

High-stress childhoods blind adults to potential loss

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Adults who lived high-stress childhoods have trouble reading the signs that a loss or punishment is looming, leaving themselves in situations that risk avoidable health and financial problems and legal trouble.

According to researchers at the University of Wisconsin-Madison, this difficulty may be biological, stemming from an unhelpful lack of activity in the [brain](#) when a situation should be prompting heightened awareness. And that discovery may help train at-risk young people to be better at avoiding risk.

"It's not that people are overtly deciding to take these negative risks, or do things that might get them in trouble," says Seth Pollak, a UW-Madison psychology professor who has studied kids and [stress](#) for decades. "It may very well be that their brains are not really processing the information that should tell them they are headed to a bad place, that this is not the right step to take."

Pollak and UW-Madison psychiatry Professor Rasmus Birn brought back to the lab more than 50 people—now ages 20 to 23—who were participants in a study Pollak conducted about stress hormones when they were 8 years old. They were drawn equally from that study's least-stressed and most-stressed kids. Those who dealt with chronic high stress as children experienced traumatic events like parents killed by gunfire or substance abuse, multiple foster home placements and severe maltreatment, according to Pollak.

The researchers put the adults through a series of tasks—while in and out of brain-scanning functional magnetic resonance imagers (fMRI)—designed to stimulate the brain regions that weigh gain and loss, risk and reward.

The high [childhood stress](#) group was less attentive to potential loss than the low [childhood](#) stress group, and more piqued by resulting losses. The results were published today (Dec. 4, 2017) in the journal *Proceedings of the National Academy of Sciences*.

Among the most striking outcomes, Birn says, was watching the high-

stress group work through a gambling scenario in which a token is hidden behind one of 10 squares. Some of the squares are colored red, others blue. The object is to choose the color of the square covering the token.

"Most people if you see nine red squares, one blue square—and the token is randomly placed—you're going to guess red," he says. "And yet, in a lot of these individuals who experienced high childhood stress we saw, they're betting on the one instead of the nine. And they're betting against the odds again and again."

And they spent longer doing it, according to Pollak, agonizing over the decision before making a poor decision again.

"It was our observation not that they couldn't do math, but that they weren't really attending to the right things," he says. "We didn't see people improving over time. You might say, 'Well, they don't get how it works.' But the people with high-stress childhoods, even after many trials, they weren't using negative feedback to change their behavior and improve."

In brain scans from the people who lived with high stress as children, Birn and Pollak could see a surprisingly low amount of activity in the brain region expected to light up when confronted by a potential loss.

"And then, when they would lose, we'd see more activity than expected—an overreaction—in the part of the brain that responds to reward," Pollak says, "which makes sense. If you didn't catch the cue that you were likely to lose, you're probably going to be pretty shocked when you don't win."

The high-stress childhood group also reported undertaking more risky behaviors—smoking, not wearing a seatbelt in a car or texting while

driving—on a regular basis than their low-stress counterparts.

Interestingly, it was just the childhood stress level—not the level of stress in the participants' adult lives—that was predictive of their ability to identify potential loss or avoid risky behavior.

The researchers' knowledge of their subjects' childhood stress is unique. Typically, assessing the childhood of a group of adults requires relying on their recollections and spotty records.

"But we knew these people when they were kids," says Pollak. "We have a clinical assessment of their stress levels in childhood that was done at that time of their lives, while their parents sat in the waiting room. That's powerful data."

The results are powerful, too, and have already drawn interest from child welfare authorities and family court judges often in the position of trying to change behavior by threatening or applying punishment.

"So many of our behavioral interventions are predicated on the idea that people will understand there's a sign they're about to be punished," Pollak says. "Maybe we need to rethink some of those things."

And maybe people can be taught to spot potential loss and risk. Understanding the brain mechanisms that contribute to repeated poor judgment could illuminate ways to prevent it.

"What are they paying attention to? What associations from past experience are they able to remember and connect? Can we help them make better observations and predictions?" Pollak says. "Framing behavioral problems as a learning problem opens up new doors of what we can do to help people."

Next, the researchers plan to expand the scope of their brain scans and analyses.

"Now that we have this finding, we can use it to guide us to look at specific networks in the brain that are active and functionally connected," Birn says. "We may find that childhood stress reshapes the way communication happens across the brain."

More information: Rasmus M. Birn et al., "Early childhood stress exposure, reward pathways, and adult decision making," *PNAS* (2017). www.pnas.org/cgi/doi/10.1073/pnas.1708791114

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