



## Emotional memory and psychopathic traits in conduct disordered adolescents

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### ABSTRACT

The limited number of studies reporting emotional memory impairments in adults with psychopathic traits has not yet been replicated in conduct disordered adolescents with callous unemotional (CU) traits. This study aimed to test the developmental hypothesis that emotional memory will also be impaired in conduct disordered adolescents with CU traits on similar memory tasks. Eighty-four conduct disordered male adolescents assessed using the Psychopathy Checklist: Youth Version (PCL: YV) were tested on a well-validated emotional memory task. Task performance was assessed in relation to scores on the PCL: YV with particular reference to the affective domains which reflect CU traits. As expected, in the sample as a whole, memory for emotional events was better than memory for neutral events. High psychopathy scorers had attenuated cued recall for the more emotional components of the task. Psychopathy scores, particularly the affective facet scores (reflecting CU traits) showed a negative relationship to recall accuracy for emotional events. The findings essentially replicate those from our adult studies suggesting that the emotional memory processing deficits seen in psychopathy are reasonably stable across the lifespan.

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### 1. Introduction

Conduct disorder (CD), antisocial personality disorder (ASPD) and psychopathy are a group of overlapping developmental disorders that are associated with significant intra and interpersonal dysfunction. While all of these disorders focus on behavioural problems such as criminality and rule breaking, psychopathy emphasises the more interpersonal and affective aspects of predatory antisocial behaviours. Prevalence studies suggest CD and ASPD are more common (by an estimated six times) than the dimensionally higher order construct of psychopathy which affects approximately 1% of the general population and approximately 15–25% of incarcerated offenders (Hare, 1991). Psychopathy as operationalised in the Psychopathy Checklist Revised (PCL-R, Hare, 1991) is characterised by distinct interpersonal, affective and behavioural traits and is thought to be particularly associated with instrumental aggression (Cornell et al., 1996). Psychopaths display arrogant, superficial, manipulative and deceitful interpersonal behaviours. Affectively, they are shallow, unable to make strong attachments and lack empathy, anxiety and guilt. Behaviourally, they are impulsive, irresponsible, sensation seeking and likely to be involved in criminal activity.

With the development of age appropriate measures of psychopathy in adolescents such as the Psychopathy Checklist: Youth Version (Forth, Kosson, & Hare, 2003) there is now an opportunity to

explore the aetiology of this disorder from a neurodevelopmental perspective. It is recognised that specific facets of the antisocial personality disorders may have different neural substrates. For example, executive dysfunction may be particularly related to impulsivity and antisocial behaviour (Moffitt & Henry, 1991; Morgan & Lilienfeld, 2000) while amygdala dysfunction may be more associated with the affective components of psychopathy (Blair, 2005).

The neural systems implicated in the development and maintenance of antisocial behaviour and psychopathy include a range of interconnected circuits that encompass the orbital frontal cortex (Damasio, Tranel, & Damasio, 1990), prefrontal cortex (Raine, Lencz, Bihrlé, LaCasse, & Colletti, 2000) and limbic structures such as the amygdala (Patrick, Cuthbert, & Lang, 1994). The amygdala has been the focus of study in relation to the affective (callous unemotional – CU) components of psychopathy as lesions in humans reduce the ability to acquire conditioned autonomic responses (Bechara et al., 1995) and impair emotional memory (Adolphs, Cahill, Schul, & Babinsky, 1997; Cahill, Babinsky, Markowitsch, & McGaugh, 1995; Hamann, Lee, & Adolphs, 1999). Functional imaging studies also confirm the notion that the amygdala is activated in response to affectively loaded visual stimuli (Hariri, Mattay, Tessitore, Fera, & Weinberger, 2003; Morris et al., 1996).

According to the Integrated Emotions System (IES) proposed by Blair (2005) amygdala dysfunction in psychopathy disrupts the ability to form stimulus-reinforcement associations which results in impairments in the normal socialisation process. As a result, the individual is less likely to learn to avoid the use of antisocial

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behaviour to achieve their goals but instead may learn to use anti-social behaviour instrumentally to achieve their desires. That is, they may receive the potential rewards, e.g., financial gain, without the feelings of guilt over the victim's distress. The IES model also makes a distinction between reactive and instrumental aggression and suggests that reactive (impulsive) aggression may be more associated with orbital/ventrolateral prefrontal cortical dysfunction, while amygdala dysfunction may be associated with instrumental aggression, which is seen as an important potentially distinguishing feature of psychopathy.

There are now a number of studies that suggest the affective (CU traits) deficits seen in psychopathy are associated with impairments in processing the emotional significance of negatively valenced stimuli (Day & Wong, 1996; Patrick et al., 1994) and with deficits in face affect recognition (Marsh & Blair, 2008) particularly for sadness, fear and disgust. Impairments in the processing of emotional words have also been reported in psychopathic populations (Day & Wong, 1996; Williamson, Harpur, & Hare, 1991). Support for the notion that amygdala dysfunction may account for the CU components of psychopathy comes from fMRI studies in both adults (Birbaumer et al., 2005; Deeley et al., 2006; Kiehl et al., 2001) and children (Marsh et al., 2008). Furthermore, there is evidence of structural alterations in the basolateral, lateral, cortical, and central nuclei of the amygdala in psychopathic populations (Yang, Raine, Narr, Colletti, & Toga, 2009).

To date, there have only been two studies examining memory for emotional material in adult antisocial samples despite evidence that emotional memory is associated with amygdala function (Cahill et al., 1995). Both reported attenuated memory for emotional material in those with psychopathic traits (Christianson et al., 1996; Dolan & Fullam, 2005). The latter studies did not specifically examine the key components of psychopathy that may have been more pertinent, e.g., CU traits or deficient affective experience (Cooke, Michie, Hart, & Clark, 2004) to the study of emotional information processing. The present study examined psychopathy related attenuation of emotional memory in a cohort of CD adolescents who were assessed on the PCL: YV. We hypothesised that if psychopathy is a developmental construct then the deficits seen in adults with psychopathic traits (particularly CU traits) should also be apparent in samples with CD who have been screened to the same degree for confounds as our original sample of ASPD adults (Dolan & Fullam, 2005).

## 2. Methods

### 2.1. Participants

Eighty-four male incarcerated adolescent offenders in secure care or prison in the North West Region of England who met criteria for DSM-IV conduct disorder, in the absence of other Axis I or II disorders and attention deficit hyperactivity disorder (ADHD), on the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS, Kaufman, Birmaher, Brent, Rao, & Ryan, 1997), were assessed

and accepted into the study. Exclusion criteria included: prescription medication, illicit drug use, a history of head injury and an IQ < 70.

All were British born with 67 (79.8%) being Caucasian. The remainder of the sample were of Asian (8.3%), Afro-Caribbean (9.5%) or Oriental descent (2.4%). The mean age of the sample was 16.35 (SD 0.74) years. The age range was 14–18 years. The mean age at first arrest was 13 (SD 1.7) years and mean age of first antisocial behaviour was 11.4 (SD 2.5). The Vocabulary and Matrix Reasoning subtests of the Wechsler Abbreviated Scale of Intelligence (WASI, Wechsler, 1999) were used to assess intellectual ability. The mean IQ of the sample was 86.7 (SD 9.5).

### 2.2. Procedures and materials

The study was approved by the North West Multi Centre Research Ethics Committee and written informed consent was obtained from all participants and guardians for those <16 years old.

#### 2.2.1. Assessment of psychopathy

Psychopathic traits were assessed using the Psychopathy Checklist: Youth Version (PCL: YV, Forth et al., 2003). This 20-item scale was scored on a three-point ordinal scale 0 (*no*), 1 (*maybe or in some respects*), 2 (*yes*), based on interview and file information. The PCL: YV manual recommends a four facet model. Factor 1 reflects interpersonal dimensions and includes impression management, grandiosity, pathological lying and manipulation. Factor 2 reflects affective dimensions and includes lack of remorse, shallow affect, callous/lacking empathy and failure to accept responsibility. The latter factor most closely relates to the concept of callous unemotional (CU) traits. Factor 3 reflects lifestyle features including stimulation seeking, parasitic orientation, lacks goals, impulsivity and irresponsibility. Factor 4 reflects antisocial dimensions and includes poor anger control, early behaviour problems, serious criminal behaviour, serious violations of conditional release and criminal versatility. Reliability checks in 10 cases revealed Intra-class Correlation Coefficients for two raters on total scores of 0.96, which were satisfactory in terms of the PCL: YV manual citations. As there are no agreed cut-off scores for assignment into "psychopathic" and "non-psychopathic" groups using the PCL: YV across cultures, we categorised the sample based on the 33rd and 66th percentile for PCL: YV Total to obtain three groups; low psychopathic traits (LP,  $n = 29$ ), moderate psychopathic traits (MP,  $n = 23$ ) and high psychopathic traits (HP,  $n = 32$ ). There were no significant group differences for age or IQ. The mean total psychopathy score in the sample was 20.04 (SD 6.29) see Table 1.

#### 2.2.2. The emotional memory task (EMT, Cahill & McGaugh, 1995)

The EMT was chosen to study emotional memory as it has been shown to demonstrate that recall of aversive emotional material is greater than recall of neutral material (Cahill et al., 1995; Heuer & Reisberg, 1990; Reisberg & Heuer, 1992). This task has been used to demonstrate impaired emotional memory in patients with bilat-

**Table 1**  
Characteristics of the sample.

	LP ( $n = 29$ )	MP ( $n = 23$ )	HP ( $n = 32$ )	$F(2,81)$	Sig.
Age	16.3 (0.86)	16.4 (0.66)	16.3 (0.68)	0.12	0.88
IQ	87.5 (9.6)	87.17 (11.8)	84.16 (7.7)	2.07	0.13
PCL: YV interpersonal	0.93 (1.06)	2.1 (1.39)	3.5 (1.8)	24.3	0.001
PCL: YV affective	2.79 (1.5)	4.95 (1.5)	6.18 (0.99)	47.1	0.001
PCL: YV behavioural	4.89 (1.8)	6.17 (1.3)	7.75 (1.01)	30.05	0.001
PCL: YV antisocial	4.24 (1.8)	5.8 (1.3)	7.46 (1.29)	34.8	0.001
PCL: YV total	13.34 (3.9)	19.6 (1.3)	26.43 (2.6)	151.0	0.001

LP, low psychopathy traits; MP, moderate psychopathy traits; HP, high psychopathy traits.

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