For boys at risk of psychopathy, laughter isn't so contagious

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For most people, laughter is highly contagious. It's nearly impossible to hear or see someone laughing and not feel the urge to join in. But researchers reporting in *Current Biology* on September 28 have new evidence to show that boys at risk of developing psychopathy when they become adults don't have that same urge.

Individuals at risk of psychopathy show persistent disruptive behaviors alongside callous-unemotional traits. When asked in the study, boys fitting that description reported that they didn't want to join in with laughter as much as their peers. Images of their brains also showed reduced response to the sound of laughter. Those differences were seen in brain areas that promote joining in with others and resonating with other people's emotions, not in auditory brain areas.

"Most studies have focused on how individuals with psychopathic traits process negative emotions and how their lack of response to them might explain their ability to aggress against other people," says senior author Essi Viding, of University College London. "This prior work is important, but it has not fully addressed why these individuals fail to bond with others. We wanted to investigate how boys at risk of developing psychopathy process emotions that promote social affiliation, such as laughter."

Viding and colleagues recruited 62 boys aged 11 to 16 with disruptive behaviors with or without callous-unemotional traits and 30 normally behaved, matched controls. The groups were matched on ability, socioeconomic background, ethnicity, and handedness.

"It is not appropriate to label children psychopaths," Viding explains. "Psychopathy is an adult personality disorder. However, we do know from longitudinal research that there are certain children who are at a higher risk for developing psychopathy, and we screened for those features that indicate that risk."

The researchers captured the children's brain activity using functional MRI while they listened to genuine laughter interleaved with posed laughter and crying sounds. The boys who took part were asked, on a scale of 1 to 7, "How much does hearing the sound make you feel like joining in and/or feeling the emotion?" and "How much does the sound reflect a genuinely felt emotion?"

Boys who showed disruptive behavior coupled with high levels of callous-unemotional traits reported less desire to join in with laughter than did normally behaved children or those who were disruptive without showing callous-unemotional traits.

All the boys showed brain activity to genuine laughter in many parts of the brain, including the auditory cortex, where sounds are processed. However, some interesting differences also emerged, and these were particularly pronounced in boys whose disruptive behavior was coupled with callous-unemotional traits. They showed reduced brain activity in the anterior insula and supplementary motor area, brain regions that are

thought to facilitate resonating with other people's emotions and joining in with their laughter. Boys who were disruptive but had low levels of callous-unemotional traits showed some differences too, but not as pronounced as the group with high levels of callous-unemotional traits.

Viding says it's hard to know whether the reduced response to laughter is a cause or a consequence of the boys' disruptive behaviors. But the findings should clearly motivate further study into how signals of social affiliation are processed in children at risk of developing psychopathy and antisocial personality disorder. She and her colleagues hope to explore related questions, including whether these children also respond differently to dynamically smiling faces, words of encouragement, or displays of love. They also want to learn at what age those differences arise.

The findings show that kids who are vulnerable to developing psychopathy don't experience the world quite like the rest of us, Viding says.

"Those social cues that automatically give us pleasure or alert us to someone's distress do not register in the same way for these children," she says. "That does not mean that these children are destined to become antisocial or dangerous; rather, these findings shed new light on why they often make different choices from their peers. We are only now beginning to develop an understanding of how the processes underlying prosocial behavior might differ in these children. Such understanding is essential if we are to improve current approaches to treatment for affected children and their families who need our help and support."

More information: *Current Biology*, O'Nions and Lima et al.: "Reduced Laughter Contagion in Boys at Risk for Psychopathy" www.cell.com/current-biology/f … 0960-9822(17)31102-8 , DOI: 10.1016/j.cub.2017.08.062