New research spurs debate on early brain development

Don't waste child's first years, scientist urges

By Fran Ellers

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MINNEAPOLIS -- Brain researcher Charles Nelson plays a game with each baby brought to his laboratory at the University of Minnesota.

He sneaks a red toy into the baby's hand without letting the baby look at it. Then he shows the baby a picture of the toy to see if he or she recognizes it, simply from having felt its shape.

And sure enough -- according to the brain waves that Nelson is recording -- the baby does.

This little exercise has a lofty goal.

Nelson hopes to identify, as early as possible, which babies may develop memory problems so that researchers can eventually devise ways to help them.

His work is an example of the "new brain research" that has fueled the national discussion about the rapid development of children in the first three years of life -- and prompted policy-makers and politicians,[...] to push for early childhood programs. [...]

Using electrodes and sophisticated imaging scans of the developing brain, Nelson and other neuroscientists have shown that the brains of babies and toddlers are much more nimble than parents and the public previously thought. He says his research has, for instance, shown that a newborn can recognize his mother's voice from having heard it in the womb.

Thus the early years offer "a period of opportunity as well as being a period of vulnerability," Nelson says. "You can take advantage of that rapid change, and also, you can really undermine development."

But Nelson urges caution on the part of those who want to draw conclusions from the research, which he says has been badly oversimplified and misinterpreted by educators, politicians and reporters.

For instance, he dismisses such popular notions as playing classical music to babies to build better brains.

And he is uncomfortable with statements [...] [that make unsupported claims about the first five years of development]

[...][These] gives the mistaken impression that the degree of the brain's development is set for life by kindergarten, Nelson said.

Although it's true that a child's brain grows stunningly fast until about age 3, research has found that the brain is "highly adaptable through much of the lifespan" except in the areas of vision and recognition of speech, he said.

Also, while the life experiences of babies and toddlers do affect the organization of their brains, scientists still don't know which of those changes are permanent or long-lasting. It's clear, in fact, that many are not, according to Nelson.

For now, he says, neuroscientists know enough to say this about the brain: The first three years "are probably like putting the foundation in and framing up a house." Therefore, it's important that children have the right building materials -- good nutrition, proper stimulation, and nurturing parents and teachers.

At the same time, Nelson adds, "I can't tell you what that house is going to look like when it's finished."

Nelson also points out that research in another field, behavioral science, has provided "overwhelming" evidence of the critical need for parents and caregivers to nurture children. The University of Minnesota's Institute of Child Development, where Nelson works and where he was interviewed, is a hub of research on child development from different perspectives and in a variety of disciplines, including behavioral science.

For instance, in a widely heralded study, Nelson's colleague Byron Egeland began following 180 high-risk children in 1975 to see if those who were more "securely attached" to their mothers would do better in school and elsewhere. Strong attachments form when a parent is available, sensitive and responsive. This tells the child that his or her needs will be met and leads to a sense of security.

Egeland found that a child's relationship with his mother at age 1 predicted whether the child would develop behavior problems and stable relationships later. And the child's relationship at age 31/2 predicted academic achievement even when the child was as old as 16.

Research on the brain

What we know

We know that until about age 2 or 3, the brain develops faster than at any other time, laying down a sketchy blueprint for how we feel, think and behave. Parts of that blueprint will last forever -- vision, hearing and, to some extent, language. But most of it will keep changing.

· We know that a baby's experiences help "turn on" parts of the brain, as well as activate many genes. Some of the brain is so responsive that this process will take place regardless of the quality of the baby's environment. Some, however, depends directly on experience.

· We've learned that, well into adulthood, the brain has the ability to compensate for some problems. Part of the reason may be that the brain stores what it learns in many ways -- it doesn't learn just motor skills in one part of the cortex, for instance, and language in another.

What we don't know

We don't know that the first three years of life are more important for brain development than, say, years 5-7, or early adolescence. At each of those ages, the brain is developing in different ways.

· We don't know if there are "sensitive periods" when we must have the right experiences or lose part of our potential for, say, loving relationships.

For instance, the part of the brain that helps control emotions uses a lot of energy between age 6 months and 2 years. Does that mean that emotional experiences during this time could affect the brain forever? That seems possible, according to behavioral studies, but it's not yet proven by brain research.

· We don't know whether extra stimulation will make toddlers smarter. Small children do thrive on novelty, but too much stimulation can actually backfire.

Because this attachment theory is so well-established by the Minnesota study and others, scientists such as Allan Schore of the University of California, Los Angeles, theorize that developing an attachment actually builds the orbitofrontal cortex of the brain, which helps regulate or control emotions and finishes maturing at about 18 months of age.

Nelson said there may well be a “sensitive period” in the brain for forming attachments, but he argues that much of what we know is based on animal studies. Human studies still need to be done, he said.

Egeland, meanwhile, thinks the brain research is pretty much beside the point. He tells of a troubling finding from his studies that children who are largely ignored by their mothers can grow up to be as aggressive and prone to violence as those who are severely physically abused. The neglected children also showed a big -- and permanent -- drop in IQ by the time they were 2 years old, he said.

“Having an emotionally unavailable parent not only influences the kid’s social, emotional, personality development; it also affects their cognitive development,” Egeland says. “What it does to the brain, who knows? And quite frankly, I don’t care. The fact that we found this relationship, and it seems to be a very devastating form of maltreatment, says to me that these are issues that need to be dealt with in terms of early intervention.”

The intervention that has become most common in recent years is home visitation [...] It involves sending nurses, social workers or others into the homes of struggling young families to teach parenting and to help prevent child abuse and neglect.

Studies in other countries have shown that similar programs can help children develop secure attachments, Egeland said, but studies in this country have found less success. That’s possibly because the U.S. studies have involved families who face so many obstacles and deal with so much stress that their situation hinders any intervention, he said. Still, he recommends that policy-makers keep trying.

“In the long run you want securely attached kids” because they “bounce back a lot faster” from a variety of life’s challenges, he said. “Day care’s not going to compensate for a poor home environment.”

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