Affective empathy, cognitive empathy, and social attention in children at high risk of criminal behaviour

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Abstract

Background: Empathy deficits are hypothesized to underlie impairments in social interaction exhibited by those who engage in antisocial behaviour. Social attention is an essential precursor to empathy; however, no studies have yet examined social attention in relation to cognitive and affective empathy in those exhibiting antisocial behaviour. **Methods:** Participants were 8-12 year-old children at high risk of developing criminal behaviour (*N*=114, 80.7% boys) and typically developing controls (*N*=43, 72.1% boys). The high-risk children were recruited through an ongoing early identification and intervention project of the city of Amsterdam, focusing on the underage siblings or children of delinquents and those failing primary school. Video clips with neutral and emotional content (fear, happiness and pain) were shown while heart rate (HR), skin conductance level (SCL) and skin conductance responses (SCRs) were recorded to measure affective empathy. Answers to questions about emotions in the clips were coded to measure cognitive empathy. Eye tracking was used to evaluate visual scanning patterns towards social relevant cues (eyes and face) in the clips. **Results:** The high-risk group did not differ from the control group in social attention and cognitive empathy, but showed reduced HR to pain and fear, and reduced SCL and SCRs to pain. **Conclusions:** Children at high risk of developing criminal behaviour show impaired affective empathy but unimpaired social attention and cognitive empathy. The implications for early identification and intervention studies with antisocial children are discussed. **Keywords**; criminality, antisocial behaviour, empathy, eye gaze, psychophysiology

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A small group of children is at high risk of persistent antisocial behaviour, including future involvement in the criminal justice system. More effective strategies for targeting these children at an early sensitive period for intervention may provide crucial opportunities, not only to help these children attain a more positive developmental trajectory, but also to diminish the enormous negative impact their behaviour can have on society. Recent reviews of evidence from neuroscience (Fairchild, van Goozen, Calder, & Goodyer, 2013), clinical science, forensic psychology, and criminology (Skeem, Scott, & Mulvey, 2014) indicate that high-risk children have poorer parental supervision, come from more disadvantaged neighbourhoods, have greater problems with emotional functioning, and exhibit alterations in brain structure and function compared to other young people. However, research challenges the notion that high-risk children inevitably mature into adult offenders (Odgers et al., 2007), which raises the possibility that well-targeted intervention could create a turning point in antisocial behaviour for high-risk children. The period between childhood and early adolescence is a time when children are particularly adept at specific kinds of social and emotional learning. This creates a window of opportunity for intervention.

Large cities such as Amsterdam in the Netherlands are confronted by serious criminal problems caused by groups of severe and persistent offenders, who come from families, which frequently operate off the radar from health and social services. The Preventive Intervention Trajectory (PIT) is a project of the municipality of the city of Amsterdam that targets children at risk of future criminal behaviour. These children are the underage siblings of young offenders, have delinquent parents, or fail at school because of severe absenteeism or extreme antisocial behaviour. Whilst these children might have behavioural problems, they often have no diagnosis, nor do their families actively seek help from clinicians, which substantially increases the risk of an unfavourable social developmental trajectory (Farrington, Piquero, & Jennings, 2013; Loeber & Stouthamer-Loeber, 1998). Building on a theoretical model of the development of antisocial behaviour in children that focuses on the mediating role of neurocognitive and emotional processes (Van Goozen, Fairchild, Snoek, & Harold, 2007), the aim of the PIT project is to actively seek and target these children, assess their socio-emotional functioning, and provide them with an opportunity to redirect them onto a more adaptive, prosocial pathway through directed interventions (Van Goozen & Fairchild, 2008).

Recognition of others' emotions and empathy are learned through experience and based on the gradual refinement with age of children's production and recognition of emotional signals (Klinnert & Campos, 1987). Young children who are good in recognizing other people's emotions are more socially skilled and popular (Manstead & Edwards, 1992), but the reverse process also exists. Children who are adversely treated or exposed to aberrant emotional signals exhibit a range of emotional difficulties (Pollak, Cicchetti, Hornung, & Reed, 2000). There is substantial evidence that individuals who engage in inappropriate interpersonal behaviour, such as aggression or antisocial behaviour, have problems in emotion recognition and empathy (Marsh & Blair, 2008). The reasoning is that if one cannot correctly identify distress caused to another person, one is more likely to continue with the harmful or distressing behaviour. Since it is assumed that empathy deficits underlie the impairments in social interaction related to antisocial behaviour (Blair, 2005), the aim of the present study was to examine the role of empathy in children at high risk of developing future criminal behaviour.

Empathy is distinguished into affective and cognitive empathy (Singer, 2006). Affective empathy is the capacity of an individual to experience what it feels like for another person to experience a certain emotion (e.g. Blair, 2005; De Waal, 2008; Smith, 2009), while cognitive empathy is the capacity of an individual to understand what others' emotions and thoughts might be, without being emotionally involved (e.g. Bartoli & Wendt, 2014; Blair, 2005; Bons et al., 2013; Dadds, El Masry, Wimalaweera, & Guastella, 2008; De Vignemont & Singer, 2006; Lovett & Sheffield, 2007; Singer, 2006). Several studies have examined both affective and cognitive empathy in children with antisocial behaviour and found impaired affective empathy but unimpaired cognitive empathy in children with conduct disorder and high levels of callous-unemotional (CU) traits (Anastassiou, Hadjicharalambous & Warde, 2008; Schwenk et al., 2012), in children with conduct disorder with or without ADHD (Van Goozen et al., 2016), in those with conduct problems and high levels of CU traits (Pasalich, Dadds, & Hawes, 2014), and in children with psychopathic tendencies or conduct problems recruited from the community (Jones, Happé, Gilbert, & Viding, 2010), in line with the empathy imbalance theory (Smith, 2009, 2010). In addition, studies that examined only cognitive empathy showed normal cognitive empathy (Sutton, Reeves, & Keogh, 2000; Woodworth & Waschbusch, 2008). However, these studies investigated empathy by using questionnaires and failed to measure affective empathy with physiological measures. Although physiological arousal is not synonymous with affective empathy, it certainly represents a reliable, objective, and direct measure of affective empathy (Bons et al., 2013), and has often been related to antisocial behaviour (e.g. Gao, Raine, Venables, Dawson, & Mednick, 2010; Van Goozen, 2015). Furthermore, verbal reports of one's own experienced emotion (-s) are difficult, especially for antisocial boys, who are known to have low verbal IQ and problems with self-reflection, which could result in unreliable self-reported affective empathy (Bowen, Morgan, Moore, & van Goozen, 2014; Tyson, 2005). Similarly, studies that used physiological measures to assess affective empathy often did not include measures of cognitive empathy. These affective empathy studies reported that children with disruptive behaviour disorders (De Wied, Boxtel, Posthumus, Goudena, & Matthys, 2009; De Wied, van Boxtel, Matthys, & Meeus, 2012; De Wied, van Boxtel, Zaalberg, Goudena, & Matthys, 2006), and children with conduct disorder with and without CU-traits (Marsh, Beauchaine, & Williams, 2008) displayed decreased physiological responses and thus less affective empathy in response to negative emotions. With the present study we extend the existing literature by using objective physiological measures for affective empathy, combined with both cognitive and affective empathy.

In order to understand someone's emotions and respond empathetically, initial attention to socially relevant cues is crucial. From early age on, humans have a preference towards social information (ChitaTegmark, 2016), which can be referred to as social attention. Faces, in particular the eyes, play a key role in providing information about the mental and emotional state of another person during social interaction (Emery, 2000; Klein, Shepherd, & Platt, 2009), and attention to the eyes is considered necessary for the recognition of facially expressed emotions (Bons et al., 2013). Social attention can therefore be seen as an essential precursor of an empathic response. In a previous study, community children with high CU-traits showed deficits in attention to the eyes compared to children low on CUtraits, particularly for fearful faces (Dadds et al., 2008). When these children were instructed to direct their attention to the eyes, their fear recognition was as accurate as that of controls. The authors therefore concluded that the fear recognition problems in children with CU-traits are partly due to a failure in attention towards the eyes (Dadds et al., 2006).

Whereas previous studies on social attention often used static (facial) stimuli, we used stimuli that represent dynamic social situations to evoke an empathetic response, making the current design more sensitive to examine the role of social attention in cognitive and affective empathy (Chevallier et al., 2015). The current study examined the role of social attention and empathy in response to different emotionally meaningful events in children at high risk of future criminal behaviour, and predicted in line with Herpers, Scheepers, Bons, Buitelaar, and Rommelse (2014) and Dadds et al., (2006) that the high risk children would have impaired social attention and affective empathy, but unimpaired cognitive empathy compared to typically developing controls.

Methods

Participants

Data were gathered from children recruited through the Preventive Intervention Trajectory (PIT). This is a large ongoing project of the municipality of the city of Amsterdam, the Netherlands. Participants were the underage siblings of young offenders, children of delinquent parents, or children who fail at school due to severe unauthorized absenteeism (e.g. truancy) or because of extreme antisocial behaviour. The total sample consisted of 157 children (123 boys and 34 girls) with a mean age of 10.37 years (*SD*=1.35). The high-risk group consisted of 114 children (92 boys and 22 girls) with a mean age of 10.40 years (*SD*=1.38). The control group (*N*=43; 31 boys and 12 girls; mean age of 10.27 years [*SD*=1.29]) was recruited through the same schools that were attended by the children in the high-risk group. The Dutch version of the Teacher Report Form (TRF; Achenbach & Rescorla, 2001; Verhulst, Van der Ende, & Koot, 1997) was used to confirm risk status of the participants; all high-risk children scored in the borderline or clinical range on the aggression and/or rule breaking behaviour scales (*t*-score ≥ 65); their average internalizing problem behaviour score was in the normal range. All control children scored within the normal range on all problem scales (*t*-score < 65). The Dutch version of the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001; Verhulst, Van der Ende, & Koot, 1996) was used to inventory the problem behaviour reported by the parents of the high-risk group.

Children were eligible to participate if they were between eight and thirteen years old and spoke and understood the Dutch language. Other exclusion criteria were the use of stimulants and a known DSM classification; based on these criteria three participants were excluded. Written informed consent was obtained from the parents and from the children if they were twelve years or older. Ethical approval for this study was obtained from Leiden University's Education and Child Studies Ethics Committee.

Procedure

Following informed consent, an appointment was made at school, where the tests were administered following a standard protocol. All participants were individually assessed in a quiet room. The assessors were two trained graduate students under supervision of a clinical investigator (LvZ).

Instruments

Stimuli. We showed four video clips: a neutral baseline clip (180 sec.) displayed an aquarium with fishes (Coral Sea Dreaming, Small World Music Inc.), to obtain baseline cardiovascular and electrodermal activity; three emotional clips with different emotional contents were presented in random order. The target emotions in these clips were fear (103 sec.), happiness (87 sec.), and pain (101 sec.). The three clips were derived from existing movies (for details, see Van Rijn, Barendse, van Goozen, & Swaab, 2014).

Social attention. Social attention was assessed by means of visual scanning patterns towards social relevant cues; i.e. eyes and face. The visual scanning patterns were measured with a Tobii T120 eyetracker (Tobii Technology, Sweden) using the I-VT fixation filter. After a five-point calibration procedure, the clips were shown on a LCD screen, placed at approximately 65 cm distance from the participant. In Tobii Studio (version 3.0.2.), dynamic Areas of Interest (AOIs) were drawn by hand in all clips for the eyes and face (without the eyes) (Hessels, Kemner, Boomen, & Hooge, 2015). To control for slight differences in AOI durations between clips, total fixation duration was computed as the percentage of the total AOI duration for each clip separately. These percentages of total fixation were used as indices of social attention.

Affective empathy. Affective arousal was operationalized as the contrast between baseline and the emotional clips in cardiovascular and electrodermal activity. Electrodes to measure electrodermal activity were placed on the middle phalanges of the ring finger and index finger of the non-dominant hand. Before the electrodes were attached, the participants were asked to wash their hands carefully. Two electrodes measuring cardiovascular activity were placed on the chest and left ribs underneath the clothes. Participants were instructed not to move or talk during the measurement.

Physiological data were recorded continuously with AcqKnowledge software version 4.3.1. (BIOPAC Systems Inc.). Recordings were acquired through a galvanic skin response amplifier (GSR100C), electrocardiogram amplifier (ECG100C), and a BIOPAC data acquisition system (MP150 Windows) with a sampling rate of 200 Hz. The physiological monitoring equipment was synchronized with the Tobii software by manually assigned event markers representing the start and end of each clip. In AcqKnowledge a 0.5 Hz highpass filter and a 50 Hz notch filter were applied to stabilize the cardiovascular signal. The recorded physiological data were further processed with a script in MATLAB Release 2012b (The MathWorks, Inc., Natick, Massachusetts, United States). A forward and reverse first order lowpass digital Butterworth filter with a cutoff frequency of 0.33 Hz was used on the raw electrodermal signal, which removed all high frequency noise while ensuring precisely zero phase distortion. To detect skin conductance responses (SCRs) a phasic channel was created by filtering the tonic channel using a zero-phase forward and reverse digital IIR filter with a cut off frequency of one. Each section on the phasic channel that lies above the threshold was considered a SCR. The SCR peak was located at the maximum value of this interval, as measured on the tonic channel (Boucsein, 1992; Society for Psychophysiological Research Ad Hoc Committee on Electrodermal, 2012). Motion artifacts were visually identified and excluded from the data. We used heart rate (HR) as cardiovascular response variable and skin conductance level (SCL) and skin conductance responses (SCRs) as electrodermal response variables.

Cognitive empathy. After each clip participants were asked questions concerning the type and intensity of the emotions of the main character in the clip and the reasons for these emotions. The answers were scored with a coding system taking into account four elements of empathy: (1) the correct target emotion, (2) correct similar and relevant other emotion(-s), (3) the intensity of the emotion(-s), and (4) the explanation for the causes of the emotion (for details see, Van Goozen et al., 2016; Van Rijn et al., 2014). Answers were independently coded by two coders; the interrater agreement was 73.1%.

Intellectual functioning. Intellectual functioning was assessed with the Dutch version of the

Wechsler Intelligence Scale for Children (WISC-III; Kort et al., 2005). Two subtests, Block Design (perceptual organization skills) and Vocabulary (verbal skills), were used to estimate full scale IQ (FSIQ; Campbell, 1998).

Statistical analyses

There were no outliers or violations of statistical assumptions. Due to technical difficulties, HR data were not available for one participant, SCL and SCR data were not available for 54 participants (44 high-risk; no differences in aggression (p=.638) or rule-breaking behaviour (p=.472) within the highrisk group between those with and without data), and eye-tracking data were unavailable for five participants.

A priori, the high-risk and control groups were compared on age, gender, and intellectual functioning. We next examined total fixation duration on the total screen to control for potential differences in attention. To analyze group differences we performed a two-way repeated measures analysis of variance (RM-ANOVA) with AOI (eyes, face) and Emotion (fear, happiness, pain) as within-subject factors and Group as between-subjects factor. Subsequently, we performed three RMANOVAs to investigate differences between groups in HR, SCL, and SCR, respectively, in response to the emotion clips, with Emotion (fear, happiness, pain) as within-subject factor and Group as between-subjects factor. A simple contrast was used with baseline as reference for each of the three emotions. Post-hoc group differences in baseline were examined. Lastly, we compared mean cognitive empathy scores for the two groups with a MANOVA. Significance level was set at $\alpha < .05$. A false discovery rate (FDR) control as described by Glickman, Rao, and Schultz (2014) to correct for multiple testing was used. Effect sizes were calculated using partial eta squared (η_p^2) with $\eta_p^2 \sim 0.03$ representing a small effect, $\eta_p^2 \sim 0.06$ representing a moderate effect, and $\eta_p^2 \geq 0.14$ a large effect (Cohen, 1992).

Results

Descriptive statistics

Descriptive data for gender, age, FSIQ, externalizing problem behaviour, and internalizing problem behaviour are shown in Table 1. The high-risk and control groups did not differ in age or gender, but the high-risk group had a significantly lower estimated FSIQ; the high-risk group also scored significantly higher on TRF aggression, rule-breaking behaviour, total externalizing behaviour, and total internalizing behaviour (Table 1). As expected, parents of the high-risk children reported less problem behaviour ($M_{aggression}$=58.81, *SD*=8.80; $M_{\text{rule breaking}}$=58.30, *SD*=6.85) compared to teachers for aggression ($t(1,112)=14.21$, $p<.001$, $d=1.7$) and rule breaking behaviour ($t(1,112)=13.13$, $p<.001$, $d=1.6$). Because IQ was not correlated with any of the social attention or empathy variables, IQ was not included as a covariate in subsequent analyses.

INSERT TABLE 1 ABOUT HERE

Social attention

First, we examined the total fixation duration to the total screen, controlled for the duration of the clips. The groups did not differ in attention to the total screen ($.30<p<.82$). In Figure 1, the means and standard errors of measurement (SEM) are shown for the percentages of total fixation as a function of Group, AOI and Emotion. The RM-ANOVA results revealed no main effect of Group on social attention ($p=.527$); however, there was a significant effect of Emotion ($F(2,300)=358.43$, $p<.001$, $\eta_p^2=.823$), AOI ($F(1,150)=290.92$, $p<.001$, $\eta_p^2=.66$), and a significant Emotion by AOI interaction ($F(2,300)=137.36$, $p<.001$, $\eta_p^2=.662$), indicating that differences in fixation duration between eyes and face were largest for the negative emotions (Figure 1). No significant Group by Emotion ($p=.135$), or Group by AOI ($p=.152$) interactions were found.

INSERT FIGURE 1 ABOUT HERE

Affective empathy

There were no group differences in HR (p=.431), SCL (p=.135), or SCR (p=.087) at baseline. With regard to HR, there was no effect of Group (p=.971), but there was a significant main effect of Emotion ($F(3,462)=8.37$, $p<.001$, $\eta_p^2=.052$) and a significant Emotion by Group interaction ($F(3,462)=5.08$, $p=.003$, $\eta_p^2=.032$). Subsequent simple contrasts showed a significant Emotion by Group interaction effect for fear ($F(1,154)=7.70$, $p=.006$, $\eta_p^2=.048$), and pain ($F(1,154)=9.62$, $p=.002$, $\eta_p^2=.059$), but not for happiness (p=.023). Figure 2 illustrates that HR increased during emotion exposure in the control group, whereas it decreased in the high-risk group.

INSERT FIGURE 2 ABOUT HERE

With regard to SCL, the results showed no main effect of Group (p=.655), but a significant effect of Emotion ($F(3,291)=134,10$, $p<.001$, $\eta_p^2=.58$), and a significant Emotion by Group interaction ($F(3,291)=7.86$, $p=.001$, $\eta_p^2=.075$). Subsequent simple contrasts showed a significant Emotion by Group interaction effect for pain ($F(1,97)=17.37$, $p<.001$, $\eta_p^2=.152$), reflecting a smaller increase in SCL during the pain clip in the high-risk group than in the control group, but no such pattern was observed for fear (p=.086) or happiness (p=.105).

With regard to SCR, the results showed no main effect of Group (p=.492), but a significant effect of Emotion ($F(3,291)=130.90$, $p<.001$, $\eta_p^2=.574$), and a significant Emotion by Group interaction ($F(3,291)=3.69$, $p=.012$, $\eta_p^2=.037$). Subsequent simple contrasts showed a significant Emotion by Group interaction effect for pain ($F(1,97)=5.79$, $p=.018$, $\eta_p^2=.056$), but not for fear (p=.234) or happiness (p=.916), reflecting fewer SCRs during the pain clip in the high-risk group than in the control group.

Cognitive empathy

Mean cognitive empathy scores for the two groups and the three emotions are shown in Table 2. No group differences were found (p=.887).

INSERT TABLE 2 ABOUT HERE

Discussion

A small group of children is at high risk of persistent antisocial behaviour and a criminal career. Early intervention may provide crucial opportunities to prevent the detrimental effects on the children themselves as well as on society (Van Goozen, 2015). The current study is embedded within the Preventive Intervention Trajectory (PIT), a project that targets children at risk of future criminal behaviour. The current study specifically focused on empathy deficits underlying the impairments in social interaction related to antisocial behaviour (Blair, 2005). The results show that the high-risk children had impaired affective empathy when viewing emotional clips. Specifically, they showed reduced HR to pain and fear, and reduced SCL and SCRs to pain compared to controls. However, importantly, they did not differ from controls on measures of social attention and cognitive empathy, nor in affective empathy to happiness.

To the authors' knowledge, this is the first study that examined the role of social attention using eye-tracking methodology and empathy in response to different emotionally meaningful events in a group of children at high risk of developing criminal behaviour. Although social attention to emotionally charged events is required to ensure an empathic response, we did not find evidence of impaired social attention in the high-risk group, suggesting that social attention does not account for the deficits in affective empathy that we observed in these children. These results are in contrast to some studies, e.g.

Dadds et al. (2008); Dadds et al. (2006) who reported that fear recognition problems in children with CU-traits are partly due to a failure in attention towards the eyes. Correcting attention towards the eyes subsequently seemed to correct some of the recognition impairments (Dadds et al., 2006). It is possible that the attentional mechanisms underlying CU-traits differ from those underlying aggressive, antisocial or criminal behaviour, and future research would need to examine this. However, we found no deviance in social attention and this suggests that the type of training for children with CU-traits, as recommended by Dadds et al. (2006), would not necessarily benefit all children with conduct problems and/or who are at high-risk of future criminal behaviour. These results are in need of replication. Future studies should also include children at high risk of developing criminal behaviour and assess their levels of CU-traits to cross-validate these findings.

In line with previous studies on cognitive and affective empathy (see review; Herpers et al., 2014), and Smith's empathy imbalance theory (Smith, 2009, 2010), our results revealed significant differences in affective empathy but not in cognitive empathy. These results indicate that high-risk children showed adequate recognition and good understanding of the emotions presented in the video clips but had specific problems with empathizing and experiencing others' negative emotions. These results in combination with our findings on unimpaired social attention, suggests that impaired affective empathy is the key empathy component that is related to antisocial behaviour (Blair, 2005).

Elaborating on these results, when a child does not empathize with the distress caused by their aggressive behaviour, they are more likely to continue the display of harmful behaviour (Marsh & Blair, 2008). Our results show that the affective response was significantly smaller for high-risk children, in particular in response to seeing someone else in pain or fear. Problems in affective empathy in children with CD (Van Goozen et al., 2016) or psychopathic traits in response to negative emotions have been observed before (Lockwood, Bird, Bridge, & Viding, 2013). However, we observed similar deficits in children who are not psychopathic and also do not have a diagnosis of CD, showing that these affective processes could play a role in a much larger range of problem behaviours. Future research would benefit from incorporating not only social attention and physiological assessments, but fMRI as well, to investigate the possible relation between functional brain networks and affective empathy. This would eventually increase our insight in the underlying brain mechanisms of empathy.

The study also had several limitations. First, we did not assess motor empathy, which precluded obtaining information about the ability to express empathic facial reactions. Since this is an important component of empathy (Van der Graaff et al., 2015), information on motor empathy could confirm the finding that affective empathy is the key empathy component related to antisocial behaviour. Future research on high-risk samples should therefore aim to incorporate this measure of empathy. Another limitation is the loss of data on electrodermal activity due to technical difficulties. However, it was verified that the data loss was random, and that participants without electrodermal data did not differ from those for whom data were available on key outcome measures. Third, we were not able to include a questionnaire measure of CU-traits, nor did we obtain information about affective empathy using a self-report measure. Future studies should aim to include these self-report measures.

Our sample consisted of children who are at high risk of developing criminal behaviour. The high risk consists of the severity of their externalizing behaviour as reported by their teachers in combination with the parental ignorance of these problems as they reported their child's behaviour to be in the normal range, which might explain why they did not actively seek help. Teachers are often considered more reliable informants; their report of children's behaviour is more objective and they can compare the behaviour of each child against that of many others. The severe behavioural problems of these children as reported by the teachers, in combination with their parents' unawareness of these problems, could negatively impact their future social development (Van Goozen et al., 2007). Early identification of these children is crucial in order to provide tailored interventions to prevent them from drifting towards a criminal career (Van Goozen & Fairchild, 2008).

The findings of the current study indicate that the empathy impairment that presumably plays a significant role in antisocial development is primarily a deficit in affective empathy rather than in social attention or cognitive empathy. This has implications for the development of interventions, which focus specifically on enhancing emotional awareness and affective empathy. For example, emotion awareness programs in clinical samples of aggressive children (Van Baardewijk, Stegge, Bushman, & Vermeiren, 2009) and young offenders (Hubble, Bowen, Moore, & van Goozen, 2015) have been found to be successful in attenuating aggression or severity of crimes committed. Moreover, there are preliminary indications that empathy and compassion training result in increased affective response and functional activity in brain areas involved in emotion processing (Klimecki, Leiberg, Ricard, & Singer, 2014). Programs that target an increase in emotion awareness could thus be an important component in future intervention and prevention research.

Conclusion

This study found impaired affective empathy but unimpaired social attention and cognitive empathy in a sample of children considered to be at high risk for future criminal behaviour because they are the underage siblings of young offenders, they have delinquent parents or fail at school because of severe absenteeism or extreme antisocial behaviour. The findings highlight not only the important role of emotion function, specifically reduced affective response, in the development of antisocial behaviour, but also suggest that interventions should directly target these affective processes in order to influence the development of behaviour in a more prosocial direction.

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Key points

- Deficits in empathy are hypothesized to play a key role in the impairments in social interaction shown by those who engage in antisocial behaviour. Although evidence highlights the role of affective and/or cognitive empathy in antisocial development, its precursor – social attention – has not yet been investigated.
- The role of social attention, and affective and cognitive empathy was studied in a group of children at high
risk of developing future criminal behaviour.
- Findings indicate a specific deficit in affective empathy for negative emotions, but no impairment in social attention, cognitive empathy or affective empathy for happiness.
- Interventions aimed at preventing future problem behaviour should focus on enhancing emotional awareness and/or affective empathy.

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Table 1.

Descriptive statistics for gender, age, FSIQ, aggression, rule-breaking behaviour, total externalizing behaviour, and total internalizing behaviour for the two groups

	Risk grour		Control gro			
	M	*SD*	*M*	*SD*	t/χ^2 test	*p*
Gender (% boys)	80.7%		72.1%		χ^2 (1,157) = 1.36	.243
Age (years)	10.40	1.38	10.27	1.29	*t*(155) = 0.53	.598
FSIQ	83.01	12.54	104.45	15.43	*t*(155) = -8.95	<.001
Aggression TRF (*t*-score)	75.64 (61.4%)	10.77	52.51 (0.0%)	4.35	*t*(1,155) = 19.17	<.001
Rule-breaking TRF (*t*-score)	69.98 (50.8%)	7.54	52.33 (2.33%)	3.90	*t*(1,155) = 19.12	<.001
Total Internalizing *(t*-score)	61.09 (43.9%)	7.76	49.84 (4.65%)	8.14	*t*(1,155) = 7.99	<.001
Total externalizing (*t*-score)	73.51 (93.0%)	7.58	48.49 (2.33%)	7.09	*t*(1,155) = 18.76	<.001

Note: Between brackets are the percentages of the children within the clinical range displayed.

Table 2.

Means, standard deviations, and ANOVAs for the three emotions

	High-risk group (*N* = 114)		Control group (*N* = 42)			
	M(SD)	*Range*	*M(SD)*	*Range*	*F*	*p*
Fear	4.70 (1.52)	0-7	4.50 (1.76)	0-7	(1,155) = .46	.483
Happiness	4.75 (1.13)	0-7	4.64 (1.19)	0-6	(1,155) = .29	.589
Pain	4.82 (1.53)	0-8	4.79 (1.42)	2-8	(1,155) = .02	.886

Note. Maximum range was 0-9. Scores were normally distributed and there were no ceiling effects, skewness ranged between -0.4 and -1.5.

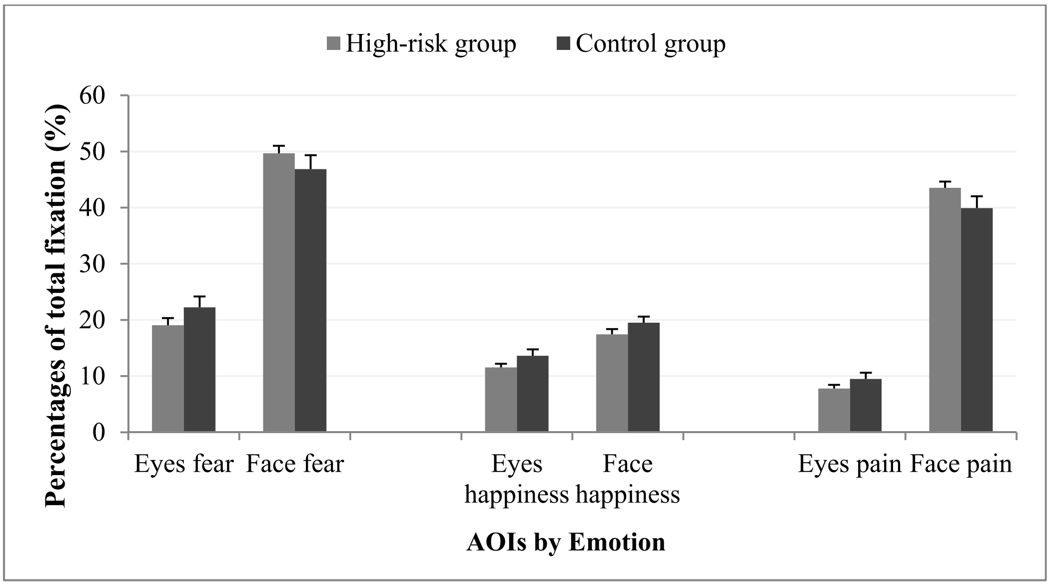

Figure 1. Percentages of total fixation (*M*, *SEM*) for Areas of Interest and Emotion for the high-risk group and control group.

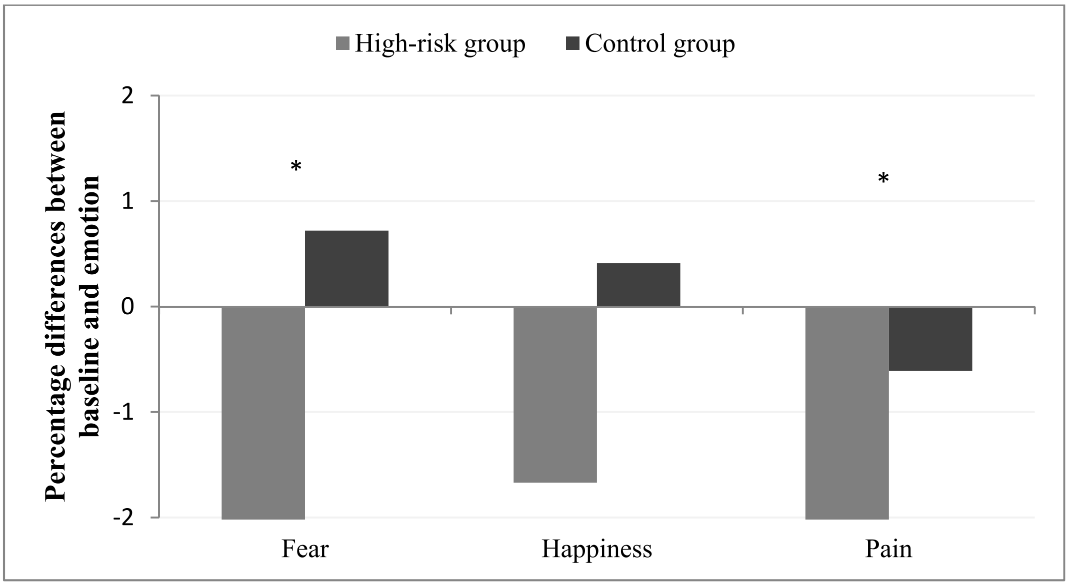

Figure 2. The differences in percentage of Heart Rate responses for the three clips versus baselines for the two groups. *p<.01

Note. For visualization purposes the *differences* in percentage between the emotions and baselines are shown.