if they receive greater care and attention to compensate.

**Question - What are the best activities for my children to engage in to enhance their overall brain development?**

Children benefit from a variety of different activities. However, three critical activities that contribute considerably to overall brain development are music, art and physical activity.

First, music engages all aspects of the brain and stimulates multiple aspects of brain functioning. Children should be exposed often to many different kinds of music, but especially rhythm, rhyme, and repetition in music and songs.

Second, art engages a variety of the brain's areas that help children learn emotion, cognition and memory. Children should receive many opportunities to draw, paint, craft and create using different types of art.

Third, physical activity and movement help stimulate much brain growth and facilitate key connections for learning. Regular exercise and engagement in all varieties of physical activity are critical for healthy brain development in children.

### ***The brain of a child is a developing miracle.***

A child's developing mind is nurtured by loving interactions, a secure and predictable environment and hands-on experiences that invite exploration and learning. Parents, as children's first teachers, should unlock doors and open windows that allow children to learn and grow.

## ***Recommended Resources***

### **Books**

Gopnik, A., Meltzoff, A.N., and Kuhl, P.K. (1999). *The Scientist in the Crib: Minds, Brains, and How Children Learn*. New York: William Morrow & Co. Inc.

*Babies as scientists - this book summarizes all kinds of amazing research findings with babies.*

Healy, J. (1994). *Your Child's Growing Mind: A Practical Guide to Brain Development and Learning from Birth to Adolescence*. New York: Doubleday.

*This easy-to-read book is full of practical suggestions for teaching and learning.*

Martin, E. (1988). *Baby Games: The Joyful Guide to Child's Play from Birth to Three Years*. Running Press Book Publishers.

*This fun book is full of activities, songs and ideas for parents of young children.*

Ramey, C.T., and Ramey, S.L. (1999). *Right from Birth: Building Your Child's Foundation for Life*. New York: Goddard Press Inc.

*By a leader in the field, this book sets forth seven essential factors to help children grow each day from birth to 18 months.*

Shore, R. (1997). *Rethinking the Brain: New Insights into Early Development*. New York: Families and Work Institute.

*Well-written and descriptive book on key aspects of brain development in children and their importance for children and parents.*

Siegel, D.J. (1999). *The Developing Mind*. New York: Guilford Press.

*Profound and interesting insights on how the brain and biology influence who we are and how we develop as human beings.*

## **Videos**

*The First Years Last Forever.*

This video is available from the *I Am Your Child* Campaign sponsored by the Reiner Foundation. For ordering information, visit the Web site (see below) or write to: I Am Your Child, P.O. Box 15605, Beverly Hills, CA 90209.

## **Web sites**

- *The Better Brains for Babies* publication series was done by faculty in the College of Family and Consumer Sciences at the University of Georgia. The Web site is [www.fcs.uga.edu/pubs](http://www.fcs.uga.edu/pubs) .
- *I Am Your Child* is a national public awareness and engagement campaign that the Reiner Foundation created to help people understand the importance of new brain research and its implications for our children's lifelong healthy development. Information can be accessed on the Web site at [www.iamyourchild.org](http://www.iamyourchild.org) .
- The Wisconsin Council on Children and Families has educational resources that include *Great Beginnings: The First Years Last Forever* and the *Brain Watch* series. Information can be accessed on the Web site at [www.wccf.org](http://www.wccf.org) .
- *The Secret Life of the Brain* is a Public Television site featuring information about the brain at different points in the lifespan. With fascinating three-dimensional imagery, you will want to bookmark this site for future reference. Go to [www.pbs.org/wnet/brain/](http://www.pbs.org/wnet/brain/) .

## References

- Bales, Diane. (1998). *Better Brains for Babies*. Publication Nos. FACS 01-1, 01-2, 01-4, 01-6 and 01-7. College of Family and Consumer Sciences, University of Georgia.
- Bower, Don. (1998). *Better Brains for Babies*. Publication Nos. FACS 01-3 and 01-5. College of Family and Consumer Sciences, University of Georgia.
- I Am Your Child* Campaign. (1999). Web site: [www.iamyourchild.org](http://www.iamyourchild.org) . Beverly Hills, Calif.
- Gopnik, A., Meltzoff, A.N., and Kuhl, P.K. (1999). *The Scientist in the Crib: Minds, Brains, and How Children Learn*. New York: William Morrow & Co. Inc.
- Healy, J. (1994). *Your Child's Growing Mind: A Practical Guide to Brain Development and Learning from Birth to Adolescence*. New York: Doubleday.
- Jensen, Eric. (1998). *Teaching with the Brain in Mind*. Association for Supervision and Curriculum Development, Alexandria, Va.
- Shore, Rima. (1997). *Rethinking the Brain: New Insights into Early Development*. New York: Families and Work Institute.
- Siegel, D.J. (1999). *The Developing Mind*. New York: Guilford Press.
- Wisconsin Council on Children and Families. (January 1999). *Brain Watch: The Facts About Baby's Brain*. Web site: [www.wccf.org](http://www.wccf.org) .

## Conclusion

For children, the development of their minds holds the key to their future and learning. A hostile or stressful living environment, coupled with adults who are inattentive or emotionally unpredictable, can leave a child with diminished potential for learning. If the windows of opportunity for learning are missed, the parts of the brain regulating emotion and attachment do not develop to their full potential.

However, a consistent caregiver providing loving and nurturing care during the first few years of life can go a long way toward ensuring

optimal brain development in a young child. Children have a greater chance of reaching their full potential when the environment is rich with interesting people, toys, language and things to do.

Loving interactions with parents and other caregivers, a secure and predictable environment, and hands-on experiences that invite exploration and learning are keys to brain development in young children.

---

## FS-611

---

County Commissions, North Dakota State University and U.S. Department of Agriculture cooperating. North Dakota State University does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, Vietnam Era Veterans status, sexual orientation, marital status, or public assistance status. Direct inquiries to the Chief Diversity Officer, 205 Old Main, (701) 231-7708. This publication will be made available in alternative formats for people with disabilities upon request, 701 231-7881.

**INFORMATION ACADEMICS RESEARCH EXTENSION PUBLICATIONS CALENDAR WEATHER DIRECTORY**

[Information for Prospective Students](#)

NDSU is an equal opportunity institution

This information may be copied for noncommercial, educational purposes in its entirety with no changes.

Requests to use any portion of the document should be sent to [NDSU.permission@ndsu.edu](mailto:NDSU.permission@ndsu.edu).

North Dakota State University Agriculture and University Extension

Morrill Hall, P.O. Box 6050, Fargo, ND 58108-6050