

Poverty can physically impair brain, reducing children's ability to learn

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(PhysOrg.com) -- Chronic stress from growing up in poverty can physiologically impact children's brains, impairing their working memory and diminishing their ability to develop language, reading and problem-solving skills, reports a new Cornell study.

The study, published online March 30 in the [Proceedings of the National Academy of Sciences](#), is one of the first to look at cognitive responses to physiological stress in children who live in poverty.

"There is a lot of evidence that [low-income families](#) are under tremendous amounts of stress, and we know already that stress has many implications," said lead author Gary W. Evans, the Elizabeth Lee Vincent Professor of Human Ecology in the Departments of Design and Environmental Analysis and of Human Development in Cornell's College of Human Ecology. "What these data raise is the possibility that stress is also related to cognitive development."

Evans and Michele A. Schamber '08, who worked with Evans as an undergraduate, have been gathering detailed data about 195 children from rural households above and below the poverty line for 14 years. They quantified the level of physiological stress each child experienced at ages 9 and 13 using a "stress score" called allostatic load, which combines measures of the stress hormones cortisol, epinephrine and norepinephrine, as well as blood pressure and [body mass index](#).

At age 17, the subjects also underwent tests to measure their working

memory, which is the ability to remember information in the short term. Working memory is crucial for everyday activities as well as for forming long-term memories.

Evans found that children who lived in impoverished environments for longer periods of time showed higher stress scores and suffered greater impairments in working memory as young adults. Those who spent their entire childhood in poverty scored about 20 percent lower on working memory than those who were never poor.

"When you are poor, when it rains it pours," Evans explained. "You may have housing problems. You may have more conflict in the family. There's a lot more pressure in paying the bills. You'll probably end up moving more often. We know that produces stress in families, including on the children.

"We put these things together and can say one reason we get this link between poverty and deficits in [working memory](#) may be from this chronic elevated stress," he said.

The findings suggest that government policies and programs that aim to reduce the income-performance gap should consider the stress children experience at home.

"It's not enough to just take our kids to the library," Evans said. "We need to also take into account that chronic [stress](#) takes a toll on their cognitive functioning."

Provided by Cornell University ([news](#) : [web](#))

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