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UNIVERSITY OF SOUTHAMPTON

FACULTY OF SOCIAL AND HUMAN SCIENCES

Psychology

Volume 1 of 1

**Empathic accuracy in adolescents with Conduct Disorder and
varying levels of callous-unemotional traits**

by

Terri Brown

Thesis for the degree of Doctor of Clinical Psychology

May 2014

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

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Psychology

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EMPATHIC ACCURACY IN ADOLESCENTS WITH CONDUCT DISORDER AND VARYING LEVELS OF CALLOUS-UNEMOTIONAL TRAITS

Terri Brown

Adolescents with Disruptive Behaviour Disorders (DBDs) appear to experience deficits in both affective empathy and in cognitive empathy for emotional states in others; this relationship is more robust when self-report rather than physiological measures are used, although findings are inconsistent. The literature suggests that adolescents with DBDs have deficits in empathy for specific emotions, rather than an overall absence of empathy, although it is currently unclear which emotions are affected. The role of callous-unemotional (CU) traits in mediating the relationship between DBDs and empathy is also unclear. Previous studies have been subject to a number of methodological limitations, including poorly characterised samples and limitations in methods used to assess empathy.

The current study used an Empathic Accuracy (EA) paradigm with adolescents aged 14–18 years, 20 with a research diagnosis of Conduct Disorder (CD) and 24 typically-developing controls. The CD sample was divided into subgroups with either high CU (CD/CU+) or low CU (CD/CU-) traits. Participants watched films of actors (targets) experiencing happiness, sadness, surprise, anger, disgust and fear. No differences between CD and control groups in ability to track emotion intensity were detected. Participants with CD/CU+ were significantly more accurate in tracking intensity of anger than participants with CD/CU-; no other between-group differences were significant. Individuals with CD were significantly less accurate in recognising sadness and fear than controls, indicating impaired cognitive empathy. No differences in emotion recognition between the CD/CU- and CD/CU+ subgroups were detected. Participants with CD were also impaired in affective empathy for sadness, fear and disgust compared to controls and also reported less sympathy towards targets experiencing sadness. Participants with CD/CU+ reported less sympathy for targets experiencing sadness than those in the CD/CU- group and participants with CD/CU+ reported significantly fewer affect matches for happiness than those with CD/CU-.

The between-group differences in affective and cognitive empathy support and extend previous findings by demonstrating between-group differences in cognitive and affective empathy for specific emotions using a more naturalistic paradigm. Although no between-group differences were detected in the ability to track intensity of emotions, this study would benefit from replication with larger sample sizes to increase statistical power.

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DECLARATION OF AUTHORSHIP

I, Terri Brown, declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

Empathic accuracy in adolescents with Conduct Disorder and varying levels of callous-unemotional traits.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given.
With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before

Signed:

Date:.....

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Chapter 1: Systematic Review

Do young people who show clinical levels of antisocial behaviour have impairments in empathy?

1.1 Introduction

Individuals who show persistent antisocial behaviour that violates the rights and welfare of others are thought to have deficits in empathy (Ellis, 1982). The negative relationship between empathy and antisocial behaviour is intuitively plausible – if one does not know the impact of one's antisocial behaviour on another's feelings there would be less of an incentive to cease behaving in such a way (Blair, 1995). This intuitive view of a negative association between empathy and antisocial behaviour is not consistently borne out in the literature, however. This paper reviews the findings of research examining empathy in youth with clinical levels of antisocial behaviour and considers possible explanations for why there may not be a straightforward relationship between these two variables.

1.1.1 Persistent antisocial behaviour in young people

Antisocial behaviour in young people is widely acknowledged to be a major social problem and is one of the most common reasons for referral to mental health services (Romeo, Knapp, & Scott, 2006). Youth presenting to clinical services with persistent patterns of antisocial behaviour may be given diagnoses of a Disruptive Behaviour Disorder (DBD), either Conduct Disorder (CD) or Oppositional Defiant Disorder (ODD) (American Psychiatric Association [APA], 2013; see Appendix A for diagnostic criteria). Around 9.5% of young people meet diagnostic criteria for CD (Nock, Kazdin, Hiripi, & Kessler, 2006) although prevalence estimates vary widely (Lovett & Sheffield, 2007). The lack of evidence-based interventions for DBDs with demonstrated long-term efficacy is likely to partly explain the high prevalence rates of DBDs (Connor, 2002). It has been suggested that a better understanding of the processes underlying antisocial behaviour in young people is needed in order to design targeted, effective treatments (e.g. Lovett & Sheffield, 2007).

Investigating the aetiology of DBDs is complicated by the heterogeneous nature of this diagnostic category (Sebastian et al., 2012). The presence of callous–unemotional traits (CU+) in this group may moderate the relationship between antisocial behaviour and empathy (Bons et al., 2013). The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; APA, 2013) has recently included a ‘limited prosocial emotions’ descriptive features specifier of CD, which is equivalent to being high in CU+, to identify a subgroup of young people with CD who may be particularly severely affected and difficult to treat (Frick & White, 2008). High comorbidity with other disorders including Attention–Deficit/Hyperactivity Disorder (ADHD), mood disorders, anxiety disorders, and substance and alcohol use disorders have also been identified in this population (e.g. Nock et al., 2006), making it harder for researchers to say whether empathy deficits are a result of DBDs per se or some other form of psychopathology.

1.1.2 Empathy

There is no universally accepted definition of empathy, contributing to the inconsistency in the literature regarding appropriate methods of measurement. This review will use Cohen and Strayer’s (1996, p.988) definition: “The ability to understand and share in another’s emotional state or context”. This reflects the generally accepted idea that empathy involves at least two partially dissociable systems. The first, “the ability to understand”, labelled by Blair (2005) as cognitive empathy (sometimes referred to as Theory of Mind), involves the top–down process of taking another’s perspective and understanding their context and feelings. The second system involves sharing the emotions of others, and is labelled by Blair (2005) as affective empathy. This process involves the vicarious experiencing of an emotion more appropriate to another’s situation than one’s own (e.g. feeling happy when observing someone receiving good news). Affective empathy (feeling *with* another person) is often confused with sympathy (feeling *for* another person), but both involve the perceiver experiencing emotions in response to the situation or feelings of another.

Empathy has been measured through a variety of methods. Film clips, cartoons, pictures of faces, and vignettes have been used as stimulus materials and researchers have used self-report (e.g. questionnaires, forced-choice

written or pictorial items), behavioural (e.g. observations of behaviour in response to another's distress) and objective physiological measures (e.g. heart rate (HR) or skin conductance level (SCL)) to investigate empathic responses. Different stimulus sets and methods of capturing responses may impact on results and therefore findings need to be carefully considered in relation to the method of measurement.

While several distinct populations appear to have deficits in empathy the specific aspects of empathy that are impaired seem to differ between groups. For example, both individuals with Autism Spectrum Disorder (ASD) and those with DBDs are thought to have an underlying deficit in empathy and, in the case of DBDs, this is thought to contribute to their antisocial behaviour. Why, then, do individuals with ASD not show the same antisocial behaviour as a result of their empathy deficits? Blair (2005, 2008; Blair & Blair, 2009) suggests that individuals can be impaired in one empathy system (i.e. cognitive or affective) while the other remains intact, leading to different behavioural phenotypes. Individuals who show persistent antisocial behaviour are thought to have deficits in affective empathy but intact cognitive empathy (i.e. knowing how another person feels and why, but not experiencing any feelings in response to their situation) while individuals with ASD show the reverse pattern, namely deficits in cognitive empathy and intact affective empathy (i.e. not knowing how or why another person feels the way they do, but still experiencing emotions in response to another's distress cues).

1.1.3 Previous reviews

This is not the first systematic review to consider the relationship between antisocial behaviour and empathy. Previous reviews have included studies measuring antisocial behaviour in adults and children in the general population as well as studies with individuals who show severe antisocial behaviour (e.g. those with CD, ODD, or prisoners) and have found trends towards a negative association between affective empathy and aggression or antisocial behaviour (Lovett & Sheffield, 2007; Miller & Eisenberg, 1988). Method of measurement and participant age appears to impact on findings; trends were stronger for behavioural than questionnaire measures of empathy in young people (Lovett & Sheffield, 2007) while the reverse was true in Miller and Eisenberg's (1988) meta-analysis of studies containing both child and

adult samples, although this latter review is now somewhat dated. Jolliffe and Farrington (2004) reviewed studies measuring affective or cognitive empathy in offenders through self-report questionnaires and found a medium effect size for the relationship between cognitive empathy and offending ($d = -.48$) and a small effect size for affective empathy and offending ($d = -.11$). However, they also demonstrated that the significant differences in empathy between offending and non-offending groups disappeared when socioeconomic status was controlled for and was significantly reduced when IQ was included as a covariate.

Several authors have reviewed the literature with the intention of understanding more about the contribution of empathy to the behavioural phenotypes displayed by specific clinical groups. Increasing attention has been given to comparing empathy deficits in individuals with ASD and DBDs to determine whether these groups differ in the aspects of empathy for which they are impaired. The demonstration of different deficits in empathy would provide support for theoretical models proposing multiple empathy subsystems (e.g. Blair, 2005, 2008; Blair & Blair, 2009). Bons et al. (2013) reviewed the literature in children and adolescents with ASD or CD to this effect and reported that there were dissociable differences between groups, although evidence for specific impairments in empathy was far from consistent. Relevant to the current review, Bons et al. (2013) reported that young people with CD were impaired in facial mimicry, emotional identification and cognitive empathy for negative emotions and that CU+ may be associated with additional difficulties in recognising sad facial expressions and affective empathy for sadness and fear.

1.1.4 The current review

The current review is the first, to the author's knowledge, to integrate findings from studies with young people who show antisocial behaviour at a level severe enough to meet diagnostic criteria for a DBD (i.e. CD or ODD) and to include studies using a variety of methods of empathy measurement, including questionnaires, vignettes, facial affect recognition tasks and physiological data.

The research questions for this review are:

1. Do young people with DBDs have impairments in cognitive or affective empathy, or both?
2. Does the method used to measure empathy alter the relationship between empathy and DBDs?
3. Does the presence of CU+ or PT+ alter the relationship between DBDs and empathy?
4. Does controlling for age, socioeconomic status (SES), IQ and comorbidity reduce the strength of the relationship between DBDs and empathy?

1.2 Method

1.2.1 Locating relevant literature

Two methods were used to locate literature for this review. First, internet-based databases – PsycInfo via Ebsco and Web of Science (WoS) – were searched (procedure described below). Abstracts of references were reviewed against the inclusion criteria for the review. Full-text articles were obtained if studies appeared to meet inclusion criteria or if there was insufficient detail in the abstract to determine whether inclusion criteria were met.

Second, reference lists of full-text articles and previous systematic reviews and meta-analyses in the field were inspected for additional articles that may be relevant. Abstracts were obtained via Google Scholar and assessed against the inclusion criteria; full-text articles were obtained if studies appeared to meet the criteria or if there was insufficient detail in the abstract to determine whether the inclusion criteria were met.

1.2.2 Inclusion and exclusion criteria

Inclusion criteria for this review were as follows: (a) the majority of participants were aged between 8 and 18 years; (b) the study must be empirical, rather than a review or a theoretical paper; (c) at least one group in the study meets diagnostic criteria for CD, ODD or DBD; (d) participants' levels of antisocial behaviour are measured using validated interview-based or questionnaire measures consistent with diagnostic classification systems (DSM, ICD; International Classification of Diseases; World Health Organisation

[WHO],1992); (e) the study includes a control group defined by the absence of antisocial behaviour; (f) empathy is measured in a way that allows evaluation of the relationship between DBDs and empathy (e.g. through questionnaires, physiological measures, behavioural measures); and (g) CD, ODD or DBD is the primary diagnosis of the clinical sample.

1.2.3 Database search strategies

Due to the manner in which articles are indexed in PsychInfo and WoS, slightly different but comparable search strategies were employed.

1.2.3.1 PsychInfo via Ebsco.

PsychInfo indexes articles according to ‘major concepts’ – aspects of an article by which it can be primarily defined (e.g. clinical group, area of study). Using major concepts allows articles to be located that have a high probability of being directly related to the search and eliminates the need for spelling variations to be included in searches (e.g. behaviour/behaviour).

The terms in Table 1 were entered as major concepts into PsychInfo:

Table 1

PsychInfo search terms

Population		Research area
“Antisocial behaviour” OR “Conduct Disorder” OR “Behaviour disorders” OR “Psychopathy” OR “Antisocial Personality Disorder” OR “Oppositional Defiant Disorder” OR “Juvenile Delinquency” OR “Criminals”	AND	“Empathy” OR “Facial Expressions” OR “Emotion Recognition”

37,415 articles were returned for population search terms and 13,468 articles were returned for research area search terms. When these searches were combined using the Boolean operator “AND” 250 articles were returned.

Filtering results to include only peer-reviewed journal articles in English using human participants resulted in the return of 139 articles.

1.2.3.2 Web of Science.

WoS does not have an indexing system so an altered but consistent search strategy was employed. Searches were conducted within the Science Citation Index – Expanded (SCI-Expanded) and Social Sciences Citation Index (SSCI).

The terms in Table 2 were entered into WoS:

Table 2

WoS search terms

Population		Research area
“antisocial behaviour (behavior)” OR “conduct disorder” OR “behaviour (behavior) disorder” OR “oppositional defiant disorder” OR “psychopathy” OR “psychopathic” OR “antisocial personality disorder” OR “crim*” OR “disruptive behaviour (behavior) disorder*” OR “juvenile delinquen*” OR “offen*” OR “callous– unemotional”	AND	Empath* OR “facial expression*” OR “emotion recognition” OR “facial affect recognition”

Initially terms were searched within ‘Topic’ (search terms present in title, abstract or author identified keyword) and limited to published articles in English, however this returned 3031 articles, a number beyond that which could be screened for this review. In order to reduce the number of articles returned and increase specificity, terms were searched within article titles.

142,970 results were returned for population search terms and 26003 results were returned for area of study search terms. When these were

combined with the Boolean operator AND 151 results were returned. Limiting results to articles published in English further reduced the results to 107. Of these, 49 were duplicates of articles obtained from PsychInfo.

Overall, 150 articles were excluded after their abstracts were reviewed and a further 30 were excluded after a review of the full text. Two articles were identified through reference lists of articles obtained through database searches. In total, 19 articles were included in the review. Please see Figure 1 for selection flowchart and reasons for exclusion.

1.3 Results

A number of studies used multiple measures to assess cognitive and affective empathy. To allow results to be clearly synthesised, studies are presented according to method of empathy assessment (i.e. questionnaires, responses to vignettes, facial affect recognition accuracy, and physiological responses). As a result of studies frequently using these methods in conjunction with one another, six studies appear in two sections and one study appears in three sections. Sample characteristics are reported only the first time a study appears to avoid repetition. Where comorbidity and demographic variables have been measured they are reported; the absence of this information indicates that it was not reported in the study.

1.3.1 Questionnaire measures of empathy

Six studies (Table 3) used the following questionnaires: Questionnaire Measure of Emotional Empathy total score (QMEE; Mehrabian & Epstein, 1972); Empathy Index total score (EI; Bryant, 1982); and Interpersonal Reactivity Index (IRI; Davis, 1983) total score and subscale scores (empathic concern, personal distress, fantasy, and perspective taking). All questionnaires have been repeatedly used with children and adolescents and are generally considered reliable and valid measures of empathy.

Figure 1: Flowchart to illustrate the study selection process used in this review

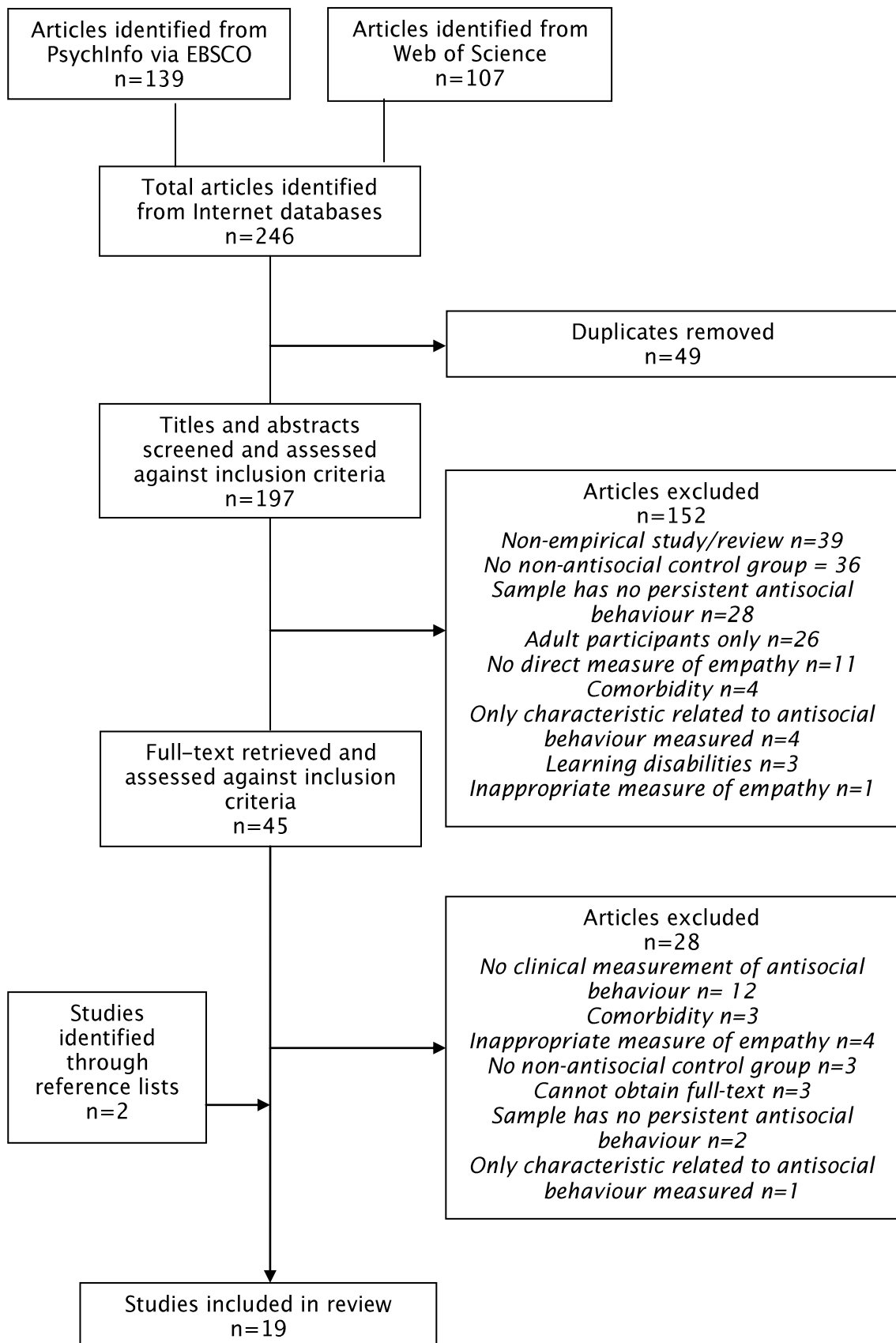


Table 3

Questionnaire measures of empathy

Citation	Sample		DBD measure(s)	Empathy measure(s)	CU/PT measure	DBD–empathy relationship
	DBD (n)	Con. (n)				
Anastassiou–Hadjicharalambous and Warden (2008)	CD/CU+ = 33 CD/CU– = 29	33	DSM–IV–TR criteria for CD; Revised Rutter Scales for Children	EI	APSD	CD/CU+ and CD/CU– ↓ than con. CD/CU+ ↔ CD/CU–.
Cheng, Hung and Decety (2012)	CD/CU+ = 13 CD/CU– = 15	17	DSM–IV criteria for CD	IRI	PCL:YV	CD/CU– and CD/CU+ ↓ than con. on cognitive subscales. CD/CU+ ↔ CD/CU–. CD/CU+ ↔ CD/CU– ↔ con. on affective subscales
Cohen and Strayer (1996)	CD = 30	32	Clinician diagnosed CD.	EI IRI	–	CD ↓ than con. on EI, and empathic concern, perspective taking, and fantasy IRI subscales. CD ↑ than con. on personal distress IRI subscale.
de Wied, Goudena and Matthys (2005)	DBD = 25	22	DISC; CBCL parent and teacher	EI	–	DBD ↓ than con.
de Wied, van Boxtel, Zaalberg, Goudena and Matthys (2006)	DBD = 22	22	DISC; CBCL parent and teacher	EI	APSD	DBD ↓ than con.
Schonert–Reichl (1993)	DBD = 39	39	Clinician diagnosed DBD	QMEE	–	DBD ↓ than con.

Note: DBD = developmental behaviour disorder; CD = conduct disorder; CD/CU+ = high callous–unemotional traits; CD/CU– = low callous–unemotional traits; con. = control; DISC = diagnostic interview schedule for children; CBCL = child behaviour checklist; QMEE = questionnaire measure of emotional empathy; EI = empathy index; IRI = interpersonal reactivity index; APSD = antisocial process screening device; PCL:YV = psychopathy checklist youth version; ↓ = significantly lower than, ↔ = no significant differences between groups

Schonert-Reichl (1993) used the QMEE to measure affective empathy in 39 boys with DBDs aged 14.7–19.0 years and 39 age- and SES-matched controls. All participants had IQs within the normal range. Participants with DBDs had significantly lower affective empathy scores than participants in the control group.

Cohen and Strayer (1996) used the EI and the IRI to assess cognitive and affective empathy in male and female participants with and without CD. Participants with CD ($n = 30$; 46% male; mean age 14.9 years) obtained significantly lower affective empathy EI scores than those in the control group ($n = 32$; 46% male; mean age 15.6 years) and significantly lower scores on one IRI subscale assessing affective empathy (empathic concern), but significantly higher scores on the other affective empathy subscale (personal distress). Participants with CD scored significantly lower on both IRI cognitive empathy subscales (fantasy and perspective taking) than the control group.

The IRI was also used by Cheng et al (2012) in their sample of 28 male offenders aged 15–18 years with CD/CU+ (CD and high CU; $n = 15$) or CD/CU- (CD and low CU; $n = 13$) and 17 age-matched controls. Boys in both the CD/CU+ and CD/CU- groups obtained significantly lower scores than the control group on the cognitive empathy dimension of the IRI (fantasy and perspective taking subscales combined), but there were no significant between-group differences in the affective empathy dimension (empathic concern and personal distress subscales combined). No significant differences were detected between the CD/CU+ and CD/CU- groups for either dimension.

de Wied et al (2005) used the EI to assess affective empathy in 25 boys with DBDs aged 8–12 years and 24 controls matched on age and IQ, but with significantly lower levels of anxiety, depression and attention difficulties than the DBD group. Boys with DBDs had significantly lower affective empathy scores than the control group.

de Wied et al (2006) also used the EI with 22 boys aged 8–12 with DBDs and 22 controls matched for age and IQ but with significantly lower levels of anxiety, depression and attention difficulties than the DBD group. Boys with DBDs obtained significantly lower affective empathy scores than the control group.

Anastassiou–Hadjicharalambous and Warden (2008) used the EI to assess affective empathy in males and females aged 7.6–11 years with CD/CU+ (n = 33; 3% female), CD/CU- (n = 29; 6.9% female) and controls (n = 33; 6.1% female). The groups were matched on age, gender, SES and ADHD symptoms, but controls had significantly higher verbal ability than both CD groups. Both the CD/CU+ and CD/CU- groups obtained significantly lower affective empathy scores than controls. There were no significant differences between the CD/CU+ and CD/CU- groups. The effect of verbal ability, which was included as a control variable in all analyses, was non-significant.

1.3.2 Vignettes to elicit empathy

Six studies (Table 4) used vignettes, either film clips or verbally recounted stories, to assess cognitive (ability to identify the emotion of the protagonist, causes of emotion or intentions) and affective (emotional response to vignettes) empathy.

Strayer (1993) developed the Empathy Continuum (EC), a coding system for measurement of cognitive and affective empathy in response to film clips. After watching films of individuals in emotionally-laden situations respondents were asked to identify: (a) the protagonist's emotion and its intensity (cognitive empathy), (b) their own emotions and their intensity (affective empathy), and (c) the reason for their emotion (affective empathy). Responses were scored on an interval-level scale giving overall, cognitive and affective empathy scores. Cohen and Strayer (1996; sample characteristics described previously) used the EC to measure the responses of 30 adolescents with CD and 32 control participants to seven film clips of one or two adults or children experiencing one of happiness, sadness, fear, anger, or surprise. Adolescents with CD had lower overall empathy scores and were less able to identify protagonists' emotions and report the reasons for the emotions than the control group. The CD group were also significantly less likely to report emotions concordant with the protagonist than the control group; when emotions were reported they were more likely to be of similar valence to those of the protagonist rather than an exact match.

Table 4

Vignette measures of empathy

Citation	Sample		DBD measure(s)	Stimulus material(s)	Empathy measure(s)	CU/PT measure	DBD–Empathy relationship
	DBD (n)	Con. (n)					
Anastassiou–Hadjicharalambous and Warden (2008)	CD/CU+ = 33 CD/CU– = 29	33	DSM–IV–TR criteria for CD; Revised Rutter Teacher Scales for Children	Film of child feeling fear	Self-report affective response	APSD	CD/CU+ and CD/CU– ↓ affective response than con. CD/CU+ ↔ CD/CU–.
Cohen and Strayer (1996)	CD = 30	32	Clinician diagnosed CD	7 films of adults or children experiencing happy, sad, frightened, angry, or surprised.	EC	–	CD ↓ overall EC scores than con. CD ↓ emotion ID than con. CD group ↓ concordant emotions than con. When emotion elicited in CD, more likely to be similar than affect match.
de Wied et al. (2005)	DBD = 25	22	DISC; CBCL parent and teacher	6 films of children (3x sadness, 2x happiness, 1x anger)	EC	–	DBD ↓ EC scores overall and for sadness and anger vignettes than con. DBD ↔ con. emotion ID. DBD ↓ affect matches than con. overall and for sadness. DBD ↓ sympathy overall and for sadness and anger.
de Wied, van Boxtel, Matthys and Meeus (2012)	DBD/CU+ = 14 DBD/CU– = 17	32	DISC; CBCL parent and teacher	6 films (2x sad, 2x happy, 2x angry)	Self-report of quality and intensity of protagonist and own emotions	APSD	DBD/CU+ ↓ empathic sadness than con. DBD/CU+ and DBD/CU– ↓ empathic happiness than con. DBD/CU– ↔ DBD/CU+ all emotions.

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Jones, Happé, Gilbert, Burnett and Viding (2010)	CD/PT- = 23 CD/PT+ = 21	31	Child and Adolescent Symptom Inventory – CD subscale	1. Outcome values measure; 2. Emotion attribution to self; 3. First and second order ToM tasks; 4. Animated shapes task	1. Self-reports of emotional response to aggression; 2. Self-reports of emotional responses to situations; 3. False-belief questions; 4. Inferring intentions	ICU	Reactive aggression: CD/PT+ ↓ care re punishment than con. and CD/PT-. Instrumental aggression: CD/PT+ ↓ care about peer feeling bad and ↑ care about being in charge than con. CD/PT+ ↓ fear than con.
Schwenck et al. (2012)	CD/CU+ = 36 CD/CU- = 34	67	DSM-IV criteria for CD; Observer rating scale	1. Video sequences task (9 films of emotionally-laden situations) 2. Animated shapes task	1. Identification of protagonist's emotion and reason for it, strength of own affect. 2. Inferring intentions	ICU	CD/CU+ ↔ CD/CU- ↔ con. emotion ID. CD/CU+ ↓ affective response than con. CD/CU+ ↔ CD/CU- ↔ con. for animated shapes task.

Note: DBD = developmental behaviour disorder; CD = conduct disorder; CD/CU+ = high callous-unemotional traits; CD/CU- = low callous-unemotional traits; con. = control; DISC = diagnostic interview schedule for children; CBCL = child behaviour checklist; EC = empathy continuum; ASPD = antisocial process screening device; PCL:YV = psychopathy checklist youth version; ICU = inventory of callous-unemotional traits; ↑ = significantly higher than, ↔ = no significant differences between; ↓ significantly lower than.

de Wied et al. (2005) also used the EC with DBD boys and controls (sample characteristics described previously) to measure responses to six films; three depicting sadness, two depicting happiness and one depicting anger. Boys with DBD had significantly lower overall empathy scores than controls when responses were collapsed across emotion and for anger and sadness, but not happiness, when data were analysed by emotion. No significant between-group differences were found in ability to identify protagonists' emotions. Insufficient data were available for analysis of between-group differences in the perceived reason for protagonists' emotions as this was only collected when participants reported feeling an emotion in response to the films. Boys with DBDs reported significantly fewer affect matches (feeling the same as the protagonist) than controls when responses were collapsed across emotion and for sadness, but not anger or happiness, when data were analysed by emotion. The authors also investigated sympathy (experiencing an emotion of similar valence to the protagonist but not an exact match) and found significantly lower scores in boys with DBDs than controls when data were collapsed across emotion and for sadness and anger clips, but not happiness, when data were analysed by emotion.

Anastassiou-Hadjicharalambous and Warden (2008) used an 8.5 minute film clip of a boy feeling frightened to examine affective empathy in children with CD/CU+, CD/CU- and controls (sample described above). Controls were significantly more likely to report experiencing an emotion while watching the clip than both the CD/CU+ and CD/CU- groups. There were no significant differences between the CD/CU+ and CD/CU- groups in self-reported emotion.

de Wied et al. (2012) used six films depicting sadness, happiness or anger to assess cognitive (identifying the protagonist's emotion and intensity) and affective (own emotions and intensity) empathy in their sample of 12–15 year old boys. 31 boys had DBD diagnoses (17 ODD, 14 CD) and could be separated into DBD/CU+ (DBD and high CU; $n = 14$) and DBD/CU- (DBD and low CU; $n = 17$). There were also 32 controls matched for age and IQ, but with significantly lower levels of ADHD, anxiety and depression than the DBD group. Responses were scored according to a 5-point Likert scale which combined cognitive and affective empathy. Higher scores indicated more empathy, although the specific scoring system was not described clearly in the paper.

The DBD/CU+ and DBD/CU- groups obtained significantly lower scores for happiness films than controls but there were no significant differences between the DBD/CU+ and DBD/CU- groups. For sadness films, the DBD/CU+ group obtained significantly lower scores than controls; there were no significant differences between the DBD/CU- group and controls or between the DBD/CU- and DBD/CU+ groups. No significant differences between groups were detected for anger films.

Jones et al. (2010) assessed cognitive and affective empathy in boys aged 9.3–16.9 years with CD/PT- (CD and low PT; $n = 23$), CD/PT+ (CD and high PT; $n = 21$) and controls ($n = 31$)¹. Controls obtained significantly higher IQ scores than the CD/PT+ group; there were no other between-group differences in IQ. Participants were administered the Outcome Values Measure (OVM; Boldizar, Perry, & Perry, 1989) which is comprised of eight vignettes depicting reactive and proactive aggression against a same-sex peer. Participants were asked how much they cared about: (a) reducing the aversive behaviour of their peer; (b) punishment for responding aggressively; (c) making their peer feel bad; (d) feeling bad for their own actions; and (e) feelings of dominance as a result of their aggression. In vignettes depicting reactive aggression, boys with CD/PT+ reported significantly less concern about being punished than controls; no other between-group differences for any questions were found. In vignettes depicting instrumental aggression, boys with CD/PT+ reported caring significantly less about making their peer feel bad and placed greater value on feelings of dominance than control participants; no other between-group differences for any questions were found. The authors also used a modified version of the Emotion Attribution to Self questionnaire (Burnett, Bird, Moll, Frith, & Blakemore, 2009). Participants listened to eight situations and rated on 4-point Likert scales how much fear, disgust, embarrassment and guilt they would feel in response to another's emotion. Four situations where one might feel happy were added to ensure that participants were not solely thinking about emotions of negative valence. Participants with CD/PT+ self-attributed significantly less fear than controls and there was a trend towards lower levels of self-attributed guilt in the CD/PT+ group compared to controls; no other significant between-group differences were detected. First- and second-order Theory of Mind (ToM)

¹ Jones et al. (2010) also included a group of boys with ASD. As findings related to this group are not relevant to the present questions they will not be discussed here.

tasks and the ToM Animated Shapes Task (Abell, Happé, & Frith, 2000) were also used; no significant differences between groups were detected on either task.

Schwenck et al. (2012) used the Video Sequences Task (VST) to measure cognitive and affective empathy in boys aged 6–17 with CD/CU+ (n = 36) , CD/CU- (n = 34) and controls matched on age and IQ but with significantly lower levels of ADHD, anxiety and depression (n = 67)² . Participants viewed nine films of emotionally-laden situations and were asked to identify the protagonist's emotion and the reason for the emotion (cognitive empathy) and the strength of their own emotion while watching the clip (affective empathy). No significant between-group differences were detected for identification of the protagonist's emotion or reason for the emotion. The CD/CU+ group reported lower levels of affective response than the control group. The ToM Animated Shapes Task (Abell et al., 2000) was also administered; no significant between-group differences were detected.

1.3.3 Facial affect recognition

Six studies (Table 5) used static or dynamic emotional faces to assess facial affect recognition ability.

In an early study, Walker (1981) used the Cross-Cultural Test of Emotion Recognition (Izard, 1971, as cited in Walker, 1981) to assess the abilities of 9–13 year old children with Unsocialised-Aggressive Personality Disorder³ (n=15; 60% male) and controls (n=15; 46% male)⁴ to identify joy, anger, surprise, disgust, shame, fear, sadness, and interest from black and white pictures of male and female, adult and child faces. Groups were matched for age and IQ. No significant between-group differences in facial affect recognition were found when data were collapsed across emotion or analysed separately by emotion.

² Schwenck et al. (2012) also included a group of boys with ASD. As findings related to this group are not relevant to the present questions they will not be discussed here.

³ Diagnoses were made according to DSM-III categories. Children in this group would have likely met more recent criteria for DBD.

⁴ Walker (1981) also included groups of children with Schizophrenia and Anxiety/Depression. As findings related to these groups are not relevant to the present questions they will not be discussed here.

Table 5

Facial affect recognition

Citation	Sample		DBD measure(s)	Stimulus material(s)	CU/PT measure	DBD–Facial affect recognition relationship
	DBD (n)	Con. (n)				
Cadesky, Mota and Schachar (2000)	CD = 24; CD/ADHD = 63	27	Parent Interview for Child Symptoms and Teacher Telephone Interview	Diagnostic Analysis of Nonverbal Accuracy	–	CD ↓ ID than con. overall and for all emotions except anger
Fairchild, Stobbe, van Goozen, Calder and Goodyer (2010)	25	30	K–SADS–PL	Emotion Hexagon Task	YPI	CD ↓ ID than con for anger and disgust.
Fairchild, van Goozen, Calder, Stollery and Goodyer (2009)	EO–CD = 42; AO–CD = 39	40	K–SADS–PL	Emotion Hexagon Task	YPI	AO–CD ↓ fear ID and trend towards less anger ID than con. EO–CD ↓ fear, anger, disgust and happiness ID than con. CD/PT+ ↓ fear, sadness, surprise ID than CD/PT–.
Pajer, Leninger and Gardner (2010)	35	30	DISC	Pictures of Facial Affect	–	CD ↔ con. overall ID and by emotion.

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Schwenck et al. (2012)	CD/CU+ = 36; CD/CU- = 34	67	DSM-IV criteria for CD; Observer rating scale.	Morphing task	ICU	CD/CU+ ↔ CD/CU- ↔ con. overall and by emotion.
Walker (1981)	DBD = 15	15	DSM II diagnosis	Cross Cultural Test of Emotion Recognition	–	CD ↔ con.

Note: DBD = developmental behaviour disorder; CD = conduct disorder; CD/ADHD = CD and comorbid ADHD; EO-CD = early onset CD; AO-CD = adolescent onset CD; CD/CU+ = high callous unemotional traits; CD/CU- = low callous unemotional traits; con. = control; DISC = diagnostic interview schedule for children; K-SADS-PL = schedule for affective disorders and schizophrenia for school-aged children, present and lifetime version; YPI = youth psychopathic traits inventory; ICU = inventory of callous unemotional traits; ↑ = significantly higher than, ↔ = no significant differences between; ↓ = significantly lower than; ID = identification.

Pajer et al. (2010) used 42 pictures of still faces portraying surprise, happiness, fear, disgust, sadness, and anger from the Ekman Pictures of Facial Affect stimulus set (POFA; Ekman & Friesen, 1976, as cited in Pajer et al., 2010) to assess facial affect recognition ability in 35 females with CD (mean age 17.9 years) and 30 controls (mean age 17.7 years). Groups were matched for age, ethnicity and SES but control participants had significantly higher IQ than those with CD and were absent of psychiatric comorbidity, whereas participants with CD had a number of other diagnoses, including anxiety, depression and ADHD. There were no significant between-group differences in emotion identification collapsed across emotion or for specific emotions. A significant positive correlation was found between IQ and emotion identification overall and for fearful, happy, sad and angry expressions, although analyses were not re-run including IQ as a covariate.

Fairchild et al. (2010) used the Emotion Hexagon Task to examine facial affect identification in 25 females with CD (mean age 15.6 years) and 30 controls (mean age 15.3 years) matched for age and SES but with significantly higher IQs and lower levels of ADHD and major depressive disorder (MDD) diagnoses. Participants were shown morphed facial expressions spanning happiness–surprise, surprise–fear, fear–sadness, sadness–disgust, disgust–anger, and anger–happiness and asked to name the predominant emotion. The CD group were significantly less accurate than controls in identification of anger and disgust; no other between-group differences were detected. Analyses were re-run after removing eight control participants with the highest IQ scores; between-group differences remained significant. When the CD group was split into CD/PT+ ($n = 11$) and CD/PT- ($n = 14$) subgroups, participants with CD/PT+ were significantly less accurate in identification of sadness than participants in the CD/PT- group; no other between-group differences were detected. Splitting the CD group by CD/CU+ and CD/CU- also showed significant impairments in the identification of sadness in the CD/CU+ group compared to the CD/CU- group with no other between-group differences.

Fairchild et al. (2009) also used the Emotion Hexagon Task to assess facial affect identification in males aged 14–18 years. 39 boys with adolescent-onset CD (AO-CD; symptoms beginning after 10 years old), 42 boys with early-onset CD (EO-CD; symptoms beginning before 10 years old)

and 40 controls were shown the morphed-face stimulus materials described previously. Controls were of higher SES than both CD subgroups and the AO-CD group was of higher SES than the EO-CD group. All groups were matched for age and IQ. Compared to controls, participants with AO-CD showed significant impairments in fear identification and a trend towards impairments in anger identification ($p=.054$), while participants with EO-CD showed significant impairments relative to controls in identification of anger, disgust, fear and happiness; no other between-group differences were detected. When AO-CD and EO-CD groups were directly compared, EO-CD participants were significantly impaired in disgust identification. Recognising the high level of ADHD in their CD sample (17 out of 81), the authors excluded these participants to determine if comorbidity significantly impacted on results; compared to controls, participants with AO-CD remained significantly impaired in recognition of fear and participants with EO-CD remained significantly impaired in recognition of anger, disgust and happiness. To examine the impact of PT+, participants with CD were allocated to CD/PT+ or CD/PT- subgroups. Participants with CD/PT+ were significantly less accurate in identification of fear, sadness and surprise than CD/PT- participants; no other between-group differences were detected.

Schwenck et al. (2012; sample described previously) presented participants with 60 clips of a neutral face morphing into happiness, sadness, fear and disgust expressions over 9 seconds and participants were asked to indicate when they could identify the facial expression. No significant group differences were found between participants with CD/ CU+ or CD/CU- and controls for time taken to identify expressions or accuracy of identification.

Cadesky et al. (2000) used the Diagnostic Analysis of Nonverbal Accuracy (Nowicki & Duke, 1994) containing child and adult facial expressions and paralinguistic stimuli portraying happiness, sadness, anger and fear to assess ability to identify emotions from faces and voices. Their sample consisted of males and females aged 7-13 years with CD ($n = 24$; male:female 6:1) CD/ADHD+ (CD and ADHD; $n = 63$, male:female 7:1) and controls ($n = 27$; male:female 1.5:1). Groups were matched for age, IQ anxiety and depression, but there were a significantly higher proportion of females in the control group than in the other groups. The CD group were significantly less accurate in emotion identification overall and in identification of happiness,

sadness and fear specifically. The CD/ADHD+ group were significantly more accurate in emotion identification overall than the CD group and there were no significant differences between the CD/ADHD+ group and controls.

1.3.4 Physiological measurement of empathy

Nine studies (Table 6) measured physiological responses to stimuli through electromyography (EMG), event-related potentials (ERPs), HR, SCL and functional magnetic resonance imaging (fMRI).

de Wied et al. (2006; sample described previously) recorded facial EMG activity in the zygomaticus major (responsible for smiling) and corrugator supercilii (responsible for frowning) muscles while viewing neutral, happy and angry dynamic facial expressions. Boys with DBDs showed significantly less corrugator muscle activity while viewing angry facial expressions than controls. Both groups showed increased levels of zygomaticus muscle activity while viewing happy facial expressions.

Using the same sample, de Wied, van Boxtel, Posthumus, Goudena and Matthys (2009) extended the above findings by measuring zygomaticus and corrugator EMG activity and changes in HR while participants watched six films depicting sadness (three clips), happiness (two clips) and anger (one clip). Boys with DBDs showed significantly less corrugator activity than controls during films depicting anger or sadness. Both groups showed increased levels of zygomaticus muscle activity while viewing happy films. Participants with DBDs also showed less HR deceleration during clips depicting sadness than controls; no other between-group differences in HR were observed.

Again extending previous findings, de Wied et al. (2012; sample described previously) used the same stimuli as de Wied et al. (2009) to measure zygomaticus and corrugator muscle activity and HR changes in boys with DBD/CU+, DBD/CU-, and controls. During happiness films DBD/CU- participants showed significantly less zygomaticus activity than controls; no significant differences were observed between DBD/CU+ and DBD/CU- groups

Table 6

Physiological measures of empathy

Citation	Sample		DBD measure(s)	Stimulus material(s)	Physiological measure(s)	CU/PT measure	DBD–Empathy relationship
	DBD (n)	Con. (n)					
Anastassiou– Hadjicharalambous and Warden (2008)	CD/CU+ 33 CD/CU– 29	33	DSM–IV–TR criteria for CD; Revised Rutter Scales for Children	Film of child experiencing fear	HR	APSD	CD/CU+ ↓ HR change than CD/CU– and con. CD/CU– ↔ con.
Cheng et al. (2012)	CD/CU+ 13 CD/CU– 15	17	DSM–IV criteria for CD	124 photos of non/painful intentional/accidental injuries	ERP	PCL:YV	CD/CU+ and CD/CU– ↓ LLP than con. CD/CU+ ↓N120 than con.
de Wied et al. (2006)	DBD 22	22	DISC; CBCL parent and teacher	Neutral, happy and angry dynamic facial expressions	EMG	–	DBD ↓ frowning to anger than con.
de Wied et al. (2009)	22	22	DISC; CBCL parent and teacher	6 films (3 sadness, 2 happiness, 1 anger)	EMG	–	DBD ↓ frowning to sad and angry than con. DBD ↓HR reduction to sad than con.
de Wied et al. (2012)	DBD 31	32	DISC; CBCL parent and teacher	6 films (2 sad, 2 happy, 2 angry)	EMG; HR	APSD	CD/CU– ↓ smiling to happy films than con. CD/CU+ ↑ smiling to anger films than CD/CU–. CD/CU+ and CD/CU– ↓ frowning to sadness than con. CD/CU+ ↓ HR deceleration to sadness than CD/CU– and con.
Decety, Michalska, Akitsuki and Lahey	CD 8	8	DISC; teacher reports	Photos of non/painful and	fMRI	–	Accidental: CD ↑increased activation in amygdala, striatum

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(2009)				intentional/accidental injuries			and temporal poles than con. Intentional: CD ↓less activation in frontal neural areas than con.
Marsh, Beauchaine and Williams (2008)	DBD 31	23	CASI	Sadness film	SCL, PEP, RSA, EBCS	–	DBD ↔ con. DBD ↓ association between physiological and facial responses than con.
Marsh et al. (2013)	DBD 21	14	K-SADS-PL	90 photos mild/moderate/severe pain to self/other	fMRI	APSD PCL:YV	Con. ↑ activation than CD in pain matrix. CD/PT+ ↓less response to others pain than con.
Sebastian et al. (2012)	CD 31	16	CASI – CD	30 cartoons	fMRI	ICU	CD showed ↓ activation in right amygdala and anterior insula for affective vs. cognitive ToM.

Note: DBD = developmental behaviour disorder; CD = conduct disorder; CD/CU+ = high callous unemotional traits; CD/CU– = low callous unemotional traits; con. = control; DISC = diagnostic interview schedule for children; K-SADS-PL = schedule for affective disorders and schizophrenia for school-aged children, present and lifetime version; CASI = child and adolescent symptom inventory; ASPD = antisocial process screening device; PCL:YV = psychopathy checklist youth version; YPI = youth psychopathic traits inventory; ICU = inventory of callous unemotional traits; ↑ = significantly higher than, ↔ = no significant differences between; ↓ = significantly lower than; EMG = electromyography; HR = heart rate; SCL = skin conductance level; PEP = cardiac preejection period; RSA = respiratory sinus arrhythmia; EBCS = emotional behaviour coding system; fMRI = functional magnetic resonance imaging; ERP = event related potential.

or the DBD/CU+ group and controls. During anger films DBD/CU+ participants showed significantly more zygomaticus activity than the DBD/CU- group, indicating that they were smiling; no other between-group differences were observed. During sadness films, both DBD/CU+ and DBD/CU- groups showed significantly less corrugator activity than controls; no significant differences were observed between DBD/CU+ and DBD/CU- groups. DBD/CU+ participants also showed significantly less HR deceleration during sadness clips than DBD/CU- and control groups; there were no other significant differences in HR response to sadness, happiness or anger films.

Anastassiou-Hadjicharalambous and Warden (2008) measured changes in HR in participants with CD/CU+, CD/CU- and controls (sample described previously) while watching a film depicting fear. CD/CU+ participants showed significantly less HR deceleration than CD/CU- and control participants. No significant differences between the CD/CU- and control groups were detected.

Marsh et al. (2008) showed their sample of 9–13 year old boys with DBDs (n = 31) and controls (n = 23) matched for age and SES but with significantly lower levels of ADHD, MDD and dysthymia, a film clip of a boy displaying intense sadness. Autonomic reactivity was measured through SCL, Cardiac Preejection Period (PEP), and Respiratory Sinus Arrhythmia (RSA) and facial expressions were measured through the Emotional Behaviour Coding System (EBCS). No significant between-group differences were found in autonomic arousal or in facial expressions, although correspondence between facial expressions and physiological responses was significantly lower in the DBD group than in controls.

Cheng et al. (2012; sample characteristics described previously) used ERP methods to measure neurological responses to 124 static pictures of painful and non-painful situations where pain was accidentally or intentionally caused. The central late positive potential (LLP) response was reduced in CD/CU+ and CD/CU- groups compared to controls, indicating impairments in the late cognitive evaluative component of pain perception. The CD/CU+ group also showed a reduced response in the frontal N120 compared to controls, which is thought to be an early affective arousal component of pain perception.

Decety et al. (2009) measured neural responses to others' pain using fMRI. Adolescents with EO-CD aged 16–18 years ($n = 8$) and controls ($n = 8$) matched for age, sex and ethnicity, but with significantly lower levels of ADHD were shown 96 animated pictures of individuals in painful or non-painful situations caused accidentally or intentionally. Viewing painful situations caused pain matrix activation in both groups (including the anterior cingulate cortex (ACC), insula, somatosensory cortex, supplementary motor area and periaqueductal grey). Viewing pain caused accidentally led to significantly increased activation in the amygdala, striatum and temporal poles in the EO-CD group compared to controls. When the painful situation was caused intentionally participants in the EO-CD group showed activation only in the insula and precentral gyrus whereas the control group showed significantly more activation in the medial prefrontal cortex, lateral orbitofrontal cortex and right temporo-parietal junction. The EO-CD also exhibited significantly less amygdala-prefrontal coupling than the control group when watching intentionally caused pain.

Marsh et al. (2013) recruited 35 males and females aged 10–17 years with DBD/PT+ (DBD and high PT; $n=14$; 57% male) and age-, IQ-, and gender-matched controls ($n=21$; 71% male). Participants were shown 90 photographs of hands and feet in situations where severe, moderate or no pain would be experienced and were asked to imagine themselves or another person in the situation during fMRI scanning. DBD/PT+ participants showed reduced activation in the pain matrix compared to controls as the severity of pain increased, particularly when the pain was perceived as happening to another person. In addition, when perceiving pain happening to another person Psychopathy Checklist, Youth Version (PCL: YV; Forth, Kosson, & Hare, 2003) scores were significantly negatively correlated with activation in the amygdala and left rostral anterior cingulate cortex.

Sebastian et al. (2012) recruited 31 males with CD (mean age 14.34 years) and 16 control participants (mean age 13.5 years) matched for age, SES, ethnicity, and IQ but with significantly lower levels of ADHD, anxiety, MDD and alcohol and substance misuse. Participants viewed 30 cartoon sequences and chose the next event in the story sequence while fMRI scanning was taking place. 10 cartoons required cognitive ToM judgements, 10 required affective ToM judgements, and 10 required an understanding of physical causality.

Participants with CD showed significantly reduced amygdala reactivity when presented with affective stimuli compared to non-affective stimuli.

Participants with CD also showed significantly reduced amygdala reactivity during tasks requiring affective ToM compared to controls. When levels of CU were controlled during analysis of performance on affective ToM tasks there was a positive relationship between conduct problems and amygdala reactivity, and when conduct problems were controlled during analysis, CU+ and amygdala reactivity were negatively correlated. As neither conduct problems or CU+ were related to amygdala reactivity during zero-order correlation analyses, it is possible that there are suppressor effects between conduct problems and CU traits.

1.4 Discussion

As this review illustrates clearly, there are many inconsistent findings in the literature regarding empathy deficits in individuals with DBDs; consequently, the precise nature of the relationship between empathy and CD/DBDs is difficult to determine.

Studies using questionnaires have shown relatively consistent deficits in both cognitive and affective empathy in young people with CD/DBDs compared to controls; these differences do not appear to be modulated by CU traits, contrary to models predicting disproportionate impairments in affective empathy in those with high CU (Blair, 2013). Both of the studies measuring cognitive empathy showed significant deficits in participants with CD (Cheng et al., 2012; Cohen & Strayer, 1996) and the majority of studies measuring affective empathy showed a similar relationship (Anastassiou-Hadjicharalambous & Warden, 2008; Cohen & Strayer, 1996; de Wied et al., 2005; de Wied et al., 2006; Schonert-Reichl, 1993). The two studies that did not show this relationship are likely to be affected by the inclusion of the IRI personal distress subscale in the affective empathy domain (Cheng et al., 2012; Cohen & Strayer, 1996). Authors have suggested that high levels of personal distress are associated with a high level of self-focus which may impair empathy rather than promote it (e.g. Lovett & Sheffield, 2007). Cohen and Strayer (1996) report findings for the IRI empathic concern subscale separately and find that participants with CD score significantly lower on this scale than their control group, demonstrating lower levels of affective

empathy; unfortunately Cheng et al. (2012) do not report subscale scores to allow this comparison. Therefore, questionnaire measures consistently demonstrate impairments in cognitive and affective empathy in young people with DBDs when appropriate measures are used. Arguably, questionnaires measure trait empathy, requiring individuals to consider how they generally think and feel, whereas other stimulus materials may measure state empathy, i.e. how one feels in response to a specific situation being experienced at the present moment.

With regard to identifying facial expressions of emotions in others, a key process required for cognitive empathy, it appears that young people with CD experience some impairments relative to controls, although these findings are far from consistent. Studies using simple, posed pictures of facial expressions (Walker, 1981), emotions displayed at 100% intensity (Pajer et al., 2010) or highly expressive dynamic faces (Schwenck et al., 2012) report no differences between CD/DBD groups and controls, possibly due to ceiling effects. However, it would appear that when tasks or stimuli become more complex, presenting morphed facial expressions (Fairchild et al., 2010; Fairchild et al., 2009) or requiring the assimilation of facial expressions and paralanguage (Cadesky et al., 2000), differences between groups emerge, although these are not uniform across all emotions. Fairchild et al. (2010; 2009) found impairments in anger and disgust identification in their male and female CD groups, with additional impairments in happiness and fear recognition in males with CD, while Cadesky et al. (2000) found impairments in the identification of happiness, sadness and fear but not anger in their CD group. It is far from clear, then, which emotions individuals with CD are consistently impaired at identifying, if any. Previous data also suggest that individuals with EO-CD experience more impairments relative to controls than individuals with AO-CD (Fairchild et al., 2009), and that individuals with CD/CU+ may be more impaired than those with CD/CU- in identification of emotions, particularly sadness (Fairchild et al., 2009, see also Dawel, O’Kearney, McKone and Palermo [2012] for a meta-analysis of the relationship between PT and facial affect recognition in adult and child populations), although this is not a universal finding (Schwenck et al., 2012).

Cognitive empathy can also be measured through emotion identification in vignettes. Here, findings are even more mixed. Two studies found no

impairment in recognition of emotion (de Wied et al., 2005; Schwenck et al., 2012) while one study found significant impairments in adolescents with CD in recognition of emotion overall, although data were not reported for individual emotions and therefore it is not possible to determine for which emotions this difference may have been significant (Cohen & Strayer, 1996). Interestingly, studies that used tasks requiring only the inference of intentions and beliefs of others and not an understanding of their emotional response found no differences between participants with CD and controls (Jones et al., 2010; Schwenck et al., 2012), suggesting that this ability may remain intact, consistent with the predictions of Blair's (2005) model of partially dissociable empathy subsystems.

All studies measuring affective responses to vignettes demonstrate impairments in CD groups (Anastassiou-Hadjicharalambous & Warden, 2008; Cohen & Strayer, 1996; de Wied et al., 2005; de Wied et al., 2012; Jones et al., 2010; Schwenck et al., 2012), however whether this difference reflects affective empathy deficits is unclear due to the nature of questions asked of participants. When affect matches (feeling the same emotion as the protagonist, i.e. affective empathy) were measured two studies found significantly fewer affect matches in DBD groups than in controls (de Wied et al., 2005; Strayer, 1993). Other studies measured affective responses to vignettes through strength of emotion (Schwenck et al., 2012) or yes/no responses (yes = affect match or emotion of similar valence, no = no or incongruent emotion; Anastassiou-Hadjicharalambous & Warden, 2008) and also found significantly less self-reported emotion in DBD groups, although it is not possible to know if this reflects affective empathy or a response more akin to sympathy. Studies that measured sympathy responses specifically also found significantly reduced sympathy in participants with DBDs compared to controls. Studies also suggest that individuals with DBD/CU+ may be more impaired than those with DBD/CU- (de Wied et al., 2012; Schwenck et al., 2012), particularly in sadness where individual emotions are considered (de Wied et al., 2012), although greater impairment in DBD/CU+ compared to DBD/CU- groups is not a universal finding (Anastassiou-Hadjicharalambous & Warden, 2008).

Affective response to stimuli has also been measured physiologically. When facial mimicry was measured using EMG, impairments were found in DBD

groups for anger and sadness films but not happiness (de Wied et al., 2009; de Wied et al., 2006). Less HR deceleration in response to sadness films was observed in DBD groups (de Wied et al., 2009) with differences perhaps more significant for those with CU+ viewing films containing sadness (de Wied et al., 2012) and fear (Anastassiou-Hadjicharalambous & Warden, 2008). Other studies, however, found no differences between groups in physiological response to sadness (Marsh et al., 2008). fMRI and ERP studies have also revealed neurological differences between groups in response to stimuli depicting others in pain with DBD adolescents showing atypical neural responses relative to controls (Cheng et al., 2012; Decety et al., 2009; Marsh et al., 2013). This could reflect differences in either affective or cognitive empathy although the exact nature and impact of these differences require further investigation. Recent research also suggests that the neurological differences between groups may be particularly pronounced for affective empathy (Sebastian et al., 2012).

1.4.1 Limitations of previous research

Findings regarding the relationship between DBD/CD and empathy are inconsistent and challenging to synthesise, possibly due in part to differences between samples and task characteristics.

Firstly, comorbidity within CD samples needs to be considered. When measured, the level of comorbidity is so high that it would be neither practical nor representative of this population to recruit a sample with 'pure' CD, thus the impact of comorbidity must be considered. Some studies included in this review included no information regarding comorbidity in their sample (Anastassiou-Hadjicharalambous & Warden, 2008; Cheng et al., 2012; Jones et al., 2010; Marsh et al., 2013; Schonert-Reichl, 1993; Walker, 1981), whereas those that did often reported significant differences between groups but did not demonstrate that they had considered these differences during their analysis (de Wied et al., 2005; de Wied et al., 2012; de Wied et al., 2009; de Wied et al., 2006; Decety et al., 2009; Marsh & Blair, 2008; Pajer et al., 2010; Schwenck et al., 2012; Sebastian et al., 2012). Others measured comorbidity, and indeed CD symptoms, only within the group they expected to fulfil CD criteria, and not within their controls (Cohen & Strayer, 1996) risking the possibility that their control group may have had CD symptoms or psychiatric

illness. Other potentially confounding factors, including IQ (Cheng et al., 2012; Decety et al., 2009; Marsh et al., 2008) and SES (Cadesky et al., 2000; Cheng et al., 2012; de Wied et al., 2005; de Wied et al., 2012; de Wied et al., 2009; de Wied et al., 2006) were also not measured by some studies and significantly lower IQ in CD groups was not considered in the statistical analysis in others (Cadesky et al., 2000; Pajer et al., 2010). Although there are far fewer studies including female participants, largely due to difficulties with recruitment of female participants with DBD/CD, some studies have also failed to control for differences in gender between groups (Cadesky et al., 2000), with females often overrepresented in control groups. This is problematic as some studies have reported superior emotion recognition or increased empathy in females relative to males (Eisenberg & Lennon, 1983). In order to ascertain why studies differ in their findings with respect to the relationship between empathy and CD, it is essential to characterise the groups comprehensively and control for potentially confounding factors such as gender, IQ and SES in order to interpret the group differences. A number of studies are more robust in their measurement of sample characteristics in this review and it appears that controlling for these differences does not entirely remove between-group differences, but may attenuate them.

The second major limitation contributing to the difficulties with synthesising results across studies are the differences in stimulus materials. It was extremely rare for different studies to use the same stimulus materials as one another in this review. As a result it is possible that inconsistent findings are a result of stimulus materials being differentially effective in eliciting and/or measuring empathy in their sample. It is also possible that the situations portrayed in vignettes resonate more with the experiences of individuals without CD than those with, or vice-versa, and that the advanced verbal skills and imagination required to understand and interpret vignettes place participants with CD, who may have lower verbal IQs than controls, at a disadvantage. This may be less of an issue when considering questionnaire completion. Further, the high levels of comorbid ADHD in CD groups may mean that these participants fail to concentrate during vignettes and therefore miss key information. Given the consistent findings when questionnaires are used and the inconsistent findings from studies using vignettes, this account seems entirely plausible.

Third, the treatment of data obtained from participants could also significantly affect findings. Studies differ in whether they analyse differences between groups collapsed across all emotions or whether they consider each emotion separately. Given that studies that analyse discrete emotions separately tend to show impairments in some emotions but not others (Cadesky et al., 2000; de Wied et al., 2005; de Wied et al., 2012; de Wied et al., 2009; de Wied et al., 2006; Fairchild et al., 2010; Fairchild et al., 2009), it is likely that there is not a global impairment in empathy or emotion recognition, but possibly just impairments in specific emotions. Therefore, studies that analyse emotions overall are perhaps less helpful in understanding the specific impairments experienced by individuals with CD. Some studies also combine cognitive and affective empathy into one construct (de Wied et al., 2012). Again, given the current theoretical position that these two types of empathy are dissociable, findings collapsing across these two areas are arguably less reliable and helpful in understanding specific deficits.

Finally, the measurement of CU and PT in samples differs substantially between studies. With the publication of the DSM-5 (APA, 2013) it has been acknowledged that the presence of CU traits in individuals with CD is important and specifies a subgroup of individuals who are arguably more severely affected than those without CU traits (Frick & White, 2008), therefore the measurement of these traits in any study with this population is particularly important. As a criterion for CU traits is a lack of empathy for others these individuals should arguably show consistently worse performance than those without CU; however, this has not been universally observed (Anastassiou-Hadjicharalambous & Warden, 2008; Cheng et al., 2012; de Wied et al., 2012) and the majority of studies in this review have included no measurement of CU or PT (Cadesky et al., 2000; Cohen & Strayer, 1996; de Wied et al., 2005; de Wied et al., 2009; de Wied et al., 2006; Decety et al., 2009; Marsh et al., 2008; Pajer et al., 2010; Schonert-Reichl, 1993; Walker, 1981). Without robust measurement of CU in samples it is not possible to assess the impact of these traits on empathy.

1.5 Conclusions and directions for future research

Findings related to both cognitive and affective empathy deficits in young people with DBDs are inconsistent. It appears that when self-report

measures of affective empathy are used, including questionnaires and self-reports of emotional responses to vignettes, individuals with DBDs generally report less empathy than controls, although this relationship is not necessarily supported by studies using physiological measurements. Measures of cognitive empathy show some possible impairment in ability to identify emotions in others in individuals with DBDs; this is not a consistent finding, but studies suggest that cognitive empathy for intentions and beliefs of others is intact, while cognitive empathy for the emotions of others may not be, particularly when these emotions are not of 100% intensity and involve more complex stimulus materials. It is possible that greater deficits are experienced for emotions of negative valence but it should be considered that anger, disgust, fear and sadness are all included under this heading and it is not currently clear which of these emotions, if any, are more impaired than the others. These emotions are also more difficult to identify than happiness, so it is possible that larger group differences for emotions of negative valence reflect task difficulty rather than a specific deficit in recognition of these emotions. The impact of CU is also unclear at the present time, although physiological measurements suggest that individuals with CU may experience greater impairments in empathy than those without, despite the relative lack of group differences in self-report measures.

Clinically, it is increasingly important to understand the precise nature of deficits in empathy in individuals with CD in order that effective treatments can be devised. Currently, a number of interventions are based on the notion that individuals with CD have a reduced understanding of the impact of their antisocial behaviours on others (cognitive empathy) and resonate less with the emotional experiences of others (affective empathy). If the literature was able to demonstrate whether impairments lay in cognitive or affective empathy or both, and whether this was for specific emotions or was more global in nature, interventions could be more clearly targeted and efficacy could be better measured. Future research should focus on replication of previous studies using well-validated stimulus materials and carefully consider sample characteristics in order to build a robust, consistent evidence base to aid in supporting and treating these young people.

Chapter 2: Empirical Paper

Empathic accuracy in adolescents with Conduct Disorder and varying levels of callous-unemotional traits.

2.1 Introduction

CD is a diagnosis used to describe a repeated, persistent pattern of severe antisocial behaviour which violates the rights of others and is contrary to age-appropriate and societal norms (APA, 2000). It is one of the most common reasons for referral to mental health services and treatment incurs a significant public health cost (Romeo et al., 2006) with longitudinal studies demonstrating that individuals with life-course persistent CD often have poor social and psychiatric outcomes as adults (Odgers et al., 2007). Untreated, it is estimated that 40–50% of young people who meet diagnostic criteria for CD will go on to fulfil the diagnostic criteria for Antisocial Personality Disorder (ASPD) as adults (Kazdin, 1995).

In order to effectively treat the behaviours shown by young people with CD and alter their developmental course, the factors contributing to their aetiology must be properly understood. This is made more difficult by the heterogeneous nature of the group of young people who meet the criteria for the diagnosis.

2.1.1 Conduct Disorder

The lifetime prevalence of CD is estimated to be around 9.5% with more boys (12%) than girls (7.1%) affected (Nock et al., 2006). Its course is remarkably persistent, with a number of studies demonstrating that individuals who show antisocial or aggressive behaviour in early childhood continue to show this behaviour into adolescence and adulthood (Odgers et al., 2007).

The DSM-IV-TR (APA, 2000) defines CD as a persistent pattern of antisocial behaviour beginning either in childhood (prior to 10 years of age) or adolescence (after 10 years of age) and causing clinically significant impairment in social, academic or occupational functioning. This may be characterised by aggression to people or animals, destruction of property, deceitfulness or theft, and serious violations of rules (see Appendix A for the

diagnostic criteria). In the recently published DSM-5 (APA, 2013), a descriptive features specifier of 'limited prosocial emotions' has been added to classify individuals who meet the criteria for CD but also show significant CU traits including a reduced capacity to feel empathy and guilt, and a pervasive callous-unemotional interpersonal style. Individuals who meet diagnostic criteria for CD and also have CU+ often have a more severe form of CD which is more problematic to treat and is associated with poorer outcomes (Frick & White, 2008).

Risk factors for the development of CD have been studied extensively. Research suggests a combination of intrapersonal factors (e.g. IQ, temperament, poor social skills), familial factors (e.g. abuse, criminality, poor attachment, poor parenting skills) and environmental factors (e.g. low socioeconomic status, homelessness, social isolation) may have a role in the development of CD (e.g. Murray & Farrington, 2010). Of course, cross-sectional research cannot demonstrate a causal relationship between these variables and CD, although increasingly evidence is being generated by prospective longitudinal studies (Murray & Farrington, 2010).

2.1.2 Empathy

There is no universally accepted definition of empathy, although researchers broadly agree that it consists of three partially dissociable components operating in parallel (Zaki & Ochsner, 2012). Blair (2005) defines these components as motor, affective and cognitive empathy. Motor empathy is considered to be the most primitive form of empathy and involves the automatic and unconscious processes of facial, postural and reflex mimicry. Affective empathy is the experiencing of an emotion more appropriate to another's situation than one's own; feeling *with* another person, often an exact 'affect match'. Affective empathy is often confused with sympathy, feeling *for* another person; an emotion of similar valence but not an affect match. Cognitive empathy is the top-down process of rationally recognising and understanding the emotional states of others and the ability to understand their perspectives. It has been argued by a number of researchers that individuals can have deficits in one area of empathy while others may remain intact (e.g. Blair, 2005; Blair, 2008; Bons et al., 2013).

Impairments in empathy (or even a lack of empathy) have long been considered to be a factor contributing to the development of aggressive or antisocial behaviour (e.g. Ellis, 1982) and as a result have been the target of many intervention programmes (Varker, Devilly, Ward, & Beech, 2008). Blair (1999) proposed that children who behave in persistently antisocial ways, particularly those with PT, have deficits in a system he referred to as the Violence Inhibition Mechanism (VIM; Blair, 1995). In typically-developing individuals, the VIM operates through a process of socialisation experiences and classical conditioning, whereby the distress of another causes the perceiver to become distressed; the cessation of aggressive behaviour towards peers is negatively reinforced by a reduction in one's own distress or through social consequences. Blair (1995) proposed that when individuals with PT and persistently antisocial behaviour observe distress cues in others (e.g. sad or fearful facial expressions) they do not feel emotions akin to those of the other individual (i.e. do not experience empathy) and are therefore less likely to inhibit aggressive behaviour towards others.

2.1.3 Empathy deficits in CD

Findings concerning empathy deficits in CD populations are mixed, possibly a result of differences in sampling strategies, demographic and diagnostic variables, methods of measuring empathy and failure to consider cognitive and affective empathy separately.

2.1.3.1 Cognitive empathy

Cognitive empathy has primarily been assessed through questionnaire measures and by asking individuals to identify emotions in others from facial expressions or vignettes. Questionnaire measures such as the IRI (Davis, 1980) frequently demonstrate that adolescents with CD show deficits in self-reported ability to take the perspective of others compared to controls (Cheng et al., 2012; Cohen & Strayer, 1996). Findings of between-group differences using tasks measuring recognition of facial expressions or vignettes are less consistent. Studies using posed facial expressions (Walker, 1981), emotions displayed at 100% intensity (Pajer et al., 2010) or highly expressive dynamic facial expressions (Schwenck et al., 2012) find no differences between adolescents with CD and controls, possibly as a result of ceiling effects. Other studies, using more complex morphed facial expressions, find deficits in

specific emotions, often of negative valence (Cadesky et al., 2000; Fairchild et al., 2010; Fairchild et al., 2009). Studies using vignettes, often films of individuals experiencing strong emotions, also report mixed findings with some reporting deficits in emotion recognition in adolescents with CD compared to controls (Cohen & Strayer, 1996) while others find no differences between groups (de Wied et al., 2005; Schwenck et al., 2012). Interestingly, tasks that do not require cognitive empathy for feelings but instead ask about others' perspectives and intentions have consistently found no significant differences in ability between adolescents with CD and controls (Jones et al., 2010; Schwenck et al., 2012).

The nature of cognitive empathy deficits in adolescents with CD is, then, unclear, although it may be the case that self-reported cognitive empathy is lower in these youth and that impairment in identification of emotions in others is present, which is most evident for negatively-valenced emotions, while the ability to understand the perspectives and intentions of others remains intact. To further complicate the relationship between cognitive empathy and CD, some studies suggest that youth with EO-CD may experience greater impairments in facial affect recognition relative to controls (fear, anger, disgust and happiness) than youth with AO-CD (fear, anger) and that for disgust recognition the EO-CD group may be significantly more impaired than the AO-CD group (Fairchild et al., 2010). Individuals with CD/PT+ may also have impairments in the identification of fear, sadness and surprise compared to individuals with CD/PT- (Fairchild et al., 2009).

2.1.3.2 Affective empathy

Measurement of affective empathy has involved use of questionnaires, vignettes, and physiological responses to stimuli. Questionnaire measures demonstrate impairments in affective empathy in adolescents with CD compared to controls (Anastassiou-Hadjicharalambous & Warden, 2008; Cohen & Strayer, 1996; de Wied et al., 2005; de Wied et al., 2006; Schonert-Reichl, 1993). Studies that have included the IRI personal distress subscale as a measure of affective empathy, however, have not found this relationship (Cheng et al., 2012) although the validity of this subscale as a measure of affective empathy has been questioned (e.g. Jolliffe & Farrington, 2004; Lovett & Sheffield, 2007). Youth with CD consistently report lower levels of affective empathy in response to film clips than controls (Anastassiou-

Hadjicharalambous & Warden, 2008; Cohen & Strayer, 1996; de Wied et al., 2005; Schwenck et al., 2012); when affective response is analysed by emotion it appears that adolescents with CD may be particularly impaired in affective empathy for sadness (de Wied et al., 2005), although many studies do not analyse responses by emotion (e.g. Cohen & Strayer, 1996; Schwenck et al., 2012). In addition, researchers have often asked whether participants felt any emotion in response to clips rather than which emotion they felt, limiting the degree to which deficits in affective empathy, rather than sympathy, can be reliably concluded from the findings (e.g. Anastassiou-Hadjicharalambous & Warden, 2008; Schwenck et al., 2012). In studies that specifically measure sympathy (feeling any emotion), adolescents with CD report this at significantly lower levels than controls (Cohen & Strayer, 1996; de Wied et al., 2005). Although some studies have shown that participants with CD/CU+ report experiencing emotion in response to vignettes at a lower rate than controls (any emotion, not necessarily the same emotion as the protagonist; Schwenck et al., 2012), several studies have not found significant differences between participants with CD/CU+ and CD/CU- (Anastassiou-Hadjicharalambous & Warden, 2008; de Wied et al., 2012).

Responding to the criticism that self-report measures of empathy are subjective and subject to demand characteristics, there has been a recent increase in the use of physiological measurements of empathy as these are seen as more 'objective'. EMG has been used to measure facial mimicry and it appears that adolescents with CD may show reduced responses to sad and angry facial expressions relative to controls (de Wied et al., 2009; de Wied et al., 2006). Adolescents with CD may also experience weaker HR decreases than controls in response to sadness (de Wied et al., 2012; de Wied et al., 2009) although this is not a universal finding (Marsh et al., 2008). One study has also suggested that participants with CD/CU+ may show weaker HR responses than adolescents with CD/CU- (de Wied et al., 2012). ERP studies have also suggested greater impairments in adolescents with CD/CU+ in arousal in response to pain in others (Cheng et al., 2012); fMRI studies have also supported significant between-group differences in perception of others' pain, but the implication of these differences is as yet unclear (Decety et al., 2009; Marsh et al., 2013). fMRI has also been used to demonstrate differences in neural circuits involved in affective ToM tasks in adolescents with CD compared to typically-developing controls (Sebastian et al., 2012).

It appears, then, that adolescents with CD self-report lower levels of affective empathy than controls through questionnaire measures and vignettes and that these differences between groups are beginning to be supported by physiological measurements of empathy. Physiological measurements of affective empathy have also begun to suggest that individuals with CD/CU+ may be more impaired than those with CD/CU-, although studies comparing these subgroups are still rare. It is not clear, however, whether adolescents with CD experience impairment in affective empathy for specific emotions rather than global difficulties. In addition, few studies have differentiated between affective empathy and sympathy.

2.1.4 Empathic accuracy (EA)

As the study of empathy has evolved, several criticisms of stimulus materials used in earlier experiments have emerged. Frequently, materials used in these studies have been oversimplified (e.g. pictures of still faces, pictures of eyes along with high or low frequency words describing emotions) and lacking in ecological validity. Neuropsychological research demonstrating that the brain processes simple and complex stimuli differently has added to concerns that oversimplified stimulus materials prevent researchers from assessing how individuals perform in real-world situations (Zaki & Ochsner, 2012). Although researchers have responded to this by using vignettes or films, often taken from television programmes, these are still subject to two main criticisms. Firstly, participants are often asked only to name the overall emotion being portrayed in the clip and are occasionally asked to rate its strength and the reason for it. This reliance on an overall judgement of emotion, often through forced-choice, means that it has not been possible to investigate whether participants are able to track changes in emotions, a skill vital in real-world encounters. Secondly, selecting clips from television or from filmed actors means that the emotion in the clip is inevitably feigned and, further, that it is not possible to ascertain whether targets were genuinely experiencing the emotion they were portraying.

One research group has suggested that these criticisms can be overcome with the use of an Empathic Accuracy (EA) task. EA, defined as the ability to accurately infer the intensity and type of thoughts or feelings being experienced by a social target (Zaki, Bolger, & Ochsner, 2008; Zaki & Ochsner,

2011) consists of mental state attribution (cognitive empathy) and experience sharing (affective empathy, Zaki & Ochsner, 2011). EA tasks involve recording individuals (targets) speaking about real events when they experienced strong emotions. The target watches the film they have recorded and provides continuous ratings of the intensity of the emotion they experienced while speaking. Participants subsequently watch the film and provide their own continuous ratings of the intensity of the emotion they perceive being experienced by the target. The extent of the match between a participant's and target's ratings is the measure of EA, quantified using correlation coefficients. EA tasks, therefore, permit researchers to assess the ability of individuals to track changes in the intensity of emotions in real-time. EA tasks have previously been used successfully to demonstrate differences in empathy between adults with schizophrenia and controls (Lee, Zaki, Harvey, Ochsner, & Green, 2011).

2.1.5 The current study

The current research uses an EA task to assess the cognitive and affective empathy abilities of males with CD, a population in whom this task has not been used previously. The EA task has been slightly adapted from the original version developed by Zaki et al. (2008). In the original form of the task, emotions were only categorised into positive and negative valences. However, given previous findings that adolescents with CD are impaired in the identification of specific emotions when facial expressions and films are used as stimulus materials, films containing each of the six primary emotions (sadness, happiness, fear, anger, disgust, and surprise) were used in the current study. In addition, given that prior research has suggested that we are more likely to empathise with those we perceive as similar to ourselves, we chose to collect video clips from young male targets, as it was felt that these were more likely to resonate with a male adolescent audience. Participants' ability to accurately identify the emotion of the target was also assessed as an additional measure of cognitive empathy. As an additional measure of affective empathy, participants were asked to name the predominant emotion they had felt while watching a clip; if the participant's affect matched the targets this was coded as affective empathy, if the participants felt an emotion that was congruent to the target's emotion, this was interpreted as reflecting sympathy.

The present study was restricted to male participants for practical reasons (CD is more common in males than females (Nock et al., 2006) and there was a preponderance of males in the organisations referring participants into the study). It was also felt that sex differences in empathy might complicate analyses if females were included. In order to provide continuity with previous research using self-report or parent-report questionnaire measures rather than experimental tasks, standard empathy questionnaires were also included in the testing battery.

This study aimed to assess cognitive and affective empathy in adolescent males with and without CD through EA and self-report measures. A secondary aim was to determine whether levels of CU impacted on EA performance and self-report empathy.

The hypotheses for the study were as follows:

- Participants with CD will self-report lower levels of cognitive and affective empathy than controls. Participants with CD/CU+ will self-report lower levels of cognitive and affective empathy than participants with CD/CU-.
- Participants with CD will have lower EA scores than controls. Participants with CD/CU+ will have lower EA scores than participants with CD/CU-.
- Participants with CD will be less accurate at identification of targets' emotions than controls. Participants with CD/CU+ will be less accurate at naming targets' emotions than participants with CD/CU-.
- Participants with CD will be less likely than controls to feel the same emotion (an 'affect match') as the targets. Participants with CD/CU+ will report affect matches less often than participants with CD/CU-.
- Participants with CD will report feeling no emotion in response to the film clips more frequently than controls. Participants with CD/CU+ will report feeling no emotion more often than participants with CD/CU-.

2.2 Method

2.2.1 Ethical approval

Ethical approval was obtained from the University of Southampton Psychology Ethics Committee, and from Hampshire County Council Children's Services Department Research Governance Committee and Southampton City

Council Children's Services and Learning Directorate Research Governance Committee to approach Youth Offending Services (YOSs) in Southampton and Hampshire.

2.2.2 Participants

Participants belonged to one of three separate groups: actors (targets) providing the stimulus materials (video clips and continuous ratings of their own emotions), students participating in the pilot study (validating the new version of the EA task), and adolescent participants in the main study.

2.2.2.1 Targets

Targets were recruited through advertisements to male university students (Appendix B1). Participants were informed of the intended use of their video clips and were asked to sign two consent forms: one to consent to participation in filming and one to consent for the use of their video clips in the study (see Appendix C1, D1 and D2 for information sheet and consent forms). Six target participants contributed six video clips each, although two of these targets were not used in the final experiment. The filming process took two hours in total for each participant, and they received £20 for taking part (see Appendix E1 for debriefing statement).

The mean age of targets was 23.5 years ($SD = 4.76$). Five targets described their ethnic origin as White British and one described himself as Asian.

2.2.2.2 Pilot participants

Pilot study participants were recruited through an online advertisement on Psychobook and posters in the School of Psychology (Appendix B2). 12 respondents with normal or corrected to normal vision and hearing were paid £10 or awarded 6 course credits for the 90-minute testing session (Appendix C2, D3 and E2 for information sheet, consent form, and debriefing statement).

The mean age of pilot participants was 22.3 years ($SD = 4.87$). 9 of the pilot participants were female (75%). 10 (83%) were undergraduate students and 2 (17%) were postgraduate students.

2.2.2.3 Participants

Male adolescents aged 14 to 18 years were recruited through Youth Offending Services (YOSs) across Southampton and Hampshire via poster advertisements (Appendix B3) and referrals from key workers and through mainstream schools and colleges through responses to mail shots (Appendix B4). Adolescents who had participated in previous studies in the Developmental Brain–Behaviour Laboratory and who had consented to be contacted regarding future studies were also contacted.

To be included in the study, participants were required to meet the following criteria: they had to be: (a) male; (b) aged between 14 and 18 years; (c) a fluent speaker of English; (d) have an estimated IQ of greater than or equal to 70, as the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999); and (e) free of psychotic illness, severe current bipolar or affective illness, or ASD as assessed through the Schedule for Affective Disorders and Schizophrenia for School–Age Children – Present and Lifetime Version (K–SADS–PL; Kaufman et al., 1997) and parent and adolescent self-reports of previous diagnoses and involvement with mental health services.

Participants over 16 years of age gave written informed consent (Appendix C3, C4 and D4 for information sheets and consent form). Parents or carers of participants under 16 years gave consent for them to participate; young people also signed to indicate their assent (Appendix C5, C6, D5 for information sheets and consent form). Parents were paid £8 for participating in the K–SADS–PL interview (which lasted approx. one hour). Young people were paid £12 following the K–SADS–PL interview (1 hour) and testing session (1.5 hours). All participants were fully debriefed at the end of the study (Appendix E3).

Two adolescent respondents were excluded due to current psychotic illness or having a clinical diagnosis of ASD and two failed to complete the required tasks. Following these exclusions, there were 20 participants in the CD group and 24 in the control group. Please see Table 7 (results section) for demographic information and between–group comparisons.

2.2.3 Questionnaires and materials

2.2.3.1 K-SADS-PL (Kaufman et al., 1997)

The K-SADS-PL is a semi-structured interview used for the assessment of current and lifetime psychiatric disorders in children and adolescents as defined by the DSM-IV (APA, 1994).

The K-SADS-PL includes an 82-item symptom screen assessing 20 diagnostic categories (e.g. mood disorders, anxiety disorders, psychosis). If individuals endorse symptoms in a diagnostic area the supplemental questions in that area are also administered. Current and past symptomatology are assessed using four-point (0 = no information; 1 = symptom not present; 2 = sub-threshold levels of symptomatology; 3 = symptom present, threshold criteria met) or three-point Likert scales (0 = no information; 1 = symptom not present; 2 = symptom present, threshold criteria met). The K-SADS-PL has demonstrated good concurrent validity with other semi-structured diagnostic interviews and questionnaire measures of mental illness in children and adolescents (Kaufman et al., 1997).

Due to time constraints in the current research, the K-SADS-PL symptom screen was adapted to include screening items for the most common disorders affecting males in this age group, i.e. mood disorders, Generalised Anxiety Disorder (GAD), Obsessive Compulsive Disorder (OCD), Post Traumatic Stress Disorder (PTSD), alcohol abuse/dependence, substance abuse/dependence, Oppositional Defiant Disorder (ODD), and psychosis (Appendix F) – items about enuresis, encopresis, and eating disorders were omitted. This shortened version of the screen has been used previously in the Developmental Brain- Behaviour Laboratory. The full CD and ADHD supplements (covering all 15 symptoms of CD and all 18 symptoms of ADHD) were administered to all participants and additional diagnostic supplements were administered where threshold scores had been achieved during the screening interview. Where both parent and child data were available, responses were synthesised in order for research diagnoses to be made; a symptom was judged to be present if it was endorsed by either parent or child, as recommended by Kaufman et al. (1997).

2.2.3.2 WASI (Wechsler, 1999)

The WASI is a frequently used assessment of intellectual functioning for individuals between the ages of 6 and 89 years. An overall estimate of intellectual function, full-scale IQ (FSIQ) can be calculated through the completion of four sub-tests (Block Design, Vocabulary, Matrix Reasoning, and Similarities) or two sub-tests (Vocabulary and Matrix Reasoning).

The current research utilised the two sub-test method of estimating IQ, which has been shown to be highly correlated with other measures of intellectual functioning in young people, including more extensive IQ assessments (Wechsler, 1999). Individuals are required to give definitions of orally and visually presented words (Vocabulary) and to generate solutions to incomplete grid patterns by selecting one of five possible options (Matrix Reasoning). Participants' raw scores are converted to age-corrected t-scores ($M=10$, $SD=3$) which are then summed and converted into a FSIQ score.

2.2.3.3 YPI (Andershed, Kerr, Stattin, & Levander, 2002)

The YPI is a 50-item self-report measure of psychopathic traits (PT) in young people (Appendix G). The YPI is comprised of ten subscales each containing five statements measured on four-point Likert scales. Young people are asked to rate how well each positively-framed statement applies to them (e.g. "I'm better than everyone on almost everything"; 1 = does not apply at all, 4 = applies very well). The ten YPI subscales map onto three domains: interpersonal (Grandiose-Manipulative), affective (Callous-Unemotional), and lifestyle (Impulsive-Irresponsible). Total scores range from 50 to 200, with higher scores indicating higher levels of PT.

In the original development study Cronbach's alpha for the total YPI score was .88, with alphas of .84, .74 and .78 for the interpersonal, affective and lifestyle domains respectively (Andershed et al., 2002). This was replicated with a UK sample of adolescent boys with CD by Dolan and Rennie (2006). Their data agreed with the original three-factor solution and found similar alpha levels to the original development study.

For the current study, Cronbach's alpha for the total score was .912, with alphas of .871, .825, and .867 for the interpersonal, affective and lifestyle domains respectively.

2.2.3.4 ICU (Frick, 2003)

Although the YPI assesses CU traits, this is measured as part of the broader dimension of PT. Given the hypotheses related to CU traits in the current study a specific measure of these was required.

The ICU is a 24-item measure developed from items in the CU self-report scale of the Antisocial Process Screening Device (APSD; Frick & Hare, 2001), which is commonly used to assess PT in young people. Respondents use a four-point Likert scale (0 = not at all true, 3 = definitely true) to indicate their agreement with statements (e.g. “I do not care who I hurt to get what I want”), half of which are positively worded and reverse scored (e.g. “I try not to hurt others’ feelings”; Appendix H). Total scores range from 0 to 72 with higher scores indicting higher levels of CU traits. A number of studies have found that the ICU items measure three separate but related factors: Callousness (11 items), Uncaring (8 items), and Unemotional (5 items) (e.g. Essau, Sasagawa, & Frick, 2006; Kimonis et al., 2008).

In the current study the youth self-report version of the ICU was used. This version of the ICU has been shown to have good internal consistency in adolescent offenders, with an alpha level for the total scale of .81 and alphas of .81, .80, and .53 for the callousness, uncaring and unemotional subscales respectively (Kimonis et al., 2008). ICU scores have also been shown to correlate positively with measures of aggression, psychosocial impairment and conduct problems, and negatively with positive affect and empathy (Essau et al., 2006; Kimonis et al., 2008).

In the current study, the Cronbach’s alpha was .85 for the total scale and .81, .79, and .78 for the callousness, uncaring and unemotional subscales respectively.

2.2.3.5 IRI (Davis, 1983)

The IRI is a 28-item self-report measure of empathy (Appendix I). Respondents rate their agreement with statements (e.g. “Sometimes I don’t feel very sorry for other people when they are having problems”) on 5-point Likert scales ranging from A (does not describe me well) to E (describes me very well). The IRI items comprise four subscales, each containing seven items: perspective taking, fantasy, empathic concern, and personal distress (Davis,

1983). Davis (1980) report good internal consistency for the subscale scores in male participants, with alpha coefficients of .78 (fantasy), .71 (perspective taking), .68 (empathic concern), and .77 (personal distress).

The IRI has been used in numerous studies as a self-report measure of empathy and has been shown to correlate well with other questionnaires measuring different facets of empathy (Davis, 1983). Due to concerns about the validity of the personal distress subscale (e.g. Jolliffe & Farrington, 2004; Lovett & Sheffield, 2007), differences between groups in individual subscale scores will be considered separately.

Cronbach's alphas for the current study were .75 for the fantasy scale, .67 for the perspective taking scale, .78 for the empathic concern scale, and .64 for the personal distress scale.

2.2.3.6 Benton Facial Recognition Test (BFRT; Benton, Sivan, Hamsher, Varney, & Spreen, 1983)

The BFRT is used as a screen for deficits in basic facial perception skills. Individuals are presented with one target face and six test faces and are asked to indicate which of the test faces matches the target face. The short-form of the BFRT contains 13 items. The first six items ask the individual to match the target face to one test face, which is exactly identical. The following seven items require the individual to match the target face to three of the six test faces, which are presented in different orientations and lighting conditions. Scores range from 0 to 54, with scores below 41 indicating deficits in facial perception. The BFRT has extensive normative data and is widely used in clinical settings and in research (Benton, Sivan, Hamsher, Varney, & Spreen, 1994).

2.2.3.7 Empathy Accuracy (EA) task

The aim of this task was to determine whether participants could: (a) continuously track the emotional intensity being experienced by the target; (b) identify the predominant emotion being felt by the target; and (c) experience the same emotion as the target. The procedures for collecting stimulus materials for the EA task and the task itself were adapted from the work of Zaki et al. (2008) and Zaki, Weber, Bolger and Ochsner (2009) and are described below and in detail in Appendix J.

Video clips of targets describing occasions where they had experienced each of the six primary emotions (Ekman, Friesen, & Ellsworth, 1972) were collected. From the pool of video clips, 14 clips were selected to form the EA task (see Appendix K for clip selection procedure), two clips per emotion and two training clips. Clip lengths ranged from 61 to 158 seconds long, with a mean length of 144 seconds. Targets' continuous ratings of the intensity of their emotion on a nine-point scale (0 = no emotion, 9 = very strong emotion) were correlated with perceivers' ratings of emotion on the same scale while viewing the clips. The resulting correlation formed the measure of EA. After viewing each clip participants were asked to name the predominant emotion they had perceived from a list of the six basic emotions plus the option of 'no emotion'. They were also asked to name the predominant emotion they had experienced and rate the strength of this emotion on the same nine-point scale.

Clips were presented in two pseudo-randomised orders, such that no two clips portraying the same target emotion were shown consecutively and positive and negative clips were intermixed.

2.2.4 Procedure

2.2.4.1 Targets

Targets were recruited to provide video clips for use in the EA task.

Individuals who responded to the advertisement met with the researcher and were informed of the aims of the research, their role and the intended audience for their video clips.

The procedure detailed in Appendix J was followed. Participants were asked to recall events where they had experienced one of the six basic emotions (happy, sad, frightened, surprised, angry, and disgusted) strongly and where it had been a relatively 'pure' emotion (i.e. it was not accompanied by other strong emotions). Participants wrote a brief description of the event, giving it a title of five words or less, and rated overall how strongly they had felt the emotion during the experience on a nine-point scale used throughout all EA tasks in this study (1 = no emotion, 5 = moderate emotion, 9 = very strong emotion). Participants then discussed the experience with the researcher, with emphasis on re-experiencing the emotion they had felt at the

time. When participants felt that they were re-experiencing the target emotion they were filmed speaking about the event, avoiding naming the target emotion. Immediately after filming, participants watched the clip and provided continuous ratings on the nine-point scale of how strong their emotion had been while speaking about the event, not during the event itself. After viewing the clip participants named the predominant emotion they had felt during filming and gave an overall intensity rating on the nine-point scale. Before beginning the next clip participants were given time for residual emotion to reduce in intensity. The procedure was employed for all six emotions; total filming time for each participant was approximately 2 hours, for which they were paid £20. The order in which emotions were recalled was pseudorandomised for each participant. Following their participation targets were asked to provide written consent for their clips to be used in the final study and were debriefed.

2.2.4.2 Pilot participants

Students were recruited in order to: (a) ensure that it was possible to identify the target emotion in clips, (b) ensure that significant correlations between target and perceiver ratings could be achieved, and (c) determine whether similar emotions to the target were elicited in the perceiver. Pilot data were used to select the clips for the final EA task that was used with adolescents.

Clips from five targets were included in the pilot study. Clips from one participant were excluded prior to piloting due to his low emotion intensity ratings when recalling experiences and during filming, and lack of variability in intensity ratings post-recording.

Students who responded to the advertisements came to the University and were informed about the aims of the research and their role. Demographic information including age, degree programme and year of study, home postcode and parent's occupation were collected. Participants were introduced to the nine-point scale and observed the researcher using the scale to rate a training clip (see Appendix L for detailed instructions). They were asked to view the clips and continuously rate the intensity of the emotion being experienced by the target while speaking, rather than during the event itself. Each clip was followed by three questions:

1. Which of these emotions do you think the person felt most strongly while talking about the event? (options: happy, sad, frightened, angry, disgusted, surprised, no emotion)
2. Which of these emotions did you feel most strongly while watching the clip? (options: happy, sad, frightened, angry, disgusted, surprised, no emotion)?
3. How strongly did you feel that emotion? (rated using the same nine-point scale as used during EA task)

Participants viewed clips in one of three pseudorandomised orders. No more than two clips from one target or two clips with the same target emotion were presented consecutively. Participants were offered regular breaks during the task to combat the effects of fatigue.

Data from pilot participants were collated and clips for the final EA task were selected based on the following criteria: (a) target identified one of the primary emotions as the predominant emotion during the experience and this was rated at an intensity at or above the mid-point of the scale (i.e. 5), (b) target identified re-experiencing the same primary emotion during filming and this was rated at an overall intensity at or above the mid-point of the scale (i.e. 5) during filming, (c) the majority of participants accurately identified the target's emotion, (d) the majority of participants reported feeling an emotion in response to the film, where possible clips were selected that contained high levels of affect matches, and (e) the participants' and targets' continuous ratings were significantly correlated. Where more than two clips for an emotion met the above criteria, clips were selected that were likely to resonate with the adolescent audience. Two clips per emotion and two training clips were selected (see Appendix K for clip-selection procedure).

2.2.4.3 Participants

Adolescents who expressed an interest in the study were contacted via telephone or email and offered a time to meet with the researcher at a mutually convenient location (e.g. their home, the YOS offices, the University) to discuss their involvement and begin the first phase of the study.

The K-SADS-PL (Kaufman et al., 1997) was administered to adolescents and also a parent or carer, if they were available and willing to participate. Adolescent and parent interviews were identical in content and items, but were

conducted in separate rooms to ensure confidentiality. The interviews included screening questions and the full CD and ADHD K-SADS-PL supplements. In addition, if the responses to the screening questions indicated that the participant may be suffering from current mood, anxiety, psychotic, substance or alcohol misuse disorders the corresponding supplements were completed. The K-SADS-PL interviews lasted between 40 and 60 minutes. Parents were paid £8 for their time.

If the interview data showed no evidence of ASD, psychosis or severe current affective illness, the participant was invited to the University to participate in the second phase of the study. If participants met exclusion criteria for the study at this point they were paid £8.

During the second phase at the University, the WASI and BFRT were administered; if participants achieved an IQ score of 70 or above and scored within the normal range on the BFRT, indicating no evidence of deficits in basic face perception skills, they were invited to continue with the study. Participants then completed the IRI, ICU and YPI.

Participants were introduced to the EA task using a standardised script (see Appendix L) and watched the researcher using the programme to rate a sample video. Participants' understanding that they were rating the strength of emotion rather than the valence was checked. Participants then viewed and rated a practice clip; any unusual uses of the scale (e.g. repeated movements up and down when changes in emotion were not observable) were discussed. Participants viewed the 12 test clips in one of two pseudorandomised orders depending on whether they had been allocated an odd or even participant number. After each video clip, the adolescents answered the same three questions as the pilot participants (emotion recognition and personal affective response).

Participants were verbally debriefed regarding the aims and hypotheses of the study following their participation.

2.2.5 Data analytic strategy

2.2.5.1 Allocation to groups

Participants who met diagnostic criteria for CD (three or more CD symptoms endorsed either by adolescent or parent/carer) were allocated to the CD group; participants with fewer than three CD symptoms were allocated to the control group.

Within the CD group, participants were further categorised as being either CD/CU+ or CD/CU- using a median split procedure according to ICU scores. Participants scoring above 35.5 were classified as CD/CU+ while participants achieving a score below this level were classified as CD/CU-.

2.2.5.2 Ethnicity and SES

As the majority of participants described their ethnicity as Caucasian there were insufficient numbers of participants in other ethnic groups for between-group comparisons. As a result, participants' ethnicity was categorised as Caucasian or non-white.

Participant SES was calculated according to the profession of parents using Office for National Statistics (ONS) guidance (ONS, 2010). Due to the relatively small sample size and to allow meaningful comparison between groups participants' SES was categorised into 'higher' (high and intermediate ONS categories) or 'lower' (routine/manual and unemployed ONS categories).

2.2.5.3 Self-report measures of empathy

Participants' self-reported empathy, as measured by the IRI, was compared between groups (CD vs. control; CU+ vs. CD/CU-) for each subscale (perspective taking, fantasy, personal distress, empathic concern) using t-tests where the required assumptions were met and Mann-Whitney tests where they were not.

2.2.5.4 Empathic Accuracy (EA) task

Continuous intensity rating data were separated by participant and by clip. Mean ratings for each two-second period served as one data point in subsequent analyses. Participant ratings for each two-second point (bin) were correlated with target's ratings, resulting in one correlation coefficient per

participant per clip. Correlations were then transformed using Fisher's z for all subsequent analyses (Silver & Dunlap, 1987). Average correlations for each participant for each emotion were then calculated. Correlations were compared between groups (CD vs. control; CD/CU+ vs. CD/CU-) using 2x6 mixed ANOVAs with group as the between subjects factor (2 levels) and emotion as the within subjects factor (6 levels; i.e., six primary emotions).

2.2.5.5 Emotion naming accuracy

Participants' emotion naming accuracy was considered overall and for each emotion specifically. Participants were given one of three scores for each emotion (0 = no emotions accurately identified; 50 = emotion accurately identified in one clip; 100 = emotion accurately identified in both clips). Emotion naming accuracy was compared between groups for overall naming accuracy and accuracy for each emotion (CD vs. control; CU+ vs. CD/CU-) using Mann-Whitney tests as data were non-normal.

2.2.5.6 Affect matching

Participants were given one of three scores for affect matches for each emotion (0 = no affect matches; 50 = affect match in one clip; 100 = affect match in both clips). Participants' self-reports of experiencing the same emotion as the target were compared between groups (CD vs. control; CU+ vs. CD/CU-) for overall matching and matching for specific emotions using Mann-Whitney tests as data were non-normal.

Groups (CD vs. control; CD/CU+ vs. CD/CU-) were also compared on self-reports of experiencing no emotion when considering all six emotions together and for each emotion specifically. Participants were allocated a score for each emotion (0 = no emotion for either clip; 50 = emotion experienced during one clip; 100 = emotion experienced during both clips). The Mann-Whitney test was used as data were non-normal in their distribution.

2.3 Results

2.3.1 Demographic characteristics and comorbidity

Demographic characteristics and psychiatric comorbidity by group and between-group comparisons are presented in Tables 7 and 8 below.

No significant differences were found between CD and control groups in age ($t(42) = .832$, $p = .410$; $r = .127$) or ethnicity ($\chi^2(1) = .023$, $p = .880$). The CD group had significantly lower IQ scores than the control group ($t(42) = -4.480$, $p < .001$; $r = .569$) and being in the CD group was associated with being of lower SES ($\chi^2(1) = 4.968$, $p = .026$) with the odds ratio indicating that participants in the CD group were 4.16 times more likely to be of lower SES than those in the control group. Participants in the CD group had significantly higher levels of CU traits ($t(42) = 3.820$, $p < .001$; $r = .508$) than controls.

Table 7

Demographic characteristics and comorbidity: CD .vs. control group comparisons

		Control participants (n=24)	CD (n=20)	p value
		M (SD)	M (SD)	
Age (years)		16.42 (1.21)	16.71 (1.01)	.410
Estimated IQ		104.67 (10.06)	91.50 (9.26)	<.001
Callous–unemotional traits (ICU)		21.73 (6.89)	31.3 (9.69)	<.001
Psychopathic traits (YPI)		94.08 (17.70)	119.75 (11.24)	<.001
		n (%)	n (%)	
SES				
	Higher	17 (71)	7 (35)	.026
	Lower	7 (29)	12 (60)	
	Missing	0 (0)	1 (5)	
Ethnicity				
	Caucasian	20 (83)	17 (85)	.880
	Non-white	4 (17)	3 (15)	
Current disorder*				
	ADHD	0 (0)	11 (55)	–
	Mood disorder	0 (0)	2 (10)	–
	Anxiety disorder	0 (0)	4 (20)	–
	Substance misuse	0 (0)	4 (20)	–
	Alcohol misuse	0 (0)	2 (10)	–

Note: * Percentage values sum to more than 100% due to multiple comorbidities in some participants. CD = Conduct Disorder; SD = standard deviation; IQ = intelligence quotient; SES = socioeconomic status; ICU = Inventory of Callous Unemotional traits; YPI = Youth Psychopathic traits Inventory; ADHD = attention–deficit/hyperactivity disorder.

Due to the absence of comorbidity in the control group it was not possible to use statistical procedures to test for differences between groups, although it is notable that more than half of the participants in the CD group had co-occurring ADHD diagnoses. Eight participants (40%) in the CD group were free of diagnoses other than CD.

Table 8

Demographic characteristics and comorbidity: CD/CU+ vs. CD/CU- group comparisons

	CD/CU- (n=10)	CD/CU+ (n=10)	p value
	M (SD)	M (SD)	
Age (years)	16.36 (1.095)	17.05 (.870)	.136
Estimated IQ	94.1 (7.249)	88.90 (10.651)	.218
Callous-unemotional traits (ICU)	23.300 (5.078)	39.300 (5.498)	<.001
Psychopathic traits (YPI)	114.600 (8.947)	124.900 (11.308)	.037
	n (%)	n (%)	
SES			
Higher	5 (50)	2 (20)	.350
Lower	5 (50)	7 (70)	
Missing	0 (0)	1 (10)	
Ethnicity			
Caucasian	7 (70)	10 (100)	.211
Non-white	3 (30)	0 (0)	
Current disorder*			
ADHD	4 (40)	7 (70)	.370
Mood disorder	0 (0)	2 (20)	–
Anxiety disorder	0 (0)	4 (40)	–
Substance misuse	0 (0)	4 (40)	–
Alcohol misuse	0 (0)	2 (20)	–

Note: * Percentage values sum to more than 100% due to multiple comorbidities in some participants. CD/CU- = Conduct Disorder with low callous-unemotional traits; CD/CU+ = Conduct Disorder with high callous-unemotional traits; SD = standard deviation; IQ = intelligence quotient; SES = socioeconomic status; ICU = Inventory of Callous Unemotional traits; YPI = Youth Psychopathic traits Inventory.

No significant differences were found between the CD/CU+ and CD/CU- groups in age ($t(18) = 1.561$, $p = .136$, $r = .345$) IQ ($t(18) = 1.276$, $p = .218$, $r =$

.288), SES ($p = .350$; Fisher's Exact Test (FET)), or ethnicity ($p = .211$; FET). Confirming the effectiveness of the median split, the CD/CU+ group had significantly higher levels of CU traits than the CD/CU- group ($t(18) = 6.760$, $p < .001$, $r = .847$). The CD/CU+ group also had significantly higher levels of PT than the CD/CU- group ($t(18) = 2.259$, $p = .037$, $r = .470$).

Due to the relative absence of comorbidity in the CD/CU- group, it was not possible to use statistical procedures to test for differences between groups for mood, anxiety, alcohol or substance misuse disorders. Differences between the CD/CU- and CD/CU+ groups for ADHD comorbidity were non-significant ($p = .370$; FET).

2.3.2 Facial identity recognition

2.3.2.1 CD vs. control group comparisons

The distribution of BFRT scores within the CD group was non-normal due to positive skew and could not be corrected with square root or logarithmic transformations. Therefore, a Mann-Whitney U test was used to examine differences between groups. BFRT scores for the CD group ($Mdn=45$) did not differ significantly from those of the control group ($Mdn=47$), $U = 188.5$, $z = -1.230$, $p = .219$, $r = -.185$.

2.3.2.2 CD/CU+ vs. CD/CU- group comparisons

There were no significant differences between the CD/CU+ ($M = 44.90$, $SE = .924$) and CD/CU- ($M = 46.20$, $SE = 1.489$) groups in BFRT scores ($t(18) = -.742$, $p = .468$, $r = .172$).

2.3.3 Self-report measures of empathy

The groups were compared in IRI scores using independent measures t -tests where data were normally distributed. Where this assumption was not met and data could not be normalised using transformations, Mann Whitney U tests were used.

2.3.3.1 CD vs. control group comparisons

Self-report empathy scores by group and by subscale and the results of between-group comparisons are presented in Table 9 below.

Table 9

Self-report empathy scores: CD vs. control group comparisons

Scale	CD (n=20) M (SD)	Control (n=24) M (SD)	p value
Perspective Taking	11.75 (5.06)	15.71 (3.917)	.006
Fantasy	11.25 (5.00)	14.29 (6.43)	.092
Empathic Concern	14.50 (5.33)*	19.50 (3.79)*	.008
Personal Distress	12.95 (5.63)	10.63 (4.05)	.119

Note: *Median values were reported due to non-normal distribution of scores. SD = standard deviation.

In subscales measuring cognitive empathy, significant differences were detected between groups for perspective taking ($t(42) = -2.93$, $p = .006$, $r = .41$) with participants in the CD group scoring significantly lower than controls. There was also a trend towards participants in the CD group obtaining lower scores than controls on the other cognitive empathy subscale, fantasy ($t(42) = -1.724$, $p = .092$, $r = .26$).

In the affective empathy subscales, participants with CD obtained significantly lower scores for the empathic concern subscale ($U = 127$, $z = -2.67$, $p = .008$, $r = -.40$), but there were no significant between-group differences for the personal distress subscale ($t(42) = 1.589$, $p = .119$, $r = .24$).

2.3.3.2 CD/CU+ vs. CD/CU- group comparisons

Self-report empathy scores by group and by subscale and the results of between-group comparisons are presented in Table 10 below.

Participants in the CD/CU- group scored significantly higher on the perspective taking subscale than participants in the CD/CU+ group ($t(18) = -2.43$, $p = .026$, $r = .50$). No significant between-group differences were detected for the fantasy ($t(18) = -.305$, $p = .764$, $r = .07$), empathic concern ($U = 45.5$, $z = -.341$, $p = .733$, $r = -.08$), or personal distress subscales ($U = 41.5$, $z = -.645$, $p = .519$, $r = -.14$).

Table 10

Self-report empathy scores: CD/CU- vs. CD/CU+

Scale	CD/CU- (n=10) M (SD)	CD/CU+ (n=10) M (SD)	p value
Perspective Taking	14.20 (4.24)	9.30 (4.76)	.026
Fantasy	11.60 (5.13)	10.90 (5.13)	.764
Empathic Concern	14.50 (3.36)*	15.50 (6.98)*	.733
Personal Distress	11.50 (3.23)*	15.00 (7.39)*	.519

Note: *Median values were reported due to non-normal distribution of scores. SD = standard deviation.

2.3.4 Empathic Accuracy (EA) task

2x6 mixed design ANOVAs were used to examine differences between groups. Group (control; CD) was entered as a between-subjects factor and emotion was a within-subjects factor (6 levels; i.e., six primary emotions) for all analyses. Where significant differences emerged post-hoc tests were used to examine where significant differences lay. In order to control for family-wise error rates, the Holm-Bonferroni method (Holm, 1979) was used to adjust the alpha level required for statistical significance. This method was chosen as it copes well with violations of parametric assumptions, but is less conservative (i.e., results in fewer type II errors) than the original Bonferroni method of correcting p values.

2.3.4.1 CD vs. control group comparisons

Descriptive statistics by group are presented in Table 11 and graphs displaying average correlations by clip are presented in Appendix M. On average, the CD group obtained numerically lower EA correlation coefficients for all emotions than the control group, although these differences were largest for clips depicting happiness, fear, surprise, and disgust.

EA data for standardised residuals of sad, frightened and surprised emotions were non-normal in their distribution as a result of negative skew. Mauchly's test indicated that the assumption of sphericity had been violated ($\chi^2(14) = 35.104, p = .001$), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon = .732$).

Table 11

EA descriptive statistics: CD vs. control group comparisons

Emotion	CD (n = 19*)	Control (n = 24)	p values
	Mean correlation (r) (SD)	Mean correlation (r) (SD)	
Sad	.444 (.261)	.459 (.191)	1.000
Happy	.455 (.320)	.527 (.178)	.671
Frightened	.454 (.308)	.558 (.185)	.229
Surprised	.368 (.297)	.468 (.268)	.258
Angry	.334 (.246)	.346 (.237)	.769
Disgusted	.405 (.408)	.568 (.349)	.229

Note: * Data from one participant missing due to technical error. Mean scores transformed back to correlation coefficient scores (r) from Fisher's Z for ease of interpretation.

There was a significant main effect of emotion ($F(3.658, 149.986) = 5.093$, $p = .001$, $\eta_p^2 = .398$), with a very large effect size. Post-hoc pair-wise comparisons using Wilcoxon signed-rank tests (due to non-normal distributions) were used to determine which differences between emotions were contributing to the main effect. Applying the Holm-Bonferroni correction, significant differences were detected between angry and happy (Mdn Angry = .380, Mdn Happy = .572; $z = -3.188$, $p = .001$, $r = -.374$), angry and frightened (Mdn Angry = .380, Mdn Frightened = .735; $z = -3.888$, $p < .001$, $r = -.419$) and angry and disgusted (Mdn Angry = .380, Mdn Disgusted = .667; $z = -3.019$, $p = .003$, $r = -.326$). However, no significant main effect of group ($F(1,41) = 1.058$, $p = .310$, $r = .161$, $\eta_p^2 = .025$), effect of each emotion by group, or interaction between group and emotion ($F(3.658, 149.968) = 8.24$, $p = .503$, $\eta_p^2 = .092$) was observed.

2.3.4.2 CD/CU+ vs. CD/CU- group comparisons

Descriptive statistics by group are presented in Table 12 and graphs displaying average correlations by clip are presented in Appendix N.

EA data for standardised residuals of sad, frightened and surprised emotions were non-normal in their distribution as a result of negative skew. Mauchly's test indicated that the assumption of sphericity had been violated ($\chi^2(14) = 24.225$, $p = .045$), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon = .617$).

Table 12

EA descriptive statistics: CD/CU- vs. CD/CU+ group comparisons

Emotion	CD/CU- (n=10)	CD/CU+ (n = 9)*	p values
	Mean correlation (r) (SD)	Mean correlation (r) (SD)	
Sad	.504 (.168)	.384 (.328)	.597
Happy	.712 (.176)	.367 (.409)	.406
Frightened	.491 (.179)	.417 (.407)	.450
Surprised	.338 (.307)	.398 (.299)	.705
Angry	.225 (.276)	.455 (.137)	.027
Disgusted	.312 (.390)	.498 (.425)	.364

Note: * Data from one participant missing due to technical error. CD/CU- = Conduct Disorder with low callous-unemotional traits; CD/CU+ = Conduct Disorder with high callous-unemotional traits; SD = standard deviation. Mean scores transformed back to correlation coefficient scores (r) from Fisher's Z for ease of interpretation.

There was no significant main effect of emotion ($F(3.085, 52.442) = 1.430, p = .244, \eta_p^2 = .078$) or group ($F(1,17) = .284, p = .601, \eta_p^2 = .016$) but there was a trend towards an interaction between group and emotion ($F(3.085, 52.442) = 2.273, p = .089, \eta_p^2 = .118$). This appeared to be driven by participants with CD/CU- scoring numerically higher than participants with CD/CU+ on sad, happy and frightened clips, and participants with CD/CU+ scoring numerically higher than participants with CD/CU- on surprised, angry and disgusted clips. Post-hoc Mann-Whitney tests (due to non-normal distributions of scores) revealed significant differences between CD/CU+ and CD/CU- groups in EA for anger with participants with CD/CU+ scoring significantly higher than those with CD/CU- with a medium to large effect size ($U = 18.000, z = -2.205, p = .027, r = -.493$). This result did not remain significant after applying the Holm-Bonferroni method to control for family-wise error rates. No significant differences between groups were detected for any other emotions.

2.3.5 Affect recognition

Participants' affect recognition scores were coded by emotion. Participants were given a score of 100% if they accurately identified the emotion in both clips, 50% if they identified the emotion in one clip, and 0% if they failed to identify the emotion in either clip. Data for all emotions were significantly non-normal as participants were only able to obtain one of three

scores (0, 50, and 100). Therefore the data could not be transformed to a normal distribution and Mann Whitney U tests were used to examine differences in scores between groups, subject to the Holm–Bonferroni method for control of family–wise error rates.

2.3.5.1 CD vs. control group comparisons

Between–group comparisons for emotion recognition in CD and control groups are presented in Table 13.

Table 13

Emotion recognition: CD vs. control group comparisons

Emotion	CD (n=20) Mean (SD)	Control (n=24) Mean (SD)	<i>U</i>	<i>Z</i>	p value	Effect size (<i>r</i>)
Happy	97.5 (11.18)	97.92 (10.21)	238	–.131	.896	–0.02
Sad	85.0 (23.51)	97.92 (10.21)	178	–2.306	.021	–0.35
Angry	60.0 (44.72)	72.92 (32.90)	207	–.856	.392	–0.13
Frightened	67.5 (37.26)	93.75 (16.89)	145	–2.787	.005	–0.42
Surprised	62.5 (31.93)	75.0 (29.49)	189.5	–1.333	.183	–0.20
Disgusted	70.0 (41.04)	89.58 (25.45)	180	–1.810	.070	–0.27

Note: CD = conduct disorder; SD = standard deviation. Although Mann Whitney U tests use median values, these were not informative as participants could only obtain one of three possible scores (0, 50, 100), and therefore mean scores are presented in the Table.

Participants in the CD group were significantly less accurate in recognition of sadness ($U = 178$, $z = -2.306$, $p = .021$, $r = -.35$) and fear ($U = 145$, $z = -2.787$, $p = .005$, $r = -.42$) than the control group, and there was a trend towards the CD group being less accurate in recognition of disgust ($U = 180$, $z = -1.810$, $p = .070$, $r = -.27$) than the control group. When the Holm–Bonferroni method was applied, the group effects on recognition of sadness remained significant whereas the effect for fear did not. No other significant between–group differences in emotion identification were detected.

2.3.5.2 CD/CU+ vs. CD/CU– group comparisons

Between–group comparisons for emotion recognition in the CD/CU– and CD/CU+ groups are presented in Table 14.

Table 14

Emotion recognition: CD/CU- vs. CD/CU+ group comparisons

Emotion	CD/CU+ (n=10)	CD/CU- (n=10)	<i>U</i>	<i>z</i>	<i>p</i> value	Effect size (<i>r</i>)
	Mean (SD)	Mean (SD)				
Happy	95.0 (15.81)	100.0 (0.00)	45	-1.00	.739	-0.22
Sad	90.0 (21.08)	80.0 (25.82)	40	-.951	.481	-0.21
Angry	60.0 (51.64)	60.0 (39.44)	48	-.165	.912	-0.04
Frightened	75.0 (35.36)	60.0 (39.44)	39	-.912	.436	-0.20
Surprised	65.0 (24.15)	60.0 (39.44)	48	-.170	.912	-0.04
Disgusted	90.0 (21.08)	50.0 (47.14)	26	-2.068	.075	-0.46

Note: CD/CU+ = Conduct Disorder with high callous-unemotional traits; CD/CU- = Conduct Disorder with low callous-unemotional traits. SD = standard deviation. Although Mann Whitney U tests use median values, these were not informative as participants could only obtain one of three possible scores (0, 50, 100), and therefore mean scores are presented in the Table.

There was a trend towards participants in the CD/CU+ group being more accurate in recognition of disgust ($U = 26$, $z = -2.068$, $p = .075$. $r = -.46$) than the CD/CU- group, but no other significant between-group differences were detected.

2.3.6 Affect matches

Participants' affect match scores (self-reporting the same emotion as the target during the clip) were coded by emotion. Participants were given a score of 100% if they reported an affect match for both clips, 50% if they reported an affect match for one clip, and 0% if they failed to report an affect match for either clip. Data for all emotions were significantly non-normally distributed as participants were only able to obtain one of three scores (0, 50, and 100). Data could not be transformed to a normal distribution; therefore Mann Whitney U tests were used to examine differences in scores between groups, subject to the Holm-Bonferroni method for control of family-wise error rates.

2.3.6.1 CD vs. control group comparisons

Between-group comparisons for affect matches in CD and control groups are presented in Table 15.

Table 15

Affect matches: CD vs. control group comparisons

Emotion	CD (n=20) Mean (SD)	Control (n=24) Mean (SD)	<i>U</i>	<i>z</i>	p value	Effect size (<i>r</i>)
Happy	47.5 (49.93)	66.67 (35.10)	189	-1.280	.201	-0.19
Sad	60.0 (34.79)	87.5 (30.40)	131	-2.971	.003	-0.45
Angry	12.5 (31.93)	25.0 (39.01)	198	-1.306	.191	-0.20
Frightened	12.5 (27.51)	41.67 (40.83)	143	-2.598	.009	-0.39
Surprised	27.5 (34.32)	27.1 (32.90)	240	.000	1.000	0.00
Disgusted	35.0 (36.64)	70.83 (41.49)	128	-2.815	.005	-0.42

Note: CD = conduct disorder; SD = standard deviation. Although Mann Whitney U tests use median values, these were not informative as participants could only obtain one of three possible scores (0, 50, 100), and therefore mean scores are presented in the Table.

Participants in the CD group reported significantly fewer affect matches than participants in the control group for clips with targets experiencing sadness ($U = 131$, $z = -2.971$, $p = .003$, $r = -.45$), fear ($U = 143$, $z = -2.598$, $p = .009$, $r = -.39$), and disgust ($U = 128$, $z = -2.815$, $p = .005$, $r = -.42$). When the Holm-Bonferroni correction was applied, between-group differences for sadness, fear and disgust remained significant. There were no significant between-group differences for the other emotions, although the findings were in the predicted direction for anger and happiness (i.e. fewer affect matches in the CD group).

2.3.6.2 CD/CU+ vs. CD/CU- group comparisons

Between-group comparisons for affect matches in CD/CU+ and CD/CU- groups are presented in Table 16.

Participants in the CD/CU- group reported significantly more affect matches than participants in the CD/CU+ group for clips with targets experiencing happiness ($U = 26.5$, $z = -2.004$, $p = .045$, $r = -.45$). When the Holm Bonferroni method was used the between-group differences did not remain significant, however this correction may be overly stringent given the small sample size involved in these comparisons. There were no between-group differences for self-reported affect matches for the other emotions.

Table 16

Affect matches: CD/CU- vs. CD/CU+ group comparisons

Emotion	CD/CU+ (n=10) Mean (SD)	CD/CU- (n=10) Mean (SD)	<i>U</i>	<i>z</i>	<i>p</i> value	Effect size (<i>r</i>)
Happy	25 (42.42)	70.0 (48.31)	26.5	-2.004	.045	-0.45
Sad	50.0 (33.33)	70.0 (34.96)	34	-1.327	.185	-0.30
Angry	10.0 (31.23)	15.0 (33.75)	45.5	-.548	.584	-0.12
Frightened	15.0 (33.75)	10.0 (21.08)	49	-.108	.914	-0.02
Surprised	30.0 (34.96)	25.0 (35.36)	45.5	-.382	.702	-0.09
Disgusted	35.0 (33.75)	35.0 (41.16)	48.5	-.123	.902	-0.03

Note: CD/CU+ = Conduct Disorder with high callous-unemotional traits; CD/CU- = Conduct Disorder with low callous-unemotional traits. SD = standard deviation. Although Mann Whitney U tests use median values, these were not informative as participants could only obtain one of three possible scores (0, 50, 100), and therefore mean scores are presented in the Table.

2.3.7 Emotional responses to film clips

Participants' self-reports of experiencing any affect in response to the clips (i.e. not just affect matches) were coded by emotion. Participants were given a score of 100% if they reported experiencing an affective response to both clips, 50% if they reported an affective response to one clip, and 0% if they had no affective response to either clip. Data for all emotions were significantly non-normally distributed as participants were only able to obtain one of three scores (0, 50, and 100). Data could not be transformed to a normal distribution, therefore Mann Whitney U tests were used to examine differences in scores between groups, subject to the Holm-Bonferroni method for control of family-wise error rates.

2.3.7.1 CD vs. control group comparisons

Between-group comparisons for emotional responses to clips in CD and control groups are presented in Table 17.

Table 17

Emotional responses to clips: CD vs. control group comparisons

Emotion	CD (n=20) Mean (SD)	Control (n=24) Mean (SD)	<i>U</i>	<i>z</i>	p value	Effect size (<i>r</i>)
Happy	50.0 (51.23)	72.9 (32.90)	185.0	-1.424	.154	-0.21
Sad	62.8 (35.37)	87.5 (30.40)	143.0	-2.683	.007	-0.40
Angry	37.5 (42.54)	68.8 (32.35)	140.0	-2.507	.012	-0.38
Frightened	52.5 (47.23)	66.7 (40.83)	201.5	-.989	.332	-0.15
Surprised	60.0 (41.68)	68.8 (41.21)	210.5	-.763	.445	-0.12
Disgusted	52.5 (37.96)	77.1 (38.95)	152.5	-2.265	.023	-0.34

Note: CD = conduct disorder; SD = standard deviation. Although Mann Whitney U tests use median values, these were not informative as participants could only obtain one of three possible scores (0, 50, 100), and therefore mean scores are presented in the Table.

Participants in the CD group reported significantly fewer emotional responses to clips than participants in the control group for clips with targets experiencing sadness ($U = 143$, $z = -2.683$, $p = .007$, $r = -.40$), anger ($U = 140$, $z = -2.507$, $p = .012$, $r = -.38$), and disgust ($U = 152$, $z = -2.265$, $p = .023$, $r = -.34$). When the Holm-Bonferroni method was used only the between-group difference for sadness remained significant. There were no other between-group differences for emotional responses to clips, although the findings were in the predicted direction for all emotions, including happiness, fear and surprise.

2.3.7.2 CD/CU+ vs. CD/CU- group comparisons

Between-group comparisons for affective responses in CD/CU+ and CD/CU- groups are presented in Table 18.

Participants in the CD/CU- group reported significantly more emotional responses to clips than participants in the CD/CU+ group for clips with targets experiencing sadness ($U = 24$, $z = -2.137$, $p = .033$, $r = -.48$). When the Holm-Bonferroni method was used this result remained significant. There was also a trend for participants in the CD/CU- group to experience more emotional responses to happy clips than participants in the CD/CU+ group ($U = 30$, $z = -1.744$, $p = .081$, $r = -.39$). There were no between-group differences for the other emotions.

Table 18

Emotional responses to clips: CD/CU- vs. CD/CU+ group comparisons

Emotion	CD/CU+ (n=10) Mean (SD)	CD/CU- (n=10) Mean (SD)	<i>U</i>	<i>z</i>	<i>p</i> value	Effect size (<i>r</i>)
Happy	30.0 (48.31)	70.0 (48.31)	30.0	-1.744	.081	-0.39
Sad	45.5 (36.24)	80.0 (25.82)	24.0	-2.137	.033	-0.48
Angry	30.0 (48.31)	45.0 (36.89)	37.5	-1.027	.304	-0.23
Frightened	40.0 (45.95)	65.0 (47.43)	35.5	-1.193	.233	-0.27
Surprised	55.0 (43.78)	65.0 (41.16)	43.5	-.527	.598	-0.12
Disgusted	55.0 (36.89)	50.0 (40.83)	46.5	-.284	.776	-0.06

Note: CD/CU+ = Conduct Disorder with high callous unemotional traits; CD/CU- = Conduct Disorder with low callous unemotional traits. SD = standard deviation. Although Mann Whitney U tests use median values, these were not informative as participants could only obtain one of three possible scores (0, 50, 100), and therefore mean scores are presented in the Table.

2.4 Discussion

2.4.1 Summary of key findings

2.4.1.1 Self-report empathy

Consistent with the hypotheses, participants with CD self-reported lower levels of cognitive and affective empathy on the two most commonly used IRI subscales for measurement of these constructs (perspective taking and empathic concern, respectively). Participants with CD also obtained lower scores on the fantasy subscale, measuring cognitive empathy, but significantly higher scores on the personal distress subscale, supporting questions raised by other authors (e.g. Jolliffe & Farrington, 2004; Lovett & Sheffield, 2007) regarding the validity of this subscale in measuring empathy.

Participants with CD/CU+ self-reported lower levels of cognitive empathy on the perspective taking subscale than CD/CU- participants but there were no significant between-group differences for the other subscales.

These findings support previous studies that have found lower self-reported cognitive and affective empathy in participants with CD compared to controls (e.g. Cheng et al., 2012; Cohen & Strayer, 1996; de Wied et al., 2005, Schonert-Reichl, 1993) and suggest that these between-group differences are not solely attributable to CU traits.

2.4.1.2 Empathic Accuracy (EA)

Contrary to hypotheses, no significant between-group differences in EA scores were found between CD and control participants. There was a trend towards participants with CD/CU- obtaining higher EA scores than participants in the CD/CU+ group for sadness and happiness films, although the reverse, and only significant between-group difference, was observed for anger.

There are a number of possible reasons why the hypotheses were not fully supported. First, the small sample size may have limited the degree to which differences between groups could be detected. Consistent with the hypothesis, in CD vs. control group comparisons CD participants obtained numerically lower scores across emotions, but these differences failed to reach statistical significance, potentially due to heterogeneity within both the CD and control groups. It is possible that with a larger sample size and the associated increase in statistical power, these between-group differences may have reached significance for some emotions, particularly for happiness, fear, surprise and disgust films. Second, analysis of data by emotion, rather than overall or by valence as in previous studies (e.g. Lee et al., 2011), was performed based on previous research suggesting between-group differences in CD and control participants only for some emotions, rather than globally (e.g. de Wied et al., 2005, Fairchild et al., 2009; Fairchild et al., 2010). Analysing the data in this way reduced power further, and therefore a larger sample size may be required to detect between-group differences. Third, although the films were piloted with students, it is possible that adolescents were less able to identify and track the intensity of the emotions expressed by the targets than pilot participants, regardless of group status. Further piloting of stimulus materials and consideration of the moderate average correlations in the control group may lead to the collection of new films for future studies. It would be beneficial to pilot these with adolescents.

2.4.1.3 Affect recognition

Consistent with hypotheses, participants with CD were less accurate in recognition of sadness and fear than controls, the effect for sadness remaining significant after applying Holm-Bonferroni correction for multiple comparisons. There were no differences between groups for happiness, surprise, anger or disgust, suggesting that individuals with CD are more

impaired in recognition of some emotions than others, particularly those of negative valence, supporting the findings of previous research (e.g. de Wied et al., 2005, Fairchild et al., 2009; Fairchild et al., 2010). There were no significant differences between participants with CD/CU+ and CD/CU- suggesting that between-group differences in affect recognition are not solely attributable to CU, however small sample sizes must be borne in mind when interpreting these null findings.

Stimulus materials used in this study were rich and multi-sensory, including verbal information, paralanguage, facial expressions, and postural information, all of which may help participants to identify affect in the targets. It is therefore striking that, given the richness of stimulus materials and the relatively small sample sizes, group-differences for recognition of specific emotions still remain. Previous studies have been criticised for an overreliance on verbally presented stimulus materials, placing participants with CD and lower verbal IQ scores at a disadvantage compared to controls with normal or superior verbal ability. This criticism was addressed by the stimulus materials used in the current study which were more ecologically valid than those used in previous research; therefore it is highly likely that participants with CD experience difficulties with emotion recognition in real-world settings.

2.4.1.4 Affect matches

Data on affect matching demonstrated that, consistent with hypotheses, participants with CD were impaired in affective empathy compared to controls for sadness, fear and disgust. This is consistent with previous research finding impairments in affective empathy for negatively valenced emotions (e.g. Anastassiou-Hadjicharalambous & Warden, 2008; de Wied et al., 2005; Schwenck et al., 2012). Between-group differences for all three emotions remained after applying Holm-Bonferroni corrections. CD/CU+ participants showed impairments in affect matches for happiness compared to CD/CU- participants, but this result was no longer significant when applying the Holm-Bonferroni correction.

These findings suggest that, even when using rich and naturalistic stimulus materials, participants with CD experience lower affective empathy than controls for some emotions of negative valence that remain even after stringent procedures to control family-wise error rate, and that participants

with CD/CU+ may be more impaired in affective empathy for happiness than participants with CD/CU-, which has not been found previously. These findings also support the theoretical position that cognitive and affective empathy are partially dissociable systems, as although the same emotions of negative valence were impaired in both cognitive and affective empathy measures, impairments for affective empathy in participants with CD were statistically stronger than those for cognitive empathy, suggesting a greater impairment in this area, detectable even with a relatively small sample size. Again, these findings suggest that impairments are not solely a result of CU traits in CD samples; CD/CU- individuals also appear to show difficulties in affect matching.

2.4.1.5 Emotional response to films

Sympathy was measured by self-reports of any emotional response to films, congruent with the target's affect (e.g. sadness when watching a target expressing anger). Consistent with hypotheses, participants with CD reported fewer emotional responses to clips containing sadness, anger and disgust than control participants; significant differences in emotional response to sadness remained after applying Holm-Bonferroni corrections. Participants with CD/CU- reported more emotional responses to clips containing sadness than participants with CD/CU+ and this finding survived correction for multiple comparisons. These findings support previous research that suggests that not only do participants with CD report fewer affect matches than controls, they also experience an attenuated 'sympathetic' response (Cohen & Strayer, 1996; de Wied et al., 2005). Again, this difference was not solely accounted for by levels of CU traits, but individuals with CD/CU+ appeared to experience fewer emotional responses when viewing targets expressing sadness than participants with CD/CU-.

2.4.2 Links with current theories of empathy deficits in individuals with CD

The group differences found between participants with CD and controls in cognitive and affective empathy for specific emotions suggest that, even with rich and multisensory stimulus materials, individuals with CD are impaired in identifying certain emotions in others and experiencing empathy and sympathy them. The observation of impairments in specific emotions, rather

than global impairments across all emotions, is consistent with other studies in this area (e.g. de Wied et al., 2005; Fairchild et al., 2009; Fairchild et al., 2010) and extends them with the use of stimulus materials that are more ecologically valid. This has implications for future research in terms of the importance of analysis of data by emotion rather than by valence or overall. In addition, different levels of impairment in cognitive and affective empathy for different emotions highlight the importance of analysing tasks assessing these two constructs separately, and support current theories that these two systems operate to some extent independently, albeit in parallel, and that individuals can experience impairments in one aspect of empathy but not another (Blair, 2005).

The lack of consistent impairments in participants with CD/CU+ compared to those with CD/CU- suggest that impairments in empathy in individuals with CD are not solely a result of CU traits in such samples. Rather, the present findings indicate that individuals with CD experience impairments in cognitive and affective empathy that are to some extent independent of CU traits. This is consistent with other studies in this area finding few differences in empathy between CD/CU+ and CD/CU- groups (e.g. Anastassiou-Hadjicharalambous & Warden, 2008; de Wied et al., 2012). The small sample size in the current study should be held in mind, however, as should previous findings that participants with CD/CU+ experience impairments compared to controls when participants with CD/CU- do not (e.g. Jones et al., 2010; Schwenck et al., 2012). This issue clearly warrants further investigation given the introduction of the limited prosocial emotions specifier to the DSM-5. Current theoretical models of deficits in empathy focus on the role of CU traits or PT in antisocial populations (e.g. Blair, 2005); findings from this study would suggest that perhaps these models need to be extended to antisocial populations without these traits or, perhaps, that a focus on these traits has led researchers to miss deficits in empathy that are present in the broader population of individuals who show persistent and severe antisocial behaviour but who are not elevated in CU traits.

Differences in groups with CD/PT+ and CD/PT- were subject to preliminary analysis in this study; the decision was taken not to include these analyses due to few participants in the sample achieving the recommended cut-off score for PT+ on the YPI (Skeem & Cauffman, 2003), therefore reducing

the likelihood that between-group differences would be observed. Interestingly, the overlap between the CD/CU+ and CD/PT+ groups was not perfect, supporting the utility of using both measures in studies of this type. Therefore, future studies should carefully consider whether they measure CU or PT in their sample. An argument could be made that, given the inclusion of a CU specifier in the DSM-5 criteria for CD, these traits should be measured as opposed to the psychopathic traits construct which is used more commonly with adult populations.

2.4.3 Limitations

There are a number of limitations in this study which should be considered when interpreting the results. Firstly, the small sample size and resulting low statistical power in the analyses, particularly those comparing the CD/CU+ and CD/CU- subgroups, is likely to have resulted in reduced ability to detect between-group differences. There were also significant differences in IQ, SES and psychiatric comorbidity between the control and CD groups; as these variables could not be included as covariates in non-parametric analyses it is not possible to know whether the observed group differences in cognitive and affective empathy are partly a result of these demographic and diagnostic differences. It should be acknowledged, though, that participants with CD are frequently found to differ from controls in IQ, SES and comorbidity (Nock et al., 2006); these factors are likely to be defining characteristics of this population. This study also only included male participants and it is currently unclear whether females with CD show empathy deficits.

As noted in the Results section, the distributions of EA scores for some emotions were significantly non-normal. Although the ANOVA is thought to be robust enough to manage non-normal distributions (Field, 2009) and there was no non-parametric alternative to test for differences between groups, this limits the degree with which results can be confidently interpreted. The analysis of emotion identification, affect matches, and emotional responses to clips was also carefully considered. Due to the distributions of data it was not possible to use parametric analyses and, as we sought to include responses from both clips of each valence rather than reduce the measure to a dichotomous (correct/incorrect) variable, Mann-Whitney U tests were selected for analysis despite participants only being able to obtain three different

scores. In future studies the inclusion of only one clip per emotion could reduce this difficulty with data analysis, although using two clips, as in the present study, rather than one, arguably increases the reliability and sensitivity of the task. In addition, Holm–Bonferroni corrections were used to account for the number of comparisons instead of the Bonferroni correction, due to concerns about the conservativeness of the latter; given the exploratory nature of this study and small sample sizes, it was thought that this correction would be too restrictive and likely to cause Type II errors.

Finally, consideration should be given to the piloting and validation of clips used in this study. Although it is a strength of the study that the clips were piloted, some clips, particularly those used to depict anger and surprise, had relatively low levels of emotion identification and affect matches during piloting. Time constraints did not allow for the collection of new clips that may have had higher levels of emotion identification, but this could be completed for future studies. With regard to affect matches, it is possible that the majority of individuals do not experience matched–affect when viewing anger or surprise in others; this hypothesis could be tested with collection and piloting of further clips.

2.4.4 Clinical implications

This study demonstrates that, although participants with CD may report lower levels of global cognitive and affective empathy on questionnaires, this masks difficulties with empathy and sympathy for particular emotions. In clinical practice, it would be important to assess which emotions individuals have difficulty recognising and feeling empathy for so that these can be targeted; ideally this would be assessed using naturalistic paradigms such as the video clips used in this study to mimic real–life situations as closely as possible. It would also be important to assess and target affective and cognitive empathy separately in order to determine whether interventions facilitated change in these abilities. For example, it might be easier to enhance cognitive empathy than affective empathy, or vice–versa.

2.4.5 Conclusions and directions for future research

This study extended previous research by demonstrating that, even with rich and multi–sensory stimulus materials that are far more ecologically–valid

than those used in previous studies, adolescents with CD have deficits in cognitive and affective empathy for specific emotions. An EA task has not been used with this population previously, and, although no significant differences between groups were detected, the impairments in participants with CD in general and CD/CU+ more specifically certainly warrant further investigation with larger samples. It will also be important to investigate the impact of psychiatric comorbidity on empathic accuracy. When EA tasks have been further validated for use with this population, they could also be used to assess empathy in clinical settings and to evaluate the effectiveness of interventions designed to increase cognitive and affective empathy in adolescents with DBDs such as mentalising-based therapies. The use of rich, complex, ecologically-valid stimulus materials that have been thoroughly piloted is essential as research in this field continues. It will also be critical to characterise the samples as thoroughly as possible, so that the relative impact of CD diagnoses, CU traits, and psychiatric comorbidity can be assessed.

Appendices

Appendix A– Diagnostic criteria for DBDs

Conduct Disorder (APA, 2000)

- A. A repetitive and persistent pattern of behaviour in which the basic rights of others or major age-appropriate societal norms or rules are violated, as manifested by the presence of three (or more) of the following criteria in the past 12 months, with at least one criterion present in the past 6 months:
- **Aggression to people and animals**
 1. often bullies, threatens, or intimidates others
 2. often initiates physical fights
 3. has used a weapon that can cause serious physical harm to others (e.g., a bat, brick, broken bottle, knife, gun)
 4. has been physically cruel to people
 5. has been physically cruel to animals
 6. has stolen while confronting a victim (e.g., mugging, purse snatching, extortion, armed robbery)
 7. has forced someone into sexual activity
 - **Destruction of property**
 8. has deliberately engaged in fire setting with the intention of causing serious damage
 9. has deliberately destroyed others' property (other than by fire setting)
 - **Deceitfulness or theft**
 10. has broken into someone else's house, building, or car
 11. often lies to obtain goods or favours or to avoid obligations (i.e., "cons" others)
 12. has stolen items of nontrivial value without confronting a victim (e.g., shoplifting, but without breaking and entering; forgery)
 - **Serious violations of rules**
 13. often stays out at night despite parental prohibitions, beginning before age 13 years
 14. has run away from home overnight at least twice while living in parental or parental surrogate home (or once without returning for a lengthy period)
 15. is often truant from school, beginning before age 13 years
- B. The disturbance in behaviour causes clinically significant impairment in social, academic, or occupational functioning.
- C. If the individual is age 18 years or older, criteria are not met for Antisocial Personality Disorder

Specify type based on age at onset:

Childhood-Onset Type: onset of at least one criterion characteristic of Conduct Disorder prior to age 10 years

Adolescent-Onset Type: absence of any criteria characteristic of Conduct Disorder prior to age 10 years

Specify severity:

Mild: few if any conduct problems in excess of those required to make the diagnosis and conduct problems cause only minor harm to others

Moderate: number of conduct problems and effect on others intermediate between "mild" and "severe"

Severe: many conduct problems in excess of those required to make the diagnosis or conduct problems cause considerable harm to others

Oppositional Defiant Disorder (APA, 2000)

- A. A pattern of negativistic, hostile, and defiant behaviour lasting at least 6 months, during which four (or more) of the following are present:
 - 1. often loses temper
 - 2. often argues with adults
 - 3. often actively defies or refuses to comply with adults' requests or rules
 - 4. often deliberately annoys people
 - 5. often blames others for his or her mistakes or misbehaviour
 - 6. is often touchy or easily annoyed by others
 - 7. is often angry and resentful
 - 8. is often spiteful or vindictive
- Note:* Consider a criterion met only if the behaviour occurs more frequently than is typically observed in individuals of comparable age and developmental level.
- B. The disturbance in behaviour causes clinically significant impairment in social, academic, or occupational functioning.
- C. The behaviours do not occur exclusively during the course of a Psychotic or Mood Disorder.
- D. Criteria are not met for Conduct Disorder, and, if the individual is age 18 years or older, criteria are not met for Antisocial Personality Disorder.

Appendix B – Study advertisements

B.1 Advertisement for targets

Study ID: T85
ERGO number: 5504



Understanding empathy

What are we studying?

We are investigating whether adolescents are able to recognise the intensity of another person's emotion.

What would my role be?

We need male students to feature in video clips of people talking about past experiences.

As research has shown that people are more able to be empathic to people of a similar age, we need students who look as young as possible.

What would I be doing?

You will be asked to recall past experiences where you have felt happy, sad, scared, surprised, angry, or disgusted and be filmed talking about these. You will then be asked to watch the clips and rate how intense your emotion was throughout.

The whole process will take approximately two hours

What's in it for me?

You will be compensated for your time by payment of £20



Terri Brown Understanding empathy study t819t1@socon.ac.uk	Terri Brown Understanding empathy study t819t1@socon.ac.uk	Terri Brown Understanding empathy study t819t1@socon.ac.uk	Terri Brown Understanding empathy study t819t1@socon.ac.uk	Terri Brown Understanding empathy study t819t1@socon.ac.uk	Terri Brown Understanding empathy study t819t1@socon.ac.uk	Terri Brown Understanding empathy study t819t1@socon.ac.uk	Terri Brown Understanding empathy study t819t1@socon.ac.uk
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B.2 Advertisement for pilot participants

Study ID:
ERGO number: 5584



Understanding empathy

We have collected video clips of people talking about their past experiences. We need to make sure that the clips are valid and that we can obtain useable data from participants viewing them.

You will be asked to watch the video clips and rate the intensity of the emotion being experienced. We will also ask you how the video clips make you feel.

We will measure changes in your heart rate and sweat production—this is easy and painless, and involves us attaching sensors to your fingers and wrists.

The whole process will take about one hour. You will receive either £10 or 4 credits



Teri Brown Understanding empathy study t18g11@socon.ac.uk	Teri Brown Understanding empathy study t18g11@socon.ac.uk	Teri Brown Understanding empathy study t18g11@socon.ac.uk	Teri Brown Understanding empathy study t18g11@socon.ac.uk	Teri Brown Understanding empathy study t18g11@socon.ac.uk	Teri Brown Understanding empathy study t18g11@socon.ac.uk	Teri Brown Understanding empathy study t18g11@socon.ac.uk	Teri Brown Understanding empathy study t18g11@socon.ac.uk
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B.3 Advertisement for participants from YOSs



UNIVERSITY OF
Southampton

Understanding differences in empathy in adolescents (Study ID: 5504)

Empathy:

‘Putting yourself in someone else’s shoes’

How do we tell how other people are feeling, and are some people better at this than others?

If you are male, aged 14-18 and interested in taking part:

We will ask you to watch video clips of people talking about their experiences and tell us how they are feeling



We will ask you about your feelings and behaviours and ask you to fill in some questionnaires







You will be paid **£12 for your time and your travel expenses will be covered**

Interested?

If you would like to take part, you can call or text Terri at 07771 648707, e-mail her at tb18g11@soton.ac.uk or speak to your caseworker

B.4 Advertisements for participants from schools



UNIVERSITY OF
Southampton

Understanding differences in empathy in adolescents (Study ID: 5504)

Empathy:

‘Putting yourself in someone else’s shoes’

How do we tell how other people are feeling, and are some people better at this than others?

If you are MALE and interested in taking part:

We will ask you to watch video clips of people talking about their experiences and tell us how they are feeling



We will ask you about your feelings and behaviours and ask you to fill in some questionnaires







You will be paid **£12** for your time and your travel expenses will be covered

Interested?

If you would like to take part, you can call or text Terri at 07771 648707, e-mail her at tb18g11@soton.ac.uk or speak to your teacher



Terri Brown
Department of Clinical Psychology
Building 44a,
University of Southampton
Southampton,
SO17 1BJ

[date]

Dear Student

I am conducting a research project at the University of Southampton as part of my Doctorate in Clinical Psychology and wondered whether you would be interested in taking part.

I am investigating empathy - our ability to understand how other people are feeling. I am interested in finding out whether teenagers with behavioural difficulties have difficulties in understanding how other people are feeling when compared to typically developing teenagers.

We are sending information about our study to all boys in years 10 and 11 as we thought you might be interested in taking part. Just to emphasise, we are interested in recruiting boys without behavioural difficulties as well as those who show disruptive behaviour in school or at home.

There are two parts to the study. The first is an interview with you and your parent or carer about your typical feelings and behaviours. We would usually come to your house to do this, although you can come to the University if you would prefer, and it takes between 45 minutes and an hour. For this meeting, I would pay your parent or carer £8 for giving up their time.

The second part involves you coming into the University, filling in some questionnaires and watching some video clips of people talking about times when they have felt strong emotions. This part takes up to 1.5 hours and we would pay you £12 and reimburse you for your travel expenses.

If you are interested in taking part, please fill in the reply slip and post it back to me in the enclosed Freepost envelope (you don't need to put a stamp on it). You could also ask your parent or carer to send me an e-mail saying you'd like to take part. My e-mail address is: tb18g11@soton.ac.uk If you are under 16 years old then you will need your parent or carer's permission to take part in the study.

As the project is being run by University of Southampton, *school* will not be able to answer questions or provide information, so if you or your parents would like any more information about the project, please feel free to give me a call on 07771 648707 or email me on tb18g11@soton.ac.uk

Yours faithfully

Terri Brown
Trainee Clinical Psychologist
Under the supervision of Dr Graeme Fairchild

**REPLY SLIP**

Study title: Understanding differences in empathy in adolescents

Thank you for showing an interest in my research. Please complete this form and post it back to me in the envelope provided.

If you prefer, you may also email this information to tb18g11@soton.ac.uk

If you are under 16, please ask your parent or carer to fill in this form for you.

Please print or write in BLOCK capitals.

Teenager's name		
Teenager's date of birth		
Gender (please circle)	Male	Female
Name of parent or carer		
Home address and postcode		
Parent/carers' telephone number		
Teenager's telephone number (if different from parent/carers')		
Parent/carers' e-mail address		
Teenager's e-mail address (if different from parent/carers')		
Preferred method of contact (please circle)	Phone	E-mail

Appendix C – Information sheets

C.1 Information sheet for targets



Participant Information Sheet (Version 1.3; 04/10/2013)

Study Title: Understanding differences in empathy in adolescents

Researchers: Terri Brown and Graeme Fairchild

ERGO Study ID number: 5504

RGO reference number:

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

This research aims to add to our understanding about how well young people can identify how other people are feeling.

We will compare groups of young people with and without behavioural difficulties to see how easy they find it to identify how other people are feeling and how they themselves feel after watching other people describe emotional experiences.

In order to do this we will ask young people to watch video clips of individuals (targets) describing life experiences where they felt one of the following six emotions: sadness, happiness, anger, surprise, fear, and disgust. The young people will rate the intensity of the emotion being experienced by the target and will be asked to name the predominant emotion being displayed.

Why have I been chosen?

We are recruiting males aged 18 and over through the University of Southampton student body and through University theatre and performing arts groups.

What will happen to me if I take part?

If you agree to take part, you will be asked to meet with the researcher in the Psychology department. You will be asked to identify six past experiences that you feel comfortable speaking about when you felt sad, happy, angry, surprised, frightened, or disgusted. You will be videotaped talking about each of the experiences. After each clip has been taped you will be asked to watch it and give continuous ratings of the intensity of the emotion you felt while describing the experience.

In total, 12 clips will be selected from all that we will film. These clips will be shown to young males with and without behavioural difficulties to see if they are able to identify the emotion being felt by the target (you) and the intensity of the emotions displayed during the clip. The young people will also be asked to report the emotions they experienced while watching the clip. The initial study will involve young people living in the local community, but we would also like to reserve the option to use the video clips in similar experiments with undergraduate students in the future.

Filming the video clips and collecting your subjective ratings of emotional intensity will take approximately 2 hours. You will be reimbursed £20 for your time.

Are there any benefits in me taking part?

There are no direct benefits for you in terms of taking part, aside from receiving payment. However, you will be helping us to understand better whether young people with behavioural difficulties have deficits in judging how other people are feeling. This research might help us develop treatments for young people who find this difficult.

Are there any risks involved?

It is possible that you may feel distressed while recalling past experiences. You will be advised to choose experiences that you feel comfortable speaking about. Should you feel distressed at any point during the study you can choose to take a break or stop participating in the study. You will be given the opportunity at the end of your participation to speak with the researcher about any distress you have experienced and will be signposted to agencies, such as the university counselling service, that can provide you with further support, if appropriate.

Will my participation be confidential?

Please be aware that the video clips you provide will be shown to young people for the purposes of this study. You will be asked to view the clips once they have been collected and to consent to them being used in this way. We will also ask whether you are willing for your video clips to be used in future studies in the Psychology department.

Your participation in this study will be kept confidential unless we are concerned about your welfare. Your data will be allocated a unique ID number and this will be used in place of any personally-identifiable information.

Consent forms will be kept in a secure filing cabinet in a locked office within the School of Psychology. Electronic data (i.e. the video clips you provide and your ratings of the intensity of your emotion) will be number-coded and stored in an encrypted file on the University of Southampton computer network.

What happens if I change my mind?

You can withdraw from this study and decide not to participate at any stage. This will have no effect on your education or legal rights.

If you should decide at any point in the future that you do not wish for your clips to be used in research projects then please contact the lead researcher and your clips will be withdrawn.

What happens if something goes wrong?

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 4663, email slb1n10@soton.ac.uk

Where can I get more information?

If you would like more information about this study or have any questions about your participation please contact Terri Brown (tb18g11@soton.ac.uk or 07771 648707) or the project supervisor, Graeme Fairchild (g.f.fairchild@soton.ac.uk).

C.2 Information sheet for pilot study participants



Participant Information Sheet (Version 1.2; 04/10/2013)

Study Title: Understanding differences in empathy in adolescents

Researchers: Terri Brown and Graeme Fairchild

ERGO Study ID number: 5504

RGO reference number:

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

We are interested in studying empathy - how people understand how others are feeling.

We will compare groups of young people with and without behavioural difficulties to see how good they are at telling how other people are feeling and how they feel after watching other people describe their experiences.

Why have I been chosen?

We are recruiting students from the University of Southampton to help us pilot and validate video clips that will be shown to young people, the participants in this study.

Anyone who chooses to take part can do so. It is up to you to decide whether or not to take part and you can stop at any time.

What will happen to me if I take part?

You will be asked to watch some videos of people talking about their life experiences. You will be asked to tell us about the emotion the person was feeling and how strong the emotion was. You will also be asked to tell us about the emotions you may have felt while watching the video.

While you are watching the videos we will monitor your heart rate and sweat production. This is easy and painless. We will attach stickers to your wrist to measure your heart rate and sensors to your fingertips to measure tiny changes in sweat production.

You will be participating for a maximum of 1 hour. You will be paid £10 or given 4 research credits for your time.

Are there any benefits in me taking part?

There will not be any direct benefits to you aside from the payments, although many people find it interesting to take part. However, the long-term goal of this research is to develop treatments for people who find it difficult to understand how others are feeling.

Are there any risks involved?

Some of the video clips you watch will be of people talking about difficult experiences. It is possible that you might find these upsetting. After each clip the researcher will ask you how you are feeling. You will have a chance to talk about any upsetting feelings you are having and can be referred to the University Counselling Service to talk about your experiences further, if required.

Will my participation be confidential?

Your participation in this study will be kept confidential. This means that any information you give us will not be passed on to anyone outside of the research team, unless we are concerned that you or another person might be at risk of serious harm.

You will be given an ID number and this will be used instead of your name. Any written information will have this ID number on it, instead of your name. This ID number will also be used for any information we keep on a computer.

What happens if I change my mind?

You can stop taking part in this study at any time. This will have no effect on your legal rights or education.

What happens if something goes wrong?

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 4663, email slb1n10@soton.ac.uk

Where can I get more information?

If you would like more information about this study or have any questions about your participation please contact Terri Brown (tb18g11@soton.ac.uk or 07771 648707) or Graeme Fairchild (g.f.fairchild@soton.ac.uk)

C.3 Information sheet for YOS participants



Participant Information Sheet - Teenagers (Version 1.2; 10/04/2013)

Study Title: Understanding differences in empathy in adolescents

Researchers: Terri Brown and Graeme Fairchild

ERGO Study ID number: 5504

RGO reference number:

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

We are interested in studying empathy – how people understand how others are feeling.

We will compare groups of young people with and without behavioural difficulties to see how good they are at telling how other people are feeling and how they feel after watching other people describe their experiences.

Why have I been chosen?

You will have been asked to take part by your Youth Offending Service caseworker.

We are recruiting male teenagers aged between 14-18 years through schools, colleges, education centres, and the Southampton and Hampshire Youth Offending Services. We are inviting teenagers with and without behavioural difficulties to take part in the study.

Anyone who chooses to take part can do so, as long as they meet the criteria for inclusion in the study. It is up to you to decide whether or not to take part and you can stop at any time.

What will happen to me if I take part?

If you agree to take part, we will come to your house to meet up with you and your parent or carer (or you could come to the University if you prefer). We will ask you questions about your typical thoughts, feelings and behaviours. We will also ask you to fill in some questionnaires, and tell us the meanings of words and put patterns together using shapes.

If you are not affected by the exclusion criteria, we will invite you to come to the University for around 1.5 hours. You will be asked to watch some videos of people talking about their life experiences. You will be asked to tell us about the emotion the person was feeling and how strong the emotion was. You will also be asked to tell us about the emotions you may have felt while watching the video.

While you are watching the videos we will monitor your heart rate and sweat production. This is easy and painless. We will attach stickers to your wrist to measure your heart rate and sensors to your fingertips to measure tiny changes in sweat production. We will also ask you to fill in more questionnaires.

The part of the study when we ask about your thoughts, feelings, and behaviours will take about 1 hour. Watching the video clips and filling in the other questionnaires will take around 1.5 hours. You will be paid £12 for giving up your time and reimbursed for your travel expenses. Your parent or carer will also be paid for giving up their time (£8).

All the information you and your parent or carer give us will be treated as confidential (we will not pass it on to anybody outside the research team), unless we feel that you or someone else is at risk of harm. If we have to pass on any information, we will ask you first.

Are there any benefits in me taking part?

There will not be any direct benefits to you aside from the payments, although many young people find it interesting to take part. However, the long-term goal of this research is to develop treatments for people who find it difficult to understand how others are feeling.

Are there any risks involved?

It is possible that you might find that some of the questions you are asked about your thoughts, feelings and behaviours make you feel uncomfortable. You can decide not to answer particular questions; just tell us that you don't want to.

Some of the video clips you watch will be of people talking about difficult experiences. Although it's unlikely, it is possible that you might find these upsetting. After each clip the researcher will ask you how you are feeling. You will have a chance to talk about any upsetting feelings you are having.

Will my participation be confidential?

Your participation in this study will be kept confidential. This means that any information you give us will not be passed on to anyone outside of the research team, unless we are concerned that you or another person might be at risk of serious harm. We will also not share information you give us with your parent or carer or vice versa, unless we are concerned that someone may be at risk of serious harm.

You will be given an ID number and this will be used instead of your name. Any written information (e.g. the questionnaires you complete) will have this ID number on it, instead of your name. This ID number will also be used for any information we keep on a computer.

What happens if I change my mind?

You can stop taking part in this study at any time. This will have no effect on your legal rights, education, YOS order, or care.

What happens if something goes wrong?

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 4663, email slb1n10@soton.ac.uk

Where can I get more information?

If you would like more information about this study or have any questions about your participation, please contact Terri Brown (tb18g11@soton.ac.uk or 07771 648707) or Graeme Fairchild (g.f.fairchild@soton.ac.uk).

C.4 Information sheet for participants from schools



Participant Information Sheet - Teenagers (Version 1.2; 04/10/2013)

Study Title: Understanding differences in empathy in adolescents

Researchers: Terri Brown and Graeme Fairchild

ERGO Study ID number: 5504

RGO reference number:

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

We are interested in studying empathy – how people understand how others are feeling.

We will compare groups of young people with and without behavioural difficulties to see how good they are at telling how other people are feeling and how they feel after watching other people describe their experiences.

Why have I been chosen?

You have been contacted through your school or college.

We are recruiting male teenagers aged between 14-18 years through schools, colleges, education centres, and the Southampton and Hampshire Youth Offending Services. We are inviting teenagers with and without behavioural difficulties to take part in the study.

Anyone who chooses to take part can do so, as long as they meet the criteria for inclusion in the study. It is up to you to decide whether or not to take part and you can stop at any time.

What will happen to me if I take part?

If you agree to take part, we will come to your house to meet up with you and your parent or carer (or you could come to the University if you prefer). We will ask you questions about your typical thoughts, feelings and behaviours. We will also ask you to fill in some questionnaires, and tell us the meanings of words and put patterns together using shapes.

If you are not affected by the exclusion criteria, we will invite you to come to the University for around 1.5 hours. We will ask you to watch some videos of people talking about their life experiences. You will be asked to tell us about the emotion the person was feeling and how strong the emotion was. You will also be asked to tell us about the emotions you may have felt while watching the video.

While you are watching the videos we will monitor your heart rate and sweat production. This is easy and painless. We will attach stickers to your wrist to measure your heart rate and sensors to your fingertips to measure tiny changes in sweat production. We will also ask you to fill in some more questionnaires.

The part of the study when we ask about your thoughts, feelings, and behaviours will take about 1 hour. Watching the video clips and filling in the other questionnaires will take around 1.5 hours. You

will be paid £12 for giving up your time and reimbursed for your travel expenses. Your parent or carer will also be paid for giving up their time (£8).

All the information you and your parent or carer give us will be treated as confidential (we will not pass it on to anybody outside the research team), unless we feel that you or someone else is at risk of harm. If we have to pass on any information, we will ask you first.

Are there any benefits in me taking part?

There will not be any direct benefits to you aside from the payments, although many young people find it interesting to take part. However, the long-term goal of this research is to develop treatments for people who find it difficult to understand how others are feeling.

Are there any risks involved?

It is possible that you might find that some of the questions you are asked about your thoughts, feelings and behaviours make you feel uncomfortable. You can decide not to answer particular questions; just tell us that you don't want to.

Some of the video clips you watch will be of people talking about difficult experiences. Although unlikely, it is possible that you might find these upsetting. After each clip the researcher will ask you how you are feeling. You will have a chance to talk about any upsetting feelings you are having.

Will my participation be confidential?

Your participation in this study will be kept confidential. This means that any information you give us will not be passed on to anyone outside of the research team, unless we are concerned that you or another person might be at risk of serious harm.

You will be given an ID number and this will be used instead of your name. Any written information (e.g. the questionnaires you complete) will have this ID number on it, instead of your name. This ID number will also be used for any information we keep on a computer.

What happens if I change my mind?

You can stop taking part in this study at any time. This will have no effect on your legal rights or your education.

What happens if something goes wrong?

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 4663, email slb1n10@soton.ac.uk

Where can I get more information?

If you would like more information about this study or have any questions about your participation, please contact Terri Brown (tb18g11@soton.ac.uk or 07771 648707) or Graeme Fairchild (g.f.fairchild@soton.ac.uk).

C.5 Information sheet for parents of YOS participants



Information Sheet for Parents (Version 1.2; 04/10/2013)

Study Title: Understanding differences in empathy in adolescents

Researchers: Terri Brown and Graeme Fairchild

ERGO Study ID number: 5504

RGO reference number:

Please read this information carefully before deciding to allow your teenager to take part in this research. If you are happy for your teenager to participate you will be asked to sign a consent form.

What is the research about?

We are interested in studying empathy - how people understand how others are feeling.

We will compare groups of young people with and without behavioural difficulties to see how good they are at telling how other people are feeling and how they feel after watching other people describe their experiences.

Why has my teenager been chosen?

Your teenager has been asked to participate in this study by their Youth Offending Service (YOS) caseworker.

We are recruiting male teenagers aged between 14-18 years through schools, colleges, education centres, and the Southampton and Hampshire Youth Offending Services. We are inviting teenagers with and without behavioural difficulties to take part in the study.

Anyone who chooses to take part can do so, as long as they meet the criteria for inclusion in the study. It is up to you and your teenager to decide whether or not to take part and you can stop at any time.

What will happen to my teenager if they take part?

If you agree to take part, we will come to your house to meet up with you and your teenager (or you could come to the University). We will ask you both questions about their typical thoughts, feelings and behaviours. We will also ask you both to fill in some questionnaires, and ask your teenager to tell us the meanings of words and put patterns together using shapes.

If your teenager is not affected by the exclusion criteria, they will be asked to watch some videos of people talking about their life experiences. They will be asked to tell us about the emotion the person was feeling and how strong the emotion was. They will also be asked to tell us about the emotions they may have felt while watching the video.

While your teenager is watching the videos we will monitor their heart rate and sweat production. This is easy and painless. We will attach stickers to their wrist to measure their heart rate and sensors to their fingertips to measure tiny changes in sweat production.

The part of the study when we ask about your thoughts, feelings, and behaviours will take about 1 hour. Watching the video clips and filling in the other questionnaires will take around 1.5 hours. Your teenager will be paid £12 for giving up their time and reimbursed for their travel expenses. You will also be paid for giving up your time (£8).

All the information you and your teenager give us will be treated as confidential (we will not pass it on to anybody outside the research team), unless we feel that they or someone else is at risk of harm. If we have to pass on any information, we will ask them and you first.

Are there any benefits in my teenager taking part?

There will not be any direct benefits to your teenager aside from the payments, although many young people find it interesting to take part. However, the long-term goal of this research is to develop treatments for people who find it difficult to understand how others are feeling.

Are there any risks involved?

It is possible that you or your teenager might find that some of the questions you are asked about their thoughts, feelings and behaviours make you or them feel uncomfortable. You can decide not to answer particular questions; just tell us that you don't want to.

Some of the video clips your teenager will watch will be of people talking about difficult experiences. It is possible that they might find these upsetting. After each clip the researcher will ask them how they are feeling. They will have a chance to talk about any upsetting feelings they are having and will be given details of organisations who can help them with these feelings further, should it be required.

Will my teenager's participation be confidential?

Yours and your teenager's participation in this study will be kept confidential. This means that any information you give us will not be passed on to anyone outside of the research team, unless we are concerned that they or another person might be at risk of serious harm. We will also not share information you give us with your teenager or vice versa, unless we are concerned that someone may be at risk of serious harm.

Your teenager will be given an ID number and this will be used instead of their name. Any written information (e.g. the questionnaires they complete) will have this ID number on it, instead of their name. This ID number will also be used for any information we keep on a computer.

What happens if I change my mind?

You or your teenager can decide to stop taking part in this study at any time. This will not affect their legal rights, YOS order, education, or care.

What happens if something goes wrong?

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 4663, email sb1n10@soton.ac.uk

Where can I get more information?

If you would like more information about this study or have any questions about your teenager's participation, please contact Terri Brown (tb18q11@soton.ac.uk or 07771 648707) or Graeme Fairchild (g.f.fairchild@soton.ac.uk)

C.6 Information sheet for parents of school participants



Information Sheet for Parents (Version 1.2; 04/10/2013)

Study Title: Understanding differences in empathy in adolescents

Researchers: Terri Brown and Graeme Fairchild
ERGO Study ID number: 5504
RGO reference number: TB5

Please read this information carefully before deciding to allow your teenager to take part in this research. If you are happy for your teenager to participate you will be asked to sign a consent form.

What is the research about?

We are interested in studying empathy - how people understand how others are feeling.

We will compare groups of young people with and without behavioural difficulties to see how good they are at telling how other people are feeling and how they feel after watching other people describe their experiences.

Why has my teenager been chosen?

Your teenager has been contacted through their school or college.

We are recruiting male teenagers aged between 14-18 years through schools, colleges, education centres, and the Southampton and Hampshire Youth Offending Services. We are inviting teenagers with and without behavioural difficulties to take part in the study.

Anyone who chooses to take part can do so, as long as they meet the criteria for inclusion in the study. It is up to you and your teenager to decide whether or not to take part and you can stop at any time.

What will happen to my teenager if they take part?

If you agree to take part, we will come to your house to meet up with you and your teenager (or you could come to the University). We will ask you both questions about their typical thoughts, feelings and behaviours. We will also ask you both to fill in some questionnaires, and ask your teenager to tell us the meanings of words and put patterns together using shapes.

If your teenager is not affected by the exclusion criteria, they will be invited to come to the University for around 2 hours. We will ask them to watch some videos of people talking about their life experiences. They will be asked to tell us about the emotion the person was feeling and how strong the emotion was. They will also be asked to tell us about the emotions they may have felt while watching the video.

The part of the study when we ask about your thoughts, feelings, and behaviours will take about 1 hour. Watching the video clips and filling in the other questionnaires will take around 1.5 hours. Your teenager will be paid £12 for giving up their time and reimbursed for their travel expenses. You will also be paid for giving up your time (£8).

All the information you and your teenager give us will be treated as confidential (we will not pass it on to anybody outside the research team), unless we feel that they or someone else is at risk of harm. If we have to pass on any information, we will ask them and you first.

Are there any benefits in my teenager taking part?

There will not be any direct benefits to your teenager aside from the payments, although many young people find it interesting to take part. However, the long-term goal of this research is to develop treatments for people who find it difficult to understand how others are feeling.

Are there any risks involved?

It is possible that you or your teenager might find that some of the questions you are asked about their thoughts, feelings and behaviours make you or them feel uncomfortable. You can decide not to answer particular questions; just tell us that you don't want to.

Some of the video clips your teenager will watch will be of people talking about difficult experiences. It is possible that they might find these upsetting. After each clip the researcher will ask them how they are feeling. They will have a chance to talk about any upsetting feelings they are having and will be given details of organisations who can help them with these feelings further, should it be required.

Will my teenager's participation be confidential?

Your and your teenager's participation in this study will be kept confidential. This means that any information you give us will not be passed on to anyone outside of the research team, unless we are concerned that they or another person might be at risk of serious harm. We will also not share information you give us with your teenager or vice versa, unless we are concerned that someone may be at risk of serious harm.

Your teenager will be given an ID number and this will be used instead of their name. Any written information (e.g. the questionnaires they complete) will have this ID number on it, instead of their name. This ID number will also be used for any information we keep on a computer.

What happens if I change my mind?

You or your teenager can decide to stop taking part in this study at any time. This will not affect their legal rights, education, or care.

What happens if something goes wrong?

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 4663, email slb1n10@soton.ac.uk

Where can I get more information?

If you would like more information about this study or have any questions about your teenager's participation, please contact Terri Brown (tb18g11@soton.ac.uk or 07771 648707) or Graeme Fairchild (g.f.fairchild@soton.ac.uk)

Appendix D – Consent forms

D.1 Consent form for targets – Consent to participate



CONSENT FORM – Video Clip Participants (Consent to participate)

(Version 1.3; 04/10/2013)

Study title: Understanding differences in empathy in adolescents

Researcher(s) name(s): Terri Brown and Graeme Fairchild

Study reference: TB3

Ethics reference: 5504

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (Version 1.3; 04/10/2013) and have had the opportunity to ask questions about the study.

☐

I agree to take part in this research project and agree for my data to be used for the purpose of this study and for other studies within the University of Southampton

☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected

☐

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be number-coded and password-protected so they can only be accessed by members of the research team.

Name of participant (print name)

Signature of participant

Date

[04/10/2013] [Version 1.3]

D.2 Consent form for targets – Consent for use of films



CONSENT FORM – Video Clip Participants (Consent for use of video clips) (Version 1.3; 04/10/2013)

Study title: Understanding differences in empathy in adolescents

Researcher(s) name(s): Terri Brown and Graeme Fairchild

Study reference: TB3

Ethics reference: 5504

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (Version 1.3; 04/10/2013) and have had the opportunity to ask questions about the study.

☐

I agree to take part in this research project and agree for my data to be used for the purpose of this study and for other studies within the University of Southampton

☐

I have viewed the video clips taken by the researcher, and consent for them to be used in the current study and in other studies within the University of Southampton

☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected. I may also withdraw my consent for my video clips to be used for studies at any time, without having to give a reason.

☐

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be number-coded and password-protected so they can only be accessed by members of the research team.

Name of participant (print name)

Signature of participant

Date

[04/10/2013] [Version 1.3]

D.3 Consent form for pilot participants



CONSENT FORM – Pilot Study Participants (Version 1.2; 04/10/2013)

Study title: Understanding differences in empathy in adolescents

Researcher(s) name(s): Terri Brown and Graeme Fairchild

Study reference: TB5

Ethics reference: 5504

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (Version 1.2; 04/10/2013) and have had the opportunity to ask questions about the study.

☐

I agree to take part in this research project and agree for my data to be used for the purpose of this study

☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected

☐

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be number-coded and password-protected so they can only be accessed by members of the research team.

Name of participant (print name)

Signature of participant

Date

[04/10/2013] [Version 1.2]

D.4 Consent form for participants under 16 years



CONSENT FORM – Participants aged under 16 (Version 1.2; 04/10/2013)

Study title: Understanding differences in empathy in adolescents

Researcher(s) name(s): Terri Brown and Graeme Fairchild

Study reference: TB5

Ethics reference: 5504

To be completed by the participant's parent/guardian.

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (Version 1.2; 04/10/2013) and have had the opportunity to ask questions about the study.

☐

I agree for my son/daughter to take part in this research project and agree for their data to be used for the purpose of this study

☐

I understand my son/daughter's participation is voluntary and he/she may withdraw at any time without his/her legal rights being affected

☐

Data Protection

I understand that information collected about my child during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be number-coded and password-protected so they can only be accessed by members of the research team.

Name of parent/guardian (print name) _____

Signature of parent/guardian _____

Date _____

Please turn over

[04/10/2013] [Version 1.2]



ASSENT FORM –Participants aged under 16

To be completed by the participant.

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (Version 1.2; 04/10/2013) and have had the opportunity to ask questions about the study.

☐

I agree to take part in this research project and agree for my data to be used for the purpose of this study

☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected

☐

I am happy to be contacted regarding other research projects in the Developmental Brain–Behaviour Laboratory. I therefore consent to the research team retaining my personal details on a database, kept separately from the research data detailed above. The validity of my consent is conditional upon the researchers complying with the Data Protection Act and I understand that I can request my details be removed at any time.

☐

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be number-coded and password-protected so they can only be accessed by members of the research team.

Name of participant (print name)

Signature of participant

Date

D.5 Consent form for participants over 16 years



CONSENT FORM – Participants aged 16 and above (Version 1.2; 04/10/2013)

Study title: Understanding differences in empathy in adolescents

Researcher(s) name(s): Terri Brown and Graeme Fairchild

Study reference: TB5

Ethics reference: 5504

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (Version 1.2; 04/10/2013) and have had the opportunity to ask questions about the study.

☐

I agree to take part in this research project and agree for my data to be used for the purpose of this study

☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected

☐

I am happy to be contacted regarding other research projects in the Developmental Brain–Behaviour Laboratory. I therefore consent to the research team retaining my personal details on a database, kept separately from the research data detailed above. The validity of my consent is conditional upon the researchers complying with the Data Protection Act and I understand that I can request my details be removed at any time.

☐

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be number-coded and password-protected so they can only be accessed by members of the research team.

Name of participant (print name)

Signature of participant

Date

Name of parent/guardian (print name)

Signature of parent/guardian

Date

[04/10/2013] [Version 1.2]

Appendix E – Debriefing statements

E.1 Debriefing statement for targets



Understanding differences in empathy in adolescents
Debriefing Statement – Video clip participants (*verbal*)
(Version 1.2; 04/10/13)

The aim of this research is to compare groups of young people with and without behavioural difficulties to see how good they are at telling how other people are feeling and how they feel after watching other people describe their experiences.

We expect that young people with behavioural difficulties will find it more difficult to know how other people are feeling. We also expect that they may have less strong feelings after watching other people describe their experiences.

The video clips you have provided us with will help us in testing these ideas.

You may have a copy of this summary if you would like.

You may also have a summary of the research findings, once they are completed. If you would like this, please write your e-mail address here: _____

If you have any other questions please contact me on tb18g11@soton.ac.uk or on 07771 648707.

Thank you for participating in this research.

Signature _____ Date _____

Name _____

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 4663, email s1b1n10@soton.ac.uk

E.2 Debriefing statement for pilot participants



Understanding differences in empathy in adolescents

Debriefing Statement - Pilot study (*verbal*)

(Version 1.2; 04/10/13)

The aim of this research is to compare groups of young people with and without behavioural difficulties to see how good they are at telling how other people are feeling and how they feel after watching other people describe their experiences.

We expect that young people with behavioural difficulties will find it more difficult to know how other people are feeling. We also expect that they may have less strong feelings after watching other people describe their experiences.

Your data will help us in ensuring that the video clips are valid for use with this age group and that the clips are reliably rated as depicting specific emotions.

The results of this study will not include your name, or anything else which could be used to identify you.

You may have a copy of this summary if you would like.

You may also have a summary of the research findings, once they are completed. If you would like this, please write your e-mail address here: _____

If you have any other questions please contact me on tb18g11@soton.ac.uk or on 07771 648707.

Thank you for participating in this research.

Signature _____ Date _____

Name _____

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 4663, email slb1n10@soton.ac.uk

E.3 Debriefing statement for participants



Understanding differences in empathy in adolescents

Debriefing Statement – Young people (*verbal*)

(Version 1.2; 04/10/13)

The aim of this research is to compare groups of young people with and without behavioural difficulties to see how good they are at telling how other people are feeling and how they feel after watching other people describe their experiences.

We expect that young people with behavioural difficulties will find it more difficult to know how other people are feeling. We also expect that they may have less strong feelings after watching other people describe their experiences.

Your data will help us in testing these ideas and may help us to develop new treatments that improve empathy in the future.

The results of this study will not include your name, or anything else which could be used to identify you.

You may have a copy of this summary if you would like.

You may also have a summary of the research findings, once they are completed. If you would like this, please write your e-mail address here: _____

If you have any other questions please contact me on tb18g11@soton.ac.uk or on 07771 648707.

Thank you for taking part in this research.

Signature _____ Date _____

Name _____

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 4663, email slb1n10@soton.ac.uk

Appendix F – K-SADS-PL screening tool

Date:

K-SADS SCREEN - Preliminary interview YOUTH

We would like to ask you a few questions about how you've been feeling **over the last 12 months**. It isn't a test of any kind. There are no right or wrong answers – all I'd like you to do is tell me as honestly as you can how you've been feeling. The information you give us today is **confidential** and will go no further. However, if we think that you are having problems at the moment which could benefit from help, then we will discuss the possible options with you, e.g. referring you to a doctor. *If you provide information that makes me concerned about your safety or the safety of another person in your family, I may be duty bound to refer you or them on to someone who can help, e.g., your GP. We will not pass on this information to anyone outside the research team without telling you first.*

The first thing I'd like to ask is whether you have ever seen a healthcare professional (e.g. a GP, an Educational Psychologist, a Psychiatrist or a counsellor) for any other reason apart from routine illness? This could include emotional difficulties or mood changes.

Have you ever been prescribed medication for anything apart from routine illness (e.g. colds, coughs or flu)?

1) MAJOR DEPRESSIVE EPISODE

At least 1 from the following 3 symptoms present for more than half the time for a period of at least 2 weeks:

DEPRESSION	Current	Yes/No	Onset:
Everyone has good days and bad days, but in the past 6 months has there been a time when you've felt down, miserable or depressed for days on end? How long did this feeling last? Do you feel like this at the moment? Have you ever gone through a time in your life when you felt like this?	Past 12 months	Yes/No	Onset/dur:
	Lifetime	Yes/No	Dates/dur:
IRRITABILITY	Current	Yes/No	Onset:
Has there been a time when you've felt irritable or angry for most, or all of the time, for days on end? How long did this last? What about recently? Is there a reason why you felt angry?	Past 12 months	Yes/No	Onset/dur:
	Lifetime	Yes/No	Dates/dur:

LOSS OF INTEREST/PLEASURE

Current Yes/No Onset:

What about a time when you completely lost interest in doing things or stopped going out? Or felt you couldn't have fun or enjoy the things you used to? How long? What about now?

Past 12 months Yes/No Onset/dur:

Lifetime Yes/No Dates/dur:

2) GENERALISED ANXIETY DISORDER

Current Yes/No Onset:

Would you describe yourself as a 'worrier'? Have you been worrying a lot about things that have happened to you or might happen? What sort of things? Does the worrying affect your everyday life? Is it difficult to control? How long have you felt like this?

Past 12 months Yes/No Onset/dur:

Lifetime Yes/No Dates/dur:

3) OBSESSIONS/COMPULSIONS

Current Yes/No Onset:

Have you ever been bothered by thoughts or images that make no sense to you, but keep coming into your head for no reason? What about habits that make no sense to you, like counting things several times? Or do you repeat things over and over, like washing your hands or checking whether your door is locked? Are you bothered by this at the moment?

Past 12 months Yes/No Onset/dur:

Lifetime Yes/No Dates/dur:

4) POST-TRAUMATIC STRESS DISORDER

Current Yes/No Onset:

Has anything traumatic or tragic happened to you in the last year? I mean something serious like being attacked or in car accident, or in some other sort of serious danger or nearly dying? Have you witnessed something like that happening to someone else? When? If yes, get details of the event in question. How scared were you at the time? How did you act? Did you find you couldn't think straight? Were you shaky or jittery or restless? How did you feel afterwards? Did you find it difficult to think about anything else? How long did this go on for (i.e. weeks, months or years)? How about now?

Past 12 months Yes/No Onset/dur:

Lifetime Yes/No Dates/dur:

5) ALCOHOL USE/ABUSE

Current Yes/No Onset:

How much alcohol do you drink in a typical week? What do you drink – beer, wine or spirits? How often? Do you get drunk? Has using alcohol ever caused you to have any health problems (physical/psychological)? Have you ever had to go to a doctor or hospital because of drinking too much? Have you ever missed school/work because you've been too hungover or drunk?

Past 12 months Yes/No Onset/dur:

Lifetime Yes/No Dates/dur:

6) SUBSTANCE USE/ABUSE

Current Yes/No Onset:

Have you ever tried recreational drugs (e.g., cannabis)? Which drugs have you tried? If you regularly take drugs, how often do you do this? Have you ever had any health problems (physical/psychological) as a result of using drugs? Have you ever had to go to a doctor or hospital because of taking drugs? Have you ever missed school/work because you've been high or on a comedown?

Past 12 months Yes/No Onset/dur:

Lifetime Yes/No Dates/dur:

N.B. Establish which drugs and pattern of drug-taking (i.e., at least five times for any one group of drugs).

7) OPPOSITIONAL DEFIANT DISORDER

Current Yes/No Onset:

In the last 12 months have you been in trouble a lot at school, or at home? Have you ever been suspended or excluded from school? Do you lose your temper easily? Do you get into a lot of arguments, maybe with teachers or parents? What about at the moment?

Past 12 months Yes/No Onset/dur:

Lifetime Yes/No Dates/dur:

8) PSYCHOSIS

Current

Yes/No

Onset:

Hallucinations

Has there ever been a time when you saw or heard things that other people weren't able to see or hear? Some people hear people speaking when there is nobody else around, has that ever happened to you? Some people see things moving or see people that other people can't see, has that ever happened to you?

Past 12 months

Yes/No

Onset/dur:

Lifetime

Yes/No

Dates/dur:

IF YES, assess conviction: What do you think it was? Do you think it was real? How do you explain what happened? How often does it happen? Had you taken any drugs or drunk any alcohol?

Delusions

Sometimes people believe things very strongly that other people would say aren't true, for example some people believe that they are someone great or famous, or believe that strangers are talking about them or that other people are out to get them. Does this sound like you at all?

IF YES, assess validity of belief (any grounding in reality?)

Appendix G– YPI

YPI

Version 3.0

Instructions

This sheet consists of a number of statements that deal with what you think and feel about different things. Read each statement carefully and decide how well the particular statement applies to you. You can choose between four different alternatives on each statement.

Answer each statement as you most often feel and think, not only how you feel right now.

Example:

I like reading books.

Does not
apply at all
☐

Does not
apply well
☐

Applies
fairly well
☐

Applies
very well
☐

- Put a mark in the box that corresponds to how you feel.
- Do not think too long on each statement.

REMEMBER:

- Answer ALL statements.
- Do not put a mark between the alternatives.
- Only one answer per statement.

IMPORTANT!!! There are no answers that are "Right" or "Wrong". You cannot score worse or better than anyone else. We are interested in what you think and feel, not in what is "Right" or "Wrong".

	Does not apply at all	Does not apply well	Applies fairly well	Applies very well
1. I like to be where exciting things happen.	☐	☐	☐	☐
2. I usually feel calm when other people are scared.	☐	☐	☐	☐
3. I prefer to spend my money right away rather than save it.	☐	☐	☐	☐
4. I get bored quickly when there is too little change.	☐	☐	☐	☐
5. I have probably skipped school or work more than most other people.	☐	☐	☐	☐
6. It's easy for me to charm and seduce others to get what I want from them.	☐	☐	☐	☐
7. It's fun to make up stories and try to get people to believe them.	☐	☐	☐	☐
8. I have the ability not to feel guilt and regret about things that I think other people would feel guilty about.	☐	☐	☐	☐
9. I consider myself as a pretty impulsive person.	☐	☐	☐	☐
10. I'm better than everyone on almost everything.	☐	☐	☐	☐
11. I can make people believe almost anything.	☐	☐	☐	☐
12. I think that crying is a sign of weakness, even if no one sees you.	☐	☐	☐	☐
13. If I won a lot of money in the lottery I would quit school or work and just do things that are fun.	☐	☐	☐	☐
14. I have the ability to con people by using my charm and smile.	☐	☐	☐	☐
15. I am good at getting people to believe in me when I make something up.	☐	☐	☐	☐
16. I have often been late to work or classes in school.	☐	☐	☐	☐
17. When other people have problems, it is often their own fault, therefore, one should not help them.	☐	☐	☐	☐
18. It often happens that I talk first and think later.	☐	☐	☐	☐
19. I have talents that go far beyond other people's.	☐	☐	☐	☐

	Does not apply at all	Does not apply well	Applies fairly well	Applies very well
20. It's easy for me to manipulate people.	☐	☐	☐	☐
21. I seldom regret things I do, even if other people feel that they are wrong.	☐	☐	☐	☐
22. I like to do things just for the thrill of it.	☐	☐	☐	☐
23. It's important to me not to hurt other people's feelings.	☐	☐	☐	☐
24. Sometimes I lie for no reason, other than because it's fun.	☐	☐	☐	☐
25. To be nervous and worried is a sign of weakness.	☐	☐	☐	☐
26. If I get the chance to do something fun, I do it no matter what I had been doing before.	☐	☐	☐	☐
27. When someone asks me something, I usually have a quick answer that sounds believable, even if I've just made it up.	☐	☐	☐	☐
28. When someone finds out about something that I've done wrong, I feel more angry than guilty.	☐	☐	☐	☐
29. I get bored quickly by doing the same thing over and over.	☐	☐	☐	☐
30. The world would be a better place if I were in charge.	☐	☐	☐	☐
31. To get people to do what I want, I often find it efficient to con them.	☐	☐	☐	☐
32. It often happens that I do things without thinking ahead.	☐	☐	☐	☐
33. Pretty often I act charming and nice, even with people I don't like, in order to get what I want.	☐	☐	☐	☐
34. It has happened several times that I've borrowed something and then lost it.	☐	☐	☐	☐
35. I often become sad or moved by watching sad things on TV or film.	☐	☐	☐	☐
36. What scares others usually doesn't scare me.	☐	☐	☐	☐

	Does not apply at all	Does not apply well	Applies fairly well	Applies very well
37. I'm more important and valuable than other people.	☐	☐	☐	☐
38. When I need to, I use my smile and my charm to use others.	☐	☐	☐	☐
39. I don't understand how people can be touched enough to cry by looking at things on TV or movie.	☐	☐	☐	☐
40. I often don't/didn't have my school or work assignments done on time.	☐	☐	☐	☐
41. I am destined to become a well-known, important and influential person.	☐	☐	☐	☐
42. I like to do exciting and dangerous things, even if it is forbidden or illegal.	☐	☐	☐	☐
43. Sometimes I find myself lying without any particular reason.	☐	☐	☐	☐
44. To feel guilty and remorseful about things you have done that have hurt other people is a sign of weakness.	☐	☐	☐	☐
45. I don't let my feelings affect me as much as other people's feelings seem to affect them.	☐	☐	☐	☐
46. It has happened that I've taken advantage of (used) someone in order to get what I want.	☐	☐	☐	☐
47. I like to spice up and exaggerate when I tell about something.	☐	☐	☐	☐
48. To feel guilt and regret when you have done something wrong is a waste of time.	☐	☐	☐	☐
49. I usually become sad when I see other people crying or being sad.	☐	☐	☐	☐
50. I've often gotten into trouble because I've lied too much.	☐	☐	☐	☐

Appendix H- ICU

Participant ID:
Date:

ICU (Youth Version)

Instructions: Please read each statement and decide how well it describes you. Mark your answer by circling the appropriate number (0-3) for each statement. Do not leave any statement unrated.

	Not at all true	Somewhat true	Very true	Definitely true
1. I express my feelings openly.	0	1	2	3
2. What I think is "right" and "wrong" is different from what other people think.	0	1	2	3
3. I care about how well I do at school or work.	0	1	2	3
4. I do not care who I hurt to get what I want.	0	1	2	3
5. I feel bad or guilty when I do something wrong.	0	1	2	3
6. I do not show my emotions to others.	0	1	2	3
7. I do not care about being on time.	0	1	2	3
8. I am concerned about the feelings of others.	0	1	2	3
9. I do not care if I get into trouble.	0	1	2	3
10. I do not let my feelings control me.	0	1	2	3
11. I do not care about doing things well.	0	1	2	3
12. I seem very cold and uncaring to others.	0	1	2	3
13. I easily admit to being wrong.	0	1	2	3
14. It is easy for others to tell how I am feeling.	0	1	2	3
15. I always try my best.	0	1	2	3
16. I apologize ("say I am sorry") to persons I hurt.	0	1	2	3
17. I try not to hurt others' feelings.	0	1	2	3
18. I do not feel remorseful when I do something wrong.	0	1	2	3
19. I am very expressive and emotional.	0	1	2	3
20. I do not like to put the time into doing things well.	0	1	2	3
21. The feelings of others are unimportant to me.	0	1	2	3
22. I hide my feelings from others.	0	1	2	3
23. I work hard on everything I do.	0	1	2	3
24. I do things to make others feel good.	0	1	2	3

Appendix I – IRI

Participant ID:

Date:

INTERPERSONAL REACTIVITY INDEX

The following statements ask about your thoughts and feelings in a variety of situations.

For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: A, B, C, D, or E.

When you have decided on your answer, fill in the letter on the answer sheet next to the item. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE:

A	B	C	D	E
DOES NOT DESCRIBE ME WELL				DESCRIBES ME VERY WELL

1. I daydream and fantasize, with some regularity, about things that might happen to me_____
2. I often have tender, concerned feelings for people less fortunate than me_____
3. I sometimes find it difficult to see things from the "other guy's" point of view_____
4. Sometimes I don't feel very sorry for other people when they are having problems_____
5. I really get involved with the feelings of the characters in a novel_____
6. In emergency situations, I feel apprehensive and ill-at-ease_____
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it_____
8. I try to look at everybody's side of a disagreement before I make a decision_____
9. When I see someone being taken advantage of, I feel kind of protective towards them_____

10. I sometimes feel helpless when I am in the middle of a very emotional situation_____
11. I sometimes try to understand my friends better by imagining how things look from their perspective_____
12. Becoming extremely involved in a good book or movie is somewhat rare for me_____
13. When I see someone get hurt, I tend to remain calm_____
14. Other people's misfortunes do not usually disturb me a great deal_____
15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments_____
16. After seeing a play or movie, I have felt as though I were one of the characters_____
17. Being in a tense emotional situation scares me_____
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them_____
19. I am usually pretty effective in dealing with emergencies_____
20. I am often quite touched by things that I see happen_____
21. I believe that there are two sides to every question and try to look at them both_____
22. I would describe myself as a pretty soft-hearted person_____
23. When I watch a good movie, I can very easily put myself in the place of a leading character_____
24. I tend to lose control during emergencies_____
25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while_____
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me_____
27. When I see someone who badly needs help in an emergency, I go to pieces_____
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place_____

Appendix J – Procedure for collection of EA task stimulus material

Procedure for collection of stimulus material

Ask participants to read the information sheet. Answer any questions they may have and ask them to sign the consent form for participation. Inform them that once the clips have been recorded and they have watched them all back they will be asked to sign a consent form to indicate that they are happy for their clips to be used as part of the research.

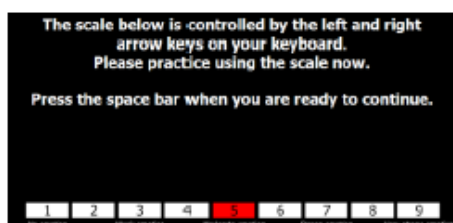
Script for introducing task:

“I am going to be asking you to remember times when you have felt happy, sad, surprised, frightened, disgusted or angry. When you’ve thought of a time where you felt the emotion I’ll ask you to write a short paragraph about it [give participant response booklet]. As you can see, there is space for you to give the experience a title and a scale for you to rate how strongly you felt the emotion during the experience. Does that make sense so far? When you have written about your experience we’ll talk about it for a while until you’ve managed to conjure up the same feelings as you had at the time. Then I’ll ask you to talk about the event while I film you. Afterwards you’ll watch the film back and rate how you felt while you were talking. Does that make sense? First, I’m going to show you how the computer programme works.

Demonstration of computer programme:

“I’m going to show you a clip of me talking about an emotional experience that I recorded earlier and to demonstrate how you will use the computer programme to rate how you felt while talking about your own emotional experiences.

Screen 1



“This scale will be on the screen while you watch your video clip. It goes from no emotion at this end (point) right up to very strong emotion at this end (point). It is controlled by the left and right arrows on your keyboard (demonstrate).

Screen 2

Please watch the clips and use the scale to CONTINUOUSLY rate how you were feeling while talking about the event, NOT during the event itself. If you have any questions, please ask the experimenter now.

Press the space bar when you are ready to continue.

“While you watch your clip I’d like you to use the scale to rate how strong your emotion was while you were talking. You are rating your emotion all

the time; whenever your emotion got stronger you press the ‘right’ key (point) and whenever your emotion got weaker you press the ‘left’ key (point). You don’t have to wait for the end of the clip to rate your emotion, you are rating it continuously as you watch. Does that make sense? Do you have any questions? I’m going to show you how I would use the scale to rate my clip”

Screen 3

(play clip and experimenter use scale to rate)

At end of clip: “Did that make sense, how I was using the scale there? Every time my emotion got stronger I went up on the scale, and every time my emotion got weaker I went down on the scale. Do you have any questions?”

Screen 4

Which of these emotions did you feel most strongly while talking about the event?

Happy Sad Angry Frightened Surprised Disgusted

How strongly did you feel that emotion?

1 2 3 4 5 6 7 8 9

No emotion Weak emotion Moderate emotion Strong emotion Very strong emotion

“After every clip you will be asked how you felt while talking and to rate how strongly you felt the emotion (demonstrate)”. Does that make sense? Do you have any questions?

Eliciting emotional experiences:

“So, the first emotion I’d like you to think about is [name of emotion, according to pseudorandomised order]. Can you think of an a time when you felt that emotion strongly?”

[If participants are unable to think of a time, offer the following examples:

- Happy: your sports team winning, being given a nice gift, seeing someone you love after a long time, doing an activity you really enjoy
- Sad: losing a loved one or a pet; being let down by someone; losing something that mattered very much to you
- Angry: being wronged by someone, being treated in a way you thought was unfair, being bullied, being accused of something you didn’t do

- Frightened: being threatened by someone, being followed late at night, getting lost, being in a place that made you feel scared, something related to a phobia
- Surprised: getting an unexpected gift, being thrown a party you weren't expecting, being given good/bad news, getting exam results you weren't expecting
- Disgusted: seeing or smelling something awful, eating something that tasted awful/had gone off, being in a very dirty place]

"Could you write a short paragraph about that, and give it a title of less than 5 words? When you're done, circle the number at the bottom of the page that represents how strongly you felt [name of emotion] during the event."

"So, now we need to conjure up similar feelings to how you were feeling during the event. Could you tell me about the event you have chosen, please? [Participants should be encouraged to focus on:

- The physical feelings they experienced during the event (e.g. "Where did you feel this in your body? How did you notice your body responding?")
- The 'hot moments' (e.g. "During the event, what was it specifically that made you feel [emotion]? Were there any times when you felt [emotion] particularly strongly? How were the people around you responding? How did that make you feel? When you think about the event now, which parts have 'stuck with you' the most?")

"Take a few moments now to sit and think about the event and how you felt, trying to conjure up the same feelings that you had during the event. Let me know when you are ready and we can start filming. [Begin recording when participant is ready to do so].

Participant ratings of clips:

[Check welfare of participant if they seem unduly distressed after filming clip].

"Are you ready to watch the clip back now? Remember, I'd like you to use the scale to continuously rate how strong your emotion was while you were talking about the event, not during the event itself." [Play clip in rating software].

"Would you like to take a break or shall we think about the next emotion?" [Repeat procedure for eliciting and rating as above for each of the six emotions].

Consent to use clips:

Ask participants to sign to indicate that they consent for their clips to be used as part of the research, reminding them that they can withdraw their consent for this at any time by contacting the researcher.

Ensure that participants are fully debriefed and that they have signed to indicate that they have received payment as compensation for their time.

Appendix K– Selection of clips for use with adolescents

The 31 clips collected from targets were pseudorandomised into two orders. Both orders contained no more than two clips depicting a target emotion and no more than two clips from one actor presented consecutively.

Pilot participants were introduced to the task (see Appendix L for script) and viewed all clips, with breaks as requested.

The following information was collected for each clip: target emotion and intensity during clip; target emotion and intensity during filming; emotions perceived by participant; participant self-reported emotion during clip. Targets' continuous ratings of the intensity of their emotion on a nine-point scale (0 = no emotion, 9 = very strong emotion) were correlated with participant's ratings of emotion on the same scale while viewing the clips. The resulting correlation formed the measure of EA. Target and pilot participant data for each clip by emotion is presented in Tables K1, K2, K3, K4, K5 and K6.

Clips were selected for inclusion in the final study according to the following criteria: (a) target identified one of the primary emotions as the predominant emotion during the experience and this was rated at an intensity at or above the mid-point of the scale (i.e. 5), (b) target identified re-experiencing the same primary emotion during filming and this was rated at an overall intensity at or above the mid-point of the scale (i.e. 5) during filming, (c) the majority of participants accurately identified the target's emotion, (d) the majority of participants reported feeling an emotion in response to the film, where possible clips were selected that contained high levels of affect matches, (e) participants and target's continuous ratings were significantly correlated. Where more than two clips for an emotion met the above criteria clips were selected that were likely to resonate with the audience. The topics of the clips selected for the final study are presented in Table K7.

Appendices

Table K1

Target and pilot participant clip-rating data: Films portraying happiness

Target ID	Clip ID	Length (s)	During experience		During filming		Pilot ratings		
			Emotion	Intensity	Emotion	Intensity	Identified emotion (%)	Average correlation (r)	Felt emotion (%)
1	6	45	Happy	8	Happy	8	Happy (75) Surprised (25)	.749 (p<.001)	None (33.3) Happy (67.7)
2*	8	135	Happy	9	Happy	7	Happy (100)	.442 (p<.001)	None (41.7) Happy (58.3)
3	13	73	Happy	8	Happy	7	Happy (100)	.165 (p=.330)	None (9.1) Happy (81.8) Sad (9.1)
4	22	59	Happy	6	Happy	5	None (9.1) Happy (63.6) Surprised (27.3)	.689 (p<.001)	None (27.3) Surprised (67.6) Happy (9.1)
4*	23	61	Happy	7	Happy	7	Happy (100)	.951 (p<.001)	None (25) Happy (75)
5	26	124	Happy	7	Happy	6	Happy (100)	.620 (p<.001)	None (50) Happy (50)

Note: * Clips selected for final study

Table K2

Appendices

Target and pilot participant clip-rating data: Films portraying sadness

Target ID	Clip ID	Length (s)	During experience		During filming		Pilot ratings		
			Emotion	Intensity	Emotion	Intensity	Identified emotion (%)	Average correlation	Felt emotion (%)
1	2	52	Sad	7	Sad	7	None (25) Sad (75)	.024 (p=.908)	None (33.3) Sad (66.7)
2*	7	152	Sad	7	Sad	5	None (8.3) Sad (91.7)	.530 (p<.001)	None (8.3) Sad (91.7)
3	14	61	Sad	9	Sad	6	Sad (100)	-.099 (p=.598)	None (9.1) Sad (90.9)
4	19	50	Sad	7	Sad	5	None (16.7) Sad (83.3)	.858 (p<.001)	None (25) Sad (75)
5*	27	103	Sad	8	Sad	7	Sad (100)	.673 (p<.001)	None (16.7) Sad (83.3)

Note: * Clips selected for final study

Appendices

Table K3

Target and pilot participant clip-rating data: Films portraying anger

Targ et ID	Cli p ID	Length (s)	During experience		During filming		Pilot ratings		
			Emotio n	Intensit y	Emotio n	Intensit y	Identified emotion (%)	Average correlation (r)	Felt emotion (%)
1	4	60	Angry	9	Angry	8	Angry (100)	.633 (p<.001)	None (25) Happy (8.3) Sad (33.3) Angry (16.7) Frightened (8.3) Surprised (8.3)
2*	11	158	Angry	8	Angry	7	Angry (90.9) Disgusted (9.1)	.348 (p=.002)	None (9.1) Angry (45.5) Surprised (45.5)
3	17	106	Angry	7	Angry	7	Angry (54.5) Frightened (9.1) Disgusted (36.4)	.372 (p=.006)	None (18.2) Happy (9.1) Sad (9.1) Angry (18.2) Frightened (18.2) Surprised (9.1) Disgusted (18.2)
4	24	63	Angry	8	Angry	6	None (10) Angry (90)	.900 (p<.001)	None (20) Happy (10) Sad (30) Angry (20) Surprised (20)
5*	30	86	Angry	9	Angry	8	None (16.7) Angry (66.7) Surprised (8.3) Disgusted (8.3)	.608 (p<.001)	None (25) Angry (33.3) Frightened (8.3) Surprised (16.7) Disgusted (16.7)

Note: * Clips selected for final study

Table K4

Appendices

Target and pilot participant clip-rating data: Films portraying fear

Target ID	Clip ID	Length (s)	During experience		During filming		Pilot ratings		
			Emotion	Intensity	Emotion	Intensity	Identified emotion (%)	Average correlation (r)	Felt emotion (%)
1	3	82	Frightened	8	Frightened	5	None (9.1) Sad (36.4) Frightened (54.5)	.701 (p<.001)	None (27.3) Sad (27.3) Frightened (36.4) Surprised (9.1)
2*	9	129	Frightened	7	Frightened	6	Sad (8.3) Frightened (91.7)	.762 (p<.001)	None (16.7) Sad (8.3) Frightened (66.7) Surprised (8.3)
3	15	108	Frightened	6	Frightened	2	None (16.7) Sad (8.3) Frightened (75)	.765 (p<.001)	None (25) Sad (50) Frightened (25)
4	21	54	Frightened	7	Frightened	4	None (16.7) Happy (8.3) Sad (8.3) Frightened (66.7)	.752 (p<.001)	None (58.3) Sad (8.3) Frightened (33.3)
5*	28	150	Frightened	8	Frightened	7	None (18.2) Frightened (81.8)	.482 (p<.001)	None (27.3) Frightened (45.5) Angry (9.1) Surprised (18.2)

Note: * Clips selected for final study

Appendices

Table K5

Target and pilot participant clip-rating data: Films portraying surprise

Target ID	Clip ID	Length (s)	During experience		During filming		Pilot ratings		
			Emotion	Intensity	Emotion	Intensity	Identified emotion (%)	Average correlation (r)	Felt emotion (%)
1	5	43	Surprised	99	Surprised	7	None (8.3) Happy (25) Surprised (66.7)	.760 (p<.001)	None (33.3) Happy (58.3) Angry (8.3)
2*	10	133	Surprised	7	Surprised	5	None (9.1) Sad (9.1) Surprised (81.8)	.849 (p<.001)	None (27.3) Sad (45.5) Surprised (27.3)
3*	16	77	Surprised	8	Surprised	2	None (16.7) Sad (8.3) Happy (8.3) Surprised (66.7)	.465 (p<.001)	None (33.3) Sad (41.7) Surprised (25)
4	20	97	Surprised	7	Surprised	6	Happy (91.7) Surprised (8.3)	.747 (p<.001)	None (16.7) Happy (66.7) Surprised (16.7)
5	29	104	Surprised	6	Surprised	6	Sad (50) Angry (16.7) Surprised (33.3)	.486 (p<.001)	None (16.7) Sad (50) Angry (16.7) Surprised (16.7)

Note: * Clips selected for final study. 99 = missing data.

Appendices

Table K6

Target and pilot participant clip-rating data: Films portraying disgust

Target ID	Clip ID	Length (s)	During experience		During filming		Pilot ratings		
			Emotion	Intensity	Emotion	Intensity	Identified emotion (%)	Average correlation	Felt emotion (%)
1	1	42	Disgusted	8	Disgusted	7	Surprised (9.1) Disgusted (90.9)	.147 (p=.513)	None (9.1) Frightened (9.1) Disgusted (81.8)
2*	12	99	Disgusted	6	Disgusted	6	Disgusted (100)	.879 (p<.001)	Disgusted (100)
3	18	98	Disgusted	6	Disgusted	6	None (9.1) Happy (9.1) Disgusted (81.8)	.770 (p<.001)	None (18.2) Disgusted (81.8)
4	25	47	Disgusted	7	Disgusted	7	Happy (9.1) Frightened (9.1) Disgusted (81.8)	.648 (p=.001)	None (27.3) Surprised (9.1) Disgusted (63.6)
5*	31	90	Disgusted	7	Disgusted	7	Disgusted (100)	.881 (p<.001)	None (9.1) Happy (18.2) Disgusted (72.7)

Note: * Clips selected for final study.

Table K7

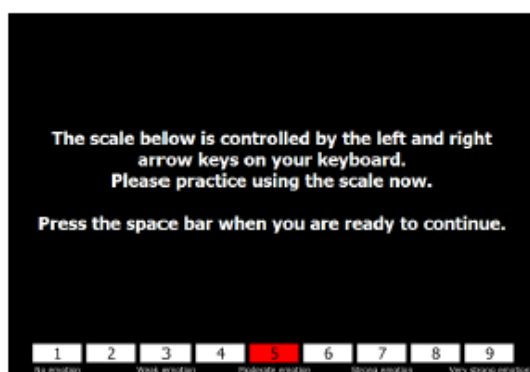
Topics of clips selected for final study

Emotion (clip number)	Content
Training – Angry (4)	Being bullied
Training – Happy (23)	Passing an important exam
Happy (8)	A football team winning an important game
Happy (22)	Going on a favourite holiday
Sad (7)	Death of a Grandparent
Sad (27)	Family break-up and depression
Angry (11)	Being accused of a crime you didn't commit
Angry (30)	Being attacked outside a club
Frightened (9)	Returning home to discover a break-in
Frightened (28)	Being followed by a group of males in a train station
Surprised (10)	Finding out about a friend's bad luck
Surprised (16)	A relationship being ended unexpectedly
Disgusted (12)	Finding rotting food in the bin
Disgusted (31)	Eating unfamiliar, horrible tasting food

Appendix L – Script for introducing participants to EA task

Task introduction script

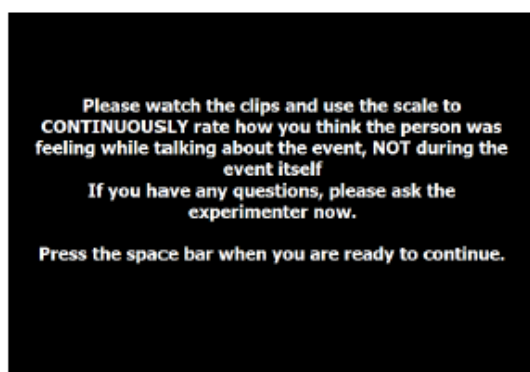
Screen 1:



“This scale will be on the screen while you watch the video clips. It goes from no emotion at this end (point) right up to very strong emotion at this end (point).

It is controlled by the left and right arrows on your keyboard (demonstrate). Please practice using the scale now. Do you have any questions about that?”

Screen 2:



“While you watch each clip I’d like you to use the scale to rate how strong you think the person’s emotion is while they are talking.

You are rating their emotion all the time; that means that whenever you see the emotion get stronger you press the ‘right’ key (point) and whenever you see the emotion get weaker you press the ‘left’ key (point). You don’t

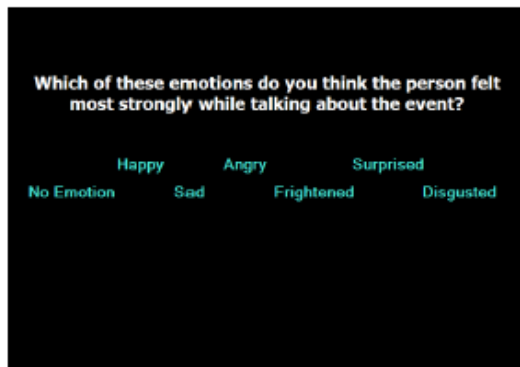
have to wait for the end of the clip to rate the emotion, you are rating it as you watch. Does that make sense? Do you have any questions? I’m going to show you how I would use the scale to rate a clip”

Screen 3:

(play clip and experimenter use scale to rate)

At end of clip: “Did that make sense, how I was using the scale there? Every time I thought his emotion got stronger I went up on the scale, and every time I thought his emotion got weaker I went down on the scale. Do you have any questions?”

Screen 4:



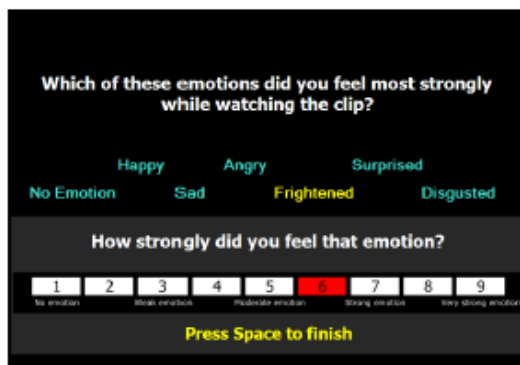
“After every clip you will be asked three questions. This is the first: Which of these emotions do you think the person felt most strongly while talking about the event? (point at and read each emotion). How do you think the person we just watched felt? (response). So you use the mouse to point and click”

Screen 5:



“This is the next question: Which of these emotions did you feel most strongly while watching the clip? (point at and read each emotion) So how did you feel? (response). So you use the mouse to point and click”

Screen 6:



“When you have chosen how you felt, it will ask you how strongly you felt that emotion overall. So, how strongly did you feel (emotion)? You use the left and right arrow keys to choose your response.

Does that all make sense? Do you have any questions? Now there will be a practice clip for you and after that 12 more clips. I’ll let

you know when you’re half way through the clips. Press ‘space’ when you are ready to start.

After practice clip:

Check that task was properly understood and query any unusual uses of the scale (“Can I just check with you how you were using the scale there?”). Monitor for distraction and loss of concentration throughout task and prompt/offer breaks as appropriate.

Appendix M – Average correlation figures CD vs. Control

M.1 Happiness

Figure M1a

Happiness (clip reference number 8)

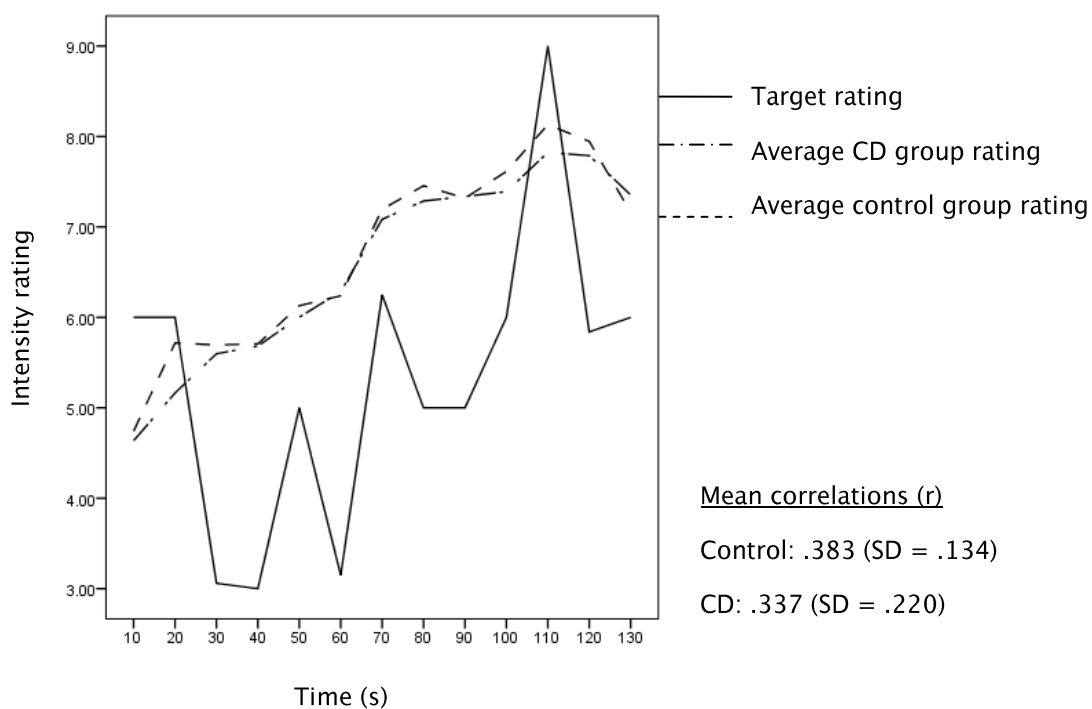
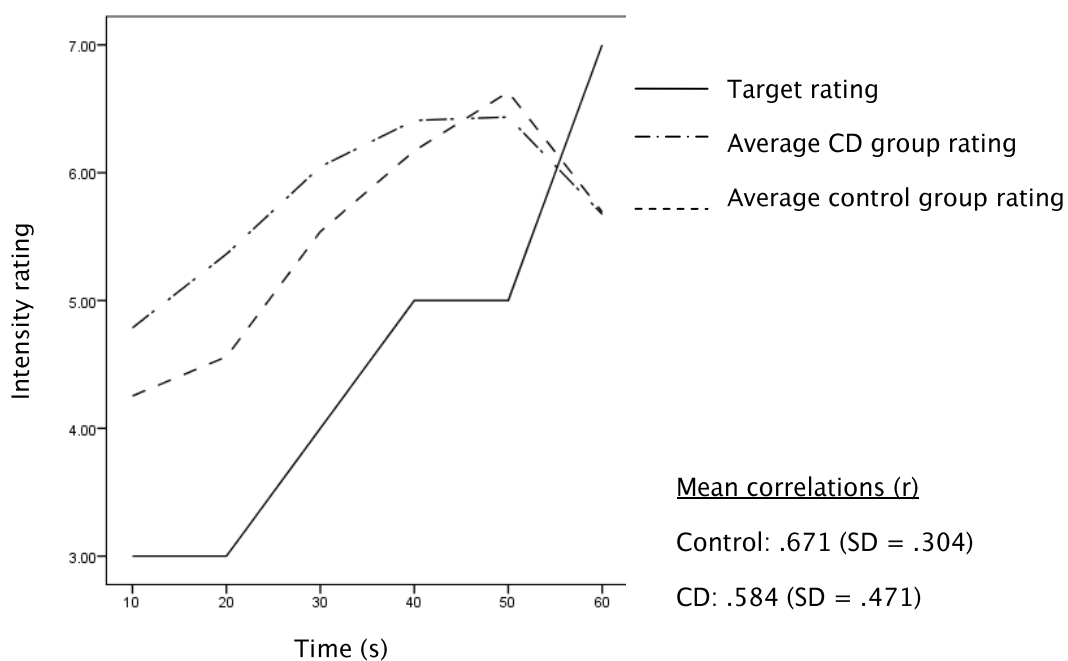


Figure M1b

Happiness (clip reference number 23)



M.2 Sadness

Figure M2a

Sadness (clip reference number 7)

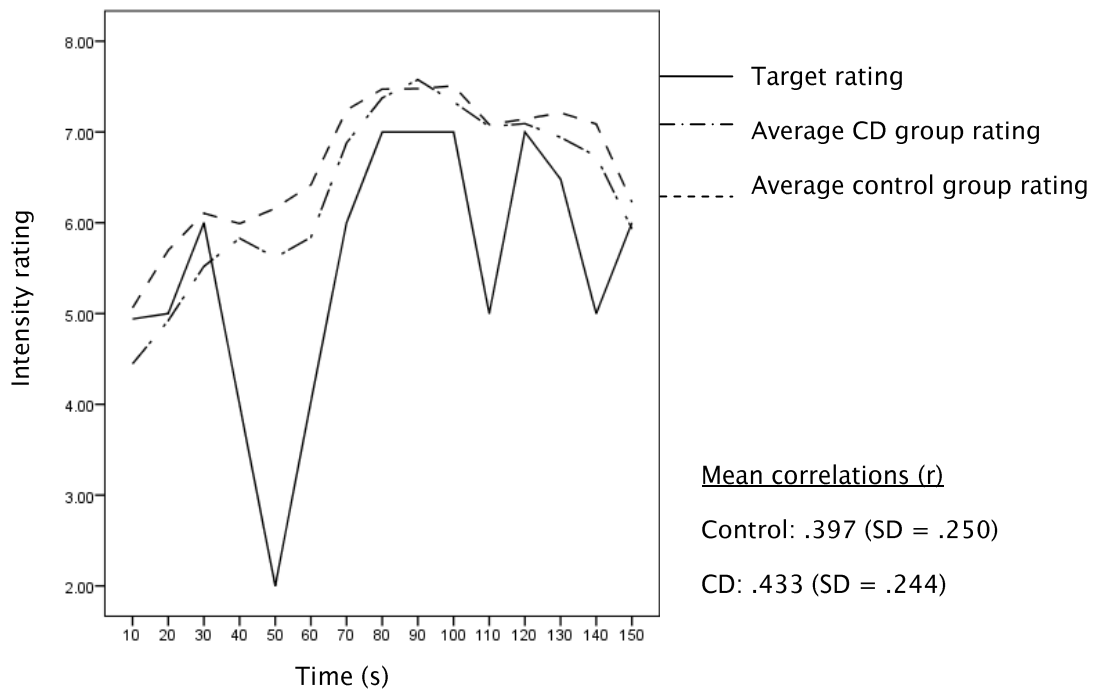
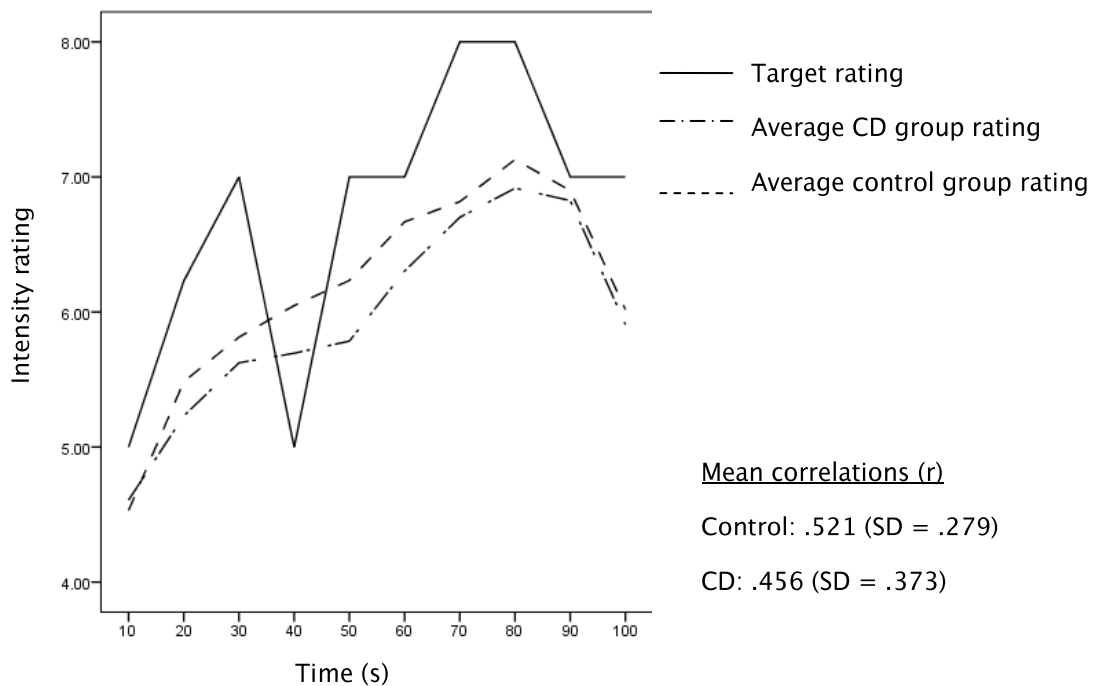


Figure M2b

Sadness (clip reference number 27)



M.3 Fear

Figure M3a

Fear (clip reference number 9)

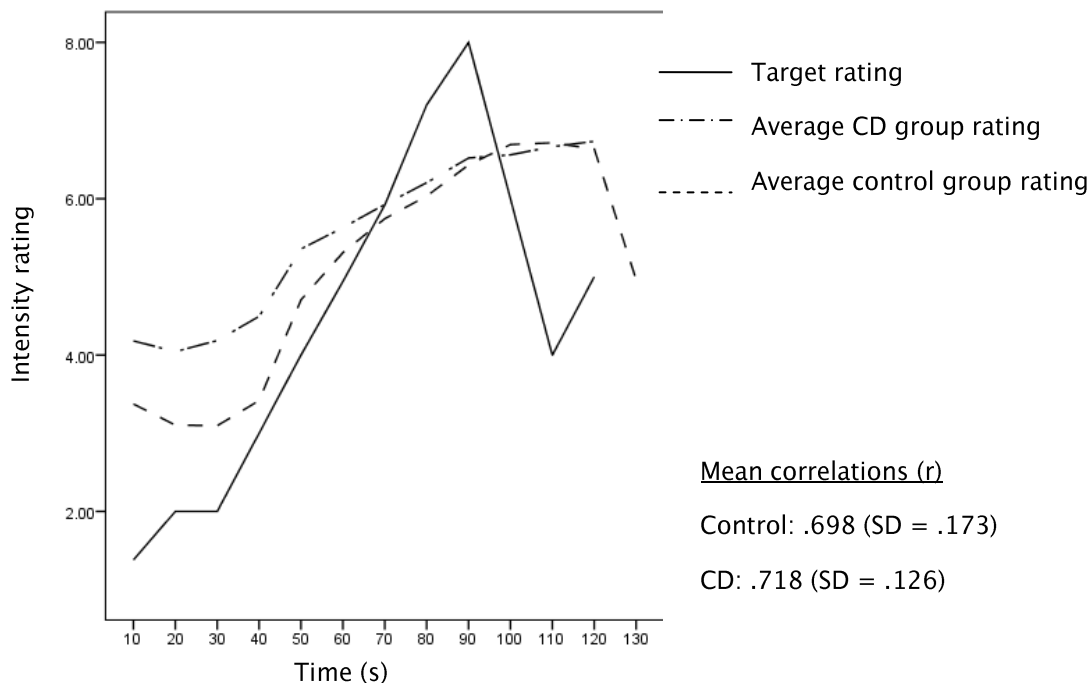
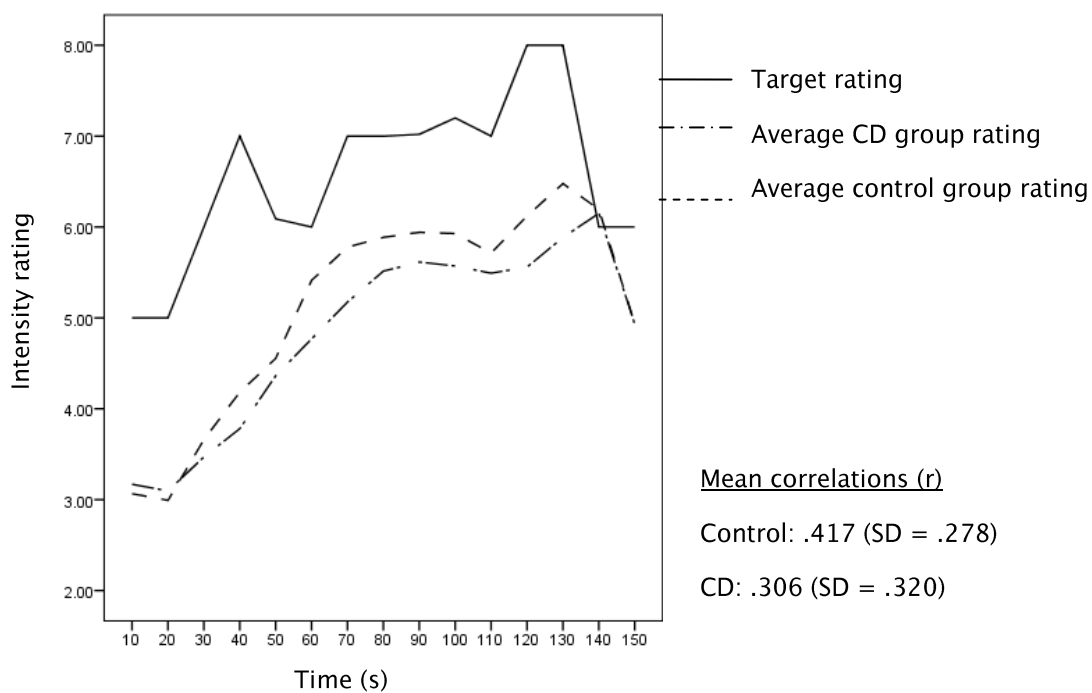


Figure M3b

Fear (clip reference number 28)



M.4 Surprise

Figure M4a

Surprise (clip reference number 10)

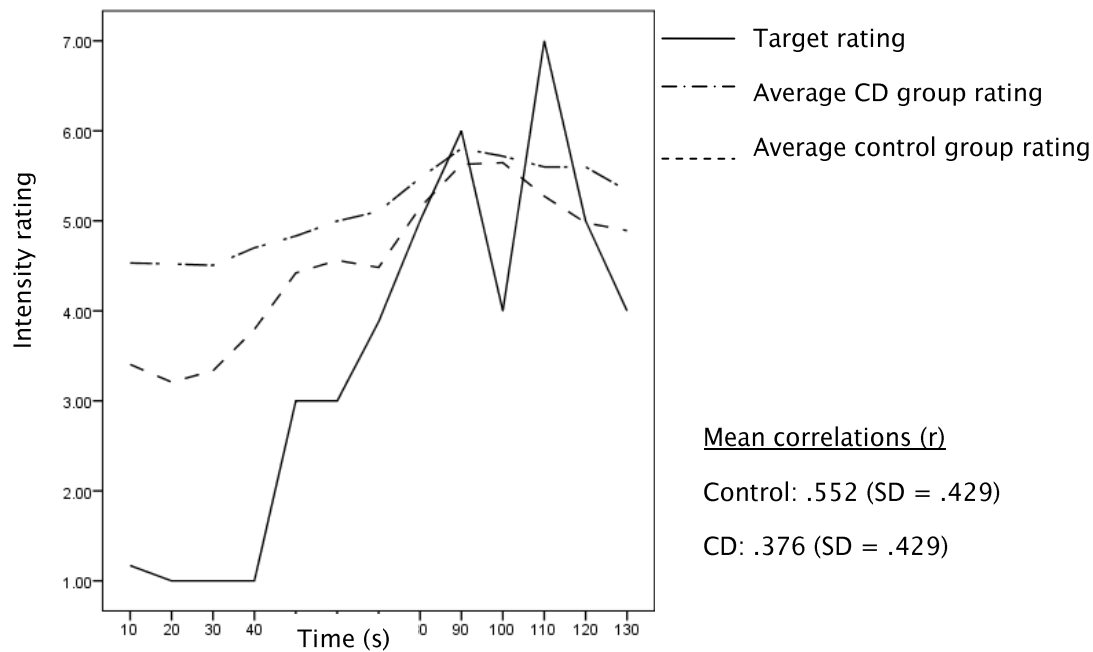
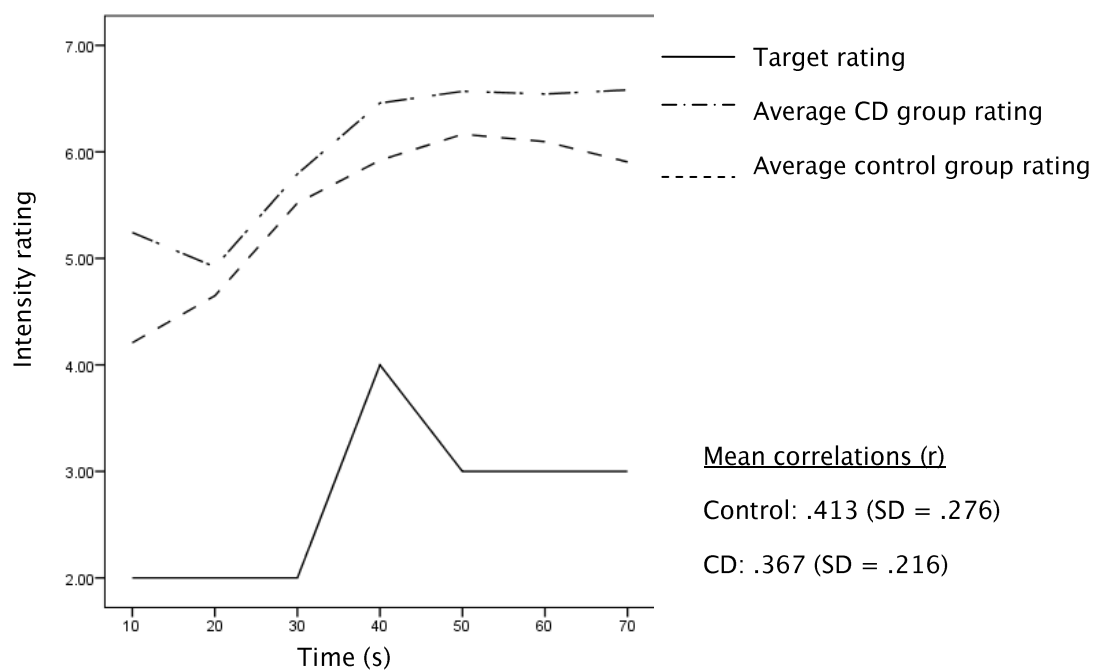


Figure M4b

Surprise (clip reference number 16)



M.5 Anger

Figure M5a

Anger (clip reference number 11)

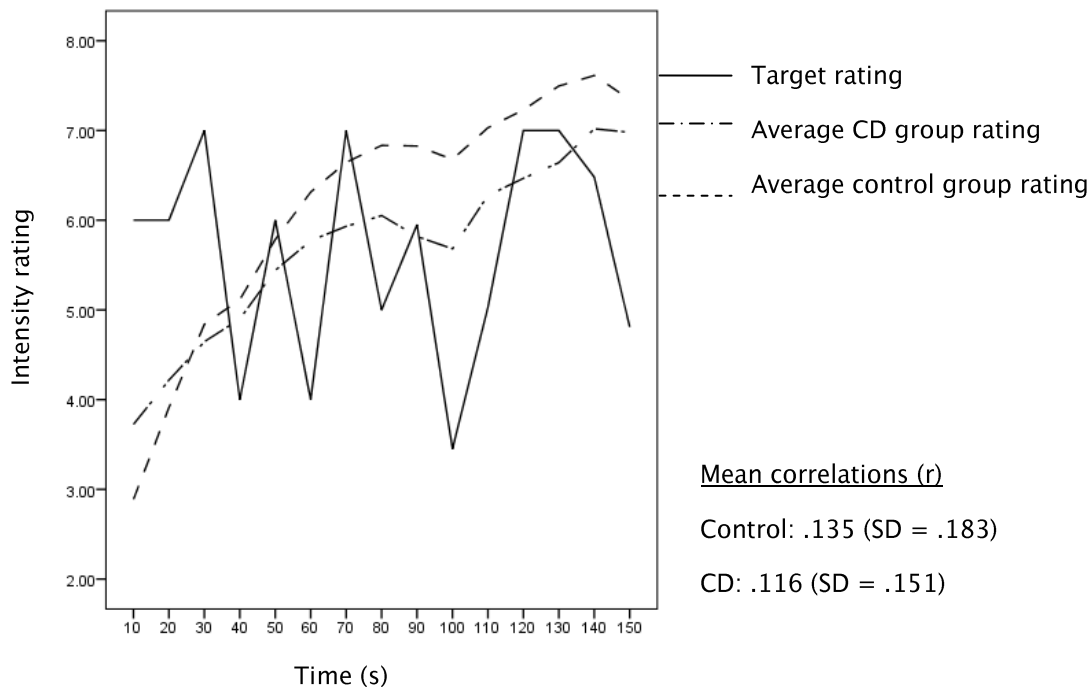
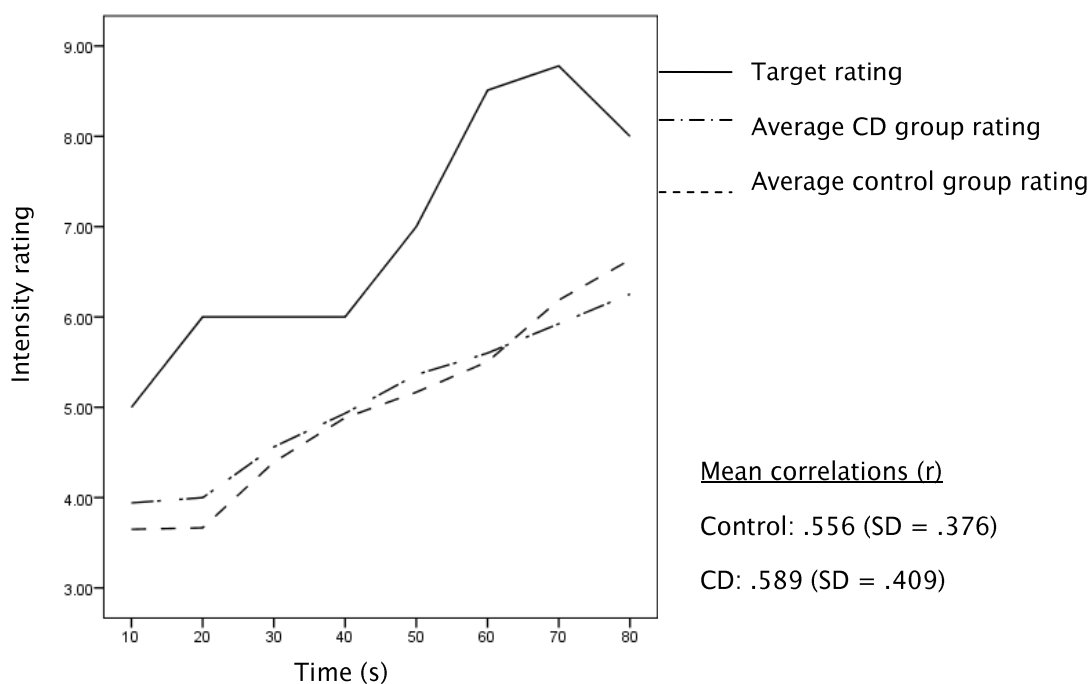


Figure M5b

Anger (clip reference number 30)



M.6 Disgust

Figure M6a

Disgust (clip reference number 12)

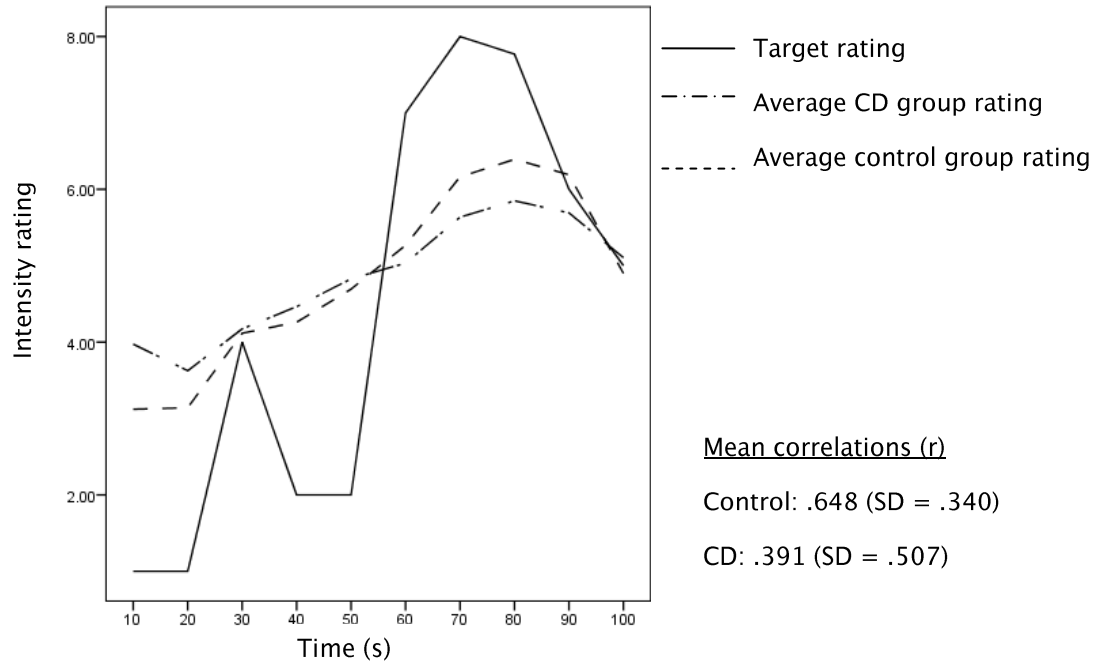
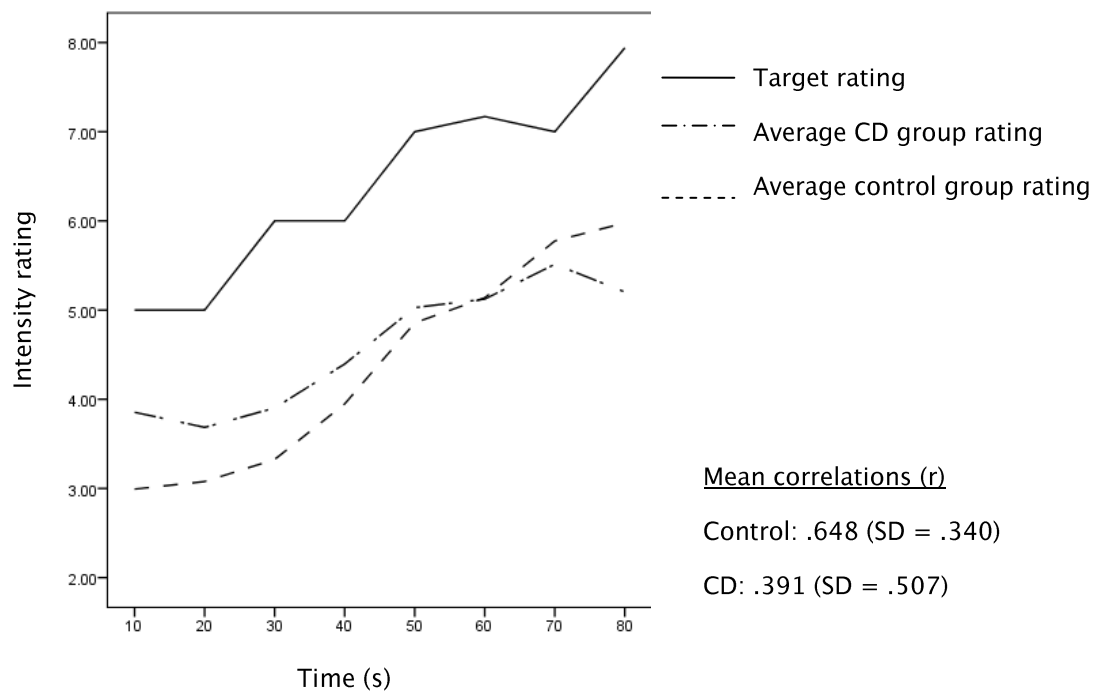


Figure M6b

Disgust (clip reference number 31)



Appendix N– Average correlation figures CD/CU+ vs. CD/CU–

N.1 Happiness

Figure N1a

Happiness (clip reference number 8)

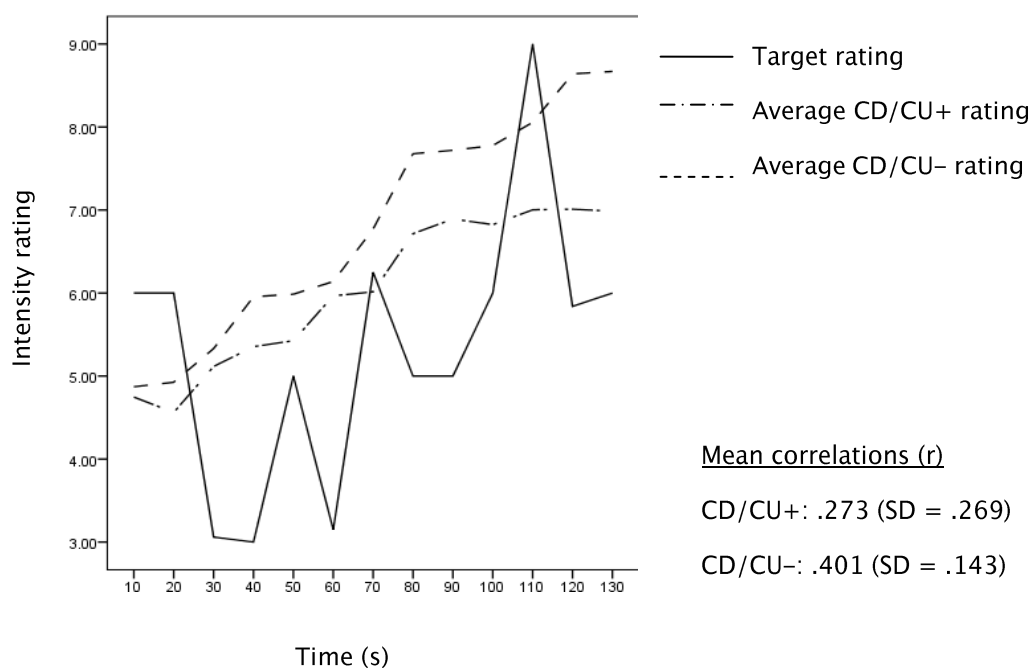
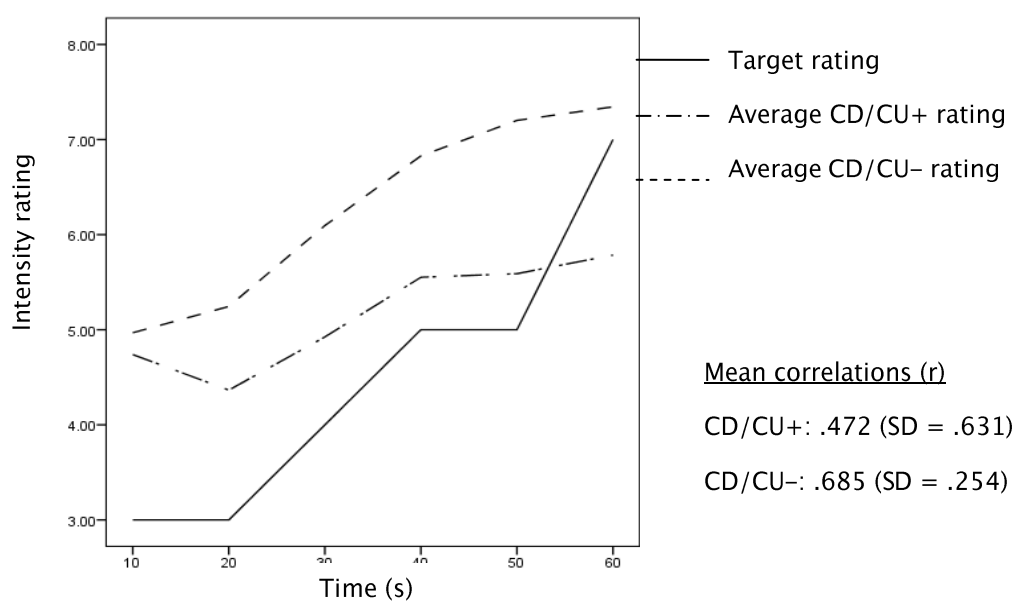


Figure N1b

Happiness (clip reference number 23)



N.2 Sadness

Figure N2a

Sadness (clip reference number 7)

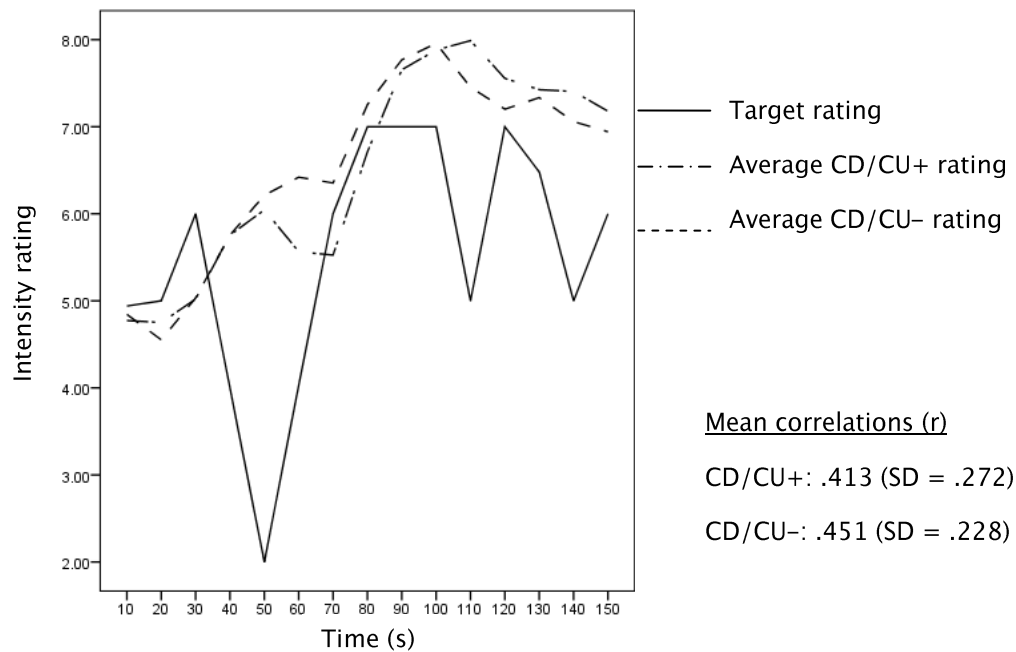
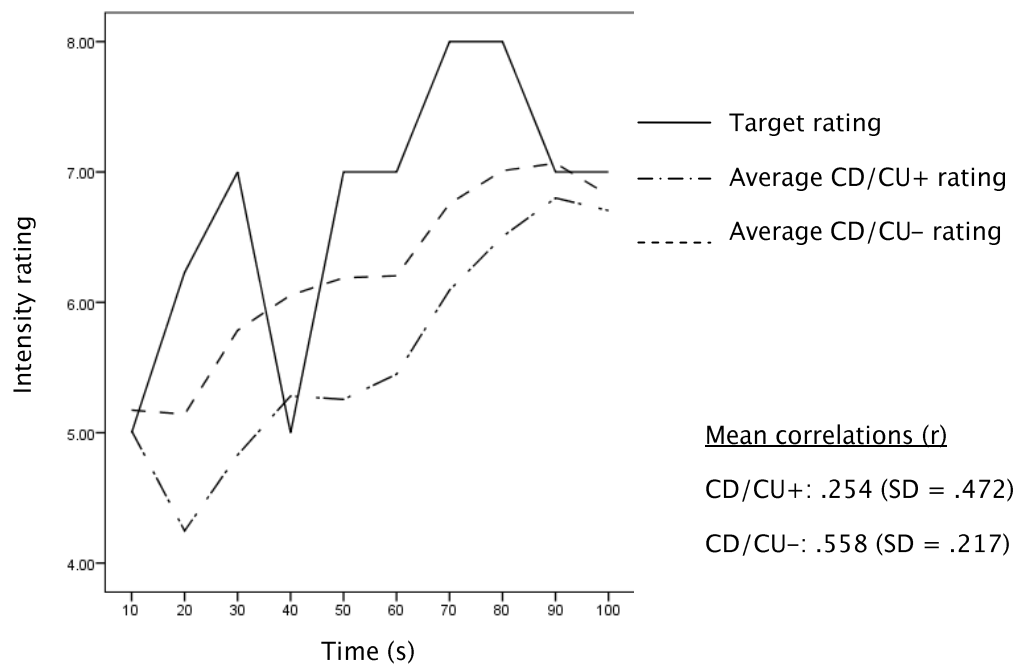


Figure N2b

Sadness (clip reference number 27)



N.3 Fear

Figure N3a

Fear (clip reference number 9)

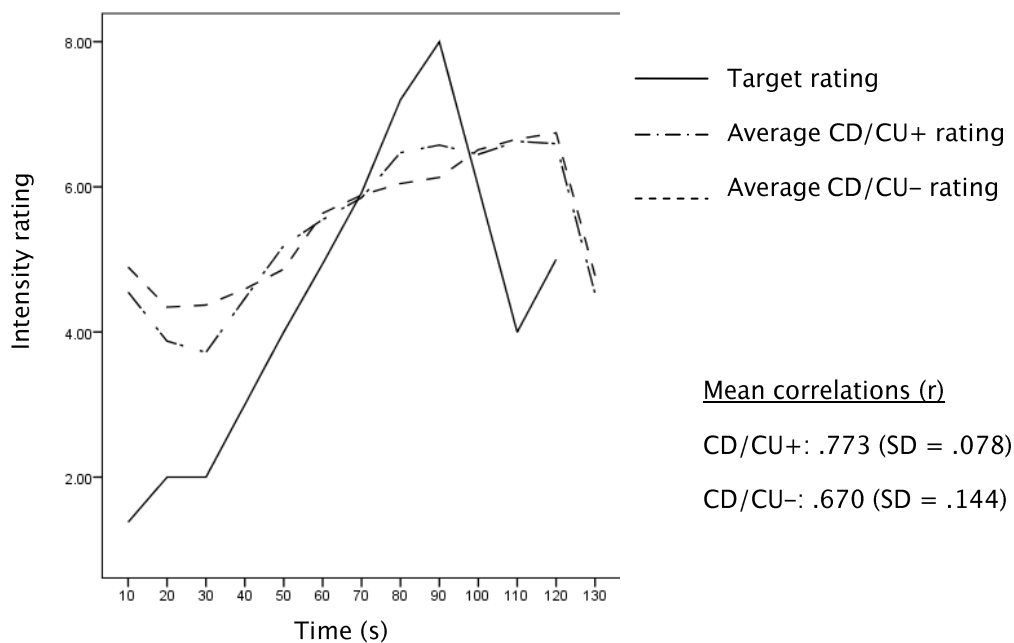
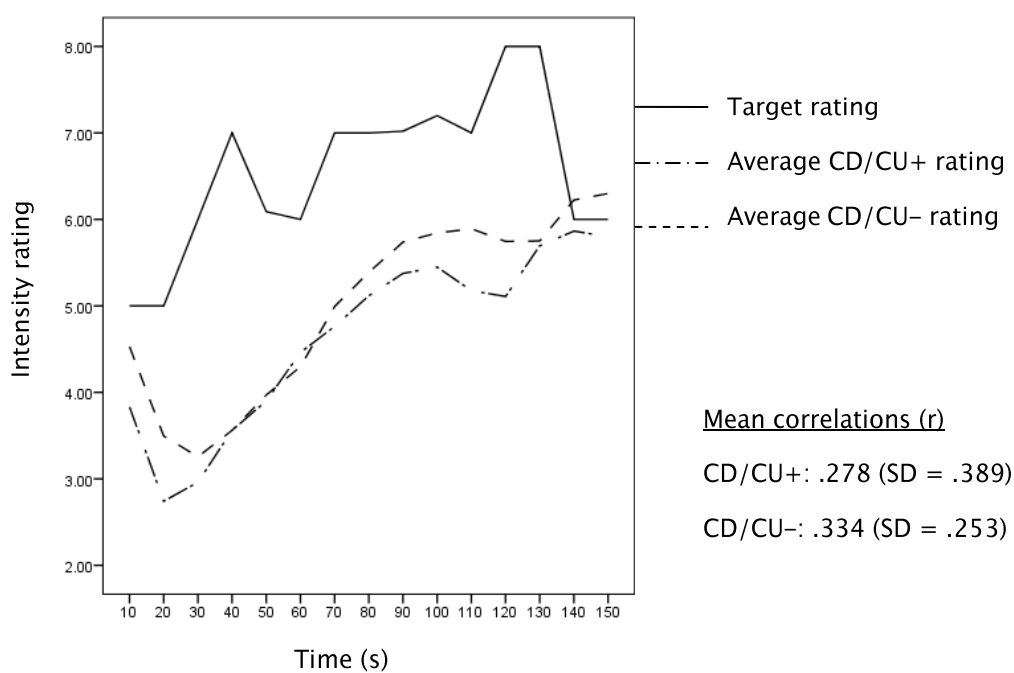


Figure N3b

Fear (clip reference number 28)



N.4 Surprise

Figure N4a

Surprise (clip reference number 10)

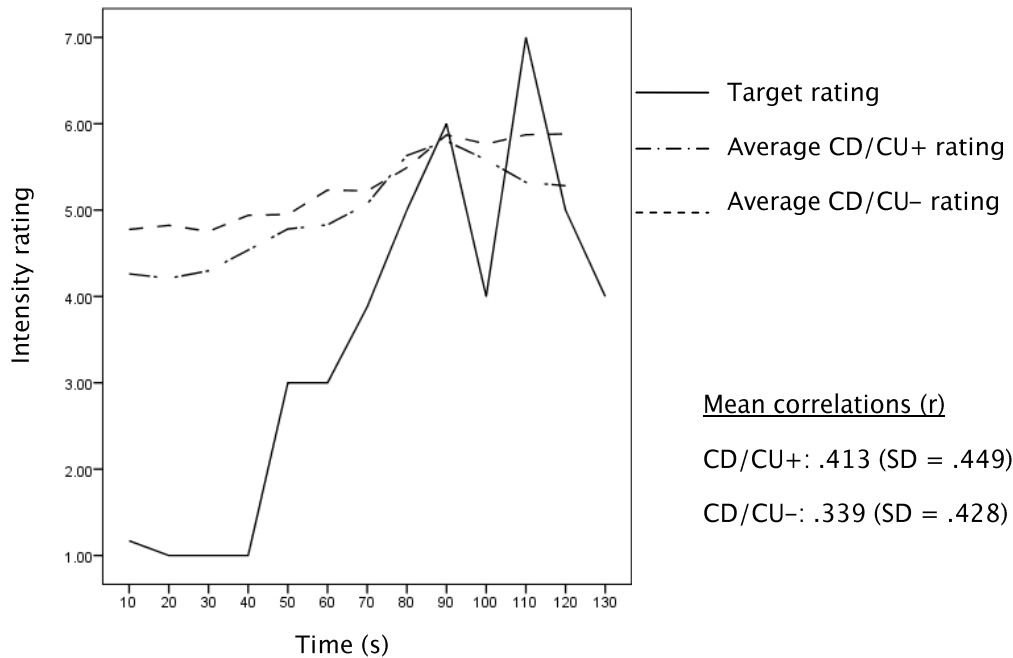
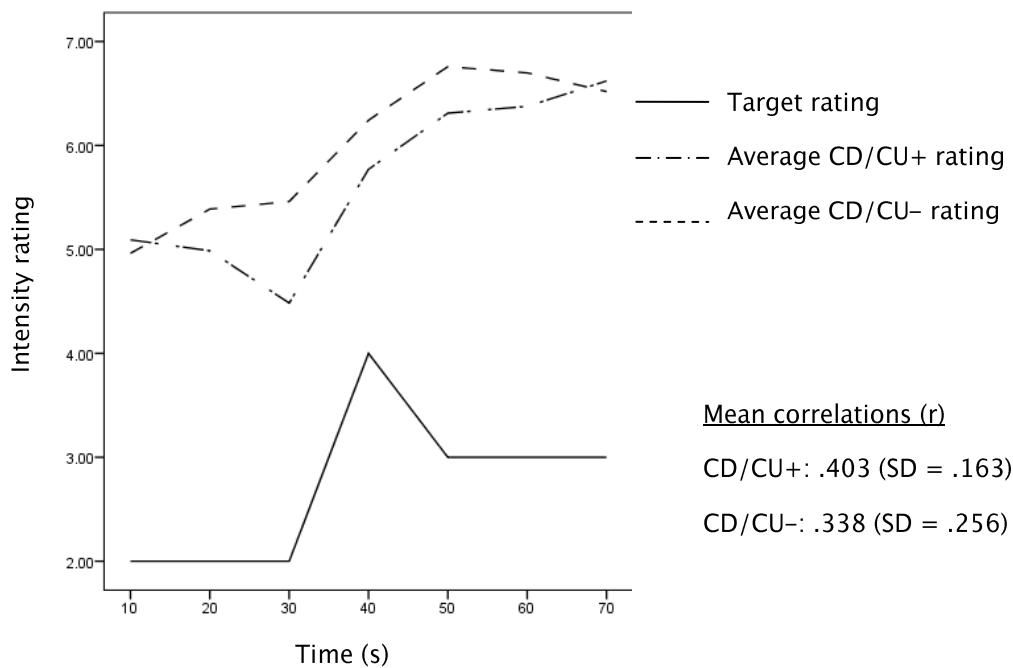


Figure N4b

Surprise (clip reference number 16)



N.5 Anger

Figure N5a

Anger (clip reference number 11)

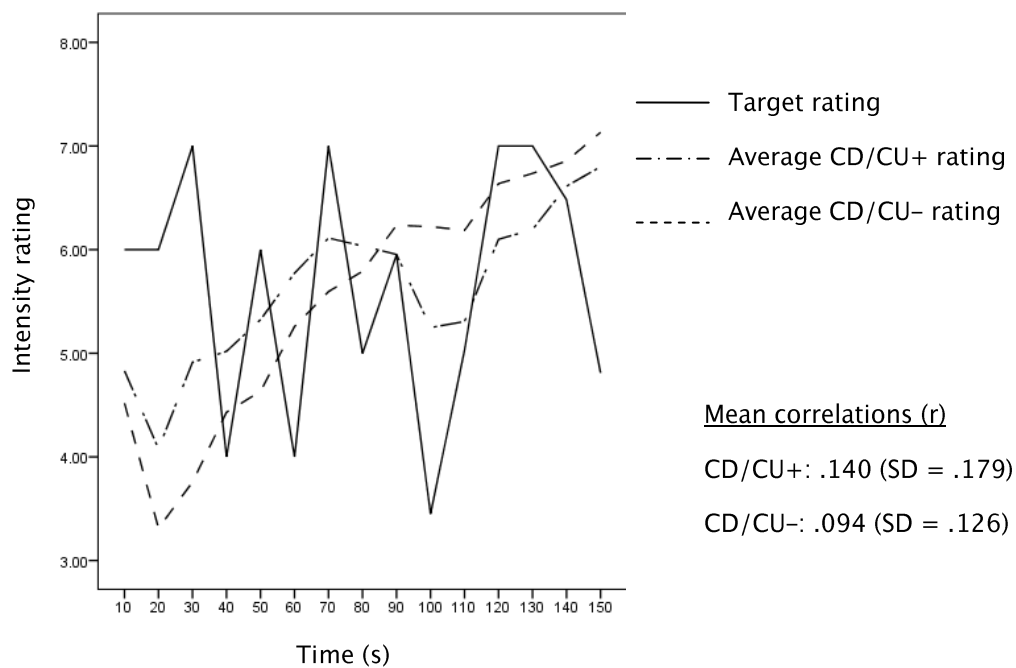
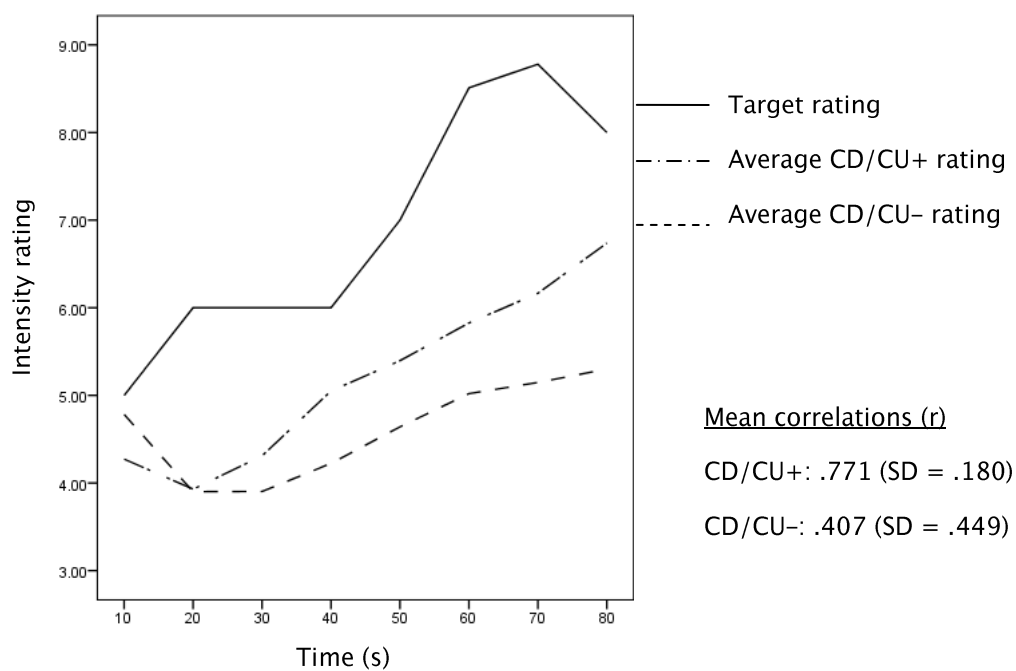


Figure N5b

Anger (clip reference number 30)



N.6 Disgust

Figure N6a

Disgust (clip reference number 12)

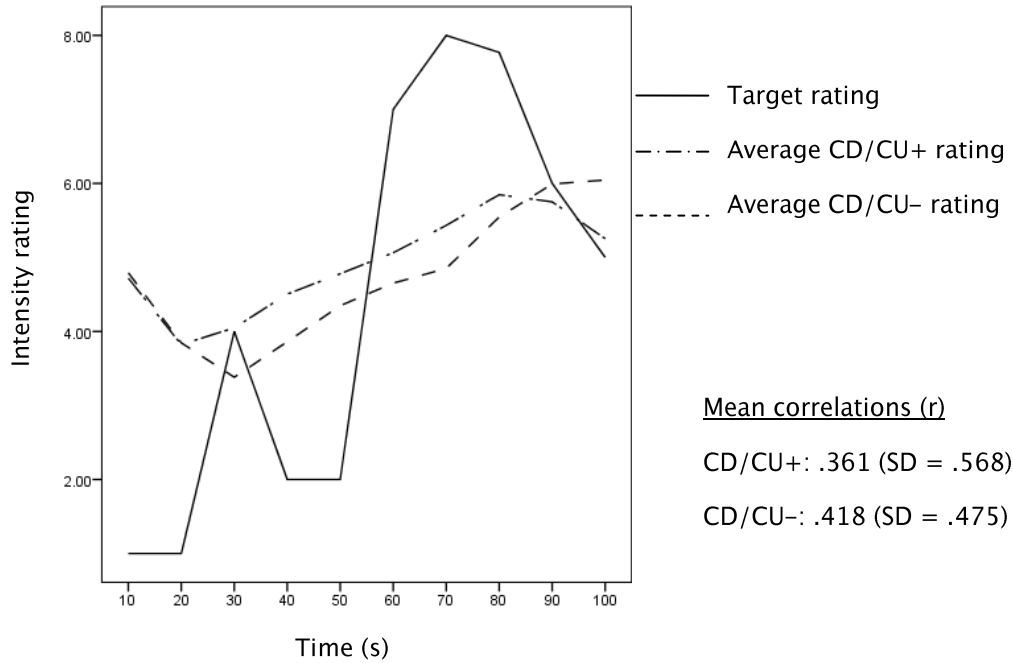
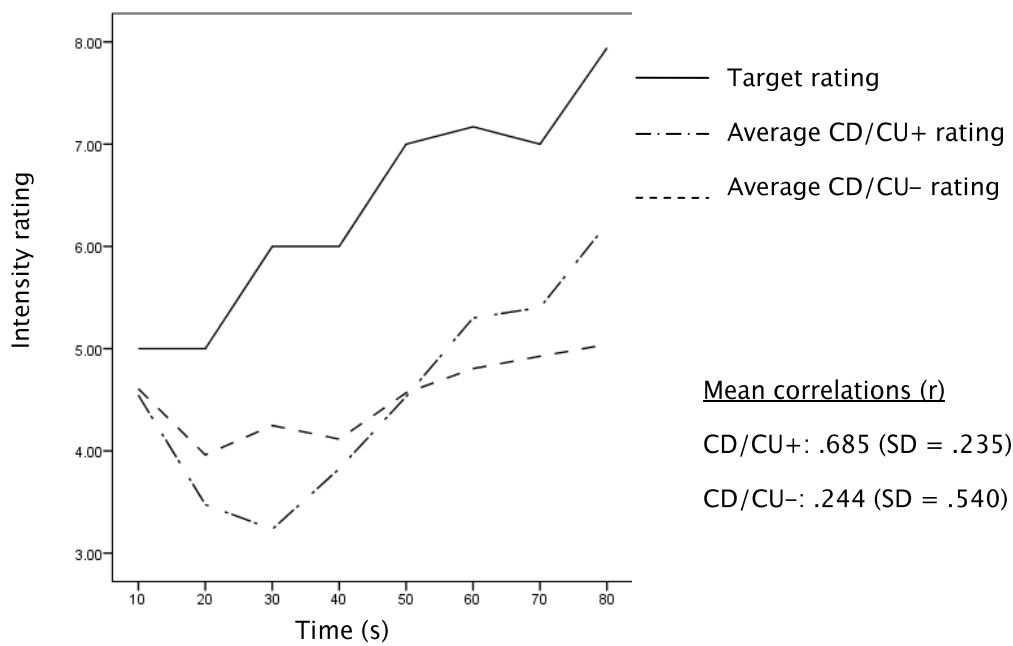


Figure N6b

Disgust (clip reference number 31)



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