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Drip, Drip, Drip: Stress Gets Under Their Skin

That parents are increasingly stressed is no surprise. But how might that stress drip down on their babies?

That parents are increasingly stressed is no surprise: Work demands, searching for affordable, high-quality childcare, rising rents, long commutes, lack of paid sick or family leave, and balancing bills. Mothers especially report feeling overwhelmed by responsibility and anxiety, and not just single mothers.

But how might the adversities and stressors faced by parents affect their babies? Would they have enduring affects? Might stressors on parents even alter the developing brains of their young children?

These are some of the questions Marilyn Essex and other researchers at the University of Madison-Wisconsin set out to explore more than two decades ago when they began the Wisconsin Study of Families and Work, a 20-year study.

First, they assessed the stress reported by 570 mostly white, working Wisconsin families during pregnancy and the early years. They asked the parents about their financial worries, role overload, worries about work, domestic conflict and other stressors, more than 50 questions overall.

The Wisconsin team then followed the children as they grew, assessing them 18 different ways over two decades. They charted their behaviors, mental health problems and classroom performance. They interviewed them with puppets. They took blood and

saliva samples looking for inflammation and the presence of stress hormones. As new technologies were invented, the researchers even looked at the pattern of chemical tags which change gene expression and visualized brain circuits.

Again and again, the findings were consistent. Children whose parents reported higher levels of stress during pregnancy and infancy tended to have worse outcomes as they grew up. Even years after the parents had experienced that stress.

For example, the saliva samples from four-year-old children of parents who reported more stress showed higher levels of cortisol, a powerful stress hormone. And the higher cortisol levels correlated with the kids' behaviors.

"They tended to be more anxious, kind of withdrawn. They tended also to be more impulsive; they tended to be more aggressive. They had a wide variety of behavior problems," explained Marilyn Essex in The Raising of America.

The same children underwent fMRI brain scans when they were eighteen years old. The neural circuits which help regulate emotions on a moment to moment basis weren't as strong in teens whose parents reported higher stress when those teens were babies—mostly the same kids whose cortisol levels were high at age four. And they still tended to exhibit behavioral problems. Teenage girls reported higher anxiety and had difficulty concentrating (Burghy, Nature Neuroscience, 2012).

Marilyn Essex concludes, "There's no doubt about the fact that if a parent is stressed, that it affects the child. We're talking processes here that are at a biological level."

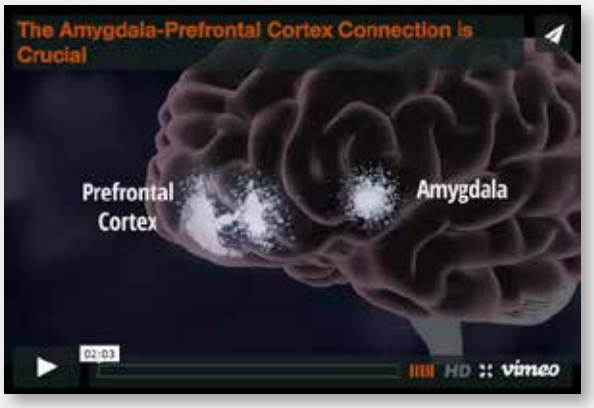
Essex says the Wisconsin studies raise "important questions about what we can do to better support young parents and families."

TAKE-AWAY

Stressors on parents can have enduring consequences for their children, even altering brain development. So, why are parental stressors often dismissed as "normal," just an inevitable part of life?

DIG DEEPER

What's the Amygdala-PFC Connection?



The fMRI experiments performed by Marilyn Essex, Rasmus Birn and their team at the University of Wisconsin at Madison looked at a crucial neural circuit connecting two structures of the brain: the amygdala and prefrontal cortex.

When we perceive a threat, the amygdala, deep in the brain, sends out signals crying "Alert!," setting off a cascade of chemical changes which trigger the fight-or-flight stress response.

But the pre-frontal cortex, in the front of our brains, is the site of reasoning and what neuro-scientists call executive function. Is that voice behind me shouting loudly really a threat? Should I hit him first? Run away? Or is it just my friend Jon, upset about something and wants my help? The prefrontal cortex quickly assesses the situation and then sends messages back along a neural circuit to the amygdala which moderates the stress response accordingly. In essence the prefrontal cortex tells the amygdala to Cool out, no problem, or Oh boy, we're in big trouble now!

As post-doctoral fellow Corey Burghy explains in The Raising of America,

> We want to see a good flow of traffic on that highway because that's a highway that's helping that child regulate their emotions on a moment-to-moment basis...how to deal with emotions, when is it appropriate to express emotions, what are good things to feel, what are bad things to feel.

But the Wisconsin team found weaker connections in the neural circuits connecting the amygdala with the prefrontal cortex in teenage girls whose parents reported higher stress when the girls were infants. It was as if the threat signals from the amygdala weren't getting through and couldn't be assessed

properly by the prefrontal cortex. And those teens also reported more anxiety, difficulty concentrating and trouble in school. Which is just what one would expect from kids unable to modulate their stress response.