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Callous-unemotional traits and empathy deficits: Mediating effects of affective perspective-taking and facial emotion recognition

Joyce H. L. Lui, Christopher T. Barry, and Donald F. Sacco

Department of Psychology, University of Southern Mississippi, Hattiesburg, MS, USA

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Although empathy deficits are thought to be associated with callous-unemotional (CU) traits, findings remain equivocal and little is known about what specific abilities may underlie these purported deficits. Affective perspective-taking (APT) and facial emotion recognition may be implicated, given their independent associations with both empathy and CU traits. The current study examined how CU traits relate to cognitive and affective empathy and whether APT and facial emotion recognition mediate these relations. Participants were 103 adolescents (70 males) aged 16–18 attending a residential programme. CU traits were negatively associated with cognitive and affective empathy to a similar degree. The association between CU traits and affective empathy was partially mediated by APT. Results suggest that assessing mechanisms that may underlie empathic deficits, such as perspective-taking, may be important for youth with CU traits and may inform targets of intervention.

Keywords: CU traits; Cognitive empathy; Affective empathy; Facial emotion recognition; Perspective-taking.

Callous-unemotional (CU) traits are a constellation of affective and interpersonal characteristics often considered to be core features of psychopathy. They include a lack of guilt and emotionality, as well as callous use of others for personal gain (Frick, Bodin, & Barry, 2000; Viding & McCrory, 2012). Youths with CU traits demonstrate distinct behavioural impairments such as more severe, chronic and earlier onset of delinquency, aggression and conduct problems relative to those without elevated CU traits (Frick, Ray, Thornton, & Kahn, 2014). Furthermore, youths with CU traits show significant emotional impairments, such as abnormalities in processing emotional stimuli (Kimonis, Frick, Fazekas, & Loney, 2006) and empathic deficits (Dadds et al., 2009; Jones, Happe, Gilbert, Burnett, & Viding, 2010).

CU traits tend to be moderately stable from adolescence to adulthood (e.g., Frick, Kimonis, Dandreaux, & Farell, 2003; Lynam, Caspi, Moffitt, Loeber, & Stouthamer-Loeber, 2007). However, there is also evidence of change in CU traits during adolescence (Frick et al., 2003; Hawes & Dadds, 2007; Pardini, Lochman, & Powell,

Correspondence should be addressed to: Christopher T. Barry, Department of Psychology, Washington State University, PO Box 644820, Johnson Tower 233, Pullman, WA 99164-4820, USA. E-mail: chris.barry@wsu.edu

2007), suggesting some malleability during this developmental period and highlighting the importance of early intervention. Viding and McCrory (2012) posit that understanding CU traits can not only inform subtypes of youth Conduct Disorder, but they suggest that CU traits can also serve as a useful indicator for a range of psychosocial vulnerability and maladjustment, even in the absence of antisocial behaviour or conduct problems. In light of the inclusion of CU traits as a specifier for Conduct Disorder in the DSM-5 (i.e., "With Limited Prosocial Emotions": lack of remorse or guilt, callous lack of empathy, unconcerned about performance and shallow or deficient affect; American Psychiatric Association, 2013), research examining individual differences in CU traits and impairments associated with these traits should help inform the next wave of research in, and interventions for, youth conduct problems in general and Conduct Disorder specifically.

Empathy and CU traits

Empathy is a multidimensional construct that includes the ability to *understand* and *identify with* another's affective state, or to know the "'how' and 'why' of other people's feelings" (i.e., cognitive empathy; Dadds et al., 2009, p. 599), and to *feel* emotions that are concordant with that affective state (i.e., affective empathy; Dadds et al., 2009; de Wied, Gispen-de Wied, & van Boxel, 2010). These two dimensions are considered interrelated but distinct (Cox et al., 2012; Duan & Hill, 1996). Previous studies have found some dissociation between cognitive and affective empathy (e.g., moderate correlations in the range of .40s; Cox et al., 2012; Jolliffe & Farrington, 2006). Specifically, one can imagine, appreciate and identify with another's emotional state (i.e., cognitive empathy) without having an emotional reaction to it, and conversely, one can experience an emotional response to another's emotional state (i.e., affective empathy) but not clearly identify with the person's feelings. Empathy plays a role in the development of social competence, as well as in facilitating and maintaining successful interpersonal relationships during adolescence, and it has been positively associated with prosocial behaviours such as helping (Barnett & Thompson, 1985; Eisenberg & Miller, 1987). Furthermore, empathy is thought to attenuate aggression; thus, a lack of empathy may contribute to the display of aggressive or antisocial behaviours (Feshbach & Feshbach, 1982; Miller & Eisenberg, 1988). Therefore, understanding processes related to empathy development can help inform interventions to reduce aggressive and antisocial behaviours, particularly for individuals at-risk for such behaviours, such as youths with CU traits.

Although CU traits comprise the affective component of psychopathy, and a lack of empathy is critical to its conceptualisation (Frick et al., 2014), there is limited research concerning how different dimensions of empathy relate to CU traits in children and adolescents. Only recently have researchers begun to investigate psychopathic traits in relation to both cognitive and affective empathy, and in this research, psychopathy is often investigated as an overarching construct with a combination of affective, interpersonal and behavioural traits rather than teasing apart the unique contributions of each component (see Blair, 2005; Jones et al., 2010; for an exception, see Pardini, Lochman, & Frick, 2003 where the contribution of each dimension of psychopathy was considered).

Existing studies consistently report a negative relation between psychopathic traits and affective empathy among youth (Anastassiou-Hadjicharalambous & Warden, 2008b; Jones et al., 2010; Muñoz, Qualter, & Padgett, 2011; Pardini et al., 2003; Schwenck et al., 2012). For example, Muñoz and colleagues (2011) found that children with the highest levels of CU traits had the lowest affective empathy compared with adolescents with moderately high, moderately low or low levels of CU traits. Similarly, Jones and colleagues (2010) found that boys with psychopathic traits reported less affective empathy for victims of aggression compared with boys without psychopathic traits, as indicated by attributions of emotions to

themselves after reading vignettes. In addition, Pardini and colleagues (2003) found CU traits to be uniquely associated with deficits in affective empathy among adolescents while controlling for delinquency and conduct problems.

Findings on psychopathic traits and cognitive empathy among youth are more equivocal, as some studies report either no relation (Dadds et al., 2009; Schwenck et al., 2012) or a negative relation (Chabrol, van Leeuwen, Rodgers, & Gibbs, 2011; Muñoz et al., 2011; Pardini et al., 2003; Pasalich, Dadds, & Hawes, 2014). Dadds and colleagues (2009) found that psychopathic traits were negatively correlated with cognitive empathy, as well as significant differences in cognitive empathy across psychopathy groups (i.e., zero, low, moderate and high). In addition, there was a significant interaction between psychopathy group, age and gender, such that both males and females with high psychopathic traits demonstrated deficits in cognitive empathy in childhood. However, males with high levels of psychopathic traits showed no such deficits in early adolescence, whereas females with high levels of psychopathic traits continued to show this pattern. Thus, there may be some developmental differences in the relation between CU traits and cognitive empathy, particularly as it relates to gender. Pardini et al. (2003) also found a negative association between adolescent CU traits and cognitive empathy while controlling for delinquency and conduct problems.

Different definitions of cognitive empathy may contribute to these inconsistent findings. For example, some researchers equate cognitive empathy with perspective-taking, as measured by the Perspective Taking subscale of the Interpersonal Reactivity Index (IRI; Davis, 1983). Many such studies report a negative relation between cognitive empathy and psychopathic traits (Brouns et al., 2013; Pardini et al., 2003). However, as Jolliffe and Farrington (2006) argued, the Perspective Taking subscale of the IRI may not be a sufficient measure of cognitive empathy because items do not necessarily assess one's ability to understand the emotions of others but more broadly assess one's ability to consider another's point-of-view. Other researchers similarly equate cognitive empathy with Theory of Mind (e.g., Baron-Cohen & Wheelwright, 2004; Blair, 2005; Jones et al., 2010). With this conceptualisation, there is often a lack of association between psychopathic traits and cognitive empathy (for a review, see Blair, 2005). Furthermore, some researchers consider cognitive empathy to involve specific abilities such as emotion recognition, assessed through morphing facial expression tasks, for example and find no relation with psychopathic traits (e.g., Schwenck et al., 2012). The few studies that conceptualised cognitive empathy as understanding the "how and why" of others' emotions (as in the current study) have reported a negative relation between cognitive empathy and psychopathic traits (Dadds et al., 2009; Pasalich et al., 2014). However, with such vastly differing conceptualisations and methods for assessing cognitive empathy, it remains difficult to discern a conclusive pattern. It is also possible that CU traits are associated with a differential pattern of deficits across the affective and cognitive dimensions of empathy such that impairment in cognitive empathy may be more subtle or non-existent or that cognitive empathy deficits associated with CU traits may be specific to particular emotions (fear, sadness) given that such individuals tend to demonstrate impairments in their responsiveness to distress cues (Frick et al., 2014).

Perspective-taking, facial emotion recognition and CU traits

Even though it is widely believed that CU traits are associated with lower empathy, there is surprisingly little attention devoted to what specific abilities may underlie these purported empathy deficits. Affective perspective-taking (APT) and facial emotion recognition may be two important abilities to examine. Because CU traits are a collection of affective characteristics, underlying impairments in processing and recognising emotions may be responsible for their associated deficits in empathy. Indeed, some studies have found relations between both APT and facial

emotion recognition and CU traits (Anastassiou-Hadjicharalambous & Warden, 2008a; Frick et al., 2014 for a review). Furthermore, there is evidence that these abilities are positively related to empathy (e.g., Carr & Lutjemeier, 2005; Knafo, Steinberg, & Goldner, 2011).

Affective perspective-taking

As with empathy, cognitive perspective-taking (CPT) or APT. CPT refers to the ability to infer the thoughts of others, whereas APT refers to the ability to infer the *emotional* state of others, based on their situation (Batson, Early, & Salvarani, 1997; Batson, Eklund, Chermok, Hoyt, & Ortiz, 2007). Perspective-taking is distinct from cognitive empathy in that perspective-taking does not require identification *with* another. Instead, it involves simply recognising another's emotions based on a situation (i.e., to decode and label an emotion based on situational cues) which does not necessarily require personal identification with another's emotions. For example, suppose one is waiting in a long line at a coffee shop and sees a staff member looking unhappy. The onlooker may assess the situation and infer that this staff member is *unhappy and frustrated* because he/she is stressed from being busy and the long line of customers APT. Cognitive empathy may or may not follow. The onlooker may then think to him/herself: (1) "This person needs to get over it. I do not see why the staff should be upset" (lack of cognitive empathy) or (2) "I understand that. If I were in that position, I would be unhappy, too" (cognitive empathy). APT does not require this personal identification component.

CPT and APT show differential relations with empathy-related behaviours such that APT in particular is thought to help elicit stronger empathic concern, empathic responding and more helping (Knafo et al., 2011; Oswald, 1996). Theoretically, it is reasonable to expect that accurately inferring the emotional of states of others in a given situation could both increase the likelihood of identifying with a person (i.e., cognitive empathy) and evoking an emotional response that resonates with the person (i.e., affective empathy). Limited research has examined the relation between CU traits and APT specifically. One study found that disruptive children with high levels of CU traits demonstrated a relative deficit in APT but not CPT (Anastassiou-Hadjicharalambous & Warden, 2008a); however, CU traits were not related to accuracy in identifying emotions from vignettes (i.e., a measure of APT) in another study (Woodworth & Waschbusch, 2008). Whereas the former study asked children to both describe and *explain* the emotion depicted, the latter study only asked children to identify the emotion. It may be that Woodworth and Waschbusch's design was not sensitive in detecting deficits among youth with CU traits. Otherwise, little is known about CU traits and APT in youths, highlighting the need for more research in this area.

Facial emotion recognition

The ability to recognise facial expressions emerges early in life and is well-developed by middle childhood (Durand, Gallay, Seigneuric, Robichon, & Baudouin, 2007). Some evidence exists that youth with psychopathic traits demonstrate impairments in recognising facial expressions, which may impede empathic responses. However, the findings in this area of research are somewhat inconsistent in regard to the specificity of deficits. Findings of impairments are generally robust for negative emotions, particularly for fear (Blair & Coles, 2000; Dadds et al., 2006; Leist & Dadds, 2009; Muñoz, 2009) and sadness (Stevens, Charman, & Blair, 2001; Woodworth & Waschbusch, 2008) and to a lesser extent, for anger and disgust (Muñoz, 2009; Sylvers, Brennan, & Lilienfeld, 2011).

Similar to research on CU traits and empathy, many studies on facial emotion recognition in youth do not differentiate components of psychopathy but examine psychopathy as a broader construct of affective/interpersonal and behavioural traits without accounting for the unique contributions of each (for exceptions, see Leist & Dadds, 2009; Muñoz, 2009). However, there does not seem to be a clear pattern of how different

conceptualisations of psychopathy have contributed to inconsistent findings. Even among studies that examined the unique effects of CU traits, some have found global deficits (Muñoz, 2009), some have found only fear deficits (Dadds et al., 2006), yet others have found a fear recognition advantage (Woodworth & Waschbusch, 2008). Differences in the operationalisation of psychopathic traits (i.e., broadly vs. CU traits specifically), along with the use of different samples across studies (i.e., ranging from young children to older adolescents to adults as well as from community to referred to forensic samples), may be implicated in such inconsistent findings to date. Thus, it remains unclear whether CU traits are uniquely associated with deficits in facial emotion recognition (either globally or specifically for certain emotions).

Theoretically, it is reasonable to expect an association between facial emotion recognition and empathy in that one needs to be able to recognise emotions accurately to respond empathically. Accurate facial emotion recognition could be viewed as an initial step in the empathy process (Besel & Yuille, 2010), and deficits in emotion recognition, particularly of distress emotions (e.g., fear, anger), may influence empathy. Some previous evidence seems to support such a connection, as Carr and Lutjemeier (2005) found a positive relation between the ability to recognise fearful facial expressions and empathy. Marsh, Kozak, and Ambady (2007) similarly found a positive relation between the ability to recognise fearful expressions and empathy-related behaviours, such as helping someone in distress. Empathy has also been related to facial recognition accuracy across the six basic emotions (i.e., happy, sad, anger, disgust, surprise and fear; Besel & Yuille, 2010) and to lower thresholds of being able to accurately identify facial expressions (Martin, Berry, Dobranski, & Horne, 1996). Given the association between facial emotion recognition and empathy, it is important to clarify whether youths with CU traits do indeed demonstrate impairments in processing facial emotional expressions and whether this deficit can help explain their purported relative deficits in empathy.

The current study

This study aimed to address whether CU traits in adolescents are associated with deficits in cognitive and/or affective empathy and how abilities such as APT and facial emotion recognition may be associated with such deficit(s). It was expected that CU traits would be related at different magnitudes to the two dimensions of empathy and that APT and facial emotion recognition would mediate these relations. Specifically, CU traits were hypothesised to negatively correlate with both affective and cognitive empathy (Hypothesis 1a). The correlation was expected to be stronger for affective empathy than for cognitive empathy, given robust findings for lower affective empathy and more equivocal findings for cognitive empathy in previous research (Hypothesis 1b). APT and facial emotion recognition were expected to positively correlate with affective and cognitive empathy (Hypothesis 2). CU traits were hypothesised to negatively correlate with APT and facial emotion recognition (Hypothesis 3a). The correlation was predicted to be stronger for APT than for facial emotion recognition because APT is more nuanced and complex and thus may be more sensitive in detecting deficits among individuals with CU traits (Hypothesis 3b). Deficits in APT and facial emotion recognition were hypothesised to mediate the relations between CU traits and affective and cognitive empathy deficits in separate models (Hypothesis 4). By understanding individual differences in CU traits and identifying the processes associated with empathy deficits and emotion processing impairments, we may ultimately inform ways to alleviate these deficits early in development as well as prevent the negative behavioural consequences of CU traits (i.e., aggression, delinquency).

METHOD

Participants

Participants were 103 adolescents (70 males, 33 females) aged 16–18 years (M = 16.93 years, SD = .72) enrolled in a residential programme in the

southeast USA for adolescents who have dropped out of high school. Reasons for dropping out included behavioural, academic, economic and personal/familial difficulties. Individuals were not involved in the legal system and voluntarily attended the programme. The sample was 57.3% White, 33% Black and 9.7% of other ethnicities. A random sample of 47.53% of youth in the programme (n = 106) were approached to participate in the study, of which 97.17% assented. It was expected that this type of at-risk sample would exhibit greater variability on CU traits than community or detained samples of adolescents.

Materials

Inventory of callous-unemotional traits (ICU)

Participants self-reported their levels of CU traits using the ICU (Frick, 2004). This measure has 24 items, and respondents rate each item on a 4-point Likert scale, ranging from 0 (*not at all true*) to 3 (*definitely true*). The total score was used for analyses to indicate overall levels of CU traits. Scores on the ICU have been found to correlate positively with aggression, delinquency and sensation-seeking and negatively with conscientiousness and agreeableness, supporting its criterion-related validity (Essau, Sasagawa, & Frick, 2006; Kimonis et al., 2008). Cronbach's alpha for the current sample was .76.

Affective perspective-taking

Participants read vignettes describing a target matched on gender and approximate age to the participant. They were asked to identify the target's emotional response (i.e., *what* is the target feeling in the situation?) and to justify that emotional response (i.e., *why* is the target feeling that way in the situation?) for each vignette. The vignettes were adapted from those used in previous studies of perspective-taking and emotion recognition with children and adolescents (Anastassiou-Hadjicharalambous & Warden, 2008a; Ribordy, Camras, Stefani, & Spaccarelli, 1988; Strayer, 1993). Some of the content of the vignettes was adapted to be more relevant for the current adolescent sample (e.g., "toy" was changed to "phone", "children" was changed to "teens", "play" was changed to "hang out with"). In a pilot study, 22 vignettes covering the six basic emotions (i.e., happy, sad, anger, fear, disgust, surprise) were administered to 28 adolescents from the same programme who did not participate in the current study to ensure that emotions were clearly depicted in each vignette and that the modified content was appropriate. From the pilot study, 12 vignettes were chosen, with two vignettes for each of the six basic emotions (see Appendix for sample vignettes). Responses were coded for correct identification (1 point) and correct justification (1 point). Responses for emotion identification that were compatible with the correct emotion were coded 0.5 point (e.g., if the primary emotion depicted was sadness, and a possible secondary emotion was anger, sadness = 1 point, anger = 0.5 point). Responses for justification that were compatible with the provided response for emotion identification and were specific to the content of the vignette were coded 1 point. Responses for justification that were incompatible with the provided response for emotion identification, or were not specific to the content of the vignette, or were strongly compatible with more than one emotion (i.e., the justification fits equally with more than one emotion) were coded 0 points. A random sample of 35% of cases was double-coded by an independent rater. The intraclass correlation for emotion identification was .90, and the intraclass correlation for justification was .86. Previous studies using these vignettes reported inter-rater agreement ranging from .73 to .86 (Anastassiou-Hadjicharalambous & Warden, 2008a; Knafo et al., 2011; Strayer, 1993). Emotion identification and justification scores were positively correlated, r = .59, p < .001; thus, average identification and justification scores across vignettes were used to indicate overall APT for each participant.

University of New South Wales facial emotion task (UNSW task)

Participants viewed a standardised set of photographed faces and were asked to identify the emotions expressed (Dadds, Hawes, & Merz,

2004). Thirty-six child, teen and adult faces were used, with each depicting happiness, sadness, anger, disgust, fear or neutral. Faces were presented in a random order for two seconds on a computer, consistent with past research (e.g., Dadds et al., 2006). Participants were asked to identify the expressed emotion from a list of six response choices. A composite of correct identification across emotions was used for analyses. The UNSW Task has been shown to detect emotion recognition deficits in children and adolescents with CU tendencies (Dadds et al., 2006). For the current study, percentage of accurate identification ranged from 47.6% to 98.1% across emotion types, with all but one photograph having a correct identification rate greater than 60%. The photograph (anger) with 47.6% accuracy rate was removed from further analyses consistent with the original validation procedures of the UNSW Task which used a 50% accuracy criterion.

Griffith empathy measure (GEM)

The GEM is a 23-item parent-report measure of child dispositional empathy and assesses both cognitive and affective dimensions (see Dadds et al., 2008 for a description of the development of the GEM). For the current study, the GEM was adapted to be in the first-person format (e.g., "My child can't understand why other people get upset" was changed to "I can't understand why other people get upset"). Questions were also reworded to be more relevant for the adolescent sample (e.g., reference to "children" was replaced with "teens"). Participants self-reported on their empathy by rating each item on a 9-point Likert scale, ranging from −4 (*strongly disagree*) to +4 (*strongly agree*). The GEM has two subscales: Cognitive Empathy (e.g., "I can't understand why people cry out of happiness"—reversed scored) and Affective Empathy (e.g., "I feel sad when I see a teen with no one to hang out with"). Our approach to adapting the GEM for self-report in the present study was used in lieu of other measures of empathy, as the GEM provides content consistent with our operationalisation of cognitive and affective empathy. The Cognitive Empathy subscale captures one's tendency to be able to understand and to personally identify with another's affective state (as opposed to simply decoding another's emotional state from their circumstances). The Affective Empathy subscale captures one's tendency to feel emotions that resonate with another's emotional state. In the initial validation of this instrument, Dadds and colleagues (2008) found that the two subscales were orthogonal (r = .07). Previous studies with parents reporting on their adolescents have demonstrated acceptable internal consistencies (α = .62–.71 for the Cognitive subscale; α = .77–.83 for the Affective subscale; Dadds et al., 2008, 2009; Pasalich et al., 2014). Both factors of the GEM, as would be expected, have demonstrated positive correlations with prosocial behaviours and negative correlations with behavioural and emotional problems (Dadds et al., 2008). Cronbach's alphas were .54 for Cognitive empathy and .83 for Affective empathy in the current study.

Procedure

This study was approved by the Institutional Review Board at the authors' affiliated university. Informed consent was first obtained from participants' parents upon their enrolment in the residential programme. Participation was voluntary and did not affect an individual's status in the programme. The study was explained to participants, and assent was obtained if they wished to participate. Participants completed, in order, demographic information, the UNSW Task, the ICU, the adapted GEM and the vignettes in a classroom setting for approximately 45–60 minutes. All measures were administered on individual computers in a group setting of approximately 30 adolescents.

RESULTS

Preliminary analyses

Descriptive statistics for study variables are provided in Table 1. Independent samples t tests were

Table 1. *Descriptive statistics for variables of interest*

Variable	*M*	*SD*	*Range*	*Skew*
CU traits (ICU)	25.74	7.95	10 to 59	1.08
Facial emotion recognition (UNSW)	31.65	4.19	5.29 to 36	–3.06
APT	.76	.13	.17 to 1	.09
Cognitive empathy (GEM)	10.07	7.83	–9 to 24	–.18
Affective empathy (GEM)	–8.46	15.07	–36 to 36	–.30

ICU, Inventory of callous-unemotional traits; UNSW, University of New South Wales facial emotion task; GEM, Griffith empathy measure.

conducted to examine potential gender differences between key variables. Results revealed a significant gender difference for affective empathy, $t(100) = -3.45$, $p = .001$, such that females reported higher levels than males. Thus, gender was examined as a covariate in analyses where affective empathy was a dependent variable.

Correlations

Correlations among variables are provided in Table 2. CU traits were negatively correlated with cognitive and affective empathy, supporting Hypothesis 1a.[1] The difference in magnitude between these correlations was not significant, Steiger's $z = -1.11$, $p = .27$. Thus, Hypothesis 1b was not supported, as CU traits appeared to be similarly associated with cognitive and affective empathy. In partial support of Hypothesis 2, APT was positively correlated with affective empathy, and facial emotional recognition was positively correlated with cognitive empathy. In support of Hypothesis 3a, CU traits were negatively correlated with APT and facial emotional recognition. The difference in magnitude between these correlations was not significant, Steiger's $z = -.09$, $p = .93$. Thus, Hypothesis 3b was not supported in that CU traits were similarly associated with facial emotion recognition and APT.

Mediation models

Although APT was not significantly correlated with cognitive empathy, and facial emotion recognition was not significantly correlated with affective empathy, Hayes (2013) suggested that mediators do not necessarily need to be significantly associated with outcome variables at the bivariate level for mediation to exist. Thus, four mediation models were examined, with CU traits as the predictor, APT and facial emotion recognition as the mediators in separate models, and each dimension of empathy as the outcome variable in separate models to test our initial hypotheses. The analyses yielded a total effect on empathy for the variables in the model (i.e., CU traits and APT or facial emotion recognition on each index of empathy), a direct effect for the relation between CU traits and each index of empathy and an indirect effect for CU traits on empathy through APT or facial emotion recognition. Indirect effects were examined via bootstrapping method with 5000 resamples using PROCESS for SPSS (Hayes, 2013). Bias-corrected 95% confidence intervals (CIs) were estimated for each indirect effect, and CIs exclusive of zero are indicative of significant mediation (Preacher & Hayes, 2008).

Facial emotion recognition as the mediator

Results of analyses with facial emotion recognition as a mediator are presented in Table 3. The overall model predicting cognitive empathy was significant, $R^2 = .15$, $p < .001$. The total effect, $b = -.36$, $SE = .09$, $p < .001$ and the direct effect, $b = -.33$, $SE = .08$, $p < .001$, of CU traits on cognitive empathy were significant. However, the indirect effect of CU traits on cognitive empathy through facial emotion recognition was $b = -.03$, $SE = .02$, 95% CI [–.09, .0004], suggesting no mediation.

The model predicting affective empathy was not significant, $R^2 = .06$, $p = .06$. The indirect effect of CU traits on affective empathy through facial emotion recognition was $b = -.02$, $SE = .04$, 95% CI [–.11, .05], suggesting no mediation.

[1] The partial correlation between CU traits and affective empathy while controlling for gender was $pr = -.23$, $p = .02$.

Table 2. *Correlations between variables of interest*

	(1) CU traits	*(2) Facial recognition*	*(3) APT*	*(4) Cognitive empathy*
(1) CU traits	–	–	–	–
(2) Facial recognition	−.20*	–	–	–
(3) APT	−.21*	.36***	–	–
(4) Cognitive empathy	−.37***	.21*	.07	–
(5) Affective empathy	−.23*	.09	.28**	.08

APT, Affective perspective-taking.
*p < .05; **p < .01; ***p < .001.

APT as the mediator

Results of analyses with APT as a mediator are also presented in Table 3. The overall model predicting cognitive empathy was significant, R^2 = .13, p = .002. The indirect effect of CU traits on cognitive empathy was b = .001, SE = .03, 95% CI [−.04, .06], suggesting no mediation.

The overall model predicting affective empathy was significant, R^2 = .12, p = .003. The total effect, b = −.48, SE = .19, p = .01, and the direct effect, b = −.38, SE = .19, p = .047, of CU traits on affective empathy were significant. The indirect effect of CU traits on affective empathy through APT was, b = −.10, SE = .07, 95% CI [−.28, −.01], suggesting partial mediation (see Figure 1). Because there was a significant gender difference in affective empathy, the model was re-examined with gender entered as a covariate. Results were similar, with APT demonstrating partial mediation between CU traits and affective empathy (indirect effect: b = −08, SE = .06, 95% CI [−.25, −.002]).[2]

Finally, given that some differentiation among types of emotion recognition deficits has been associated with CU traits, models were examined for each type of emotion separately as mediators (i.e., facial emotion recognition for each emotion; and APT for each emotion). None of these models demonstrated significant indirect effects.

DISCUSSION

This study examined whether CU traits are associated with deficits in cognitive and/or affective empathy and how APT and facial emotion recognition may be related to such deficits. CU traits were negatively associated with both cognitive and affective empathy to a similar degree. This finding is consistent with some previous research (e.g., Jones et al., 2010; Muñoz et al., 2011; Pasalich et al., 2014), although it contradicts other findings regarding cognitive empathy (e.g., Dadds et al., 2009; Schwenck et al., 2012). Many scholars do not disentangle cognitive empathy from perspective-taking or Theory of Mind and use these terms interchangeably (e.g., Blair, 2005; Brouns et al., 2013), which may be contributing to the equivocal findings in the literature. In contrast, the current study specifically examined cognitive empathy (i.e., understanding the "how" and "why" of other's emotions and identifying with these emotions) which is distinct from perspective-taking (i.e., decoding and labelling other's emotional state based on their situation) and found that CU traits were associated with a relative deficit in this dimension. Although cognitive empathy and APT have some conceptual overlap, it is noteworthy that these two measures were uncorrelated in the current study, further illustrating their distinction. Thus, it appears that

[2] Due to the cross-sectional nature of the study, alternative mediation models were also analysed to ascertain the robustness of the current findings. In the model with CU traits as a predictor and affective empathy as the mediator to predict APT, there was a significant indirect effect. However, the effect was smaller than the hypothesised model, b = −.001, SE = .001, 95% CI [−.003, −.0002]. Furthermore, the model with affective empathy as the predictor and APT as the mediator to predict CU traits did not show significant mediation (indirect effect: b = −.02, SE = .02, 95% CI [−.07, .001].

Table 3. *Indirect effects of CU Traits on dimensions of empathy through APT and facial emotion recognition*

Mediator: APT				
	B	SE	*Lower CI*	*Upper CI*
Outcome variable: cognitive empathy	.001	.03	−.04	.06
Outcome variable: affective empathy	**−.10**	**.07**	**−.28**	**−.01**
Mediator: facial emotion recognition				
	B	SE	*Lower CI*	*Upper CI*
Outcome variable: cognitive empathy	−.03	.02	−.09	.004
Outcome variable: affective empathy	−.02	.04	−.11	.05

Note: Boldface represents significant results. Results are shown for models with APT and facial emotion recognition as the mediators and cognitive empathy and affective empathy as the outcome variables. Unstandardised regression coefficients are reported for the indirect effects. Bootstrap analyses with 5000 resamples with replacement were used.
CI, 95% confidence interval.

adolescents with higher levels of CU traits show a relative deficit in both affective and cognitive empathy.

Furthermore, facial emotion recognition was positively correlated with cognitive empathy, whereas APT was positively correlated with affective empathy. Accurately recognising facial expressions appears to help one *identify with* another's emotional experience, but it does not necessarily translate to feeling *for* another person. The ability to accurately infer others' emotional states, on the other hand, appears to be associated with a higher

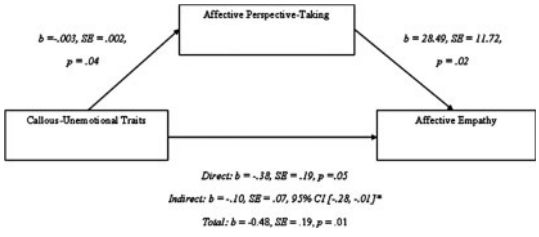

Figure 1. *Mediated outcomes on dimensions of empathy showing indirect effects of CU traits through APT and facial emotion recognition.*

tendency to feel *with* another person but not with *identifying with* another's emotional experience. CU traits were negatively related to APT and facial emotion recognition to a similar degree. Overall, therefore, CU traits were tied to a relative deficit in facial emotion recognition and with taking the perspective of another's emotional state, consistent with previous research (e.g., Anastassiou-Hadjicharalambous & Warden, 2008a; Leist & Dadds, 2009; Muñoz, 2009).

The association between CU traits and affective empathy was partially mediated by APT. Higher levels of CU traits were connected to a relative deficit in APT ability, which in turn, was associated with a relative deficit in affective empathy. This relation held when controlling for gender. Furthermore, this mediation was not specific to a particular type of emotion but was evident for the ability to engage in APT more generally. This finding is consistent with past research suggesting a link between accuracy of perspective-taking and empathy (e.g., Carr & Lutjemeier, 2005; Knafo et al., 2011) and suggests that this association may be important for affective empathy in particular. Thus, accurately engaging in APT could be an initial step that triggers some type of emotional response, and intervention that targets accurate APT could help improve affective empathy for individuals with CU traits (Oswald, 1996). This implication may be particularly relevant for emotions that signal distress (i.e., fear and sadness), as deficits concerning these particular emotions have been most consistently related to psychopathic traits in general and CU traits in particular (Frick et al., 2014), and previous research suggests that they could deter the likelihood of aggressive or antagonistic behaviours from such individuals (Jolliffe & Farrington, 2004; Lovett & Sheffield, 2007).

The association between CU traits and cognitive empathy was not mediated by either APT or facial emotion recognition in the present study. Future research should explore other processes that may underlie this relative deficit, such as the extent to which cognitive empathy might reflect the disregard for others that is a central part of CU traits. In addition, because cognitive empathy involves being able to identify with and understand

another's emotional experiences, developmental factors such as intellectual functioning or emotional intelligence may help explain the mixed findings on CU traits and this form of empathy.

The present study had several limitations that should be considered. Participants were predominantly Caucasian male adolescents attending a residential programme. Thus, findings may not generalise to females or individuals from other ethnicities, age groups or settings. In addition, due to the cross-sectional nature of this study, alternative developmental models (e.g., deficits in facial emotion recognition leading to the development of CU traits, which in turn, lead to deficits in empathy) could not be fully examined. Although it is difficult to argue conceptually that empathy is a precursor to APT or facial emotion recognition, the temporal sequence of the variables of interest could not be fully addressed in this study. APT and facial emotion recognition were conceptualised as underlying deficits that may explain the relation between CU traits and empathy in the current study. Nonetheless, future studies with a longitudinal design to track the development of these processes would better inform the connections among these variables. The current study also relied primarily on self-report data, although there were inclusions of computerised tasks and hypothetical vignettes. However, the facial stimuli and vignettes were relatively limited in terms of range of emotions covered. Of note, each emotion was represented by two faces or two vignettes, and surprise was not included in the facial emotion recognition task. The limited number of trials per emotion may have restricted our power to detect significant effects for specific emotions in the current study. Furthermore, the facial emotion recognition task involved static faces, which may not be representative of natural contexts. Thus, future studies that involve more dynamic facial emotion recognition tasks (e.g., morphing videos), tasks that have a better representation of a wide range of emotions, physiological measures or other collateral reports would be beneficial.

In addition, as noted above, some previous studies demonstrated that CU traits are connected to empathic deficits independent of behavioural problems. Still, behavioural problems may account for some of the variance in empathic deficits, an issue that was not investigated in this sample. Lastly, the poor internal consistency of the Cognitive Empathy Scale may have also made it more difficult to detect relevant effects. Removal of the item with the lowest item-total correlation did not result in an appreciable change in internal consistency; thus, the relatively poor reliability of this particular scale should be considered in interpreting the present results. It should be noted that this internal consistency is similar to that obtained in a prior study for the GEM Cognitive Empathy Scale (Dadds et al., 2009); therefore further advancements in the assessment of cognitive empathy in youth may be needed.

The current study represents one step in further understanding specific mechanisms that underlie empathy deficits associated with CU traits. Variables such as facial emotion recognition and APT could be targets of intervention. Relatively recent interventions that adapt to the cognitive, emotional and motivational style of youth with CU traits have shown promising results, such as by adding an emotion-recognition adjunct to traditional parent training-based interventions (Dadds, Cauchi, Wimalaweera, Hawes, & Brennan, 2012). The present findings suggest that developing accurate APT abilities may help improve affective empathy among youth with CU traits. Overall, this study highlights the importance of exploring specific mechanisms that underlie different dimensions of empathy deficits associated with CU traits, as they have the potential to inform prevention and intervention programmes for youth at-risk for severe and varied behavioural problems.

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APPENDIX

Sample APT vignettes

1. Johnny's/Susie's favourite sweater that he/she liked a lot was very old and worn out. He/she had to throw it away and gave it to his/her mom to get rid of it. [Sad]
2. Johnny's/Susie's little brother broke his/her phone on purpose. [Anger]
3. Johnny/Susie and his/her little sister were in their room at night. It was dark, and they saw a tree outside that looked like a person with his hand about to come in the window. [Fear]
4. It is Johnny/Susie's birthday. He/She is given a party with all his/her favourite people and everything on his/her wish list. [Happy]
5. Someone threw up on Johnny/Susie during lunch at school. [Disgust]

Adapted from Ribordy et al. (1998).