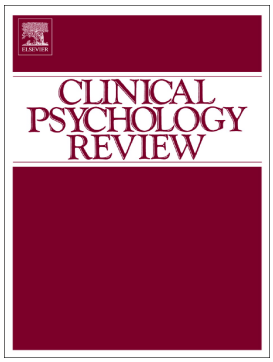

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PII: S0272-7358(22)00071-X

DOI: https://doi.org/10.1016/j.cpr.2022.102186

Reference: CPR 102186

To appear in: *Clinical Psychology Review*

Received date: 31 January 2020

Revised date: 12 June 2022

Accepted date: 21 June 2022

Please cite this article as: M.B. Ritchie, R.W.J. Neufeld, M. Yoon, et al., Predicting youth aggression with empathy and callous unemotional traits: A Meta-analytic review, *Clinical Psychology Review* (2022), https://doi.org/10.1016/j.cpr.2022.102186

Predicting Youth Aggression with Empathy and Callous Unemotional Traits: A Meta-Analytic Review

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Abstract

Historically, empathy has been thought to motivate prosocial behaviour and inhibit aggressive behaviour. Contrary to current assumptions and theoretical support, a recent meta-analysis revealed a small effect of empathy on aggression among adults (Vachon et al., 2013). The current study sought to determine whether broadening the focus from empathy to include other socially relevant affective characteristics (such as in CU traits) was advantageous in predicting aggressive behaviour. As little is known about the strength of this association among youth, the current study meta-analytically examined 192 unique effect sizes drawn from published and unpublished studies reporting on samples of children and adolescents. Analyses were conducted across general, cognitive, and emotional empathy, as well as callous-unemotional traits, and general, direct, indirect, proactive, and reactive aggression. Significant variability was noted across effect sizes. Consistent with a recent meta-analysis involving adults (Vachon et al., 2013), small to moderate associations were identified between aggression and traditional measures of empathy (i.e., general, emotional, cognitive); these effects ranged from r = -.06 to -.26. Among broader measures of emotional style (i.e., callous-unemotional traits), moderate to large effects were found; ranging from r = .30 to .37. Results suggested that broader affective measures may be more strongly associated with aggression than empathy alone. The results raise questions

about the nature of empathy assessment and indicate the utility of targeting multiple emotion-related factors during treatment to effectively reduce aggressive behaviour. In particular, the results underscore of the importance of considering the limited prosocial emotions specifier (perhaps trans-diagnostically given the varied nature of the sample) when considering implications for prognosis and treatment targets.

The prevalence of disorders characterized by aggression (e.g., conduct disorder, oppositional defiant disorder) is alarmingly high among children and adolescents (approximately 10%; Angold & Costello, 2001; Nock, Kazdin, Hiripi, & Kessler, 2007). Youth aggression has demonstrated continuity into adulthood and has been associated with several negative outcomes later in life (e.g., antisocial behaviour in adulthood, work/school problems, substance use, physical and mental health concerns; e.g., Frick et al., 2014; Frick & Viding, 2009; Karantanos, 2012; Moffitt, 2018). Given this problematic trajectory, early detection and effective interventions are imperative to preventing disruptive patterns of behaviour in adulthood. While deficits in empathy have been incorporated into the criteria used to diagnose disruptive behaviour disorders (American Psychiatric Association [APA], 2013) and have been identified as a potential treatment target (Frick & Kemp, 2021), empirical support for an association between empathy and aggression is mixed. Disagreement surrounding the relevance of these constructs may be fueled by variations in the conceptualization of empathy (broader versus more narrowly defined) and type of aggression assessed (Vachon et al., 2014; Frick & Kemp, 2021). As such, the true magnitude of association remains unclear. To help address this gap in the literature, the current study sought to clarify the association between subtypes of empathy and aggression, and

to examine whether broader affective measures (i.e., callous unemotional [CU] trait measures) predict aggression above and beyond traditional empathy measures.

Overview of Empathy

Empathy is a multidimensional construct referring to the process in which one can understand and share the feelings of others and is considered vital to healthy socioemotional development, motivating prosocial behaviour (e.g., Batson, 1991; Decety et a., 2016), and inhibiting antisocial behaviour (e.g., Jolliffe & Farrington, 2004; Miller & Eisenberg, 1988). Empathy is thought to include at least two dissociable components; (1) cognitive (i.e., the process by which an individual is able to infer or understand the mental state of others; Blair, 2005; Lawrence, Shaw, Baker, Baron-Cohen, David, 2004; Smith, 2006) and (2) emotional empathy (i.e., the processes related to sharing another's emotional experience or showing empathic concern; e.g., Baron-Cohen & Wheelwright, 2004; Vossen, Piotrowski, & Valkenburg, 2015). Notably, emotional empathy has been further divided into (a) empathic concern, and (b) affective sharing (Batson, 1991; Batson et al., 1987). Empathic concern includes feelings of sympathy and compassion that evoke altruistic motivation to care for the welfare of another (Batson et al., 2007; Eisenberg, 2000), and promote prosocial behavior (e.g., Eisenberg & Miller, 1987). In contrast, affective sharing involves the ability to share the emotional experience of another (i.e., experience a congruent emotional response). When negative in valence, affective sharing includes feelings of distress (Batson et al., 1987), thought to prompt an individual to reduce one's own distress through avoidance rather than helping (Batson, 1991).

There is evidence that cognitive and emotional empathy are dissociable (e.g., Baron-Cohen & Wheelright, 2004; Shamay-Tsoory, 2011). At a behavioural level, cognitive and emotional empathy are often differentially affected within particular disorders (e.g., see Blair,

2008 for a review). For example, those with psychopathic traits often show deficits in emotional but not cognitive empathy (e.g., Jones, Happe, Gilbert, Burnett, & Viding, 2010; Richell et al., 2003). In contrast, those diagnosed with autism spectrum disorder show deficits in cognitive but not emotional empathy (Mazza, et al., 2014); however, these deficits can vary developmentally (Dadds et al., 2009). Evidence from lesion studies (e.g., Shamay-Tsoory, Aharon-Peretz, & Perry, 2009) and neuroimaging studies (e.g., Hillis, 2014; Moul et al., 2018; Oliver, Vieira, Neufeld, Dziobek, & Mitchell, 2018) also suggest these two forms of empathy are dissociable at a neural level.

Development of Empathy (Deficits) and Aggressive Behaviour

In typically developing children, the acquisition of emotional empathy occurs earlier than cognitive empathy. Evidence of affective sharing (e.g., reflexive crying; Martin & Clark, 1982) is seen from birth and continues to become more sophisticated throughout early childhood (e.g., Eisenberg et al., 2014; Roth-Hanania et al., 2011). Around the age of four, the maturing of emotional empathy is thought to facilitate the onset of cognitive empathy development (Hawes & Dadds, 2012; Singer, 2006). According to this account, typically developing children become motivated to understand others' emotions as a means of avoiding aversive feelings in response to others' distress (e.g., feeling sad when a peer cries). For some children, however, various transactional processes (e.g., fearless child with poor parental supervision; Moffitt, 2018) may disrupt the normative development of socially relevant affective processes (such as empathy) and impede proper psychosocial adjustment. Such disruptions are thought to contribute to the onset of variety of conduct problems during childhood, including aggressive behaviour. For a more detailed review of the timing of empathy development, see Frick and Kemp (2021).

With several trajectories to aggressive behaviour, specific emotional deficits appear to be particularly relevant to a subset of youth who engage in aggressive behaviour. These deficits include lack of empathy, guilt, and prosociality. Among those without such deficits, aggression may be a temporary part of normative adolescent development or the result of an impulsive and reactive temperamental style (Moffit, 2018). For others, however, these emotional deficits are a central characteristic. This subset of youth show a more severe and persistent pattern of antisocial behaviour beginning in early childhood (Frick & Viding, 2009; Moffit, 2018) and are characterized by non-normative levels of callous-unemotional traits (CU traits); which include lack of empathy, but also other socially relevant affective characteristics such as lack of guilt, manipulation, and unemotional characteristics or shallow affect (Frick et al., 2014; Frick & Ray, 2015).

Association between Empathy Deficits and Aggression

Historically, individual differences in empathy have been used as a means of explaining variation in the manifestation and perpetration of aggressive behaviour (e.g., Feshbach, 1969). Theoretically, the association between emotional empathy and aggression has roots in learning and stimulus-reinforcement theory. According to this theory, distress cues act as punishers or unconditioned stimuli; thus, acts that cause distress (including aggressive behaviour) become aversive (Blair, 1995). Without an adequate emotional response to distress in others (or a disruption in the capacity to learn the association between aggressive acts and distress), the risk for aggression is increased (Blair, 2013). Neuroimaging studies focused on the amygdala (a central component of stimulus-reinforcement learning; Blair, 2004) provide support for this theory, showing a reduced amygdala response to fearful expressions among youth with psychopathic traits (e.g., Jones et al., 2009).

In contrast, empirical support for an association between cognitive empathy (i.e., the process by which an individual can infer or understand the mental state of others) and aggressive behaviour has been mixed. That is, some suggest *deficits* in cognitive empathy increase risk for aggression (e.g., Jolliffe & Farrington, 2006b), while others argue that *heightened* cognitive empathy may allow one to manipulate others more effectively (e.g., Cohen & Strayer, 1996; Feshbach, 1987). Generally, the literature appears to support the notion that deficits in cognitive empathy are associated with aggression (e.g., Batanova & Loukas, 2014; Euler et al., 2017).

Proactive and Reactive Aggression. Throughout the literature, distinctions are made between the functions of aggression: (a) proactive (i.e., instrumental, and premeditated behaviour committed for the purpose of obtaining something to benefit the self; Berkowitz, 1993; Dodge, 1991); and (b) reactive aggression (i.e., impulsive and emotionally driven aggression often associated with anger and frustration in response to provocation, or an overreaction to perceived threat; Berkowitz, 1993; Dodge, 1991). Although highly correlated (r = .40 to .90; Card & Little, 2006), factor analyses support the distinction between proactive and reactive aggression (e.g., Day, Bream, & Pal, 1992; Poulin & Boivin, 2000). Further, there is evidence that these subtypes are associated with distinct neurocognitive risk factors, developmental histories, and relations to maladjustment (e.g., Blair, 2010; Card & Little, 2006; Fite, Preddy, Vitulano, Elkins, Grassetti, & Wimsatt, 2012; Yang, Joshi, Jahanshad, Thompson, & Baker, 2017).

While deficits in emotional empathy are thought to increase risk for proactive aggression, hyper-reactions to perceived threat are thought to increase risk for reactive aggression (Blair, 2013; Blair, Peschardt, Budhani, Mitchell, & Pine, 2006). Neuroimaging research has identified specific neural regions (i.e., orbital, ventrolateral frontal cortex) that mediate basic responses to threat and are more heavily implicated in the regulation of reactive aggression (Blair, 2004).

Reactive aggression is thought to be driven by an overreaction to frustration or perceived threat and features heightened arousal and emotion dysregulation; it is associated with either increased threat sensitivity or impaired decision making (Blair et al., 2006; Blair, 2013). In contrast, proactive aggression (e.g., planned acts) need not be accompanied by heightened emotional arousal (Blair, 2013; Blair et al., 2006; Glenn & Raine, 2009), and has been associated with lower emotional empathy (e.g., Euler, Steinlin, & Stadler, 2017; Jolliffe & Farrington, 2006a). With respect to cognitive empathy, there appears to be a negative association with proactive aggression but not reactive aggression among youth (e.g., Euler et al., 2017). In contrast, callous-unemotional trait measures have been associated with increased risk for both proactive and reactive aggression (Frick, Cornell et al. 2003). Notably, the nature of the association between empathy facets and reactive aggression may depend on the clinical significance of deficits in empathy. For example, Pouw, Rieffe, Oosterveld, Huskens, & Stockmann (2013) found that reactive aggression was *negatively* associated with empathy facets (i.e., emotional and cognitive) among typically developing children and positively associated with empathy facets among children with autism spectrum disorder.

Direct and Indirect Aggression. A distinction is also made between the forms of aggression, (a) direct (i.e., outwardly confrontational behaviour that deliberately causes harm to another individual; Yeo, Ang, Loh, Fu, & Karre, 2011) and (b) indirect aggression (i.e., the use of social manipulation to harm others via covert means; Bjorkvist, 2001; Bjorkvist, Legerspetz, & Kaukiainen, 1992). This operationalization of aggression offers a different perspective of aggressive behaviour than the function (i.e., proactive, reactive), as it focuses more on the style in which aggression is perpetrated rather than the purpose behind the aggression. Notably, the forms and functions of aggressive behaviour should not be considered as orthogonal, but instead

are understood as overlapping constructs. That is, it is feasible for proactive or reactive aggression to be perpetrated via either direct or indirect means.

Although highly correlated among children and adolescents (r = .76; Card, Stucky, Sawalani, & Little, 2008), research has supported the distinction between direct and indirect aggression. A meta-analysis conducted by Card and colleagues (2008) suggests that, among children and adolescents, direct aggression is associated with poor peer relationships, a lack of prosocial behaviour (i.e., deceitfulness, oppositional or defiant behaviour), and symptoms of emotional dysregulation and attention deficit hyperactivity disorder. In contrast, indirect aggression is associated with clinical or subclinical depression and anxiety (Card et al., 2008). Sex differences are also noted, where boys are more likely to engage in direct aggression and girls are more likely to engage in indirect aggression (Card et al., 2008). Thus, while direct and indirect aggression may share some variance, research suggests these are distinct constructs.

Emotional and cognitive empathy appear to differentially impact engagement in direct and indirect aggression. Specifically, a consistent association has been identified between both forms of empathy and direct aggression, where the direct experience of distress cues is thought to reduce the likelihood of aggressive behaviour among those with intact emotional empathy (Batanova & Loukas, 2014; Cohen & Strayer, 1996; Jolliffe & Farrington, 2006b). In contrast, emotional and cognitive empathy are believed to be less important for regulating indirect aggression, given the absence of confrontation and privation of immediate distress cues (Bjorkqvist, Osterman, & Kaukiainen, 2000; Kaukiainen et al., 1999; Yeo et al., 2011); perhaps because the social manipulation involved in indirect aggression requires an adequate representation of another's mental state.

Previous Meta-Analyses. Despite the theoretical importance of traditional indices of empathy to aggressive behaviour, the empirical picture is surprisingly mixed. Miller and Eisenberg (1988) first examined this association among 30 studies from the child and adult literature. A small negative correlation, r = -.18, was found between self-reported emotional empathy and general aggression (i.e., delinquency, criminal behavior, and conduct disorder). Subsequently, Jolliffe and Farrington (2004) conducted a meta-analysis of 35 studies examining the association between offending (i.e., official or reported criminal offences serious enough to result in a conviction) and general, cognitive, and emotional empathy. Among these studies, effects ranged from r = -.07 to r = -.23. Age significantly moderated the association between general empathy and offending; where the association among adolescent samples was moderate, r = -.19, and the association among adult samples was small, r = -.08.

With 106 effect sizes drawn from studies utilizing a variety of methods, Vachon and colleagues (2013) meta-analytically examined the association between empathy (i.e., general, cognitive, and emotional) and aggression (i.e., verbal, physical, and sexual) exclusively among adults. Overall, a small negative association was identified between empathy and aggression, r = -.11. The magnitude of the association was consistent across empathy and aggression types, ranging from r = -.09 to r = -.20, leading Vachon and colleagues (2013) to conclude an absence of association. Finally, Zych et al. (2019) meta-analytically explored the role of empathy in bullying – a form of proactive aggression – among children and adolescents, and were the first to include measures of CU traits among traditional measures of empathy. Across 53 studies, those who bullied were found to have significantly lower odds of scoring high on cognitive (OR = 0.60), emotional empathy (OR = 0.51), and CU traits (OR = 2.55) compared to non-bullies.

Notably, there has yet to be a review quantifying the magnitude of the association between CU traits and broader measures of aggression.

Concerns with prior meta-analyses. Contrary to contemporary theory, previous meta-analyses suggest a small to modest association between empathy and aggression. Vachon and colleagues (2013) expressed their surprise at the ostensibly small association given the centrality of empathy to treatment programs aimed at reducing aggressive behavior and the diagnostic criteria for psychological disorders involving aggression. We believe that this small effect should be interpreted with caution, as several limitations are noted among the extant meta-analyses.

Firstly, these studies may be limited by the operationalization of aggressive behaviour. Despite evidence suggesting the association between empathy and aggression may differ as a function of the type of aggression examined (e.g., Berkowitz, 1993; Dodge, 1991), meta-analyses have yet to distinguish the form (i.e., direct and indirect), as well as the function (i.e., proactive and reactive) of aggressive behavior. Frick and Kemp (2021) suggest that the distinction between aggression function could be important for several reasons. For example, emotional empathy is more strongly associated to proactive, than reactive aggression (Euler et al., 2017; Munoz et al., 2008). Further, while reactive and proactive aggression are highly correlated (r = .70; Little et al., 2003), this association is asymmetrical; that is, most aggressive youth engage exclusively in reactive aggression, fewer engage in both reactive and proactive aggression, and a minority engage exclusively in proactive aggression (Marsee et al., 2014). Considering that the strength of association may be greatest among exclusively proactive youth, Frick and Kemp (2021) suggest the co-occurrence of proactive and reactive aggression may weaken the expected effects. Similarly, given the prevalence of reactive aggression, greater variance would be expected in

responses to general aggression measures relative to measures that distinguish between aggression function.

Additionally, it is unclear whether prior meta-analytic findings can be generalized to children and adolescents, as samples of youth have yet to be adequately separated from adult samples. Empathy undergoes substantial developmental changes over the course of childhood and becomes more stable in adolescence and adulthood (Steiger, & Fend, 2015). As such, it is important to understand the magnitude of effect during this critical period of development, independent of stable adult traits. With evidence of a small effect of empathy on aggression among adults (Vachon et al., 2013), and the prominence of the empathy-aggression association in current youth diagnostic criteria and treatment, there is a clear need to elucidate the strength of association among children and adolescents.

A final important consideration for interpreting the observed small effect size of empathy with caution is the existence of work conducted in forensic samples or clinic-referred youth suggesting that individual differences in broader affective traits, including empathy, are considered highly predictive of conduct problems (e.g., aggression; Frick et al., 2014), treatment responsiveness (Hawes & Dadds, 2005), and later criminal behavior (Frick, Cornell, Barry, Bodin, & Dane, 2003). These studies examine CU traits, which include lack of empathy, but also other socially relevant affective characteristics such as lack of guilt, manipulation, and unemotional characteristics or shallow affect. Although not yet meta-analytically examined, the association between CU traits and antisocial behaviour is estimated to vary from r = -.15 to .84. This raises the possibility that measures emphasizing other affective characteristics (e.g., lack of guilt, restricted affect, lack of concern for performance) may result in stronger predictions of aggressive behaviour than traditional measures of empathy.

Present Study

To address the existing gap in the literature, we conducted a meta-analytic examination of the association between empathy, CU traits, and aggressive behaviour in childhood and adolescence. Specifically, we sought to determine whether broader affective measures (i.e., CU traits) predict aggression above and beyond traditional measures of empathy. With evidence of distinct relationships between different types of empathy and aggression (e.g., Euler et al., 2017), separate analyses were conducted to examine the association between the subtypes of empathy/affective style (i.e., general, cognitive, and emotional empathy, as well as CU traits) and the forms (e.g., direct and indirect) and functions (e.g., proactive and reactive) of aggressive behaviour. This novel approach was chosen to further our understanding of the underpinnings of aggression among children and adolescents, and to inform current clinical practice. Based on the summarized literature and theoretical expectations, several hypotheses were formed.

In light of evidence that general empathy inhibits rather than promotes aggressive behaviour among children and adolescents (e.g., Penner et al., 2005), a negative association was expected between empathy (i.e., general, cognitive, and emotional) and aggression (i.e., general, direct, indirect, proactive, and reactive aggression). The magnitude of association, however, was expected to differ as a function of the type of empathy and aggression examined. Specifically, it was hypothesized that general and emotional empathy would be moderately associated with general, direct, and proactive aggression, but weakly associated with indirect and reactive aggression (e.g., Euler et al., 2017; Jolliffe & Farrington, 2006b; Yeo et al., 2011). Whereas cognitive empathy was hypothesized to be moderately associated with direct (e.g., Batanova & Loukas, 2014) and proactive aggression (e.g., Euler et al., 2017), a small or non-significant association was expected with reactive (e.g., Euler et al., 2017) or indirect aggression (e.g.,

Bjorkqvist et al., 2000). Given the mixed empirical support, a small association was expected between cognitive empathy and aggressive behavior (e.g., Caravita et al., 2010; Yeo et al., 2011). Further, it was expected that the effect of CU traits on aggression would be higher in magnitude than that of general, cognitive, and emotional empathy, and that a strong positive association would be identified across all forms of aggressive behaviour. The CU trait by proactive aggression effect size was predicted to be the strongest association across forms and functions of aggression (e.g., Frick & Kemp, 2021).

Moderator Hypotheses: Hypotheses were also made regarding the moderating effect of age and sex. Age was expected to moderate the association between all forms and functions of aggression, empathy, and CU traits. Effect sizes were expected to be stronger among adolescents than children given the developmental changes that occur during this time period (including improvements in abstract thinking; e.g., Allemand et al., 2015; Eisenberg et al., 2006). Sex was also predicted to be a moderator, as research suggests sex differences in the association between empathy and aggression (Card et al., 2008; Rieffe et al., 2016) as well as CU traits and aggression (e.g., Nwafor et al., 2015). The association between empathy (general, cognitive, emotional) and direct, proactive, and reactive aggression was expected to be stronger among boys; in contrast, the association between empathy and indirect aggression was expected to be stronger among girls. All other moderator variables were considered exploratory.

Method

Study Selection

An initial literature search was conducted in the PsycINFO, Cochrane, PubMed, and Embase databases using keywords related to empathy and aggression in May of 2022. The search terms for empathy were “empathy or empathetic or callous* or sympathy or sympathetic

or emotional contagion or perspective taking or theory of mind or compassion or emotion recognition". The search terms for aggression were "externaliz* or aggress* or antisocial or fight* or assault or murder or homicide or violen* or rape or molest* or physical abuse or crime or criminal* or incarcerat* or theft or stealing or robbery or burglary or fraud or forgery or shoplifting or vandalism or arson or bully*". Studies were excluded if they involved a sample above the age of 20, were published prior to 1964, were written in a language other than English, or examined nonhuman samples. The initial search yielded 5691 unique scholarly journal articles and unpublished dissertations (see Appendix B). Two raters coded the first 25% of studies (n = 1423) to obtain interrater reliability before screening the remaining studies (ICC = .91). An agreement coding was reached and 1392 articles were retained for further review.

To be included in the final analyses, studies were required to: (a) be an original quantitative empirical study (thereby excluding reviews, meta-analyses, theoretical papers, and qualitative studies), (b) include at least 20 participants, (c) have a participant age ranging from 5 to 19 years (inclusive), (d) include at least one lab task, informant rating, or self-report questionnaire measuring general empathy or at least one empathy facet (i.e., cognitive empathy, emotional empathy) or CU traits, and (f) include historical reports, at least one lab task, informant rating, or self-report questionnaire measuring aggression). In the current study, aggressive behaviour included any action or threat intended to cause physical or psychological harm to another person (Dodge, 1991). Studies that assessed aggressive thoughts rather than aggressive behaviour were excluded. Inclusion criteria were coded by both coders to ensure adequate reliability (ICC = 0.94). Studies were reviewed for any mismatched items until coders agreed on all items. This process identified 198 studies that satisfied the inclusion criteria.

Study Coding

All 198 unique studies were then coded for sample size, mean age, the proportion of male and Caucasian participants, country of origin, sample type (e.g., student, community, justice), the name and type of the empathy measure (i.e., self-report, laboratory task, informant rating), the name and type of the aggression measure (i.e., self-report, laboratory task, informant rating, archival records), and the publication status (i.e., published or unpublished).

All studies were coded for the content assessed by the measures (i.e., general, cognitive, emotional empathy, CU traits). A study was coded as reporting cognitive empathy if the measure assessed an understanding of another's mental state. Alternatively, a study was coded as reporting emotional empathy if the measure assessed the sharing of, or concern for, another's emotional experience. Studies that did not specifically distinguish cognitive or emotional empathy were coded as reporting on general empathy. Finally, any measure of CU traits was coded under the CU trait category.

All studies were then coded for the form (i.e., direct or indirect) and function (i.e., proactive or reactive) of aggressive behaviour to determine whether the association differs as a function of the operationalization of aggressive behaviour. Direct aggression was coded whenever the study used the term direct aggression, or assessed overt, physical, sexual, or verbal behaviour intended to cause harm. Similarly, indirect aggression was coded when the study used the term indirect aggression or when indirect-relational aggression was assessed. In terms of the function of aggression, proactive aggression (including face-to-face bullying) and reactive aggression were coded when aggression was defined as goal oriented or impulse driven, respectively. General aggression was coded when the study did not specify the form or function of the aggressive behaviour being measured.

To ensure the assumption of independence of data was not violated, articles were flagged when the first author had concerns that the same sample was reported in more than one study (n = 6). For these cases, the study published more recently was included in the meta-analysis; and both dates are reported. When a single study reported more than one effect size for the same sample using the same type of measure (e.g., emotional empathy was measured by 2 different questionnaires), the mean effect size was included in the analysis. Composite effect sizes were also obtained for studies reporting more than one time-point with the same sample (e.g., taking the average of scores in Grade 4, Grade 6, and Grade 8). Studies that reported effect sizes for more than one unique sample (e.g., student and juvenile justice) were coded as separate samples rather than a composite score. After excluding duplicate studies, 192 unique studies remained.

The internal consistency of empathy, CU trait, and aggression measures were reported by over 90% of authors. Those that did not report reliability statistics used well established measures (e.g., ICU, IRI) that have historically demonstrated adequate internal consistency. The average Cronbach's alpha among studies reporting adequate internal consistency (e.g., Cronbach's alpha > = .60) was .78, .77, and .84 for empathy, CU, and aggression measures, respectively. Among studies that met inclusion criteria, only 3% used measures with a Cronbach's alpha below .60 (Average Cronbach's alpha = .57; range .52 to .59). These studies were included in the final results presented below, as there were no differences in effect sizes when the studies were excluded.

Statistical Analyses

Individual effect sizes. Effect sizes were obtained from each study in the form of the Pearson correlation coefficient (*r*), as empathy and aggression are both assumed to be continuously distributed constructs. According to Cohen (1988), a correlation coefficient below

.30 can be considered a small effect, a correlation coefficient between .30 and .50 can be considered a moderate effect, and a correlation coefficient of .50 or higher can be considered a large effect. Notably, Cohen's empirical guidelines for interpreting correlation coefficients have been criticized for being unrealistically large benchmarks relative to what would be expected in psychological research (e.g., Hemphill, 2003). For example, upon examining 380 meta-analytic studies, Hemphill (2003) suggested a more realistic convention would label a correlation coefficient below .20 a small effect, a correlation coefficient between .20 and .30 a moderate effect, and a correlation coefficient greater than .30 a large effect. Further, when interpreting the magnitude of a correlation coefficient, it is important not to confuse the naming convention with importance (e.g., McCartney & Rosenthal, 2000; Prentice & Miller, 1992). In light of these two conventions, where they disagree, we have elected to describe effect size as a range with Cohen's convention ($r_{small} < .30$; $r_{moderate} > .30 < .50$; $r_{large} > .50$) serving as the lower bound, and Hemphill's ($r_{small} < .20$; $r_{moderate} > .20 < .30$; $r_{large} > .30$) as the upper limit of the range (e.g., a coefficient of 0.30 would be described as a small to moderate effect).

To establish a common index for measures of association among the studies included in the analysis, all data were converted to *r*-values using the procedures outlined by Borenstein, Hedges, Higgins, and Rothstein (2009). In some cases, enough information was provided to compute more than one effect size from a single study (e.g., separate effect sizes for boys and girls). Several studies also reported more than one outcome across participants. In such cases, separate meta-analyses were conducted to examine the association between each empathy type and aggression to ensure independence of effect sizes. Effect sizes were recorded separately for each type of empathy (i.e., general, cognitive, emotional) and aggression (i.e., general, direct, indirect, proactive, reactive). As several studies measured more than one form of aggression

using the same sample, it was not possible to include aggression type as a moderator variable without violating the assumption of independence. As such, the 84% confidence intervals based on the random-effects model were contrasted to identify significant differences across effect sizes for the different types of aggression (see Tryon, 2001). Specifically, non-overlapping 84% and 95% confidence intervals are indicative of a significant difference between effect sizes at the .05 and .01 level, respectively (Tryon, 2001).

Mean effect sizes. In accordance with Borenstein et al. (2009), correlation coefficients were transformed into Fisher's z_r units to average the effect sizes presented across the studies. A separate variance and standard error were also calculated for Fisher's z_r values to ensure indices were in the same metric. Transformed effect sizes were then weighted (by the inverse of the corresponding variance) using the weighted mean effect size formula (Borenstein et al., 2009; Lipsey & Wilson, 2001). The weighted effect sizes were then averaged to derive an overall mean effect size across the sample of studies as well as separate mean effect sizes for each subgroup (e.g., cognitive empathy, emotional empathy). The summary effects and confidence intervals were then converted back to a correlation coefficient for ease of interpretation. Relevant equations are presented in Appendix A.1.

Analysis of heterogeneous distributions of effect size. A test of heterogeneity was conducted for each mean effect size to determine whether any variation in effect size across the studies included in the meta-analysis was reflective of genuine differences among the results (i.e., heterogeneity) or subject-level sampling error (i.e., homogeneity). Notably, a non-significant Q-value suggests that any effect size variation among the studies can be accounted for by subject-level sampling error or chance, whereas a significant Q-value indicates heterogeneity among the studies. The Q statistic, distributed as X^2 with $df = k - 1$ (where k = the number of

studies), was used to test the equality of effect sizes across studies. As the Q statistic has poor power to detect true heterogeneity among small samples and tends to be overpowered among larger samples, Higgins, Thompson, Deeks, and Altman (2003) recommend the use of I^2 to assess the magnitude of heterogeneity. I^2 quantifies the percentage of effect size variation across the studies included in the meta-analysis attributable to heterogeneity. I^2 values of approximately 25%, 50%, and 75% are indicative of small, medium, and large heterogeneity, respectively (Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006). Relevant equations are presented in Appendix A.2.

Moderator Analyses. Given the variability in sample characteristics and methodology across studies, significant heterogeneity was expected across the effect sizes. As such, random- or mixed-effects models were selected a priori. The mixed-effects model was used when systematic factors could be identified and coded consistently across studies, otherwise the random-effects model was used. That is, moderators (e.g., demographics, measure type, and publication status) were used to partition systematic variance from random variance in mixed-effects models. Under the mixed-effects model, the variance partitioning procedure used to examine categorical moderators (i.e., sex, the name of the measure used to assess empathy and aggression, and publication status) was analogous to analysis of variance. As such, the variance among studies was divided into between-groups (i.e., distributed as X^2 (df = number of groups – 1) and within-moderator variance, where significant between-group heterogeneity implies moderation (Lipsey & Wilson, 2001). In contrast, the procedure used to examine continuous moderators (i.e., average age, proportion male, proportion Caucasian) was analogous to weighted regression. Specifically, the weighted Fisher's z_r values for each of the studies were regressed onto one moderator at a time. Linear change in the effect sizes across selected levels of the

moderator is indicative of moderation, suggesting that levels of the moderator account for the variance across studies. For a moderator to be analyzed, at least 10 studies and at least three effect sizes from each level were required. Under some circumstances it was possible to combine levels to obtain at least 3 effect sizes. The "other" category denotes the combination of levels. Notably, a more conservative significance level was used, $p < .01$; 99% CI to control for multiple comparisons.

Statistical software. All analyses were conducted in Comprehensive Meta-Analysis 2.0 (CMA; Borenstein, Hedges, Higgins, & Rothstein, 2005).

Results

A total of 198 studies (192 unique samples) provided data on the association between aggression, traditional forms of empathy, and CU traits. Of these studies, 38 unique studies examined general empathy (N = 19,178; Appendix C.1), 71 unique studies examined emotional empathy (N = 69,435; Appendix C.2), 48 unique studies examined cognitive empathy (N = 70,384; Appendix C.3), and 103 unique studies examined CU traits (N = 48,185; Appendix C.4). See Table 1 for a sample summary.

Table 1

Overview of Sample Characteristics

Characteristics	**General (*N* = 38)**	**Emotional (*N* = 71)**	**Cognitive (*N* = 48)**	**CU (*N* = 103)**
Review Type (%)				
	Published (84%) Unpublished (16%)	Published (89%) Unpublished (11%)	Published (88%) Unpublished (12%)	Published (93%) Unpublished (7%)
Origin of Study (%)				
	US (45%) Finland (5%) Spain (11%) Taiwan (3%) Ecuador (3%) Switzerland (8%) Poland (3%) Australia (8%) Malaysia (3%) England (3%) Greece (3%) China (3%) Hong Kong (3%) South Korea (3%)	US (31%) Spain (11%) Italy (7%) Netherlands (11%) Mixed (3%) Portugal (1%) Sweden (1%) Chile (1%) Australia (3%) Hong Kong (4%) Switzerland (3%) Canada (6%) Norway (1%) Finland (3%) Greece/Cyprus (4%) England (3%) Germany (3%) China (4%) Peruvia (1%) New Zealand (1%) Singapore (1%) Turkey (1%)	US (29%) Germany (2%) Greece/Cyprus (4%) England (2%) Australia (2%) Mixed (4%) Portugal (2%) Sweden (2%) Chile (2%) Italy (8%) Spain (8%) Hong Kong (6%) Switzerland (2%) Norway (2%) Finland (4%) China (6%) Peru (2%) Netherlands (2%) New Zealand (2%) Turkey (2%) Netherlands (4%) Singapore (2%) Canada (2%)	US (57%) Canada (3%) Italy (4%) Germany (2%) Netherlands (3%) Sweden (1%) Australia (1%) Greece/Cyprus (4%) Mixed (4%) Isreal (1%) Spain (5%) China (1%) England (4%) Nigeria (1%) Portugal (3%) Singapore (1%) Switzerland (1%) India (1%)
Age (Average)				
	12.26	12.01	12.31	12.76
Empathy Measure (% of studies)				
	IRI (16%) PEES (11%) BES (5%) EQ (3%) EI (21%) GEM (3%) Other (34%)	IRI (37%) BES (21%) IECA (10%) Other (17%) Mixed (1%) GEM (4%) CASES (3%) EQ (1%) PEES (1%)	IRI (41%) HIFIDS (6%) CASES (4%) EI (4%) Mixed (2%) EQ (2%) PEES (2%) Other (16%)	ICU (59%) APSD (24%) YPI (4%) Other (10%) Mixed (1%)
Sample Type (%)				
	Student (63%)	Student (83%)	Student (84%)	Student (29%)

	Community (16%) Clinical (11%) Forensic (8%) Mixed (5%)	Community (8%) Clinical (6%) Forensic (1%) Mixed (3%)	Community (8%) Clinical (6%) Mixed (6%)	Community (14%) Clinical (35%) Forensic (19%) Mixed (3%)
Aggression Type (% of studies)				
	General (45%) Direct (34%) Indirect (16%) Proactive (16%) Reactive (11%)	General (30%) Direct (21%) Indirect (24%) Proactive (55%) Reactive (20%)	General (22%) Direct (27%) Indirect (31%) Proactive (73%) Reactive (22%)	General (40%) Direct (25%) Indirect (18%) Proactive (53%) Reactive (46%)

Note. APSD = Antisocial Process Screening Device (Frick & Hare, 2001); BES = Basic Empathy Scale (Jolliffe & Farrington, 2006a); HIFDS questionnaire = How I Feel in Different Situations Questionnaire (Feshbach, Caprara, Lo Coco, Pastorelli, & Manna, 1991); ICU = Inventory of Callous Unemotional Traits (Frick, 2004); IECA; Index of Empathy for Children and Adolescence (Bryant, 1982); IRI = Interpersonal Reactivity Index (Davis, 1980); YPI = Youth Psychopathy Inventory (Andershed et al., 2002); EQ = Empathy Quotiant (Baron-Cohen & Wheelwright, 2004); CASES = Cognitive Affective and Somatic Empathy Scales (Raine & Chen, 2018); PEES = Peer Estimated Empathy.

As several studies reported more than one type of empathy, separate meta-analyses were conducted to satisfy the assumption of independence. Table 2 provides a summary of the effect sizes for general, CU, cognitive, and emotional empathy.

Table 2

Summary of Effect Sizes across General Empathy, Emotional Empathy, Cognitive Empathy, and CU Traits

Aggression Type	Empathy Type			
	General	Emotional	Cognitive	CU
General				
r	-.26	-.13	-.06	.35
95% CI	[-0.18, -0.34]	[-0.08, -0.19]	[-0.03, -0.16]	[0.30, 040]
84% CI	[-0.24, -0.28]	[-0.12, -0.14]	[-0.03, -0.09]	[0.34, 0.36]
k (*n*)	19 (5919)	23 (12107)	11 (1834)	45 (15168)
Proactive				
r	-.19	-.18	-.13	.36
95% CI	[-0.12, -0.26]	[-0.16, -0.20]	[-0.09, -0.16]	[0.32, 0.39]
84% CI	[-0.18, -0.20]	[-0.17, -0.19]	[-0.12, -0.14]	[0.35, 0.37]
k (*n*)	13 (8347)	40 (45,421)	35 (29,541)	55 (28560)
Reactive				
r	-.10	-.10	-.07	.30
95% CI	[-0.03, -0.18]	[-0.01, -0.18]	[-0.16, 0.02]	[0.26, 0.34]
84% CI	[-0.05, -0.15]	[-0.08, -0.12]	[-0.05, -0.09]	[0.29, 0.31]
k (*n*)	4 (748)	15 (8272)	11 (7553)	49 (23774)
Direct				
r	-.21	-.21	-.25	.37
95% CI	[-0.18, -0.36]	[-0.14, -0.28]	[-0.13, -0.36]	[0.29, 0.42]
84% CI	[-0.19, -0.23]	[-0.20, -0.22]	[-0.24, -0.26]	[0.36, 0.38]
k (*n*)	12 (6612)	15 (11365)	13 (9579)	24 (9175)
Indirect				
r	-.12	-.11	-.13	.36
95% CI	[-0.03, -0.20]	[-0.06, -0.16]	[-0.07, -0.19]	[0.27, 0.41]
84% CI	[-0.09, -0.15]	[-0.10, -0.12]	[-0.12, -0.14]	[0.34, 0.38]

k (*n*)	7 (2505)	18 (17526)	15 (14885)	16 (4823)

Note. CU = Callous Unemotional; 95% CI = 95% Confidence Interval; 84% CI = 84% Confidence Interval.

General Empathy

Significant heterogeneity was found concerning the strength of the association between general empathy and aggression reported by individual studies. The *Q* tests indicated variation in the effects was due to factors beyond sampling error, $Q = 0.71$ to 489.95, $p < .01$, and the I^2 statistics suggest the magnitude of heterogeneity was small ($I^2 < 50\%$) to large ($I^2 > 75\%$).

A small to moderate effect was identified between general empathy and general aggression, $r = -.26$, 95% CI [-0.12, -0.26], suggesting that as general empathy decreased, general aggression increased. Similar effects were identified between general empathy and the forms (i.e., direct, indirect) and functions (i.e., proactive, reactive) of aggressive behaviour. The 84% CIs and Fisher r-to-z transformations were then examined to compare across effect sizes. When examining the form of aggression, the effect of direct aggression ($r = -.21$) was significantly larger than the effect of indirect aggression ($r = -.12$), $z = -3.94$, $p < .001$. Similarly, when examining the function of aggression, the effect of proactive aggression ($r = -.19$) was significantly larger than the effect of reactive aggression ($r = -.10$), $z = -2.41$, $p < .01$.

Moderator. As significant heterogeneity was present, a series of categorical and continuous moderator analyses were conducted under the mixed-effects model and estimated through the method of moments (DerSimonian & Kacker, 2007). Potential moderators were examined individually (i.e., publication status, proportion of males, average age, sample type, country, empathy measure, empathy rater, aggression measure and rater). Empathy measure was identified as a significant moderator in the association between general empathy and proactive aggression, $Q(1) = 9.30$, $p < .01$, where the empathy measures categorized as other, $r = -.22$, produced greater effects than the IRI/BES, $r = -.13$.

Emotional Empathy

The *Q* tests indicated significant variation in the emotional empathy and aggression (i.e., general, proactive, reactive, direct, and indirect) strength of the association across studies, Q = 122.81 to 175.36, $p < .01$, and the magnitude of heterogeneity was large ($I^2 > 75\%$).

A small effect was identified between emotional empathy and general aggression, r = -.13, 95% CI [-0.08, -0.19], suggesting that as emotional empathy decreased, general aggressive behaviour increased. Similar effects were identified between general empathy and the forms (i.e., direct, indirect) and functions (i.e., proactive, reactive) of aggressive behaviour. Upon examining the 84% CIs and Fishers *r*-to-*z* transformation, the effect of emotional empathy on direct aggression (r = -.21) was found to be significantly larger than the effect of indirect aggression (r = -.11), z = -8.46, $p < .001$. Regarding the function of aggression, the effect of emotional empathy on proactive aggression (r = -.18) was significantly larger than the effect of reactive aggression (r = -.10), z = 6.83, $p < .001$.

Moderator. With significant heterogeneity, potential moderators were examined individually (i.e., publication status, proportion of males, average age, sample type, country, empathy measure, empathy rater, aggression measure and rater). Age was identified as a significant moderator in the association between emotional empathy and general aggression, Q(1) = 6.38, $p < .01$, where effect sizes decreased as the average age of study participants increased. The empathy measure was also identified as a significant moderator in the association between emotional empathy and general aggression, Q(3) = 13.65, $p < .01$, where the BES r = -.20, the IRI r = -.16, the IECA r = -.16, and other measures r = -.07. Finally, the aggression rater was identified as a significant moderator in the association between emotional empathy and reactive aggression, Q(1) = 11.06, $p < .01$. That is, a stronger association was identified among

self-reported aggression, r = -.15, than a combination of peer, parent, teacher, or mixed-report, r = .07.

Cognitive Empathy

Significant heterogeneity was identified among the cognitive empathy and aggression (i.e., general, proactive, reactive, direct, and indirect) strength of the association across studies. The Q tests indicate significant variation in effect sizes across studies, Q = 96.72 to 310.52, p <.01, and the I^2 statistics suggests that the magnitude of heterogeneity was large (I^2 > 75%).

Consistent with the effect of general empathy on general aggression, a small effect was identified between cognitive empathy and general aggression, r = -.06, 95% CI [-0.03, -0.16], suggesting that as cognitive empathy scores decreased, general aggression increased. Among the forms of aggression, small to moderate effects were identified between cognitive empathy, direct aggression, r = -.25, 95% CI [-0.13, -0.36], and indirect aggression, r = -.13, 95% CI [-0.07, -0.19]. Small effects were found between cognitive empathy and the function of aggression, proactive, r = -.12, 95% CI [-0.09, -0.16], reactive, r = -.07, 95% CI [-0.16, 0.02]. The 84% CIs and Fisher's r-to-z transformations indicated the effect of cognitive empathy on aggression was larger for direct aggression compared to indirect aggression, z = -9.52, p < .001. Similarly, the effect of proactive aggression was significantly larger than the effect of reactive aggression, z = -3.91, p < .01.

Moderator. Given the apparent heterogeneity, a series of moderator analyses were performed. Potential moderators included (i.e., publication status, proportion of males, average age, sample type, country, empathy measure, empathy rater, aggression measure and rater). The association between cognitive empathy and indirect aggression was found to be moderated by the average age of study participants, where effect sizes increased as the age of participants

increased, Q(1) = 31.81, $p < .01$. This association was also moderated by sample type, Q(1) = 30.08, $p < .01$, where effects were stronger among student samples, $r = -.14$, than among other samples, $r = -.12$. The association between cognitive empathy and indirect aggression also differed across the empathy measure used, Q = 30.36 (2), $p < .01$, where the BES, $r = -.14$, and IRI, $r = -.15$, showed stronger effects than other measures of cognitive empathy, $r = -.09$. Finally, the association between cognitive empathy and reactive aggression differed across sample type, Q(1) = 10.26, $p < .01$, where the effect was stronger among students, $r = -.10$, than among other sample types, $r = -.04$.

Callous Unemotional Traits

The *Q* tests indicated significant variation in the CU and aggression (i.e., general, proactive, reactive, direct, and indirect) strength of the association across studies, $Q = 115.87$ to 489.84, $p < .01$, and the magnitude of heterogeneity was large ($I^2 > 75\%$).

A moderate to large positive effect was identified between CU traits and general aggression, $r = .35$, 95% CI [0.30, 0.40], suggesting that as CU trait scores increased, general aggression also increased. Moderate to large effects were also identified between CU traits and all forms and functions of aggression. The 84% CIs and Fisher's r-to-z transformations indicated that the effect of CU traits did not differ across the forms of aggression, z = 0.65, $p = .52$. The functions of aggression, however, were found to significantly differ, where CU traits were more strongly associated with proactive aggression ($r = .36$) than with reactive aggression ($r = .30$), z = 7.10, $p < .001$.

Moderator. In the presence of heterogeneity, a series of categorical and continuous moderator analyses were conducted with the following variables: publication status, proportion of males, average age, sample type, country, CU measure, CU rater, aggression measure and

rater. The association between CU traits and general aggression was found to be moderated by the sample type, $Q(3) = 10.74$, $p < .01$, where the effect was strongest among forensic, $r = .40$, relative to clinical, $r = .20$, community, $r = .37$, and student samples, $r = .33$. The effect of CU traits on indirect aggression was moderated by the informant rating CU traits, $Q(2) = 11.95$, $p < .01$, where mixed report (e.g., parent and teacher), $r = .32$, produced stronger effects than self-report, $r = .23$.

Comparisons Across Empathy Types

To determine whether the effect of empathy on subtypes of aggression differed as a function of the type of empathy examined, the 84% CIs and Fisher's r-to-z transformations were compared across empathy type. Across all forms and functions of aggression, the effect of CU traits was significantly larger than the effect of traditional forms of empathy, $p < .001$. Among traditional forms of empathy, the effect of general empathy on general aggression was significantly larger than that of emotional, $z = -8.53$, $p < .001$, and cognitive empathy, $z = -7.70$, $p < .001$. The effect of proactive aggression on general empathy and emotional empathy was significantly larger than that of cognitive empathy, $z = -5.81$, $p < .001$ and $z = -8.33$, $p < .001$, respectively. Significant differences were also noted for the effect of traditional forms of empathy and direct aggression, where the effect of cognitive empathy was significantly larger than the general, $z = -2.66$, $p < .01$, and emotional empathy effects, $z = -3.05$, $p < .01$. No differences were noted across the effects of traditional forms of empathy, reactive, and indirect aggression.

Post Hoc Comparisons

It was noted that the samples comprising the general, emotional, and cognitive empathy effect sizes differed from the samples used to derive the CU trait effect sizes. Specifically, whereas student samples accounted for the majority of the general (63%), cognitive (84%), and

emotional empathy studies (83%), such samples made up only 29% of CU trait. To rule out the possibility that the effect size difference observed between traditional empathy measures and CU trait measures was due to sample type, post hoc comparisons were conducted. For these analyses, studies were separated into those involving clinical samples (e.g., combination of psychiatric, delinquent, at risk, mixed) and nonclinical samples (e.g., combination of community and students). Effect sizes within clinical and nonclinical samples were then calculated for each type of empathy (see Table 3; notably, only effect sizes with 2 or more studies were reported).

Table 3

Pos-Hoc Analysis Examining Differences in Effect Size Across Community and Clinical Populations.

Aggression Type	Empathy Type							
	General		Emotional		Cognitive		CU	
	Non-Clinical	Clinical	Non-Clinical	Clinical	Non-Clinical	Clinical	Non-Clinical	Clinical
General								
r	-.22	-.27	-.14	-.10*	-.05	-	.36	.34
95% CI	[-.13, -.30]	[-.16, -.36]	[-.07, -.19]	[.12, -.32]	[.05, -.14]	-	[.34, .38]	[.29, .42]
84% CI	[-.20, -.24]	[-.23, -.31]	[-.13, -.15]	[-.05, -.15]	[-.03, -.07]	-	[.34, .38]	[.33, .35]
k (*n*)	13 (4755)	6 (1164)	19 (11312)	4 (795)	10 (8092)	1 (254)	18 (5902)	27 (9266)
Proactive								
r	-.18	-.31*	-.17	-.21	-.12	-.13	.37	.35
95% CI	[-.10, -.25]	[-.20, -.42]	[-.15, -.20]	[-.14, -.28]	[-.09, -.16]	[.01, -.26]	[.30, .43]	[.31, .39]
84% CI	[-.16, -.19]	[-.24, -.38]	[-.16, -.18]	[-.19, -.23]	[-.11, -.13]	[-.10, -.16]	[.36, .38]	[.34, .36]
k (*n*)	11 (8011)	2 (336)	31 (42557)	9 (7154)	28 (23858)	7 (2376)	20 (14870)	35 (15577)
Reactive								
r	-.08*	-.13*	-.09	-.12	-.09	-.03*	.33	.29
95% CI	[.02, -.17]	[-.02, -.23]	[.02, -.20]	[-.03, -.21]	[.02, -.19]	[.17, -.23]	[.23, .42]	[.24, .33]
84% CI	[-.01, -.15]	[-.05, -.20]	[-.07, -.11]	[-.08, -.16]	[-.07, -.11]	[.02, -.08]	[.32, .34]	[.28, .30]
k (*n*)	2 (412)	2 (336)	9 (7741)	6 (998)	7 (6738)	4 (815)	15 (8323)	34 (15477)
Direct								
r	-.22	-.15*	-.19	-	-.24	-.31*	.29	.42
95% CI	[-.05, -.39]	[.32, -.55]	[-.15, -.19]	-	[-.09, -.13]	[-.16, -.45]	[.23, .35]	[.31, .52]
84% CI	[-.20, -.24]	[-.07, -.23]	[-.18, -.20]	-	[-.23, -.25]	[-.25, -.37]	[.27, .31]	[.40, .44]
k (*n*)	10 (6301)	2 (311)	14	1 (261)	11 (9151)	2 (428)	13 (5976)	11 (3199)

			(11104)					
Indirect								
r	-.11	-	-.05	-	-.16	-.03*	.31	.38
95% CI	[-.03, -.20]	-	[-.06, -.16]	-	[-.08, -.23]	[.09, -.15]	[.23, .40]	[.24, .50]
84% CI	[-.08, -.14]	-	[-.04, -.06]	-	[-.15, -.17]	[.01, -.07]	[.29, .33]	[.35, .41]
k (*n*)	7 (2505)	0 (0)	17 (17265)	1 (261)	12 (13795)	3 (1060)	10 (3420)	6 (1503)

Note. CU = Callous Unemotional; 95% CI = 95% Confidence Interval; 84% CI = 84% Confidence Interval; * = note, fewer than 5 studies were available to calculate these effects.

For both clinical and nonclinical samples, the CU trait effect size was significantly larger across the forms and functions of aggression (ranging from r = .29 to .42) than that of general (ranging from r = -.08 to -.31), cognitive (ranging from r = -.03 to -.31), and affective empathy (ranging from r = -.05 to -.21). Consistent with the moderation analyses, the effect of CU traits on aggression differed between clinical and nonclinical samples. While effect sizes for general, direct, and indirect aggression were larger among clinical samples, the effect of CU traits on reactive aggression was larger among nonclinical samples. Notably, the effect sizes for proactive aggression did not significantly differ across sample type.

Some differences were noted among traditional indices of empathy, where the effects of general and emotional empathy on proactive aggression were found to be significantly larger *among clinical samples*. As well, the effect of cognitive empathy on indirect aggression was found to be significantly larger among *non-clinical samples*. It is important that these findings should be interpreted with caution, as the number of studies included in the clinical samples was small (k = 2 to 9). Overall, there is little evidence to suggest that the observed difference in effect sizes between CU trait measures and traditional empathy measures is driven by differences in sample type or the informant used.

Publication Bias

Two tests of publication bias were conducted: (1) Egger's test of the regression intercept (Egger, Smith, Schneider, & Minder, 1997; Appendix C.5), which quantifies the bias captured in a funnel plot, and (2) Duval and Tweedies (2000) trim and fill procedure (Appendix C.6), which estimates effect size after adjusting for publication bias. Analyses were repeated for each effect size reported between the empathy and aggression subtypes. Egger's test revealed evidence of possible publication bias among the general x general, emotional x reactive, emotional x indirect, and cognitive x direct effect sizes, where $p < .05$. Conversely, Duval and Tweedies (2000) trim and fill procedure did not raise any concerns regarding funnel plot asymmetry.

Discussion

Using meta-analyses, the current study was the first to summarize the literature examining the association between empathy, CU traits, and aggressive behaviour in childhood and adolescents. Specifically, we sought to determine whether broader affective measures (i.e., CU traits) predict aggression above and beyond traditional measures of empathy. Notably, this was also the first meta-analysis to distinguish between the forms (i.e., direct and indirect) and functions (i.e., proactive and reactive aggression) of aggression when exploring its relationship with empathy.

Empathy. Overall, significant variability was noted across effect sizes. Consistent with the most recent meta-analysis involving adults (Vachon et al., 2013, only small to moderate associations were identified between subtypes of aggression and general, emotional, and cognitive empathy; with effects ranging from $r = -.06$ to $-.25$. Notably, effect sizes significantly differed as a function of the facet of empathy and subtype of aggression examined.

General empathy. Consistent with the directional hypotheses, the current study provides support for the idea that general empathy inhibits aggressive behaviour among children and

adolescents; where all effect sizes were small to moderate in magnitude. In terms of the function of aggression, the direct aggression effect size was significantly larger than the indirect aggression effect size. Similarly, differences were noted across the function of aggression, where the proactive aggression effect size was significantly larger than the reactive aggression effect size. The type of empathy measures used was also identified as a moderator, where the IRI and BES produced smaller effects than other measures collapsed across studies. Again, both effect sizes were small to moderate in magnitude. Given the evidence supporting the existence of two dissociable subtypes of empathy, it is important to consider not just the effects of general empathy, but also the independent effects of emotional and cognitive empathy on aggressive behaviour (e.g., Baron-Cohen & Wheelwright, 2004; Blair, 2005, 2008; Shamay-Tsoory, 2011).

Emotional empathy. Several theories on aggression place heavy emphasis on the affective components of empathy (e.g., Blair, 2005). Nevertheless, consistent with the adult literature (Vachon et al., 2013), the results of the current study indicate only a small to moderate negative effect of emotional empathy on aggression among children and adolescents. As expected, the magnitude of association differed across the function of aggression, with emotional empathy being more strongly associated with proactive than reactive aggression. Interestingly, this finding aligns with theories of aggression that identify distinct neurocognitive risk factors for the function of aggression, and specifically link emotional empathy deficits as more strongly associated with proactive than reactive aggression (Blair et al., 2006; Blair, 2013). Similarly, differences were noted across the forms of aggression, where emotional empathy was more strongly related to direct aggression than indirect aggression. This latter finding is interesting to consider with reference to theories emphasizing distress cues as playing a key role in eliciting emotional empathy and inhibiting aggression (Blair, 1995). For example, whereas direct

aggression involves first-hand contact with the victim (and therefore exposure to any resulting distress cues), indirect aggression need not (e.g., Yeo et al., 2011). Thus, increased trait emotional empathy may not be as effective at inhibiting indirect aggression, as distress cues are not typically witnessed as preceding, coinciding with, or immediately following the aggressive act.

It is important to note that the association between emotional empathy and general aggression was moderated by age. Contrary to expectations, effect sizes decreased as age increased; that is, there was a stronger association between emotional empathy and general aggression earlier in childhood than in adolescence. Notably, emotional empathy is seen from birth and develops throughout early childhood prior to the onset of more sophisticated cognitive processes (e.g., cognitive empathy; Eisenberg et al., 2014; Martin & Clark, 1982; Roth-Hanania et al., 2011). As such, it is possible that the absence of these basic processes during a critical developmental period contributes to the expression of primitive behaviours such as aggression. Moreover, aggressive behaviours that appear in later childhood and adolescence may be influenced by more complex factors such as personal (e.g., genetic predispositions, hormones, personality, attitudes, values, beliefs), situational (e.g., aggressive cues, violent media, alcohol), and cognitive (Anderson & Bushman, 2002; Allen, Anderson, & Bushman, 2018) influences.

The association between emotional empathy and general aggression was also moderated by the empathy measure used, where the BES, IRI, and IECA had significantly larger effect sizes than other measures. Many of the measures included in the "other" category were only used once or twice across the meta-analysis data, raising concerns about the validity of these measures, and offering a possible explanation for the difference in effect sizes. Finally, aggression rater was identified as a significant moderator in the association between emotional empathy and reactive

aggression, where effect sizes were stronger among self-reported aggression than other report (e.g., peer, parent, teacher, mixed). With evidence that children and adolescents can successfully distinguish the function of their aggressive behaviour (e.g., Reiffe et al., 2016), it is possible that the motivation behind the behaviour is less apparent to others and therefore less accurately rated. Given the fact that effect sizes vary significantly as a function of the source of the information, it is important that future research carefully consider the informants used to improve the accuracy of aggression measures (Bettencourt et al., 2017).

Cognitive empathy. With mixed empirical support, a small association was expected between cognitive empathy and aggressive behavior (e.g., Caravita et al., 2010; Yeo et al., 2011). While this hypothesis was supported, effect sizes differed as a function of the type of aggression. Specifically, cognitive empathy was most strongly related to direct aggression. Cognitive empathy was also more strongly associated with proactive than reactive aggression. This is somewhat surprising given that at least some forms of proactive aggression (e.g., bullying) are thought to require more sophisticated mentalizing acts (e.g., Sutton, Smith, & Swettenham, 1999). Notably, proactive aggression is often measured using items such as "[I] used physical force to get others to do what [I] want" and "[I have] yelled at others so they would do things for [me]" (e.g., Raine et al., 2006) among adults. In contrast, youth measures of proactive aggression are often informant based, asking others (e.g., teachers, parents) to rate whether a child "threatens others" or "pick on smaller kids" (e.g., Brown et al., 1996). It is possible that, in youth, reactive acts of aggression are more likely to be inferred as having some degree of instrumentality (e.g., a tantrum in response to a lost privilege might be interpreted as an attempt to threaten or intimidate). Future research would be needed to better understand this effect.

The association between cognitive empathy and general aggression was found to be moderated by age, where the effect increased as age increased. The direction of this effect seems logical in relation to the developmental trajectory of cognitive empathy. That is, as a more sophisticated form of social cognition, cognitive empathy is thought to appear after the development of emotional empathy in late childhood (Hawes & Dadds, 2012; Singer, 2006) and become more advanced over time as children and adolescents become more motivated to understand others' emotional state. The association between cognitive empathy and general aggression was also moderated by sample type, where effects were stronger among students than other samples. Empathy measure was identified as a significant moderator of the association between cognitive empathy and indirect aggression, where the IRI and BES showed stronger effects than other measures. Consistent with the emotional empathy analysis, many of the measures included in the "other" category were only used once or twice, raising concerns about the validity of these measures. Finally, the association between cognitive empathy and reactive aggression differed across sample type, where the effect was stronger among students than other samples.

Callous Unemotional Traits. Unlike prior meta-analyses, we also examined the association between subtypes of aggression and measures of CU traits. CU traits are a construct that includes reduced empathy, but also considers broader affective characteristics such as lack of guilt, and unemotional traits. Moderate to large effects were found between the subtypes of aggression and CU traits; with effects ranging from r = .30 to .36. The association did not differ across the forms of aggression (i.e., direct, indirect), but significant differences were noted across functions. Specifically, CU traits were found to be more strongly associated with proactive than with reactive aggression. CU traits were a significantly better predictor of all forms and functions

of aggression (proactive, reactive, direct, indirect) than measures of general, emotional, or cognitive empathy. Together, the results suggest that measures emphasizing other affective characteristics result in stronger predictions of aggression than traditional indices of empathy.

It is important to note that the effect of CU traits on indirect aggression was moderated by the CU trait informant, where mixed report (e.g., parent and teacher) produced greater effects than self-report. This finding maps onto the results of a meta-analysis conducted by Deng et al. (2019) suggesting the ICU shows greater reliability among parent and teacher report than among self-report. Finally, the association between CU traits and proactive aggression was moderated by sample type, where community and forensic samples produced stronger effects than clinical, student, and mixed samples.

Comparing Across Indices of Empathy. Analyses indicated that general and proactive aggression were more strongly associated with reductions in emotional empathy than cognitive empathy. This is consistent with existing theoretical frameworks that emphasize emotional empathy in violence inhibition (e.g., Blair, 2005) and as a diagnostic specifier (APA, 2013). Although it is common to utilize a general definition of empathy, encompassing both emotional and cognitive components, the current meta-analysis highlights the importance of distinguishing cognitive and emotional empathy. When combined, unique associations may be overlooked. It should also be noted that, emotional empathy was more strongly related to reactive aggression than was cognitive empathy. Reactive aggression has been linked to frustration (Berkowitz, 1993), and a hostile attributional style coupled with poor behavioural controls (e.g., Calvete & Orue, 2012). As such, one possibility is that emotional empathy is a protective factor against acquiring such an attributional style. Further, the effect of cognitive empathy on direct aggression was stronger than that of emotional empathy. This effect was surprising given that

emotional empathy was more strongly associated with the functions of aggression than cognitive empathy. In the current meta-analysis, direct aggression involves a combination of verbal and physical acts ranging from teasing to assault. Direct aggression items may capture some combination of proactive and reactive acts that are better predicted by cognitive empathy. For example, cognitive empathy is related to the ability to understanding and identifying faux pas (e.g., involving identifying inappropriate and hurtful comments or actions; can (Baron-Cohen et al., 1999). One possibility is that the direct form of aggression tends to capture more of these unintentional acts, thereby being more strongly associated with cognitive empathy. This is, of course, highly speculative and additional research examining the impact of cognitive empathy on verbal and physical aggression among youth is needed to elucidate this finding. Finally, effect sizes did not differ between emotional and cognitive empathy in their association with indirect aggression.

Strikingly, CU traits were found to predict general, proactive, reactive, direct, and indirect aggression significantly better than any other index of empathy. Post hoc analyses indicated that the observed difference in effect sizes was not due to variation in sample type (i.e., nonclinical vs clinical). Taken together, these findings suggest that the constellation of affective features assessed by CU trait measures may be central to the prediction of aggression (i.e., deficits in empathy, but also lack of guilt, shallow affect, lack of concern about performance). Assessing these features in combination with empathy appears to capture a more severe subgroup than traditional indices of empathy alone.

Implications

To date, the current meta-analysis provides the most comprehensive review of the magnitude of association between empathy and aggression among children and adolescents.

While prior meta-analyses examining the association between empathy and aggression included 30-86 studies (e.g., Jolliffe & Farrington, 2004; Miller & Eisenberg, 1988; Zych et al., 2016), the current meta-analysis was comprised of 188 unique samples. The current meta-analysis was also the first to consider the association between empathy, CU traits, and the forms (i.e., general, direct, indirect) and functions (i.e., proactive, reactive) of aggressive behaviour. This was also the first study to expand beyond traditional definitions of empathy (i.e., general, cognitive, emotional) to include broader indices of emotional style (e.g., lack of guilt and remorse, shallow affect) as indexed via CU traits.

Our analyses highlight three key findings: 1) as was found in adult samples (Vachon et al., 2014), traditional measures of empathy show only a small to moderate association with aggression in children and adolescence; 2) the magnitude of association between empathy and aggression significantly differs as a function of the type of aggression measured, where proactive and direct aggression tend to be more strongly associated with empathy than reactive and indirect aggression; and (3) CU trait measures, which include indices of emotional style (e.g., lack of guilt, shallow affect) in addition to capturing deficits in empathy, are significantly better predictors of all forms and functions of aggression than are traditional empathy measures.

Given the small to moderate effect sizes observed when using traditional empathy measures, it is tempting to conclude, as others have, that contemporary expectations of the empathy-aggression association may be too high in comparison to the true effect and that "applications of empathy [may] have outpaced science" (p. 768; Vachon et al., 2013). However, there are a number of important reasons why caution should be exercised before drawing this conclusion. First, we have shown that the effects are significantly larger when emotional characteristics that are related to empathy, but not captured by traditional measures, are included.

Such characteristics are captured by CU trait measures. Notably, these trait measures were not included in Vachon and colleagues (2014) meta-analysis. However, their inclusion would likely yield similar effects in adult samples. For example, in a meta-analysis exploring the association between psychopathy and proactive vs. reactive aggression, Blais, Soloduhkin, and Forth (2014) report similar effect sizes as were found in the current study (r = .29 to .44). That is, psychopathy total and Factor 1 scores (i.e., interpersonal and affective features) had a moderate to large effect on both proactive and reactive aggression.

Despite the ostensibly small to moderate effect of traditional measures of empathy on aggression, empathy is a prominent component in the treatment and diagnosis of aggressive disorders among children and adolescents (e.g., conduct disorder; APA, 2013). However, it should be noted that the recently added Limited Prosocial Emotions specifier accounts for not only reduced empathy, but other socially-relevant affective characteristics (Frick & Moffit, 2010). To qualify for this specifier, a youth must exhibit two of the following characteristics over at least 12 months across a variety of contexts: (1) a lack of remorse or guilt, (2) callousness or lack of empathy, (3) a lack of concern about performance, and (4), a shallow or deficient affect (APA, 2013). As a consequence, this specifier more closely resembles what is indexed by measures of CU traits, than by traditional empathy measures. The current study supports the continued focus not just on empathy, but other related affective characteristics when assessing violence risk, and perhaps as targets for treatment.

In addition to exhibiting more severe conduct problems, children with higher CU traits are also less responsive to traditional interventions (e.g., Hawes & Dadds, 2005; Hawes, Price, & Dadds, 2014). These traits have proven to be challenging to address in treatment settings for several reasons. Specifically, CU traits have a heavy genetic predisposition and are less

susceptible to environmental factors (Viding et al., 2005, 2008). Further, these traits are associated with deficits in various brain regions related to emotional processing (e.g., amygdala, ventromedial prefrontal cortex; Finger et al., 2008; Jones et al., 2009; Marsh et al., 2008). This emotional detachment is thought to hinder the effectiveness of parenting interventions (e.g., Muñoz et al., 2008). Further, in failing to recognize the consequences of their behaviour on others (Paradini et al., 2003), these children often maintain a positive view of aggression, often conceptualizing such behaviour as a valid means of problem solving or achieving goals (Kimonis et al., 2004). Addressing CU traits characteristics early on is imperative, as these traits are associated with the development of psychopathy in adulthood (Burke, Loeber, & Lahey, 2007; Loney et al., 2007).

Although knowledge on how to best treat this population is limited, several novel interventions are currently under investigation including the adoption of emotionally responsive parental styles (e.g., Kimonis et al., 2018) and emotion recognition training (e.g., Dadds et al., 2006, 2008). In combination, parent training and emotion recognition training have shown superior effects relative to parent training alone (Dadds et al., 2012, 2019). Overall, the current meta-analysis provides further support for the notion that treatment targets for aggressive behaviours should not just focus on responses to distress in others (i.e., emotional and cognitive empathy) but also more general affective characteristics including lack of guilt, shallow affect, and concern over performance.

In considering the implications of the current results, it is also important to note that the magnitude of the effect and its importance is strongly influenced by the methodologies of the studies used to obtain that effect (Prentice and Miller, 1992). For example, the underreporting of aggressive behaviour on self-report scales is a concern among youth (e.g., Maxfield, Weiler, &

Widom, 2000), and only weak to moderate correlations are reported between parent and child ratings of aggression (e.g., Kazdin, Esveldt-Dawson, Unis, & Rancurello, 1983). In the current study, differences in effect size varied as a function of type of informant that provided the aggression rating. For example, the strength of the relationship between reactive aggression and emotional empathy was significantly smaller for peer, parent, or teacher reports than for self-report.

Concerns have also been raised regarding the use of self-report empathy measures, as children lack the cognitive and verbal skills required to accurately report internal states (Eisenberg & Miller, 1987). Concerns have also been raised about its measurement in adolescents, where social desirability is thought to impact the accuracy of self-reported empathy (Eisenberg-Berg & Hand, 1979), and adolescents tend to report being more empathetic than indicated by parents (Johnson, Filliter, & Murphy, 2009). In the current study, however, effect sizes were not influenced by who is assessing the empathy, but instead differed as a function of the measure itself. Specifically, the IRI, BES, and IECA appear to be a stronger predictor of general and indirect aggression than other measures general, cognitive, and emotional empathy. It is possible that these differences were noted as other measures contained in the literature are used infrequently, raising concerns about the validity of these measures.

Another important reason to be cautious in dismissing the potential relevance of therapies targeting empathic responding is that although an association may be barely detectable at a single time-point, continuous dynamical interactions may substantially intensify the effect when compounded overtime. Recently applied to affective research, nonlinear dynamical systems theory (e.g., Neufeld, 1999) has been used as a means of mathematically elucidating the potential importance of superficially trivial phenomena. According to this theory, a small “initial

association" in a dynamical system can lead to a much larger effect at a later time. Despite neurobiological evidence of dynamic changes in empathy in response to the social environment (e.g., Batson, 2009), most studies assess empathy as a fixed state. Compared to adults, children and adolescents are even more sensitive to the social environment (Frey, Ruchkin, Martin, & Schwab-Stone, 2009), possibly because the prefrontal cortex is still developing (e.g., Blakemore, 2008). Thus, the failure to assess empathy as a dynamic process, especially among children and adolescents, may affect the accuracy of the estimated association between empathy and aggression identified in the current literature. As such, research examining the dynamical aspects of empathy in aggression is needed to help elucidate the empathy-aggression association.

Finally, before dismissing the importance of empathy as a target for interventions, it is worth noting that aggression is not the only form of antisocial behaviour. Empathy also has important links to variables of social importance that are not captured by measures of aggression, such as social bonding and generosity (e.g., Barraza & Zak, 2009; Choi, Johnson, & Johnson, 2011). Future work that better considers some of the social moderators (e.g., antisocial associates, social bonding) may add to our current understanding of the empathy-aggression association. Given the theoretical importance of empathy to antisociality and prosocial behaviour, there is a need for future research to better elucidate the role of empathy in inhibiting other immoral acts or prompting prosocial when assessing its therapeutic utility.

Limitations & Future Directions

Notably, the current study was limited by the small number of studies included in some analyses, as it was not always possible to explore potential moderators. Along the same lines, the definition of direct aggression utilized in the current study (which combines physical and verbal aggression) may have limited the results. While it may have been valuable to examine these

forms of direct aggression separately, as some research indicates verbal aggression is unrelated to empathy (e.g., Bjorkvist et al., 2000), this type of analysis was not possible due to the limited number of studies.

It is also important to note that the current meta-analysis is unable to comment on causation (the extent to which reduced empathy leads to aggression or vice versa), as the average same-time correlations were used to calculate effect sizes for longitudinal studies (e.g., Time1 empathy was correlated with Time1 aggression). Future studies may consider averaging the lagged effect (controlling for Time1 aggression) to explore causal links. Finally, it is noteworthy that basic emotion expression recognition has also been closely associated with prosocial behaviour (e.g., Marsh & Blair, 2008). However, there is conflict in the field as to whether emotion recognition maps onto emotional empathy or cognitive empathy (e.g., Balconi & Canavesio, 2014; Blair, 2008; Drimalla, Landwehr, Hess, & Dziobek, 2019). Considering this confusion, the current study did not specifically explore emotion recognition; this may be an avenue to consider in future meta-analyses.

One of the key motivations for conducting this meta-analysis was to determine whether broadening the focus from empathy to include other socially relevant affective characteristics (such as in CU traits) was advantageous in predicting aggressive behaviour. While this study suggests broader affective measures may be more strongly associated with aggression than empathy alone, it is not possible to comment on the sole contribution of empathy in the association between CU traits and aggression with the current analytic approach. This is an important question for future research to address, as it has been suggested that deficits in empathy may be critical to explaining the more severe pattern of disruptive behaviour seen among youth high in CU traits (Frick & Kemp, 2021; Frick et al., 2014; Waller & Hyde, 2018).

Notably, a recent meta-analysis reported a strong negative association between CU traits and empathy (ρ = -.57), where the strength of the association did not differ as a function of the type of empathy examined (i.e., cognitive versus emotional; Waller et al., 2020). Effect sizes were similar across broader affective features, where guilty magnitudes were reported for the other characteristics (e.g., guilt, ρ = -.40; prosociality, ρ = -.66). Considering these findings, it would be beneficial for future research to meta-analytically explore the contribution of empathy in the association between CU traits and aggression, controlling for the other affective characteristics included in this construct.

Conclusions

The current meta-analysis provides evidence of an association between empathy and aggression among children and adolescents. With 188 unique studies, the current meta-analysis provides the most comprehensive review of the association between empathy, CU traits, and the forms and functions of aggression among youth to date. Consistent with adult samples (Vachon et al., 2013), only a small to moderate association was found between traditional measures of empathy (i.e., general, emotional, cognitive empathy) and aggression in children and adolescents. By considering multiple types of empathy and aggression, and expanding beyond the traditional definition of empathy to include indices of emotional style indexed via CU traits (e.g., lack of guilt/remorse, shallow affect), we were able to, for the first time, provide evidence that broader measures of emotional style appear to be better predictors of aggressive behaviour than empathy alone; where moderate to larger correlations were noted between CU trait measures and aggression. These findings suggest consideration of a constellation of affective traits, rather than empathy deficits exclusively, is important to the prediction of aggression among children and adolescents.

Although contrary to contemporary theory, the ostensibly small to moderate effect between traditional measures of empathy and aggression in itself does not dismiss the potential relevance of considering empathy in relation to risk for aggression. Instead, the current study highlights the utility of targeting multiple affective features in treatment to effectively reduce aggressive behaviour. In the DSM-5 (APA 2013), the Limited Prosocial Emotions specifier was incorporated into the conduct disorder diagnosis. This work underscores the importance of considering these traits in the diagnosis and treatment of not only conduct disorder, but also trans-diagnostically given the varied nature of the sample. As effect sizes estimated in the current meta-analysis are reflective of a single time-point, it is also important to acknowledge that continuous dynamical interactions may substantially intensify the effects when compounded over time. Before dismissing the importance of empathy to aggression, one must consider the function of empathy both within a larger constellation of affective traits, and a broader range of socially relevant behaviours.

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* References for articles included in the meta-analysis are presented in Appendix D

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January 28th, 2022

Re: A Meta-Analytic Review of the Association between Empathy and Aggressive Behaviour in Childhood and Adolescence

Dear Dr. Asmundson,
We have no conflicts of interest to disclose. All authors have approved this submission, and have no potential financial interests that might influence the work. The authors confirm that this is an original, unpublished study that has not been submitted for simultaneous consideration by any other journal.

Sincerely,

Mary Ritchie

Highlights

- Small to moderate associations between aggression and traditional empathy measures
- Moderate to large association between aggression and CU trait measures
- CU traits predict all aggression types better than traditional empathy measures
- Important to consider broader affective traits in the prediction of aggression
- Limited prosocial emptions may be important cross-diagnostically