



## Infant Stress Linked to Teen Brain Changes

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The effects of a baby's rough start can linger. An early stressful environment during a baby girl's first year was associated with altered brain behavior and signs of anxiety in her late teens, scientists report online November 11 in *Nature Neuroscience*.

Although the results are preliminary, they may help reveal how negative experiences early on can sculpt the brain.

Studies in animals have pointed out how tough times in childhood can influence the brain and the animals' behavior later in life. But it's been hard to figure out how that process works in people, says Lawrence Price, a psychiatrist and clinical neuroscientist at Brown University in Providence, R.I. "One of the real advances of this paper is that it helps move us along on that pathway," he says.

The study, led by Cory Burghy of the University of Wisconsin–Madison, drew from the Wisconsin Study of Family and Work, which in 1990 recruited pregnant women in southern Wisconsin at prenatal visits. Three times during the first year of their babies' lives, the mothers reported whether they were experiencing stressful situations such as depression, marital conflict, money woes or parenting stress. Researchers assumed that women who reported higher stress levels created a more stressful situation for their baby.

Four and a half years later, daughters whose moms reported higher levels of stress had more of the stress hormone cortisol in their blood. That observation suggests the girls had trouble shutting down a hyperactive stress response. The same effect wasn't found in boys.

Fourteen years later, effects of that high cortisol also turned up in the daughters' brains: The behavior of two brain regions involved in regulating emotions — the prefrontal cortex and the amygdala — were out of sync in women who had high cortisol levels as children, brain scans revealed. Usually, the prefrontal cortex and the amygdala operate in tandem, a joint effort that seems to be involved in



shutting down negative emotions. But in these women, those two brain areas lost that connection. And the weaker this connection, the more likely a daughter was to have problems with anxiety, the researchers found.

“We have now a snapshot of what the brain is showing in response to early life stress,” says study coauthor Rasmus Birn, also of the University of Wisconsin–Madison.

Linking cortisol changes in childhood to brain differences at age 18 is a key finding, Price says. “It provides this bridge between two large bodies of literature that haven’t been able to connect with each other.”

Scientists don’t know why the results weren’t found in boys, although some say the gender difference makes sense. “The emotional lives of males and females do begin to differentiate even more at puberty,” says Megan Gunnar, a development psychologist at the University of Minnesota, Twin Cities. “It doesn’t surprise me ever when we see a difference.”

And just because this study didn’t detect an influence of early stress on boys doesn’t mean there isn’t one, she says. Stress could lead to more aggressive symptoms in boys instead of anxiety, for instance.

Like most studies in people, the new work can’t show that the infant stress caused the teen changes, only that the two seem to be linked in some fashion. “There are a lot of pieces of this story to fill in,” says Gunnar. Nonetheless, the results offer a promising lead. “It’s not proven, but it looks like a path we need to follow.”

## CITATIONS

C.A. Burghy et al. Developmental pathways to amygdala-prefrontal function and internalizing symptoms in adolescence. *Nature Neuroscience*. Published online November 11, 2012. doi:10.1038/nn.3257.

## SUGGESTED READING

L. Sanders. Suicidal threads. *Science News*. Vol. 182, November 3, 2012, p. 20.

