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## How to build a better brain

### *Helping children in earliest years is most cost-effective use of public funds, authors say*

STANFORD, Calif. - With flashy toys, expensive classes and music compilations all promising to make your child smarter, it's hard to sort out the best way to help your child's brain thrive. A new policy paper helps put those worries to rest. The gist of the paper is this: what kids need is a secure relationship with adults who adore them.

"It's all about playing with your child," said Eric Knudsen, PhD, the Edward C. and Amy H. Sewall Professor in the Stanford University School of Medicine, succinctly summing up a paper coming out in the June 27 advance online issue of the Proceedings of the National Academy of Sciences. A child's eventual ability to learn calculus or a second language, he explained, starts with the neurons that are shaped by positive interactions with nurturing adults.

The piece, written by Knudsen and three other members of the National Scientific Council on the Developing Child including Nobel Prize-winning economist James Heckman, PhD, doesn't just ease parents' toy-buying decisions - it lays out the scientific basis for why helping all kids have the best early experiences is good economic policy.

Their argument is based on work from the diverse fields of economics, neurobiology, developmental psychology and public policy. Working independently, the four authors each came to the conclusion that the earliest years of life forever shape an adult's ability to learn. Although much research has been published on the value of positive early experiences, this paper pulls those strands together into an integrated message that the group hopes will help guide public policy in the future. They've already influenced legislation in Washington state and Nebraska and have begun working with lawmakers around the country with a nonpartisan partner, the National Conference of State Legislatures.

#### **BUILDING A BETTER BRAIN**

Jack P. Shonkoff, MD, chair of the National Scientific Council on the Developing Child and an author on the paper, said that as more and more unskilled jobs move overseas, the United States needs a well-educated work force to stay economically strong. Getting that work force means making sure more kids are able to benefit from their education; that means making sure their brains are well-prepared to learn.

"This paper addresses the debate about how we invest in human capital and puts a strong scientific stake in the ground," said Shonkoff, a former dean of the Heller School for Social Policy and Management at Brandeis University who is moving to Harvard University as founding director of the newly established Harvard Center on Children. "With all the attention currently focused on K-12 education reform and job training for adults with limited skills, this paper says that the biggest bang for the buck will come from investing in the earliest years of life, well before the kids start school."

Californians encountered this argument earlier in June when they voted down a proposition to support preschool for all kids in the state. However, the paper goes beyond the debate over preschool for 4-year-olds and emphasizes the importance of early experiences on the development of basic brain architecture from birth.

The paper, written under the auspices of the National Scientific Council, aims to help guide policy-makers struggling to write legislation that will have the most benefit for kids and make the best use of tax-payers' money.

Evidence for their argument comes in part from Knudsen's research on the brains of young owls, where he has shown that the earliest experiences change the types of connections that are made between neurons in the brain. Those brain connections last throughout the life of the animal and result in adults with differing abilities to learn new skills.

Knudsen's findings about how experiences shape the brain's architecture help explain findings in both rats and monkeys, where early experiences translate directly to how the adults behave and learn. Co-author Judy Cameron, PhD, professor of psychiatry at the Oregon National Primate Research Center, has found that monkeys prevented from forming a strong bond with their mothers as infants go on to be less social, less likely to investigate new situations and more prone to anxiety as adults.

Shonkoff said the animal work has an important parallel in human development. For example, kids who are abused or neglected, whose parents are compromised by drugs, alcohol or depression, who are shuttled among relatives and foster-care placements or who spend long hours in poor-quality child-care programs don't develop the same brain power as kids with happier, more nurturing and stable childhoods. Those kids have less chance of securing skilled jobs when they grow up. They are also more likely to need expensive remedial help in school or-even more costly-rely on public assistance or serve jail time as adults.

"What we're pointing out in this paper is that the earlier you spend money on disadvantaged people the more cost-effective it is," Knudsen said. In contrast, programs that spend money on school-age kids or on adults rarely have the same return in terms of future productivity.

## **FROM SCIENCE TO POLICY**

The PNAS paper is the latest publication from the Scientific Council. The group has published four working papers on different topics relating to childhood health and development. In each case, the council digests the most current science into a form that lawmakers can use.

State Representative Ruth Kagi (D-Wash.) finds these summaries invaluable. "Law-makers don't have the time to do the reading that we want to do on a wide range of subjects. They translate the science into brief summaries that we have time to read," she said.

Kagi has worked with Shonkoff to develop policies in Washington state to support young children. She said that in politics most arguments revolve around philosophical differences. Should the government get involved in children's lives? Which is a better use of the government's money, home visits or after school programs? "This information gives us a scientific argument for changing policies not just a philosophical one," she said.

Kagi, who is the chair of the Washington House of Representatives Children & Family Services Committee, led legislation to form the Council for Early Learning in Washington. The bill had support from the Bill & Melinda Gates Foundation, Wells Fargo, Boeing and others in private industry. Kagi said that the Gates Foundation and Boeing have been long-time advocates for improving K-12 education. "They've all come to the conclusion that we are starting too late," she said.

Legislators in both Nebraska and Arizona are also working with Shonkoff and other members of the council to write policies of their own. He added that there are many different ways of implementing good policy, which vary with local politics. Kagi's is one, but anything that takes into account the need for kids to have strong, stable relationships with their parents or other caretakers passes muster.

"The key issue is the nature of kids' relationships with the important people in their lives. It's not about the toys, it's about the human connection," Shonkoff said.

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Stanford University Medical Center integrates research, medical education and patient care at its three institutions - Stanford University School of Medicine, Stanford Hospital & Clinics and Lucile Packard Children's Hospital at Stanford. For more information, please visit the Web site of the medical center's Office of Communication & Public Affairs at <http://mednews.stanford.edu>.

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