

Understanding Emotion in Abused Children

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Under the iron-fisted rule of Nicolae Ceausescu, Romanian families in the 1980s were pressured by the dictator's social engineering policies to have more children than they could afford. As a result, thousands wound up in "orphanages" – more like child warehouses or prisons – confined to cribs with minimal speech or human touch, no toys, and only the barest necessities of feeding and health care.

Many of their stories, along with those of other abandoned children from across Eastern Europe, have happy outcomes, as the children are adopted into loving families in the United States or elsewhere. But what psychological scars do these children bear from their early experience of extreme neglect? What can be done to help promote their positive development?

At the University of Wisconsin-Madison, Seth Pollak is working to answer those and similar questions, studying emotion in children adopted from Russia and Romania. An assistant professor of psychology, psychiatry, and pediatrics, and a member of the Waisman Center at UW-Madison, Pollak also studies emotional development in children severely abused by parents or caregivers. His carefully controlled laboratory research is designed to probe beneath and beyond the well-established findings that abused and neglected children are at increased risk for developing a wide variety of psychological and behavioral disorders.

The problem is pervasive. For the year 2000, the US government counts 879,000 substantiated cases of child maltreatment nationwide, with 19 percent of cases consisting of physical abuse and 62 percent of neglect. A 1992 study found significantly high rates of attention-deficit hyperactivity disorder, oppositional disorder, and posttraumatic stress disorder among maltreated children. Another study that same year found children at an increased risk for depression, often with a tendency of violence against other adults, spouses, and dating partners. A 2001 report from the National Institute of Justice showed that abuse or neglect increases the probability of arrest as a juvenile by 59 percent, arrest as an adult by 28 percent, and arrest for violent crime by 30 percent. In June, Pollak presented his research at a meeting in Washington, DC that brought together Congressional staffers, NIH scientists, and representatives from other federal agencies to confront the problem of child abuse.

At yet another level, Pollak's work has an even more ambitious aim: to advance the age-old debate about the relative contributions of nature and nurture. In the past decade or so, Pollak contends, influential scientific and popular publications have downplayed parents' importance in child development, leading many people to mistakenly view the nature-nurture debate as a closed book. He sees his research as part of a burgeoning movement to keep the issue open for inquiry, with a focus on "the complex and dynamic interplay between biology and experience in shaping children's behavior."

"If I told you that research from my laboratory was demonstrating that child abuse is bad for kids," Pollak said, "your response would probably be something like, 'Duh! That's not interesting – of course child abuse is bad for children.' But what is interesting is that this is so well documented, so much taken

for granted; yet we don't know why – and we don't often ask why.

Why is it that something that happens when someone is one or two or three years old affects their ability to regulate their emotions and behavior as a toddler, their peer relationships as a young child, their intellectual development and academic performance in elementary school, their risk for delinquency and substance abuse in the teenage years; puts them at risk for depression and criminal behavior as adults; and affects the way they parent their own children?

“Something in the person is obviously changed based on this experience,” he said. “But what could it possibly be? What are the mechanisms affecting behavior in so many different domains years after the abuse has stopped?”

With a dual PhD in clinical psychology and brain and cognitive sciences from the University of Rochester, Pollak takes a multidisciplinary approach to this problem, combining insights from both of those fields along with developmental psychology. His approach owes a debt to Loren and Jean Chapman's idea of measuring differential deficit (described in a classic 1978 article in the *Journal of Psychiatric Research*). This method, Pollak said, represents an advance in explanatory power over the largely descriptive body of research showing simply that a group of subjects with psychopathology typically perform worse than a control group. Teasing out a differential deficit – a particular, theoretically meaningful condition under which the pathological group's performance lags – allows researchers to make far more incisive interpretations of experimental data.

Pollak's guiding hypothesis is that early emotional experiences, occurring when the brain retains a high degree of plasticity, have the power to alter the way a child learns about and responds to displays of emotion in others. Given a warm, nurturing environment, the child's emotional learning will proceed along a relatively smooth course, paving the way for stable emotions and interpersonal relationships throughout life. But if instead the child is a victim of severe abuse or neglect, she may learn responses that, while adaptive under these dire conditions, are counterproductive in more benign circumstances.

A key finding that Pollak has uncovered using a variety of experimental techniques is that abused children are more sensitive than others to cues of anger. “They mobilize their attentional and cognitive resources to catch even very subtle signs of anger,” he said. “They become experts at anger detection.”

In a study of categorical perception (*Proceedings of the National Academy of Sciences*, 2002), Pollak and Doris Kistler showed maltreated and control children computer-modified pictures of faces that “morphed” in 11 steps from one emotion to another: from happy to fearful, for example, or angry to sad. Abused children had a lower threshold for perceiving faces as angry, but did not differ from controls in perceiving happy, sad, or fearful faces.

Pollak and colleagues also use electrophysiological methods to probe what happens when children's brains are confronted with emotional stimuli. In *Psychophysiology* (March 2001), they described an experiment comparing event-related brain potentials in maltreated and control children presented with pictures of faces displaying different emotions. Using the P3b brain wave – validated in perceptual and cognitive studies as a measure of heightened attention – they found that the strength of the P3b response in abused children differed from controls only for angry faces, not sad or fearful ones. P3b represents “a combination of selective attention and memory that is getting jacked up,” Pollack said. As an

involuntary, directly measured response, P3b is particularly useful in probing brain activity in real time.

In the *Journal of Abnormal Psychology* (August 2003), Pollak and Stephanie Tolley-Schell presented results of a related study. They used a selective attention task, in which happy or angry faces were used to trigger responses when the target, a star, was displayed on either the left or right side of a computer screen. In trials where the target appeared on the “wrong” side of the screen (opposite the preceding face), subjects inevitably took longer to respond, reflecting the additional cognitive step needed to respond versus when the target is on the “correct” side. According to P3b amplitude, abused children employed greater attentional resources than controls to “disengage” from angry facial displays and focus on the target. Again, the two groups did not differ when happy faces were used.

“The method we used in this study allowed us to demonstrate that abused children don’t have a problem paying attention in general,” Pollak said. Instead, “when anger is present, it’s like they stick to it.”

Taken together, he contended, these findings reinforce the theory that abused children are more attuned to anger, or what looks to them like anger, in others. This hypersensitivity likely works to a child’s advantage in the presence of an abusive parent: He can flee or change his behavior. But it may also lead the child to take an aggressive stance, or alternatively, to withdraw, even in situations where no threat is present. It is not hard to see how a child expecting confrontation from every social encounter could develop emotional and behavioral problems.

“It’s kind of like growing up with prisms over your eyes,” he says. “You can learn how to adjust to the world if it’s distorted consistently. But what happens when it’s righted? That’s where I think these kids start having a lot of interpersonal problems. They misinterpret other people’s social signals and spend so much of their cognitive resources looking for anger that they miss other cues. If you’re a child on the playground, and you think someone is going to harm you, you’re going to respond as if you’re being threatened. If the person wasn’t trying to harm you, your behavior looks bizarre to everyone else, and you get in trouble, even though you’re just doing what comes naturally – protecting yourself.”

In past research on maltreated children, Pollak noted, those who were physically abused, sexually abused, or neglected were commonly lumped together.

“But from the perspective of the developing brain, those experiences are very different,” he said. “So scientists are now starting to look at more homogeneous groups.”

In contrast to abused children, those who suffer neglect seem to have difficulties decoding and understanding emotions across the spectrum. Pollak and Alison Wismer Fries have found that neglected children have difficulty discriminating different facial expressions, and that Eastern European post-institutionalized children adopted in the United States have trouble matching pictured facial expressions to happy, sad, angry, or fearful scenarios described verbally. The longer a child was institutionalized, the greater the impairment. But the good news is that the longer children have been in adoptive homes, the better their performance.

Pollak believes the paucity of early interpersonal contact denies institutionalized children the opportunity to learn about emotions at a young age, as most children do; yet, if they are adopted into a caring family, they may be able to catch up later. Collaborating with intervention experts, Pollack is now

planning a study to see whether targeted therapies can further improve these children's emotional learning. To help gauge efficacy, children will have psychophysiological testing before and after the interventions.

"It's exciting," he said. "No one's ever done this before."

Beyond the significance of Pollak's work for maltreated children are potential clues for understanding emotional development in general.

"With my developmental or 'affective' scientist hat on, my interest is, where do basic emotions – like happiness, sadness, anger, fear, and disgust – come from?" he said.

Because such emotions span across vastly different cultures, the prevailing assumption is that they are hard-wired in the human brain. But Pollak suggests that, in part, the universality of emotions may reflect that children in every culture are treated much alike in the ways that matter most. If that is true, one of the few ways to study how emotional responses arise is to look at children whose experience is far outside the norm. Besides abuse victims and post-institutionalized children, he is studying children with depressed parents and children with Down syndrome or language disorders. In the latter cases, he explained, the difference in experience comes not from treatment by others, but from central nervous system abnormalities.

"These groups of children represent different ways we can parse the role of social experience in brain/behavior relationships," Pollak said. "If we see differences in groups of children who have had extreme experiences, this might give us insight into the relative contributions of nature and nurture to emotional behavior." In addition, he said the study could lead to a model of which parts of the brain are affected by experience.

"I do think there are biological predispositions for emotional behaviors, since they are learned so rapidly after birth," he added. "But all biological systems have to maintain some flexibility, because when we're born we don't know what our environment will be like. So I see a tremendous role for experience in changing how those systems work."

A complementary line of research is beginning to identify potential gene-environment interactions. Pollak points to a study by a group of his colleagues showing that maltreated children with a particular genetic marker are more likely to develop behavioral problems following maltreatment than those lacking the particular polymorphism. Perhaps the biggest challenge for this field, he predicted, will be trying to understand why maltreated children have such varied outcomes, ranging from depression to criminality to, for the lucky ones, happy adult adjustment.

Pollak hopes his own work, along with that of like-minded researchers, will help steer emotion research away from the recent trend of studying the brain in isolation from the social environment, and move it onto a more inclusive, interdisciplinary course.

"You can't just pay attention to what's in children's heads; you have to pay attention to what their heads are in," he said. "And it's the interaction between the two that's really crucial."

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