

ANXIETY

can alter the architecture of your child's brain. Here's how

When Andrew Gray started kindergarten last fall, lots of stuff in his life was new: A new home in a new town and, now, a classroom filled with the unfamiliar faces of 21 new kids. Undaunted, Andrew settled into school without so much as a hiccup. Even getting on the wrong bus at the end of his first day didn't faze him.

That's why Shaun Smith-Gray couldn't understand her son's reluctance to take part in the school lunch program. "I found it odd," says the St. Andrews, New Brunswick mom, "because Andrew is naturally outgoing and likes to try new things. It turned out he was worried that he would drop the tray and all the kids would laugh at him."

While many adults hold an idyllic view of childhood as one long, carefree summer bike ride with a popsicle at the end, the reality is often much darker: terrifying encounters with the schoolyard bully, slippery-

the science of STRESS

finger syndrome at the annual piano recital, pressure from mom and dad to get A's and only A's, or more serious problems such as family illness or divorce. Kids may not have to worry about covering the mortgage or doing daily battle in rush-hour traffic, but they have stress, too. And new science is exploring just how that stress affects physiology.

Research shows that a modicum of stress is stimulating, but too much of it can be overwhelming — it can make a child sick and even alter brain wiring and body chemistry.

Here's what happens the instant the brain sniffs out a threat. First it signals the body's sympathetic nervous system to dispatch adrenalin and other chemical messengers to rev the heart, lungs and muscles into high gear, priming them for action — the "fight or flight" response.

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BY KATHARINE PARTRIDGE

In an elegant relay, the brain tips off the pituitary gland, telling it to release adrenocorticotropin hormone or, thankfully, ACTH for short. The ACTH zaps through the blood until it reaches the adrenal gland, where it triggers the release of cortisol, the “stress hormone” (so-called because researchers use cortisol levels in saliva to gauge a person’s reaction to stressful events). Remember cortisol, it’s key. Whereas adrenalin and its cohorts prep the body for split-second action, cortisol provides staying power, keeping the body alert and on guard for minutes or even hours.

Short-term stress — like the bully swaggering toward you — also *temporarily* pumps up the immune system, according to Bruce McEwen, a neuroendocrinologist at Rockefeller University in New York. Cortisol helps corral infection-fighting white blood cells in high-risk areas of the body, explains McEwen in *The New England Journal of Medicine*. If a dangerous bacterium or virus drifts into range, the white cells attack. But if the immune system is not challenged and the stress signal subsides, the white cells retreat and, within a few days, return to the bloodstream.

Another upside of short-term stress is that it can boost performance levels. Jane Margles is a Toronto clinical developmental psychologist who helps young athletes and musicians harness positive stress. She explains that a performer’s goal is to have enough adrenalin, energy and excitement going through her body so that she is motivated to give her best performance, but not so much that she becomes debilitated. “It’s like flooding a car. The engine shuts down and nothing happens,” says Margles. “However, you do need a certain amount of gas to make that car run, and that’s true with our systems too.” So the task for all of us is to learn to channel short-term stress in a healthy, productive way.

Chronic stress is another matter. It can show up in headaches, upset stomachs, skin rashes and general fatigue. While short-term stress can temporarily enhance immunity, ongoing stress inhibits it. Bingo, you get sick.

Children exhibit stress in a variety of ways. This list of symptoms is from the *Kids Have Stress, Too! Facilitator’s Resource Guide*.

PHYSICAL: tense muscles, headache, stomach ache, shallow breathing, rapid heartbeat, dry mouth, cold sweaty palms, skin rash, eyes darting back and forth, clenched jaw, tense face, disturbed sleep, fatigue, illness, shakiness.

MENTAL: poor concentration, whirling mind, forgetfulness, less creative, difficulty problem-solving, easily distracted, confused, irrational.

look for these **SIGNS**

EMOTIONAL: intense feelings, withdrawn, fearful, anxious, frustrated, sad, angry, overwhelmed, panicky, overly sensitive, irritable, helpless, hopeless, threatened, overexcited.

BEHAVIOURAL: whining, clinging, poor listening, biting, kicking, crying, hair-twisting, thumb-sucking, daydreaming, nail-biting, fighting with family and friends, restless, jumpy, impulsive, cautious, poor school performance, lack of appetite or eating more than usual.

Claire McDerment has provided stress management techniques to elementary students in Toronto schools and, more recently, helped develop The Psychology Foundation of Canada’s new parent-education program, called Kids Have Stress, Too! She recalls observing the effects of stress on a six-year-old pupil whose parents had recently separated. On the outside, says McDerment, “the boy was a soldier,” handling the separation stoically. In reality, his life was completely off-kilter: He was never sure which parent would pick him up from school at the end of each day and at which home he’d sleep. When McDerment first met the boy, he talked of having a “fluttery” stomach and “buzzing” inside his head.

She says she wasn’t surprised when he later came down with pneumonia.

Researchers agree that chronic stress can have severe effects. Children who live in unstable and troubled family situations are at increased risk for insulin-dependent diabetes. Others who are raised in extremely neglectful families do not grow at expected rates (the medical condition is called stress dwarfism). Apparently, the body can’t juggle both its immediate, stressful needs and such long-term projects as growth. Under normal circumstances, growth hormone converts stores of nutrients into energy, which it directs to growing bone and tissue. During stress, it appears that this energy is commandeered by muscles that are primed for sprinting forward, not up.

Stress also affects cognitive abilities. Casual observation shows that anxious kids, like adults, are less able to concentrate, are easily distracted and have more difficulty solving problems. Now, by measuring cortisol levels, researchers have discovered that stress affects brain wiring.

The *Early Years Study*, co-chaired by physician Fraser Mustard and published last year by the Ontario government, cites compelling animal research about the effects of nurturing on rat pups. Studies demonstrate that rat pups nurtured early in life develop a cellular pathway that lets them control the amount of cortisol their bodies produce during stress. Other animal and human studies indicate that cortisol levels of adults who have not developed this pathway because they were poorly nurtured tend to remain high long after the stress has subsided. These people not only experience more difficulty soothing themselves after exposure to stress, but tend to be more easily overwhelmed by it in the first place and may have more extreme reactions to it. What’s more, high levels of the stress hormone can actually *destroy* neural connections in some parts of the brain. This finding provides a scientific explanation for the increased incidence of learning disabilities among young children who are exposed to excessive stress from, for example, extreme neglect.

Fortunately, the stress most of our

children feel is of the more mundane, sweaty-palm variety. Even so, studies by Megan Gunnar, professor of child development at the University of Minnesota, show that cortisol levels in infants rise during such situations as getting vaccinations or being separated from their parents.

Does that mean children shouldn't get immunized, or that babies who are stressed because of colic are irretrievably harmed? Quite the contrary, says Gunnar. "In fact, the most remarkable thing we've found is that over the course of the first year, as children establish attachment relations with their parents, the parents' soothing, caring presence is an incredibly powerful buffer to the system."

So much so, says Gunnar, that by 12 months of age, the cortisol levels of a child who is brought up in a normal family situation, no longer rise during a bout of crying or a vaccination. Gunnar thinks that's because "they don't have to bring on the big guns of their hormonal stress system because they've learned that they are being taken care of."

But if, in the larger picture, cortisol is the culprit, how can we keep it in check? Adequate sleep and nutrition, not to mention a secure, stable and affectionate home life go without saying. Beyond that, the obvious first step to helping your kids manage stress is to recognize when they need help. You'd think that'd be easy — the sweaty palms are a dead giveaway, right? But, says Margles, parents can miss these signals (see "Look for These Signs," p. 50). It may be that they, too, are stressed and simply fail to notice their child's anxiety. Or, like McDerment's young friend, a child may work assiduously to keep his distress under wraps. Another reason, suggests Margles, is that "often when kids are stressed, they exhibit some quite undesirable behaviour, and many parents focus on that without thinking about where it may be coming from."

Trudy Stumpf-Gagnon of Tavistock, Ontario can see that at play with Rebecca, her four-year-old daughter. "On the

That's a tough question to answer, in part because researchers didn't begin to collect data on the subject until recently. We do know that the nature of the things that stress kids has changed. Robert Glossop, executive director of programs at the Vanier Institute of the Family in Ottawa, notes that parents have come to expect their kids to adapt to and accommodate the harried and frenetic schedules that they have to keep in an adult world. Kids are also more anxious about the "fragility of the relationship between adults," he says, and worry about whether their

do kids have **MORE** stress than they used to?

parents' marriage will last.

Toronto psychologist Jane Margles adds that the increase in the number of single-parent families and those in which both parents work outside the home means children must compete for their parents' time more than in the past. Kids are also coping with a barrage of complicated sources of information. While many can handle this complexity just fine (witness a child's ability to master a video game), those who are unable to cope may experience a higher degree of stress.

Bill Mahoney, chair of the Canadian Paediatric Society's psychosocial committee, wonders if it's only a perception that our kids' lives are more stressful, though. After all, he notes, a generation ago, we obscured the issue by segregating difficult or troubled kids in special schools. "It may be," he says, "that we're just bringing the problem into the open."

whole, she's a pretty good kid," says Stumpf-Gagnon. But after her younger brother got sick a few months ago and began to command an unequal share of their mom's time, Rebecca began talking back and sometimes pitching things across the room. "Her dad gets frustrated with her," says Stumpf-Gagnon, "but I have to remind him that she's crying out for attention because she's not getting the one-on-one she needs."

If you recognize that stress is beginning to overwhelm your child, there are a number of ways you can intervene. First, acknowledge your child's anxiety. Talk and listen. Once Shaun Smith-

Gray understood why Andrew was reticent about the school lunch program, helping him find a solution was a snap: A brief confab at school and his teacher volunteered to carry the tray until Andrew gained the confidence to manage it himself.

Second, teach your kids safe and productive ways to deal with their stress. Since, at its root, stress is physiological, physical activity — such as walking, running or kicking a soccer ball — may be a good outlet. Or your child might prefer to learn to relax using deep breathing or stretching techniques. Any physical release of tension, points out McDerment, will set the climate for a third important tactic: helping your child learn to handle those problems that are within her control.

If an older child is anxious the night before a math test, you might suggest she ask herself, "What's the worst that can happen?" Using this approach she can begin to perceive that one poor performance may not seem so grave in the context of the entire school year.

McDerment points out that parents may be tempted to jump in and recommend solutions. Resist. For, just as nurturing your baby helps wire her brain to better control stress, coaching an older child to come up with solutions to everyday stress lays the foundation for a lifetime of success managing it. Just ask Andrew Gray, proud bearer of his own lunch tray. □