

# What About The Children?

Patrons: Sir Michael Morpurgo, Rebecca Abrams, Sir John Timpson, Dame Sarah Storey

*'Raising awareness of the never-changing emotional needs of the under-threes in our ever-changing society'*

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## Research Summary

**The role of early attachment and parental presence in adolescent behavioural and neurobiological regulation.** Christy R. Rogers, Xi Chen, She-Joo Kwon, Nancy L. McElwain and Eva H. Telzer, *Developmental Cognitive Neuroscience* (2021). DOI: <https://doi.org/10.1016/j.dcn.2021.101046>

Adolescence is a time of rapid neurological and psychological change, and pre-teens and teenagers find it harder to control emotions than either younger school-aged children or young adults. During this period, when young people must learn to navigate a rapidly expanding social setting, build friendships and start romantic relationships, they are particularly sensitive to social cues from their peers. Secure attachment in baby- and toddlerhood is known to help growing children and adolescents regulate their emotions, which suggests that a secure relationship with parents might protect these young people from some forms of social anxiety and the longer-term problems that it can cause.

Studies from around the world have consistently shown that young adolescents aged between about 12 and 15 show particular difficulties in controlling their emotions in social situations compared to young children, older adolescents, and adults. This difficulty is implied by studies of brain activity, which show that the amygdala, a brain region associated with emotional processing, and the ventral striatum, similarly associated with reward processing, are highly activated when adolescents process social situations. These brain regions develop earlier than the prefrontal cortex, which is involved in the rational, cognitive control of emotion. Furthermore, heightened reactivity in the amygdala and ventral striatum in adolescence has been associated with poor impulse control. Research has also suggested that adolescents' emotional responses, and even the activity patterns in their brains, can be modulated or 'buffered' by a parent's responsiveness or physical presence.

It is thought that secure attachment to a primary caregiver very early in life helps a child develop consistent internal 'working models' of social relationships that help them learn to control their emotions and develop social skills. The amygdala, in particular, grows and develops more slowly in children who were poorly attached to their mothers as babies. However, despite the growing evidence of a link between attachment security in baby- and toddlerhood and neurological – and, consequently, psychological – response to social situations in adolescence, most relevant research until now has simply compared cohorts of adolescents with different attachment

histories. This type of study, known as a retrospective study, cannot be as definitive as a prospective study that follows the same group of individuals over time.

Rogers and her co-workers designed a prospective study to test for any connection between toddlers' attachment to their parents and the extent to which, when those toddlers have become adolescents, their parents' presence affects their emotional responses. They contacted a cohort of families who had been involved in a socioeconomic study about 10 years ago, when their children had been three years old. Now about 13, these children were invited to take part in a follow-up study testing brain function and behaviour under stress. Fifty-one adolescents – the majority boys – completed the study, which involved a functional MRI (fMRI) scan of their brains during which they performed a simple activity known as a 'social go / no-go task'. Each young person completed the task and the fMRI scan twice: once alone, and once in the presence of a parent. Most of the adolescents who took part were white and from relatively prosperous backgrounds; the researchers had access to data from the earlier study that had categorised each of them as securely or insecurely attached as toddlers. In the rest of this summary, the words 'secure' and 'insecure' are used to apply to the attachment status recorded in this prior study rather than to any assessment of the participants' emotional state as teens.

The task completed by the adolescents was designed to measure impulsiveness and emotional control. Each adolescent was presented in a random order with 27 images equally divided into three equal groups, attractive, aversive, and neutral (control). The attractive images showed groups of happy adolescents 'hanging out' together; the aversive ones showed adolescents being rejected by their peers; and the neutral ones were just random patterns.

Each image was accompanied by an instance of the go / no-go task in which a letter appeared over the image. Adolescents were instructed to press a button as soon as they saw the letter (a go trial; 66% of instances) unless that letter was 'X' (the no-go trial). A false alarm – that is, pressing the button when 'X' was displayed – was taken as an instance of behavioural dysregulation in the form of poor impulse control. When the participants were alone during the trial, they were simply told that no-one would be watching them. When a parent would be present, they were warned of this in advance; the parent greeted their child with a standard, single-sentence, friendly script and then made no other contact during the trial.

The researchers compared the numbers of false alarms registered when either the attractive or aversive images had been presented against those registered with the control images for each participant. This a complex analysis that could pick out the effects of parental presence and security in early childhood both separately and together. Data was therefore available for each adolescent under six different conditions: the three image types (attractive, aversive, and neutral) both alone and when a parent was present. Brain activation in response to the different images was determined from the fMRI scans, and, again, these were obtained in both the 'alone' and 'parent present' conditions.

This analysis showed, firstly, that there was no significant difference in the adolescents' responses when viewing the attractive images compared to the control ones according to single variables of gender, age, attachment pattern as toddlers

(secure or insecure) or parental presence. All the adolescents involved in the study registered more false alarms when viewing the attractive images than the control ones, but this difference was significantly larger in those who were insecure.

On average, adolescents showed higher false alarm rates when viewing the control images than when viewing the aversive ones. Here, however, there was an important difference between secure and insecure adolescents in the effect of parental presence. The difference in false alarm rates between the control and aversive conditions only reached statistical significance with secure adolescents when they were alone, and with insecure adolescents when a parent was present.

Examining the fMRI scans showed that differences in activation levels when the three image types were viewed were concentrated in a few brain regions: the right temporal parietal junction (TPJ), which is involved in information processing; the posterior superior temporal sulcus (pSTS), which is important for social competence, and certain parts of the frontal cortex that are also involved in higher cognitive activities. Again here, there were important differences between secure and insecure adolescents. For insecure adolescents only, the TPJ and pSTS were activated more by the attractive than by the control images under both conditions, and parts of the frontal cortex were activated more by the aversive images than the control ones when the adolescents were alone. Interestingly, however, this response was not seen when the adolescents' parents were present: then, these adolescents' brain responses resembled those of their secure peers. Therefore, it seems that the hyperactivity in insecure adolescents' brains that is triggered by viewing socially aversive images can be buffered by their parents' presence.

Taken together, these results suggest that insecure adolescents have more difficulty regulating their impulses in response to both positive and negative emotional cues. This finding alone is not controversial; however, Rogers describes the observation that the presence of a parent can promote impulse regulation, and dampen some areas of brain activity, in insecure adolescents as 'unexpected'. Previous research has suggested that the physical presence of a parent helps younger children deal with strange situations. Rogers therefore proposes that the insecure adolescents might be responding to emotional content in a way that resembles that of younger children, while the securely attached ones have built up psychological resources that allow them to rely less on their parents' presence. This, in turn, suggests that, just by being there, parents can play an important role in regulating impulse control and thus promoting appropriate behaviour in their teenagers and that this is particularly important when those teenagers had been insecurely attached during early childhood.

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