

MARCH 2008 | NUMBER 28 | SPECIAL ISSUE ON POVERTY & BRAIN DEVELOPMENT

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THIS IS YOUR BRAIN ON POVERTY

Emerging brain science is finding increasing evidence that stress adversely affects infants and children and can lead to damage that may last a lifetime. Recent research suggests that the stress of poverty may lead to problems with memory and language skills. This research also offers insights into the persistence of poverty. Listen to this week's Living on Earth show, download the story or read the entire transcript at www.loe.org/shows/segments.htm?programID=08-P13-00009&segmentID=5#links. Living on Earth with host Steve Curwood is the weekly environmental news and information program distributed by Public Radio International.

SOURCE: Living on Earth | Emily Taylor, reporter | Air date: February 29, 2008

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RESEARCHERS GAIN UNDERSTANDING OF HOW POVERTY ALTERS THE BRAIN

Brain studies of poor children reveal that their neural systems develop differently from those of other children, a finding that potentially points the way toward creating methods for ameliorating the effects of poverty on academic achievement.

"Growing up poor is bad for your brain—we've known that for a long time," said Martha J. Farah, director of the center for cognitive neuroscience at the University of Pennsylvania. "What's new is that neuroscientists have begun to try to understand this problem," she said last week at the annual meeting here of the American Association for the Advancement of Science, which ends today.

For generations, psychologists have noted that children raised in poverty perform poorer on cognitive tests, on average, than do students from wealthier families. Some researchers have taken those results to argue that intelligence is determined for the most part by genetics and that certain races are inherently smarter than others. In 1994, Richard J. Herrnstein and Charles Murray presented that case in their book, *The Bell Curve: Intelligence and Class Structure in American Life*.

But the new results from neuroscience indicate that experience, especially being raised in poverty, has a strong effect on the way the brain works. "It's not a case of bad genes," said Ms. Farah. She and her colleagues have investigated the issue by trying to tease out which aspects of poverty alter specific cognitive skills, such as memory, language and the ability to delay gratification. The researchers studied a group of African-American children of low socioeconomic status, who had been tracked from birth through high-school graduation by Hallam Hurt, a pediatrician at Penn.

Over the years, Dr. Hurt's team had assessed the home environments of the children, monitoring how nurturing parents were, and how intellectually stimulating the homes were—for example, whether the children had access to books and visited museums.

When Ms. Farah's team tested 110 of those children, they found that particular cognitive skills were linked with certain aspects of the environment. Children with better language abilities were more likely to come from intellectually stimulating homes, no matter how nurturing their parents were. Memory skills, however, matched the nurturing levels in the home, reported Ms. Farah, who will publish her results in an upcoming issue of *Developmental Science*.

Effect of Nurturing on the Brain

To test why, the researchers did MRI scans of the children. They found that students raised in nurturing homes generally had bigger hippocampi, the portion of the brain associated with forming and retrieving memories. The discovery dovetails with previous

research in rodents, which showed that rats raised in a stressful environment develop smaller hippocampi.

The results of the new work suggest that "it's worth making intervention and prevention programs because clearly a lot of the action here is experiential," said Ms. Farah. "This points out the fact that these phenomena are the result of adverse environments."

At the science association's meeting, Courtney Stevens, a postdoctoral research associate at the University of Oregon's brain-development laboratory, described other experiments on the cognitive effects of poverty. In one study, researchers put a net of electrodes on the heads of children and measured their brain waves. The children were seated between two speakers playing different stories and they were asked to pay attention to only one of the stories.

While the stories were being read, the children heard identical bursts of distracting noise coming from either of the speakers. The brains of the children responded differently to those same noises, depending on whether it came from the side they were listening to or ignoring. It's almost as if the brain has a volume control, turning up the sound on the side it is attending to, said Ms. Stevens.

The study revealed that students from lower-income families were less able to screen out the noises embedded in the stories they were supposed to ignore. The students in the higher-income group, however, "had more gain on their volume control," she said. "Their brains were able to make a larger distinction between what they were trying to hear versus ignore."

With those results and others suggesting that cognitive skills are strongly influenced by environment, the Oregon team is developing intervention programs to try to counteract the effects of poverty. At the meeting, Ms. Stevens described one experimental program that has shown initial success.

Parental-Intervention Program

The program, developed by Jessica Fanning, a doctoral student at Oregon, trains parents to improve their communication skills and provides them with tools to improve their children's behavior, with the aim of reducing stress in the home. To test her program, Ms. Fanning recruited families from a Head Start program.

She found that after eight weekly sessions with parents, they reported less stress in the home, and their children performed significantly better on tests of language skills, nonverbal intelligence, memory, and attention.

The researchers have thus far tested only 14 low-income children and 14 controls and they are tracking the children to see whether the effects persist. "At the end of the day, what

we don't care about is a 5-point difference in I.Q.," said Ms. Stevens. "We care about this measure if it's going to translate into something persistent and useful."

While many of the researchers at the session supported the hypothesis that socioeconomic status plays a strong role in affecting brain development in children, Mabel L. Rice, director of the doctoral program in child language at the University of Kansas, described a new study that goes against the hypothesis, at least in the case of early verbal abilities. In tests of 1,766 children in Australia, Ms. Rice and her colleagues found no correlation between a child's verbal abilities at 24-months-old and the parents' socioeconomic status or their education levels.

"The conclusion is that we don't want to assume too strongly that children of poverty are unable to acquire early vocabulary," she told The Chronicle. Ms. Rice and three other researchers reported their results in December in the Journal of Speech, Language and Hearing Research.

— Richard Monastersky | The Chronicle of Higher Education | February 18, 2008 | accessed online March 5, 2008: <http://billsblogofpsychology.blogspot.com/2008/02/researchers-gain-understanding-of-how.html>

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GOOD PARENTING RAISES KIDS' MENTAL SKILLS: STUDY SHOWS BETTER PARENTING SKILLS SHARPEN MINDS OF KIDS IN POVERTY

Feb. 19, 2008—Growing up poor has insidious effects on kids' mental abilities, beginning when they are very young. But there is new evidence that parents living in poverty can improve their children's chances for a better life by changing how they relate to them at home.

Researchers at the University of Oregon studied a unique counseling strategy in a small group of poor families enrolled in a federal Head Start program in Oregon. They looked at measures of thinking skills in young children before and after parents had special counseling. One of the researchers, Courtney Stevens, PhD, presented early results from the study today at the annual meeting of the American Association for the Advancement of Science in Boston.

Fourteen children aged 3 - 5 were tested on language ability and attention, and they had brain scans before their parents began the counseling. Another 14 children had the same tests, but their parents did not receive any special counseling. Once a week for eight weeks, parents of the experimental group went to sessions where they learned good parenting practices, like keeping consistent routines at home and how to discipline children in constructive ways.

The parents learned to introduce “predictability where there were power struggles,” Stevens says, and they were coached on how to converse with kids, “allowing the child a chance to contribute to and direct that communication experience.”

Afterward, when researchers retested the children, those whose parents had counseling scored markedly better on tests of memory, language ability, attention and IQ compared with the group whose parents didn't do anything differently. The parents who participated also noted much less stress at home and fewer problems with their children's behavior.

Poverty and Brain Development

It has been known for a long time that living in poverty damages children's intellectual abilities. Scientists have recently begun to understand why. It's not because of money per se, and it's most certainly not a matter of being somehow inferior; it's the effect of unending stress and lack of proper social support.

At a critical time in early childhood when the brain is developing, stress inhibits the formation of connections between brain cells and restricts blood flow to the brain. “It literally disrupts brain architecture,” says Jack Shonkoff, MD, a child development expert at Harvard University.

There are three kinds of stress, Shonkoff says: Good stress, which keeps life interesting; “tolerable” stress, which can be very upsetting but which doesn't cause lasting damage; and “toxic” stress. The difference between toxic and tolerable depends on how long the stress lasts and whether or not a person has good social support. Conditions that produce toxic stress are most common in poverty—chronic fear and instability together with too little trust in other people—but it can exist in all income brackets.

The systems in a child's forming brain most vulnerable to toxic stress are those involved with language and attention. These things are not hard-wired by genes. A child develops verbal abilities and concentration in early childhood, and this development is highly influenced by the child's experiences. Bad experiences harm development, but similarly, “it has potential to be enhanced,” Stevens says.

Jeanne Brooks-Gunn, PhD, co-director of the Institute for Child and Family Policy at Columbia University in New York City, says the most helpful ways to even the odds for poor kids are preschool education and efforts to improve parenting practices. She says the policy institute she leads has “very specific recommendations on parenting practices,” which agree with what the Oregon researchers taught.

Shonkoff argues that the importance of programs to aid poor children and their parents can't be underestimated because the effects last a lifetime. “The earlier we intervene, the better,” Shonkoff says.

"We don't have a simple recipe" for good parenting, Stevens says, but the methods parents learned in the study were well founded in scientific research, and families benefited not long after beginning to try them.

— Martin Downs | ©2008 WebMD, Inc. | accessed online March 5, 2008: www.cbsnews.com/stories/2008/02/16/health/webmd/main3840627.shtml?source=RSSattr=Health_3840627

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CHILDHOOD POVERTY: SPECIFIC ASSOCIATIONS WITH NEUROCOGNITIVE DEVELOPMENT

Abstract

Growing up in poverty is associated with reduced cognitive achievement as measured by standardized intelligence tests, but little is known about the underlying neurocognitive systems responsible for this effect. We administered a battery of tasks designed to tax-specific neurocognitive systems to healthy low and middle SES children screened for medical history and matched for age, gender and ethnicity. Higher SES was associated with better performance on the tasks, as expected, but the SES disparity was significantly nonuniform across neurocognitive systems. Pronounced differences were found in Left perisylvian/Language and Medial temporal/Memory systems, along with significant differences in Lateral/Prefrontal/Working memory and Anterior cingulate/Cognitive control and smaller, nonsignificant differences in Occipitotemporal/Pattern vision and Parietal/Spatial cognition.

— Martha J. Farah, David M. Shera, Jessica H. Savage, et al. | Brain Research | Vol. 1110, Issue 1 | September 19, 2006 | pages 166-174 | Accessed online March 5, 2008: www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6SYR-4KJ5T84-2&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=7499295424907dabda8867fb1a7e6bdc

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LECTURE FOCUSES ON POVERTY & BRAIN DEVELOPMENT

Dec. 8, 2006—Martha J. Farah, director of the Center for Cognitive Neuroscience at the University of Pennsylvania, focused on the effects poverty has on brain development in children in a lecture Thursday evening, Dec. 7, at University of Delaware's Early Learning Center. Citing statistics from three studies conducted on two different socioeconomic groups of children (one living just below the poverty line and the other defined as working-to middle-class), Farah hypothesized that poverty has a greater detrimental effect on a child's overall cognitive skills than pre-natal exposure to cocaine.

"What our studies found is that prenatal cocaine exposure is not as hard on a child's development as poverty is," Farah said, addressing an audience of approximately 25 University of Delaware graduate students and faculty members.

At the outset of her lecture, "Socioeconomic Status, Childhood Experience and Brain Development," Farah said that the median ages of the groups of children in the three studies were five years and 10 months, six years and 11 years and defined socioeconomic status as being measured by income level, parental educational level and parental occupational status.

While citing numbers and clinical statistics, however, Farah emphasized that poverty—particularly as it relates to a child's brain development—is not just about financial status, but also about the status of a child's home environment. "Of all the factors that might make a marked difference in a child's cognitive abilities," Farah said, "the one factor that seems to make a significant difference is environmental stimulation in a child's home."

Quoting findings from a recent study that involved home interviews with young children and their mothers, Farah said that long-term sensory and environmental deprivation, combined with a low level of parental nurturance, can have lasting effects on a child's cognitive abilities, particularly with language skills. She stressed that home environment can also be a significant predictor of cognitive abilities. "What we learned from going into the homes of 118 children with low socioeconomic status is that environmental stimulation is critical to a child's welfare," Farah said.

Farah received Bachelor of Science degrees in both philosophy and metallurgy and materials science from the Massachusetts Institute of Technology (MIT) in 1977 and her doctoral degree in experimental psychology from Harvard University in 1983. She did postdoctoral work in neuropsychology at both MIT and the Boston University School of Medicine and was a professor of psychology at Carnegie Mellon University from 1985-92. Since 1992, Farah has been a professor of psychology at the University of Pennsylvania, where she also has served as the director of the institution's Center for Cognitive Neuroscience since 1999 and has been a senior fellow in its Center for Bioethics since 2005.

She has devoted much of her career to understanding the mechanisms of vision, memory and executive function in the human brain, and in recent years has shifted her focus to the interface between cognitive neuroscience and the real world. Farah has published widely and has received several academic honors, including the Troland Research Award from the National Academy of Sciences in 1992 and a John Simon Guggenheim Foundation fellowship in 1996.

— Becca Hutchinson | UDaily | University of Delaware | accessed online March 5, 2008:
www.udel.edu/PR/UDaily/2007/dec/brain120806.html

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ANNUAL NETWORK MEMBERSHIP MEETING | NATIONAL HEALTH CARE FOR THE HOMELESS CONFERENCE | PHOENIX, AZ | FRIDAY | JUNE 13 | 2 - 3:30 PM

Join HCH Clinicians' Network members at our 13th annual meeting, which provides an opportunity to meet other members, build new friendships and catch up with old friends. Network Chair Bechara Choucair will provide a summary of the year's activities and a glimpse of expected activities for the coming year. There will be a brief business meeting where we elect new Steering Committee members, and we salute this year's Local Heroes. We plan to introduce a new feature during this year's gathering, a process that we call Shoptalk. Members will be invited to discuss their work, noting any new or emerging trends or identifying pernicious challenges. The Network will use the information gathered during this forum to help direct future activities and direction of our organization. For information about this and other Network-sponsored events happening during the conference, visit www.nhchc.org/2008conferenceevents.html.

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TOWARD UNDERSTANDING HOMELESSNESS: 2007 NATIONAL SYMPOSIUM ON HOMELESSNESS RESEARCH

In March 2007, the U.S. Department of Health & Human Services and the Department of Housing & Urban Development sponsored the second National Symposium on Homelessness Research. Twelve papers were prepared for and presented at the Symposium, and three of these relate to homeless children, youth and families:

- Homeless Families and Children (PDF format, 33 pages)
- Homeless Youth in the United States: Recent Research Findings and Intervention Approaches (PDF format, 33 pages)
- Characteristics of Help-Seeking Street Youth and Non-Street Youth (PDF format, 40 pages)

You may download these and the other papers at <http://aspe.hhs.gov/hsp/homelessness/symposium07/index.htm#hardcopy>.

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HELPING CHILDREN COPE WITH THE STRESS OF HOMELESSNESS

"I'm in a safe place right now. I'm in a safe place right now," sings a group of preschool and kindergarteners to the tune of "Happy Birthday." "I'm in a safe place right now, and lots of people love me!" Their voices land emphatically on the last note, as they give themselves a squeeze. This young group of crooners is participating in PEACH, an initiative created by the National Center on Family Homelessness (National Center) in an effort to bring more child-friendly programming into shelters.

PEACH, which stands for Physical and Emotional Awareness for Children Who Are Homeless, teaches children and their parents about good nutrition, physical activity, and how to deal with the stress of being homeless. "Homelessness takes a toll on children. They are sick more often and have more mental health problems. Sadly, resources to address these problems are limited," says Dr. Ellen Bassuk, President of the National

Center. "The PEACH initiative is one way to support children and parents, and the providers who work with them daily."

The program is based on the award-winning *OrganWise Guys* curriculum, which the National Center adapted for shelter settings. The *OrganWise Guys* are fanciful characters representing the organs in the body. Hardy Heart® teaches children how their hearts need love, kindness, and plenty of exercise to stay healthy. Calci M. Bone is also enthusiastic about exercise, almost as much as she is about eating bone healthy foods such as yogurt and milk. Pepto® the Stomach understands that kids need to fruits and veggies, and he also sometimes gets "butterflies" when he's nervous. These characters and the other *OrganWise Guys* come to life for children through interactive and engaging materials, including books, videos, activities, and more.

PEACH is divided into 17 sessions that last for about 45 - 60 minutes. Each session follows a consistent, predictable format that helps children feel at ease. It also accommodates the high turnover of families in shelter settings; each session is broad enough for new children to understand and participate, and engaging enough for children who attend regularly.

At the heart of the PEACH curriculum are sessions on emotional health, specifically designed to help children living in shelters understand their bodies' reactions to traumatic stress and what to do about it. These sessions help children identify and feel comfortable with a range of emotions and learn strategies that help them feel safe.

PEACH is being implemented in hundreds of shelters, health centers and other community-based agencies around the country. "Children are more aware of their bodies and how they react to things," describes one service provider. "It is simply a very good program," says another. For more information, contact the National Center on Family Homelessness at peach@familyhomelessness.org or call 617 964-3834.

SOURCE: Homelessness Resource Center | Substance Abuse & Mental Health Services Administration | www.nrchmi.samhsa.gov

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WEB/AUDIO CONFERENCE SESSION ON NEW ASTHMA GUIDELINES

March 26, 2008 | 3 - 4:30 PM Eastern Time | Cost: Free

Registration Deadline: March 25, 2008 | 2 PM Eastern Time

Dr. Floyd Malveaux, Executive Director, Merck Childhood Asthma Network, will present the newest recommended asthma guidelines for school-aged children, and the rationale behind updating the older standards and creating new guidelines. Dr. Malveaux will also address common myths and misconceptions relating to asthma in school-aged children. To register, go to <https://comp17.eventcenterlive.com/cfm/ec/register/reg.cfm?> BID=1&RegID=61E3B765.

Test Your Computer

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UPCOMING EVENTS OF INTEREST TO MEMBERS

April 7 - 8: Promoting Wellness: An Integrated Approach to Homeless Service Delivery | Institute on Homelessness & Trauma | Homelessness Resource Center Regional Training | Walnut Creek Marriott | Walnut Creek, CA | www.acteva.com/booking.cfm?bevaaid=151280

April 15 - 17: Third Young Children without Homes National Conference | Horizons for Homeless Children | Hynes Convention Center | Boston, MA | www.horizonsforhomelesschildren.org/Programs-Natl-Conf-2008.asp

June 11 - 14: 2008 National Health Care for the Homeless Conference | Hyatt Regency | Phoenix, AZ | www.nhchc.org

October 23 - 25: National Summit of Clinicians for Healthcare Justice | Washington, DC | www.allclinicians.org

November 6 - 9: Collaboration: The Key to the Medical Home | Collaborative Family Healthcare Association's 10th Annual Conference | Grand Hyatt | Denver, CO | www.cfha.net

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The Health Care for the Homeless Clinicians' Network brings you this Pediatrics Interest Group e-mail update. We invite you to share your opinion on issues of concern to the pediatrics community. In addition, we welcome your feedback. If you have comments or suggestions for improvements to the newsletter, please send them to the Healing Kids newsletter editor, Brenda Proffitt, at bproffitt@nhchc.org. If you decide to cancel your subscription, please send a blank e-mail to network@nhchc.org, and put Leave Pediatric Interest Group in the Subject line of your message.

The Network develops this publication with support from the Health Resources & Services Administration. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of HRSA/BPHC, the National Health Care for the Homeless Council, Inc., or the Health Care for the Homeless Clinicians' Network.

