

# Callous-Unemotional Traits in Children

September 30, 2013



I first met Tom, a 13-year-old boy at a school for children with emotional and behavioral difficulties, when first starting out on my PhD research. Tom was a charming and effusive pupil and I instantly warmed to him. One day, over a cup of tea in the staff room, I mentioned to two of the teachers how delightful I found Tom. One of them simply gave me a wry smile; the other was not so reserved. He shared his rather frank view that Tom was the “devil incarnate.” Over the following months I began to see a very different young person. I observed behavior that was characterised by violent bullying, callous blackmail of other boys, attempts to intimidate members of staff, and lack of regret for his actions. As my research progressed it became clear that Tom typified a particular kind of youth with antisocial behavior, those with callous-unemotional traits.

Callous–unemotional traits, such as limited empathy, a lack of guilt, and shallow affect have received increased attention from both researchers and clinicians in recent years. Paul Frick trail-blazed research in this area by operationalizing a developmentally sensitive measure to capture such traits in children. Over the years, work by a formidable collective of colleagues, including Frick, at the University of New Orleans; James Blair, at the National Institute of Mental Health; Don Lynam, at Purdue University; Adelle Forth, at Carleton University, Canada; Dustin Pardini, at the University of Pittsburgh; and Mark Dadds, at the University of New South Wales, Australia, have employed a variety of methodologies to convincingly demonstrate that callous-unemotional traits delineate a group of youth at risk for severe and violent antisocial behavior that often persists into adulthood. These traits are also associated with increased risk of adult psychopathy.

My own program of research is focused on the study of children with antisocial behavior — both those with and without high levels of callous-unemotional traits. I have been particularly motivated to use multiple (twin model-fitting, genotyping, experimental psychology, and brain imaging) methods in order

to shed light on the underlying mechanisms that may make some children more vulnerable to antisocial behavior. My PhD training was interdisciplinary and I was very fortunate to be able to work with data from the Twins Early Development Study in collaboration with Robert Plomin of King's College London.

In 2005, we published a paper investigating heritability of antisocial behavior in seven-year-old children with/without high levels of callous-unemotional traits. Antisocial behavior with high levels of callous-unemotional traits appeared strongly heritable, whereas antisocial behavior with lower levels of callous-unemotional traits was (for the most part) explained by environmental factors. This study provided further indication that callous-unemotional traits could have utility as a subgrouping factor among children with antisocial behavior. It also got me hooked in this area of research.

## **Establishing a Link**

Our subsequent twin analyses have increased our understanding of callous-unemotional traits in childhood in several ways. We now know that there is substantial genetic overlap between callous-unemotional traits and antisocial behavior — in other words, the two phenotypes share risk genes. Work by my former post doc, Nathalie Fontaine, now at Indiana University, indicates that stable high levels of callous-unemotional traits are strongly heritable, in particular for boys. However, we know less about actual risk genes and no big hits have emerged so far. Work by colleagues, such as Naomi Sadeh at the University of California, San Francisco, and Edelyn Verona, at the University of Illinois at Urbana-Champaign, suggests that genetic risk for callous-unemotional traits may only express itself under unfavorable environmental circumstances. In other words, although genetic vulnerability is likely to play a role in the development of callous-unemotional traits and accompanying antisocial behavior, phenotypic expression may require specific environmental circumstances. Our own preliminary genome-wide work indicates that we may also need to investigate the contribution from rare genetic variants and gene-gene interaction.

Our research group has conducted several experimental lines of work in recent years. A study by my former PhD student, Alice Jones, now at Goldsmiths, University of London, highlighted that children with callous-unemotional traits have a very different profile of empathy problems to those seen in children with autism spectrum conditions. They have atypically blunted affective response to other people's distress, but are perfectly capable of judging other people's point of view (i.e., they can mentalize). Children with autism spectrum conditions appear to have the opposite pattern of difficulties. By contrast, children who display antisocial behavior, but who have low levels of callous-unemotional traits, look similar to typically developing children on these domains.

Neuroimaging work from our lab has also produced a number of new findings that have helped characterise the neurobiological vulnerabilities associated with callous-unemotional traits and antisocial behavior. Specifically, recent work with my post doc, Catherine Sebastian, has provided support for the view that in children with antisocial behavior, amygdala activity to other people's distress (fear and sadness) is attenuated in those with high levels of callous-unemotional traits, but heightened in children with lower levels of such traits. These findings further suggest that children with or without callous-unemotional traits may develop antisocial behaviour as a result of quite different sets of underlying vulnerabilities. Parallel work led by my colleague Eamon McCrory, with whom I run our research group at University College London, has shown that a pattern of amygdala overactivity to emotional stimuli is

also seen in children with histories of childhood maltreatment, a robust environmental risk factor for antisocial behaviour. One important future research aim for our group is to delineate the particular environmental risk factors that increase the likelihood of antisocial behaviour in those children with high or low levels of callous-unemotional traits.

## **Treating Tom**

How does any of this research advance our efforts to prevent and treat children like Tom? From a clinical perspective, research in this field has taught us three important things. First, it is now clear that children who qualify for antisocial behavior diagnosis (conduct disorder) are a heterogeneous group and that callous-unemotional traits are helpful in characterising a distinct pattern of vulnerability and prognosis in a subset of these children. Second, longitudinal work by ourselves and others indicates that callous-unemotional traits are malleable. New studies by several colleagues suggest these children respond to warm parenting, but may be less responsive to negative parenting. Third, the emerging pattern of distinct neurocognitive vulnerability to antisocial behavior in children with high vs. low levels of callous-unemotional traits has raised the possibility of tailoring existing interventions to suit the specific profile of atypical affective processing that characterises each group of children. For example, a recent study by Dadds and colleagues suggests that children with high levels of callous-unemotional traits may benefit from training in emotional literacy and emotional recognition. We need to build on these preliminary advances in applying basic research findings to inform clinical practice. I am hopeful that over the next decade we will make significant strides in being able to provide effective help and support to children like Tom.

## **Further Reading**

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