



The association between attachment and psychopathic traits

Marion van der Zouwen, Machteld Hoeve*, Anne M. Hendriks, Jessica J. Asscher, Geert Jan J.M. Stams

University of Amsterdam, the Netherlands



ARTICLE INFO

Keywords:

Attachment to parents
Psychopathic traits
Multilevel meta-analysis

ABSTRACT

The purpose of this study was to examine the association between attachment and psychopathic traits. A systematic search of relevant articles yielded 12 studies (11 independent samples), containing 133 effect sizes based on in total 1876 participants. Results from a three-level random-effects meta-analysis demonstrated a small-to-medium significant, overall association of $r = 0.18$, indicating that insecure attachment was positively related to psychopathic traits. We also tested moderator effects; six significant moderators were found. First, the magnitude of the effect size depended on which psychopathic trait was investigated; the largest effect size was found for callous-unemotional traits ($r = 0.23$), and no effect was found for antisocial behavior, narcissism and impulsivity. Second, parent- and caregiver reports on psychopathic traits resulted in stronger associations compared to self-reports and a composite of multiple sources. Third and fourth, the association varied across attachment and psychopathic traits instruments. Fifth, if both attachment and psychopathic traits were reported by the same informant, the association was stronger than when attachment and psychopathic traits were reported by different informants. Sixth, the association differed across sample setting, with the strongest association for a clinical setting followed by a secured setting and no association for both community or combined settings. No moderating effects were found for the attachment categories, attachment to whom and the informant of attachment, publication year, and sample characteristics, such as gender, age, and sample size. We discuss the implications of our findings for future research and clinical practice.

1. Introduction

Nowadays, attachment theory and John Bowlby are inseparable (e.g., Craig, Gray, & Snowden, 2013; MacDonald, Berlowb, & Thomas, 2013; Mikulincer & Shaver, 2012; Savage, 2014). Development of attachment theory started during World War II, when he conducted his first empirical study (Bowlby, 1944). In that study, Bowlby examined forty-four juvenile thieves at the London Child Guidance Clinic. Through detailed examination, he was able to link their histories of maternal deprivation and separation to their symptoms. Fourteen of these thieves were described by Bowlby as affectionless, indicating that they lacked normal affection or warmth of feeling for anyone, shame or sense of responsibility. Bowlby discovered that none of them had ever shown normal affection to anyone, and that they were unresponsive, solitary and undemonstrative. Many of their parents and foster parents remembered that nothing they said or did to the children made any difference, because they responded neither to punishment nor to kindness. The children themselves all had a very similar history of early separations from their (foster) mothers. Attachment theory was later

conceived, among other factors, to explain the relation between lack of warm and continuous child care and an absence of concern for others (Bretherton, 1992).

Almost at the same time, Hervey Cleckley was among the first to attempt to formalize a standard definition of psychopathy. Interestingly, unlike Bowlby he believed that maltreatment and poor parenting were not causes of psychopathy, but Cleckley's delineation of the psychopath was comparable to Bowlby's description of the affectionless. In his book "The Mask of Sanity", Cleckley (1988/1941) described psychopathy as a disorder with 16 different characteristics, among which are "unresponsiveness in general interpersonal relations", and "pathologic egocentricity and incapacity for love". Despite the seemingly opposite views of Bowlby and Cleckley about the role of a disruptive early environment in the origins of both psychopathy and insecure attachment, decades ago both scholars assumed a link between disturbed attachment relationships and psychopathy.

* Corresponding author.

E-mail addresses: johnmari@kpnmail.nl (M. van der Zouwen), m.hoeve@uva.nl (M. Hoeve).

<https://doi.org/10.1016/j.avb.2018.09.002>

Received 18 February 2018; Received in revised form 15 August 2018; Accepted 14 September 2018

Available online 15 September 2018

1359-1789/ © 2018 Elsevier Ltd. All rights reserved.

1.1. Attachment

Bowlby's (1970) attachment-based theory is an environmental developmental theory. This theory assumes that the etiology of psychopathy may be related to poor attachment (Bailey & Shelton, 2014; Craig et al., 2013; Schimmenti et al., 2014). Attachment is a biologically-based developmental system that regulates proximity of the child to its caregiver(s) from infancy on. It serves to protect children from danger and to provide children with the opportunity to safely develop and explore their environment.

An influential taxonomy devised by Ainsworth, Blehar, Waters, and Wall (1978) distinguishes mutually exclusive attachment styles, based on observations of infant-caregiver behavior, the so called Strange Situation Procedure (SSP). For instance, a consistently sensitive caregiver (sensitive to attachment behaviors of the child, e.g., crying) provides the child with a safe haven and a secure base. In return, the child can explore the environment and seek comfort and contact with its caregiver in times of distress, a so-called secure attachment (Ainsworth et al., 1978). When caregivers are insensitive or inconsistently sensitive, they will not be perceived as a secure base and a safe haven. Their children are described as insecurely attached. Caregivers of anxious/resistant (C) attached children are thought to be unpredictable in their response to their infant's distress. They seem to be more attuned to their own needs than to their child's needs. Anxious/resistant children seem unable to be comforted by their caregiver in times of distress. On the contrary, avoidantly (A) attached children seem indifferent or ignorant to their caregivers and do not seem to show any need of comfort. This minimization of emotions seems to be a response to the consistent rejection by the parent. The avoidant behavior allows the child to maintain sufficient proximity to the caregiver in times of danger (Bartholomew & Horowitz, 1991).

Some children behaved so inexplicably and contradictory during the SSP that the observers were unable to classify the attachment pattern in one of the above categories. Therefore, this kind of attachment is called disorganized (D) or disorientated attachment. It has been hypothesized to be a result of frightening caregiver behaviors, such as maltreatment (Cicchetti & Doyle, 2016; Guttmann-Steinmetz & Crowell, 2006). In addition to this four categorical classification, Bartholomew and Horowitz (1991) developed a two dimensional (i.e., anxiety and avoidance) model, albeit still leading to the same four quadrants as mentioned above.

The association between attachment difficulties and mental disorders in general is well documented (Beeneey et al., 2015; Bogaerts, Buschman, Kunst, & Winkel, 2010; Cicchetti & Doyle, 2016; Fearon, Bakermans-Kranenburg, Van IJzendoorn, Lapsley, & Roisman, 2010; Mikulincer & Shaver, 2012; Timmerman & Emmelkamp, 2006). Meta-analyses confirm attachment insecurity to be related to internalizing disorders (Colonnesi et al., 2011; Groh, Fearon, Van IJzendoorn, Bakermans-Kranenburg, & Roisman, 2017; MacDonald et al., 2013; Madigan, Atkinson, Laurin, & Benoit, 2013; Madigan, Brumariu, Villani, Atkinson, & Lyons-Ruth, 2016). Meta-analyses and reviews examining the relation between attachment and externalizing disorders show also an association (Fearon et al., 2010; Groh et al., 2017; Hoeve et al., 2012; Madigan et al., 2016; Savage, 2014; Schimmenti et al., 2014), but not always as consistent as for internalizing disorders (Fearon & Belsky, 2011).

1.2. Psychopathic traits

First of all, it is important to notice that there is a difference between psychopaths and individuals with psychopathic traits. In the current study, psychopathic traits include antisocial behavior, narcissism, impulsivity and callous-unemotional traits, based on the factor analyses performed by Hare (2003). They concluded that the construct of psychopathy consists of two main, partially independent, dimensions. One dimension includes the emotional and interpersonal traits,

such as superficial charm (also called as narcissism), lack of guilt and empathy, and affective deficits, the so-called callous-unemotional (CU) traits. The other dimension captures impulsive and antisocial behavior (Dadds, Jambak, Pasalich, Hawes, & Brennan, 2011; Dadds & Salmon, 2003; Salekin, 2002). The concurrent presence of both dimensions differentiates those with psychopathy from people suffering from Antisocial Personality Disorder, which includes only the latter, and people with psychopathic traits but without antisocial behavior. Only individuals with psychopathic traits who also exhibit antisocial behavior are considered to be psychopaths (Blair, 2001; Farrington, 2005). Coid, Yang, Ullrich, Roberts, and Hare (2009) found a prevalence of 29.2% of people exhibiting one or more psychopathic traits in a general population, whereas only 0.6% of their sample could be labeled as being a psychopath.

Furthermore, with regard to children and adolescents, the term psychopathy should always be substituted by "psychopathic traits". Psychopathy implies a fixed and rigid personality pattern, whereas children are still in the progress of character development (Kerig & Wenar, 2006). Therefore, in the present study, psychopathic traits comprise both overall psychopathy and the entire spectrum of these traits.

Research on psychopathic traits has suggested a strong and robust link between juveniles exhibiting psychopathic traits and psychopathology, such as serious antisocial behavior later in life (Asscher et al., 2011; Fite, Greening, & Stoppelbein, 2008; Fontaine, McCrory, Boivin, Moffitt, & Viding, 2011; Wilkinson, Waller, & Viding, 2016). This link has stimulated a growing body of research examining causes and correlates of psychopathic traits as early as possible in child development (e.g., Carlson, Oshri, & Kwon, 2015; Christian, Meltzer, Thede, & Kosson, 2016).

Risk factors for psychopathic traits are diverse. Sometimes, the development of CU traits is seen as a consequence of environmental risks, such as early maltreatment (Carlson et al., 2015; Daversa, 2010; Gao, Raine, Chan, Venables, & Mednick, 2010; Hicks et al., 2012; Kimonis, Fanti, Isoma, & Donoghue, 2013; Kolla et al., 2013), negative parental discipline (Fontaine et al., 2011), low parental warmth (Bisby, Kimonis, & Goulter, 2017; Kimonis, Cross, Howard, & Donoghue, 2012; Kroneman, Hipwell, Loeber, Koot, & Pardini, 2011), parental indifference (Bailey & Shelton, 2014), insensitive parenting (Wagner, Mills-Koonce, Willoughby, Zvara, & Cox, 2015), harsh parenting (Waller et al., 2012), emotional abuse (Schimmenti, Di Carlo, Passanisi, & Caretti, 2015), negative parenting (Waller, Gardner, & Hyde, 2013), or attachment difficulties (Fite et al., 2008; Frodi, Dernevik, Sepa, Philipson, & Bragesjö, 2001).

More in general, psychopathic traits are seen as a multicausal result of dispositional risks, such as genetics (Dadds et al., 2014; Mann, Briley, Tucker-Drob, & Harden, 2015; Tuvblad, Bezdjian, Raine, & Baker, 2014), because of the heritability of CU traits (Bezdjian, Raine, Baker, & Lynam, 2011; Hicks et al., 2012; Larsson, Viding, & Plomin, 2008; Viding et al., 2013) and maternal prenatal risks (Barker, Oliver, Viding, Salekin, & Maughan, 2011). Also neurological alterations of the amygdala and the surrounding structures (Beaver, Vaughn, DeLisi, Barnes, & Boutwell, 2012; Blair, Colledge, Murray, & Mitchell, 2001; Boccardi et al., 2011; Craig et al., 2009; Herpers, Scheepers, Bons, Buitelaar, & Rommelse, 2014), are mentioned as possible risk factors, for instance caused by early adverse parenting (Daversa, 2010), and leading to emotion recognition dysfunction, especially for the recognition of negative emotions of others (Bowen, Morgan, Moore, & Van Goozen, 2013). Subsequently, the dispositional risks could explain the fact that the CU dimension of psychopathy has been found to be fairly stable over time from infancy to adulthood (Andershed, 2010; Beaver et al., 2012; Lynam et al., 2009). Furthermore, after early childhood, their effects persist regardless of the quality of parenting (Beaver, Rowland, Schwartz, & Nedelec, 2011; Farrington, 2005; Salekin & Lochman, 2008).

1.3. The association between attachment and psychopathic traits

Although early theoretical literature on psychopathy holds a prominent position on parent-child attachment, contemporary research on this theme is scarce. McCord and McCord (1956) concluded that emotional deprivation, parental rejection, and lack of affection lead to the development of a psychopathic personality in general and to the core affective deficits in particular. Furthermore, Bowlby (1970) emphasized the importance of rejecting mothers and maternal deprivation for the development of psychopathic traits. Since then, several studies have documented an association between attachment and psychopathy and different potential explanations for this association have been put forward. For instance, delinquents high on psychopathy report a childhood with separations, maltreatment, or abuse and are subsequently insecurely attached (Bailey & Shelton, 2014; Frodi et al., 2001; Schimmenti et al., 2014). Their psychopathy is assumed to be caused by parent-driven attachment insecurity.

Nevertheless, it could also be the other way around. Parent-child relationships, such as attachment, develop as a result of complex interactions between parents and their children. CU traits are likely to impede these relationships with caregivers, so attachment difficulties could also be seen as child-driven (Hawes, Dadds, Frost, & Hasking, 2011; Larsson et al., 2008). For example, researchers found that children with CU traits fail to attend to the eyes of attachment figures in general (Dadds et al., 2011; Dadds et al., 2014), due to a dysfunction in the neural systems necessary for emotional recognition (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Bowen et al., 2013; Dawel, O'Kearney, McKone, & Palermo, 2012), thus possibly impeding the attachment relationship.

Children with CU traits are seen as relatively fearless and insensitive to punishment (Barker et al., 2011; Dadds & Salmon, 2003; Hawes et al., 2011). Subsequently, these traits pose a difficult parenting task: too gentle parenting will not be noted (Kochanska, 1995), and increasing the amount of applied power will only promote resentment and anger, and external attributions for conduct problems (Dadds & Salmon, 2003; Kochanska, Barry, Stellern, & O'Brien, 2009). Both ways will not lead to internalization of rules nor stimulate conscience-driven behavior and in all probability to the formation of an insecure attachment. Moreover, children high on CU traits are found to be at increased risk for experiencing disruptions in parent-child attachment (Pasalich, Dadds, Hawes, & Brennan, 2012). In line with these two suppositions, Hawes et al. (2011) found a bidirectional effect for both CU traits and parenting. CU traits uniquely accounted for changes in inconsistent discipline, punishment, and parental involvement (e.g., also Larsson et al., 2008). Likewise, positive parenting, parental involvement and poor monitoring uniquely predicted change in CU traits.

Although scholars have suggested a link between attachment and psychopathy, primary studies on the relation between attachment difficulties and psychopathic traits have resulted in inconsistent findings. For example, Fite et al. (2008) found a relation between attachment difficulties and CU and narcissistic traits. Some scholars have found insecure attachment to be associated with only the affective factor of psychopathy (Catchpole, 2009), or psychopathy in general (Mack, Hackney, & Pyle, 2011), whereas others concluded that they could not find any relation at all between attachment and psychopathy (Brennan & Shaver, 1998; Frodi et al., 2001; Holmqvist, 2008; Russell, 2004) or only for attachment to fathers, but not for attachment to mothers (Flight & Forth, 2007). Thus, the discussion about the relation between attachment difficulties and psychopathic traits has not been resolved yet.

1.4. The present meta-analysis

Given the inconsistencies in findings regarding the attachment-psychopathic traits link, a meta-analysis could shed light on this association and on potential explanations for the variety in findings.

However, apart from the literature reviews by Saltaris (2002), and Bailey and Shelton (2014), a systematic review or meta-analysis that relates attachment specifically to psychopathic traits has not been conducted yet. Several studies have found that the effectiveness of interventions is reduced for children with CU traits, when compared to children with antisocial behavior, but without CU traits (e.g., Wilkinson et al., 2016). It is thus important to increase knowledge on important correlates of psychopathy, with the ultimate aim to improve interventions that target both CU traits and antisocial behavior.

The main aim of the current meta-analysis was to examine the association between psychopathic traits and attachment, and because the literature distinguishes between psychopathic traits and psychopathy, to shed light on this distinction and its clinical implications. A second aim was to examine moderators that might influence the relation between attachment and psychopathic traits. A meta-analysis is designed to reveal findings upon which studies agree and eventually divest spurious findings (Dawel et al., 2012). Advantages of a meta-analysis are more reliable estimates of effect sizes and increased statistical power. Because of the inconsistency in the literature about the role of attachment in the development of psychopathic traits and vice versa, we aim to disentangle patterns underlying this association by performing moderator analyses.

2. Method

2.1. Sample of studies

We aimed to include all studies on the relation between attachment and psychopathic traits. The included studies were found in three consecutive steps. The only inclusion criterion was that the study should describe an association between psychopathy or psychopathic traits and attachment to parents/caregivers. All sample types were included. The first step was to search the database of Robert Hare. He has collected over 2000 studies that all focus on psychopathy. The second step was a search through the computerized databases Web of Science, PsycINFO, ERIC (Educational Resources Information Centre), Academic Search Premier, and Google Scholar for articles, books, chapters, paper presentations, dissertations and reviews. Combinations of the following key words were used: psychopathy, psychopathic traits, callous-unemotional and CU, cross-referenced with attachment. All found titles, abstracts, and full-text articles were screened and excluded if they violated the inclusion criterion. The literature search included all studies that were found until May 2016. In the third step, studies were located using the snowball method, that is, inspection of the reference sections of the articles, the narrative reviews and book chapters. Finally, 15 studies met the inclusion criterion that studies had to examine the association between attachment to parents/caregivers and psychopathy or psychopathy-alike disorders.

On closer inspection, three studies had to be excluded: One study measured teenage mothers' (insecure) attachment to their own caregivers and CU traits in their children (Phillips, 2004). Barb (2007) compared two groups of juveniles, with psychopathy and attachment both as independent discrete variables, but did not report the association between these variables. Schimmenti et al. (2014) investigated the relation between attachment and psychopathy, but reported only qualitative data.

Finally, we included 12 studies, based on 11 independent datasets, both published and unpublished, between 2001 and 2015, which examined 133 associations between attachment and psychopathic traits. Both longitudinal ($k = 3$) as well as cross-sectional ($k = 9$) studies were included, as were all kinds of different sample types, such as community samples, incarcerated juvenile offenders, adult and child treatment groups, juveniles in group homes, et cetera. In total, data of 1876 participants were analyzed in the present study. Sample sizes ranged from 14 (Frodi et al., 2001) to 957 (Buck, 2015) participants, with an average of 170 participants per dataset. The age of the participants

Table 1
Overview of included studies (k = 12).

Authors	N	% male	Mean age	Instrument attachment (to whom)	Instrument (informant psychopathy)	Sample type (setting)
Asscher et al., 2010	243	72	16.0	IPPA: Self-report and parent reported (parents ^b)	APSD (Self-reported or parent/caregivers reported)	Serious juvenile delinquents (boys and girls sample) in MST-group (clinical)
Buck, 2015	957	Unknown	15.0	BSQ: Self-report: secure attachment (parents)	Combination YPTI & WAI (Self-report)	Adolescents from the NICHD Study of Early Child Care and Youth Development (community)
Catchpole, 2009	109	50	15.4	AAI: Semi-structured interview: adolescent version (primary caregiver ^b)	PCL:YV (Semi-structured interview and a review of collateral information)	Adolescents (boys and girls sample) for assessment of severe behavioral problems in forensic and mental health clinic (combination)
Flight & Forth, 2007	42	100	17.1	IPPA: Self-report (mother, father ^b)	PCL:YV (Semi-structured interview and a review of files)	Incarcerated adolescents serving dispositions for violent offences (incarcerated).
Frodi et al., 2001	14	100	34.0	AAI: Semi-structured interview (parents ^b)	PCL:SV (trained assessor, structured interview and files)	Incarcerated, 10 violent index offence, 4 drug-related Swedish forensic psychiatry unit or at a medium security prison (combination)
Isaak, 2012	110	58	15.4	CAPAI: Interview (mother ^c)	PCL-YV (integration of self-reports, collateral sources and direct observation)	High risk adolescents (boy & girl sample) in forensic and mental health setting (combination). Same sample set as described by Catchpole, 2009.
Kochanska et al., 2009	100	50	5.5	SSP Observation, (mother, father ^b)	ICU (parent ratings)	Two-parent families of normally developing infants (community)
Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002	114	100	14.5	IPPA: Self-report (parents ^b)	PCL:YV; (Composite of self-report, observation and collateral sources)	Adjudicated delinquent adolescents supervised by court counselors/in short-term detention centre (combination)
Mazzarello, 2007	42	0	23.4	AAP: analysis of narratives (parents ^b)	APSD -CU (Self-report)	Adolescent mothers at Montreal children's Hospital (community)
Pasalich et al., 2012	55	100	6.3	MCAST: Story stem completion task (mother ^b)	SDQ & APSD pooled (Mother, father and teacher report)	Boys referred to university psychology clinic for assessment and treatment of conduct problems (clinical)
Smith, 2011	60	50	15.7	IPPA Self-report (father, mother ^b)	ICU (Self-report)	High-risk young offenders serving custodial services in a Secure Training Centre (incarcerated)
Willoughby et al., 2014	149	50	3.0	SSP: Caregiver, parent (mother ^b)	ASEBA (caregivers)	Children with disorganized attachment (community)

Note: ^a = overall strength of attachment, ^b = categorical measure of attachment, ^c = dimensional measure of attachment, IPPA = Inventory of Parent and Peer Attachment, BSQ = Behavioral Systems Questionnaire, AAI = Adolescent Attachment Interview (Catchpole, 2009) or Adult Attachment Interview (Frodi et al., 2001), CAPAI = Comprehensive Adolescent-Parent Attachment Inventory, SSP = Strange Situation Procedure (Kochanska et al., 2009) or Strange Situation Paradigm (Willoughby et al., 2014), AAP = Adult Attachment Projective, MCAST = Manchester Child Attachment Story Task, APSD = Antisocial Process Screening Device, YPTI = Youth Psychopathic Traits Inventory, WAI = Weinberger Adjustment Inventory, PCL:YV = Psychopathy Checklist: Youth Version, PCL: SV = Psychopathy Checklist: Screening version, ICU = Inventory of Callous-Unemotional Traits, SDQ = Strengths and Difficulties Questionnaire, ASEBA = Achenbach System of Empirically Based Assessment.

ranged from age 0–48 with a mean age of 8.9 years. Table 1 presents the included studies and their main characteristics.

2.2. Coding of the study outcomes and characteristics

Potential moderators of the association between attachment and psychopathic traits were grouped into publication characteristics, sample characteristics, study characteristics and assessment characteristics. Publication year and impact factor of the journal in which the study was published were included as *publication characteristics*. As *sample characteristics* gender (males, females, or both), percentage of boys, sample setting (incarcerated, clinical, community sample), and age at the first measurement were coded.

Study characteristics for the associations between psychopathic traits and attachment included all reported associations between psychopathic traits and attachment scores. For attachment we reported overall attachment, attachment coded as a ratio between avoidance and anxiety or coding in the categories A, B, C and D. Attachment measurements were coded as categorical (e.g., secure or insecure) or continuous (more or less insecure). With whom the attachment relationship had been measured was categorized as follows: with father, mother, or parents/caregivers. For psychopathy we reported overall psychopathy, CU traits, narcissistic traits, impulsivity, and antisocial behavior. Important to mention here is that only some of the studies that used the different versions of the Psychopathy Checklist (e.g., the PCL: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003), or PCL-Screening Version (PCL-SV; Forth et al., 2003)) included antisocial behavior in the construct of overall psychopathy. For the other instruments, overall psychopathy was composed of the scores on CU, narcissism and impulsivity.

Assessment characteristics were coded as follows. The seven different attachment instruments were coded: IPPA (Inventory of Parent and Peer Attachment; Armsden & Greenberg, 1987), AAI (Adolescent Attachment Interview or Adult Attachment Interview; George, Kaplan, & Main, 1985) or other. See Table 1 for more information about the measures. The eight different psychopathy instruments were coded: PCL (all versions), Antisocial Process Screening Device (APSD; Frick & Hare, 2001), or other. The assessment methods for attachment were coded as self-reported, parent reported or reported by clinicians. For psychopathic traits, some studies used different sources for the measurement, such as an integration of self-reports, official data and observations, coded as a composite, next to self-reports and parent/caregiver reports. Finally, we coded whether the same informants were used to gain information on psychopathic traits and attachment (same informant bias).

To capture the information regarding possible moderators, a coding scheme was developed. Possible moderators were coded by the first author according to this coding scheme. In total, 38% of the articles were randomly selected to be double coded both by the second and the third author to check for interrater reliability. The average intraclass correlation measuring correspondence between the coders was 0.95 on the coded variables. The lowest intraclass correlations between the three raters were for the variables attachment coded as categories (ABCD) or dimensional, gender and sample setting; their values were 0.79, 0.87, and 0.87 respectively.

2.3. Analyses

2.3.1. Publication bias

To test for publication bias, an Egger's test was performed to inspect whether the effect sizes were distributed symmetrically (Egger, Smith, Schneider, & Minder, 1997). Next, a trim and fill analysis was performed to investigate whether adding effect sizes to the right or the left side of the distribution influenced the mean estimate (e.g., underestimation or overestimation) of the overall effect size (Duval & Tweedie, 2000a, 2000b). These analyses were performed with a two-

level random-effects model.

2.3.2. Overall effect size

To correct for dependency because of multiple effect sizes derived from the same studies, a three-level random effects model was used for the analyses, so there were three levels of variance (Field, 2001). The first level of variance was the sampling variance around the estimated population effect size. The second level of variance was between effect sizes within studies. The third level of variance was across effect sizes between studies (Van den Noortgate, López-López, Marín-Martínez, & Sánchez-Meca, 2015). We applied the procedure and R script described by Wibbelink and Assink (2015). Parameters were estimated using a Restricted Maximum Likelihood method. The first step was to calculate an overall estimate of the effect size. Of this overall estimate it was investigated whether the variances at level 2 (within studies) and level 3 (between studies) significantly deviated from zero by performing two log-likelihood ratio tests, to compare whether constraining either the level 2 or level 3 variance deteriorated model fit compared to the unconstrained model. Next, it was established which percentage of the total variance was accounted for at each level. In addition, a check for possible outliers of the Fischer z scores of the effect sizes was conducted, but no outliers were found so just all raw data were used.

2.3.3. Moderator analyses

Univariate moderator analyses were performed to investigate which moderators significantly influenced the association between attachment and psychopathic traits. Furthermore, the best fit and likelihood of all possible 63 models was examined by checking the corrected AIC's (Akaike Information Criterion) and the Akaike weight (Anderson, 2007). The Akaike weight for a particular model can be regarded as the probability that that model is the best model (Viechtbauer, 2016). Of the final model, it was investigated whether the variance at level 2 and 3 significantly deviated from zero. Next, it was again established how much of the total variance was found at each level. Finally, it was calculated how much more of the proportion of variance was explained by adding moderators, using the formulas of Cheung (2014). All analyses were performed in R with the metafor and the glmulti package (Viechtbauer, 2010, 2016).

3. Results

3.1. Overall effect size

The mean estimate of the overall effect size of the association between attachment and psychopathic traits was 0.18 and significantly deviated from zero, $SE_{\beta} = 0.06$, $t(132) = 3.04$, $p < .001$, 95% CI = 0.06–0.31. This estimate indicated that there was a small-to-medium but significant association. There was a significant amount of heterogeneity in the effect sizes not accounted for by the model, $Q(132) = 861.55$, $p < .001$. The variance at level 2, or the variance between effect sizes within studies, was 0.02. Setting this variance to zero significantly improved model fit compared to the unconstrained model, $\chi^2(1) = 216.57$, $p < .001$, indicating a significant amount of variance at level 2. The variance at level 3, or the variance between effect sizes, was 0.03. Setting this variance to zero also significantly improved model fit compared to the unconstrained model, $\chi^2(1) = 75.06$, $p < .001$, indicating a significant amount of variance at level 3. Of the total variance, 19.98% was at level 1, 36.58% was at level 2, and 43.43% was at level 3. Because the residual heterogeneity was significant, moderator analyses were performed to investigate which moderator significantly influenced the strength of the association between attachment and psychopathic traits.

3.2. Publication bias

The Egger's test revealed that the distribution of the effect sizes was

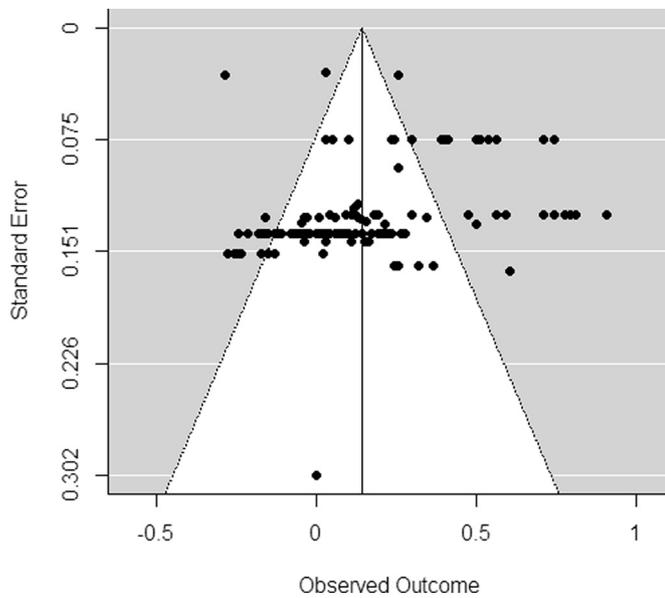


Fig. 1. Funnel plot with Fisher's z transformed correlations. On the y-axis are the standard errors of the studies, with smaller standard errors representing larger sample sizes. On the x-axis are the associations between attachment and psychopathy.

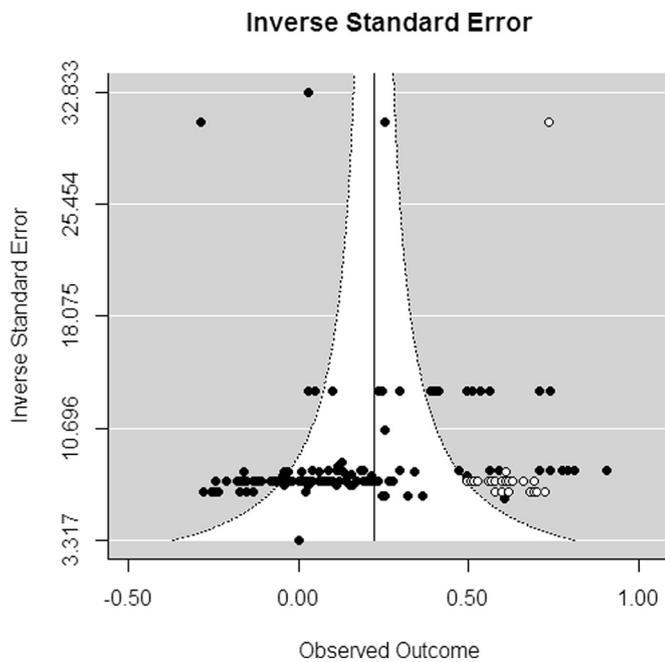


Fig. 2. Funnel plot of the effect sizes. On the y-axis are the inverses of the standard errors, on the x-axis the observed effect sizes.

Fig. 2 displays the funnel plot after the trim and fill analysis. It visualizes how the distribution of the effect sizes would be if it was symmetrical. The black dots represent the effect sizes, the white dots represent the imputed effect sizes. As is visible in Fig. 2, all the imputed effect sizes are on the right side of the distribution.

asymmetrical, $z = -3.67, p = .000$. Performing a trim and fill analysis led to adding effect sizes on the right side of the distribution. The effect size after the trim and fill analysis ($z = 0.22$) was further away from zero than the effect size before the trim and fill analysis ($z = 0.14$), thereby posing no threat for possible overestimation. Fig. 1 displays the original funnel plot of the effect sizes, whereas Fig. 2 displays the funnel plot after the trim and fill procedure, therefore visualizing how the distribution of the effect sizes would be if it was symmetrical.

Table 2

The Q_M statistics for whether a moderator was significant and the Q_E statistics for the residual heterogeneity of the moderators.

	Q_M (df)	p	Q_E (df)	p
Publication characteristics				
Year of publication	3.57 (1)	.062	264.69 (99)	< .001
Impact factor	0.05 (1)	.822	168.49 (20)	< .001
Sample characteristics				
Gender	0.54 (2)	.586	771.98 (130)	< .001
Percentage boys	0.05 (1)	.816	645.38 (129)	< .001
Age	0.68 (1)	.410	826.24 (131)	< .001
Sample setting	5.36 (3)	.002	462.56 (129)	< .001
Study characteristics				
Attachment categories	0.94 (6)	.468	675.26 (126)	< .001
Attachment to whom	1.68 (2)	.190	811.69 (130)	< .001
Psychopathic traits	2.46 (4)	.049	769.10 (128)	< .001
Assessment characteristics				
Attachment scale	0.29 (1)	.593	744.39 (131)	< .001
Attachment instrument	3.74 (2)	.026	477.12 (130)	< .001
Psychopathy instrument	5.96(2)	.003	472.35 (130)	< .001
Attachment reported by whom	1.63 (1)	.201	692.92(131)	< .001
Psychopathic traits reported by whom	28.04(2)	< .001	645.80 (130)	< .001
Informant bias	5.01 (1)	.027	859.46 (131)	< .001
Sample size	1.66 (1)	.200	817.83 (131)	< .001

3.3. Moderator analysis

The Q_M statistics for whether a moderator was significant and the Q_E statistics for the residual heterogeneity of the discrete moderators are displayed in Table 2. The following moderators were not significant: year of publication, impact factor, gender, percentage of boys, age, sample size, attachment categories, attachment scale, attachment to whom and attachment reported by whom. The moderators which psychopathic trait, psychopathic traits reported by whom, attachment instrument, psychopathy instrument, sample setting and same informant bias were significant. Coefficients for the significant univariate moderators are displayed in Table 3.

3.4. The final model

Due to the fact that we found six significant moderators, with 63 possible combinations, we used an information-theoretic approach to select the best fitting model (Anderson, 2007). The “best” model (the model with the lowest AICc, -124.49 , and the highest Akaike weight, 0.87) turned out to be a multivariate model, including all six significant univariate moderators (sample setting, psychopathic traits, attachment instrument, psychopathy instruments, psychopathy reported by whom and informant bias). Effects of all moderators remained significant, $Q_M(14) = 9.15, p < .001$. A significant amount of residual heterogeneity remained not accounted for by the model, $Q_E(118) = 201.69, p < .001$. Level-2 variance of the final model was 0.01 . Setting this variance to zero significantly deteriorated model fit, $\chi^2(16) = 43.52, p < .001$, indicating that the level-2 variance significantly deviated from zero. Level-3 variance was 0.01 . Setting this variance to zero did not deteriorate model fit, $\chi^2(16) = 0.89, p = .346$, indicating that the variance did not deviate from zero. Of the total variance, 42.59% was at level 1, 23.89% was at level 2, and 33.52% was at level 3. Compared to the model without the moderators, at level 1 there was an increase of 22.60% in variance explained by the final model. However, a decrease of 12.69% in variance at level 2, and a decrease of 9.91% in variance were explained by the final model. According to Cheung (2014), these negative values should be truncated to zero, indicating that adding the moderators did not explain more of the variance between studies or between effect sizes.

Table 3
Coefficients for the univariate moderator analyses.

	#studies	#ES	ES _z	SE	t	95% CI	p	ρ
Psychopathic traits.								
Overall psychopathy	6	28	0.17	0.07	2.41	0.031 0.311	.017	0.17
CU	10	38	0.23	0.06	3.57	0.102 0.356	< .001	0.23
Narcissism	4	26	0.08	0.07	1.17	−0.059 0.230	.245	0.08
Impulsivity	5	27	0.11	0.07	1.60	−0.027 0.255	.113	0.11
Antisocial	2	14	0.14	0.08	1.62	−0.027 0.255	.106	0.13
Psychopathic traits reported by whom.								
Self-reported	4	21	0.07	0.11	0.58	−0.160 0.291	.566	0.07
Parents/caregivers	3	23	0.44	0.12	3.79	0.209 0.665	< .001	0.41
Composite	6	89	0.14	0.13	1.05	−0.121 0.395	.296	0.14
Psychopathy instruments.								
PCL*	5	88	0.09	0.07	1.39	−0.039–0.222	.168	0.09
APSD	2	33	0.45	0.09	5.06	0.273–0.624	< .001	0.42
Other	5	12	0.11	0.07	1.65	−0.023–0.248	.102	0.11
Attachment instruments.								
IPPA	4	45	0.32	0.07	4.52	0.177–0.454	< .001	0.31
AAI	2	61	0.11	0.07	1.51	−0.034–0.252	.113	0.11
Other	6	27	0.06	0.06	0.97	−0.064–0.187	.333	0.06
Sample setting								
Community	3	10	0.09	0.07	1.35	−0.044–0.231	.180	0.09
Clinical	3	33	0.40	0.07	5.56	0.258–0.543	< .001	0.38
Incarcerated	3	12	0.23	0.08	2.78	0.066–0.391	.006	0.22
Combination	3	78	0.03	0.07	0.48	−0.101–0.165	0.632	0.00
Informant bias								
Same informant	6	91	0.23	0.07	3.44	0.097–0.359	< .001	0.22
Different informant	7	42	0.14	0.07	2.09	0.007–0.271	.039	0.14

4. Discussion

The purpose of the present meta-analysis was to investigate the strength of the association between attachment and psychopathic traits. In addition, we tested whether moderators influenced the strength of this association. The present study is, to our knowledge, the first secondary analysis to focus on the association between these constructs. On the basis of theoretical models (e.g., Farrington, 2005; Saltaris, 2002), we expected that psychopathy would be associated with attachment. However, on the basis of the literature no prior hypotheses could be formulated regarding the association between specific psychopathic traits and attachment categories and the effects of potential moderators. Therefore, the current study was mainly explorative.

Overall, we found a significant association between attachment and psychopathic traits of 0.18, meaning that psychopathy in general and attachment are weakly related to each other, following the criteria of Cohen (1992) about the interpretation of the magnitude of effect sizes. However, examining the different categories of psychopathic traits, significant differences in the attachment-psychopathic traits link were found; the strongest link was found for CU traits, followed by psychopathy in general, while nonsignificant links were found for narcissism, antisocial behavior, and impulsivity. This suggests that those with CU traits in particular were more likely to have insecure attachments. This finding is in line with prior research, in which CU traits were seen as the most impeding psychopathic trait for interpersonal relationships in general (Larsson et al., 2008; O'Connor, Humayun, Briskman, & Scott, 2016). Moreover, the heritability of CU traits is strong (Bezdzian et al., 2011; Larsson et al., 2008), meaning that children with CU traits are more likely to have parents with CU traits, thus the forming of a secure attachment may be impeded by both parents and offspring (Dadds, Allen, et al., 2014).

Further, we found that the attachment-psychopathic traits association was dependent on the setting. Moderate to large associations were found in clinical and secure setting, but no significant effects sizes were found when a study did combine two different settings, such as a forensic and a mental health clinic (e.g., Catchpole, 2009; Frodi et al.,

2001). Also, for the community samples we did not find any significant effect. An explanation may be that psychopathy (e.g., Coid et al., 2009) and CU traits (e.g., Rowe et al., 2010) are relatively rare in general population samples. Samples in clinical or justice settings may therefore be more suitable to investigate psychopathy or psychopathic traits in relation to important correlates, such as attachment (in)security.

Furthermore, we found various significant differences in effect sizes related to the method of measurement of either psychopathic traits or attachment. Regarding the attachment instrument, a medium effect size was found when the scores on the IPPA were reported, and no effect was found for any other attachment instrument. Possibly, this could be due to the fact that the IPPA measures the overall strength of attachment compared to for instance the AAI, which focuses more specifically on the different attachment categories. Moreover, the IPPA and the BSQ (Behavioral Systems Questionnaire) were the only questionnaires compared to the interviews and observations used for the other attachment assessments.

Likewise, for the psychopathy instruments, a medium to large effect size was found for the APSD, and nonsignificant effect sizes were found for the other instruments. The APSD was an adaptation of the PCL-which was based on the PCL-R for adults (Patrick, 2005, p.396), and aimed to be more sensitive to the developmental stage of children and adolescents, but in contrast to PCL-versions, the APSD captured only the CU, narcissistic and impulsive traits, and not antisocial behavior. This could be in line with the finding that the only significant effect size was found for CU traits, and not for narcissistic, impulsive or antisocial traits. The fact that most of the parent-reported instruments included only CU traits, might explain that the only significant effect size found across informants was for parent-reported psychopathic traits (i.e., not self-reports and composites of different sources), might also be in line with the largest effect size found for CU. Finally, stronger associations between insecure attachment and psychopathic traits were found for studies relying on the same informant reporting on both attachment and psychopathic traits than for studies using data from different informants. At least partly this may be explained by common method variance (see e.g., Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

We did not find any differences between attachment categories, suggesting that the associations between psychopathic traits and secure attachment on the one hand, and the various types of insecure attachment, including avoidant, anxious/resistant, and disorganized attachment on the other hand, are similar. Nevertheless, because of the low number of studies that met our inclusion criteria, these results need to be interpreted with caution. Furthermore, the association between attachment and psychopathic traits was also independent of participant characteristics, as this association was similar across gender and age groups. This former finding is in line with the literature (e.g., Blanchard & Lyons, 2016), and the latter finding could be ascribed to the high genetic component of CU traits, and thus a small contribution of environmental exposure to individual differences (e.g., Larsson et al., 2008).

Likewise, we did not find differences between to whom the attachment was reported, suggesting that attachment to mothers as well as to fathers seems to be about equally associated with psychopathic traits. This particular finding may possibly be explained by the fact that only six of the twelve included studies reported separate father and mother scores on attachment. A moderating effect may be expected, because research did show differences between mothers and fathers for the association between CU traits in boys and impaired eye contact with their attachment figures. This impairment in eye contact was associated with psychopathic traits in their fathers, whereas the mothers did not show any impairments, and the quality of their attachment-behaviors was independent of the level of eye contact of their sons (Dadds et al., 2011; Dadds, Allen, et al., 2014). Subsequently, attachment with mothers would be less impeded and therefore would show a weaker correlation with psychopathic traits. Nevertheless, the lack of an effect of this moderator could be due to the number of studies, and therefore should be interpreted with caution and needs further investigation.

4.1. Strengths, limitations and recommendations

Although an abundance of theoretical studies seem to consider the association between attachment and psychopathy as self-evident, even without any exclusion criteria, we did find only 12 studies based on empirical findings that met our criteria for the current meta-analysis. To our knowledge, the current study is the first to investigate this relation at a meta-analytic level. Due to the correlational nature of this study, we cannot make statements about a causal relation between attachment and psychopathy. Given the limitations of the present study, which is based on only 12 studies, more research on the role of attachment in the development of psychopathy and the different traits in particular, but also on the role of psychopathic traits in the development of attachment insecurity is recommended. Furthermore, although the moderators did not increase the explained variance in the strength of the association between attachment and psychopathic traits, with the significant moderators explaining a unique proportion of the variance of effect sizes, the present study yielded implications for future research on this topic.

Despite these limitations, a strength is that this study has found evidence for the association between attachment and psychopathy, and more particular the association between attachment and CU traits. Therefore, it is recommended to prospectively and longitudinally study the association between attachment and the different psychopathic traits, with the aim to obtain a more refined picture of the options and (im)possibilities of intervention and treatment methods. However, it should be emphasized that the changeability of psychopathic traits seems to be highly dependent on age, therefore stressing the importance of early interventions (Högström, Enebrink, & Ghaderi, 2013; Hyde et al., 2013; Ribeiro da Silva, Rijo, & Salekin, 2013; Savage, 2014; Waller et al., 2013) and the need for interventions to be tailored specifically for youth high on CU traits, regardless of any comorbid behavioral difficulties (Högström et al., 2013; Hyde et al., 2013; Manders, Deković, Asscher, Van der Laan, & Prins, 2013; McDonald, Dodson,

Rosenfield, & Jouriles, 2011).

4.1.1. Future perspectives

Two attachment related lines of research may be relevant when implementing the findings of the current meta-analysis into interventions. First, the findings of research showing that attention to fearful faces predicts attachment security (Pelto, Forssman, Puura, Van IJzendoorn, & Leppänen, 2015), linked with the finding that CU traits are seen as a consequence of the inability to recognize fearful faces (e.g., Dadds et al., 2006), as a result of an impairment in attention to the eye region (Dadds et al., 2011), resulted in Emotion Recognition Training (ERT). For children with high levels of CU traits, ERT and not TAU produced significant improvements in conduct problems and affective empathy. So ERT could be used as an intervention for children with high CU-traits, although the change associated with ERT seemed not to occur through improvements in emotion recognition, but by increasing overall attention to socially relevant cues (Dadds, Cauchi, Wimalaweera, Hawes, & Brennan, 2012).

The second recommended line of inquiry based on the found association between CU traits and attachment is more pharmacogenetically orientated. Oxytocin, a hormone known for its role in bonding between parents and their offspring (Buchheim et al., 2009; Liu, McElean, & Dadds, 2012; Strathearn, 2011; Strathearn, Fonagy, Amico, & Montague, 2009; Swain et al., 2014), might also be involved in the development of psychopathy. Variations in oxytocin receptors and/or oxytocin blood levels were found to be associated with CU-traits (Beitchman et al., 2012; Dadds, Moul, et al., 2014). Furthermore, administration of oxytocin to adults (Guastella, Mitchell, & Dadds, 2008), fathers (Weisman, Zagoory-Sharon, & Feldman, 2014) or children (Guastella et al., 2010) showed to increase not only their focus on the eye region of the face and therefore their emotion recognition (Guastella et al., 2010), but also the quality of the parent-child social behaviors such as positive affect (Weisman et al., 2014). So both interventions (attention to the eye region/emotion recognition and the administration of oxytocin) seem to have in common that they both target not only the CU-trait but also ameliorate insecure attachment, and therefore should be thoroughly investigated.

In addition, from a prevention perspective, it is of utmost importance to further examine the associations between CU traits and different attachment categories, given the possible protective function of secure attachment in the development of psychopathic traits. For example, secure attachment priming resulted in more attachment security and less psychopathy (Allen, 2015). Additionally, research findings indicate that formation of a more secure attachment, although complicated by the insensitivity of the child, could serve as a protective factor for a child with callous-unemotional traits (Kochanska, 1995; Nakash-Eisikovits, Dutra, & Westen, 2002). Albeit the association between attachment and psychopathic traits in particular turned out to be weak, more investigation in the correlations between psychopathic traits and other constructs concerning parental behavior, such as parental bonding (Blanchard & Lyons, 2016; Craig et al., 2013), positive parenting (Hawes et al., 2011) or parental warmth (Bisby et al., 2017; Kimonis et al., 2013) is highly recommended in general, and more specifically for treatment possibilities, given the devastating effects psychopathic traits can have on both individuals with psychopathic traits themselves, but also their environment.

5. Conclusion

Although this study provides insight into the strength of the association between attachment and psychopathic traits, it does not –nor did it intend to– provide insight in what comes first, attachment difficulties or psychopathic traits. So, the apparent paradox between Bowlby (1944), who stated that psychopathy should be seen as a result of a bad early environment, and Cleckley (1941/1988), who thought that bad parenting could not be the regular cause, still exists. However,

this study has demonstrated that there is an association between attachment and psychopathic traits. It might be that both Cleckley and Bowlby were right about the nascence of psychopathy and that it only depends on where the starting point for any assessment is put. Nonetheless, children with neurological alterations due to genetic factors and/or early childhood experiences do form a specific parenting challenge, and are therefore at a greater risk for a distorted relationship with their caregivers. It is therefore recommendable to treat psychopathic traits by improving attachment with parents, especially in younger children.

References¹

- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Hillsdale, N J: Erlbaum.
- Allen, V. R. (2013). *Psychopathy and attachment: Examining the relationship between secure attachment priming and psychopathy* (Master's thesis) *Electronic Theses & Dissertations* (Paper 850).
- Andershed, H. (2010). Stability and change of psychopathic traits: What do we know? In R. T. Salekin, & D. T. Lynam (Eds.). *Handbook of child and adolescent psychopathy* (pp. 233–250). New York: The Guilford Press.
- Anderson, D. R. (2007). *Model based inference in the life sciences: A primer on evidence*. New York: Springer.
- Armsden, G. C., & Greenberg, M. T. (1987). The Inventory of Parent and Peer Attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence*, 16, 427–454.
- *Asscher, J. J., Dekovic, M., Manders, W. A., Prins, P. J. M., & Van der Laan, P. H. (2010). *Dutch MST randomized Controlled Trial [Data file and Codebook]*. Author communication, Amsterdam: November 2010.
- Asscher, J. J., Van Vugt, E. S., Stams, G. J. J. M., Deković, M., Eichelsheim, V. I., & Yousfi, S. (2011). The relationship between juvenile psychopathic traits, delinquency and (violent) recidivism: A meta-analysis. *Journal of Child Psychology and Psychiatry*, 52, 1134–1143. <https://doi.org/10.1111/j.1469-761.2011.02412.x>.
- Bailey, C., & Shelton, D. (2014). Self-reports of faulty parental attachments in childhood and criminal psychopathy in an adult-incarcerated population: An integrative literature review. *Journal of Psychiatric and Mental Health Nursing*, 21, 365–374. <https://doi.org/10.1111/jpm.12086>.
- Barb, R. M. (2007). *The relationship between attachment, empathy, and socialmoral reasoning and psychopathy in a male juvenile delinquent population*. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 67(7-B), 4095.
- Barker, E. D., Oliver, B. R., Viding, E., Salekin, R. T., & Maughan, B. (2011). The impact of prenatal maternal risk, fearless temperament and early parenting on adolescent callous-unemotional traits: A 14-year longitudinal investigation. *Journal of Child Psychology and Psychiatry*, 52, 878–888. <https://doi.org/10.1111/j.1469-761.2011.02397.x>.
- Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology*, 51, 226–244. <https://doi.org/10.1037//0022-3514.61.2.226>.
- Beaver, K. M., Rowland, M. W., Schwartz, J. A., & Nedelec, J. L. (2011). The genetic origins of psychopathic personality traits in adult males and females: Results from an adoption-based study. *Journal of Criminal Justice*, 39, 426–432. <https://doi.org/10.1016/j.jcrimjus.2011.07.002>.
- Beaver, K. M., Vaughn, M. G., DeLisi, M., Barnes, J. C., & Boutwell, B. B. (2012). The neuropsychological underpinnings to psychopathic personality traits in a nationally representative and longitudinal sample. *Psychiatric Quarterly*, 83, 145–159. <https://doi.org/10.1007/s11126-011-9190-2>.
- Beeny, J. E., Stepp, S. D., Hallquist, M. N., Scott, L. N., Wright, A. C., Ellison, W. D., ... Pilkonis, P. A. (2015). Attachment and social cognition in borderline personality disorder: Specificity in relation to antisocial and avoidant personality disorders. *Personality Disorders: Theory, Research, and Treatment*, 6, 207–215. <https://doi.org/10.1037/per0000110>.
- Beitchman, J. H., Zai, C. C., Muir, K., Berall, L., Nowrouzi, B., Choi, E., & Kennedy, J. L. (2012). Childhood aggression, callous-unemotional traits and oxytocin genes. *European Child & Adolescent Psychiatry*, 21, 125–132. <https://doi.org/10.1007/s00787-012-0240-6>.
- Bezdzian, S., Raine, A., Baker, L. A., & Lynam, D. R. (2011). Psychopathic personality in children: Genetic and environmental contributions. *Psychological Medicine*, 41, 589–600. <https://doi.org/10.1017/S0033291710000966>.
- Bisby, M. A., Kimonis, E. R., & Goulter, N. (2017). Low maternal warmth mediates the relationship between emotional neglect and callous-unemotional traits among male juvenile offenders. *Journal of Child and Family Studies*, 26, 1790–1798. <https://doi.org/10.1007/s10826-017-0719-3>.
- Blair, R. J. R. (2001). Neurocognitive models of aggression, the antisocial personality disorders, and psychopathy. *Journal of Neurology, Neurosurgery & Psychiatry*, 71, 727–731. <https://doi.org/10.1136/jnnp.71.6.727>.
- Blair, R. J. R., Colledge, E., Murray, L., & Mitchell, D. G. V. (2001). A selective impairment in the processing of sad and fearful expressions in children with psychopathic tendencies. *Journal of Abnormal Child Psychology*, 29, 491–498. <https://doi.org/10.1023/A:1012225108281>.
- Blair, R. J. R., Peschardt, K. S., Budhani, S., Mitchell, D. G. V., & Pine, D. S. (2006). The development of psychopathy. *Journal of Child Psychology and Psychiatry*, 47, 262–276. <https://doi.org/10.1111/j.1469-7610.2006.01596.x>.
- Blanchard, A., & Lyons, M. (2016). Sex differences between primary and secondary psychopathy, parental bonding, and attachment style. *Evolutionary Behavioral Sciences*, 10, 56–63. <https://doi.org/10.1037/ebbs0000065>.
- Boccardi, M., Frisoni, G. B., Hare, R. D., Cavado, E., Najt, P., Pievani, M., ... Repotiihonen, E. (2011). Cortex and amygdala morphology in psychopathy. *Psychiatry Research: Neuroimaging*, 193, 85–92. <https://doi.org/10.1016/j.psychres.2011.12.013>.
- Bogaerts, S., Buschman, J., Kunst, M., & Winkel, F. (2010). Intra- and extra-familial child molestation as pathways building on parental and relational deficits and personality disorders. *International Journal of Offender Therapy and Comparative Criminology*, 54, 478–493. <https://doi.org/10.1177/0306624X09334519>.
- Bowen, K. L., Morgan, J. E., Moore, S. C., & Van Goozen, S. H. (2013). Young offenders' emotion recognition dysfunction across emotion intensities: Explaining variation using psychopathic traits, conduct disorder and offense severity. *Journal of Psychopathology and Behavioral Assessment*, 36, 60–73. <https://doi.org/10.1007/s10862-013-9368-z>.
- Bowlby, J. (1944). Forty-four juvenile thieves: Their character and home-life. *International Journal of Psychoanalysis*, 25, 107–127. <https://doi.org/10.1037/h0053167>.
- Bowlby, J. (1970). Disruption of affectional bonds and its effects on behavior. *Journal of Contemporary Psychotherapy*, 2, 75–86. <https://doi.org/10.1007/BF02118173>.
- *Brennan, K. A., & Shaver, P. R. (1998). Attachment styles and personality disorders: Their connections to each other and to parental death, and perceptions of parental caregiving. *Journal of Personality*, 66, 835–878. <https://doi.org/10.1111/1467-6494.00034>.
- Bretherton, I. (1992). The origins of attachment theory: John Bowlby and Mary Ainsworth. *Developmental Psychology*, 28, 759–775. <https://doi.org/10.1037//0012-1649.28.5.759>.
- Buchheim, A., Heinrichs, M., George, C., Pokorny, D., Koops, E., Henningsen, P., ... Gündel, H. (2009). Oxytocin enhances the experience of attachment security. *Psychoneuroendocrinology*, 34, 1417–1422. <https://doi.org/10.1016/j.psyneuen.2009.04.002>.
- *Buck, K. A. (2015). Understanding adolescent psychopathic traits from early risk and protective factors: Relations among inhibitory control, maternal sensitivity, and attachment representation. *Journal of Adolescence*, 44, 97–105. <https://doi.org/10.1016/j.adolescence.2015.07.009>.
- Carlson, M., Oshri, A., & Kwon, J. (2015). Child maltreatment and risk behaviors: The roles of callous/unemotional traits and conscientiousness. *Child Abuse & Neglect*, 50, 234–243. <https://doi.org/10.1016/j.chiabu.2015.07.003>.
- *Catchpole, R. E. H. (2009). *Attachment to caregivers and psychopathic characteristics among adolescents at risk for aggression*. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 70(3-B), 1967.
- Cheung, M. W. L. (2014). Modeling dependent effect sizes with three-level meta-analyses: A structural equation modeling approach. *Psychological Methods*, 19, 211–229. <https://doi.org/10.1037/a0032968>.
- Christian, E. J., Meltzer, C. L., Thede, L. L., & Kosson, D. S. (2016). The relationship between early life events, parental attachment, and psychopathic tendencies in adolescent detainees. *Child Psychiatry & Human Development*, 48, 260–269. <https://doi.org/10.1007/s10578-016-0638-3>.
- Cicchetti, D., & Doyle, C. (2016). Child maltreatment, attachment and psychopathology: Mediating relations. *World Psychiatry*, 15(2), 89–90. <https://doi.org/10.1002/wps.20337>.
- Cleckley, H. M. (1988). *The mask of sanity. Scanned facsimile produced for non-profit educational use. Copyright 1988 Emily S. Cleckley* (5th ed.).
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>.
- Coid, J., Yang, M., Ullrich, S., Roberts, A., & Hare, R. D. (2009). Prevalence and correlates of psychopathic traits in the household population of Great Britain. *International Journal of Law and Psychiatry*, 32, 65–73. <https://doi.org/10.1016/j.ijlp.2009.01.002>.
- Colomesi, C., Draijer, E. M., Stams, G. J. J. M., Van der Bruggen, C. O., Bögels, S. M., & Noom, M. J. (2011). The relation between insecure attachment and child anxiety: A meta-analytic review. *Journal of Clinical Child & Adolescent Psychology*, 40, 630–645. <https://doi.org/10.1080/15374416.2011.581623>.
- Craig, M. C., Catani, M., Deeley, Q., Latham, R., Daly, E., Kanaan, R., ... Murphy, D. G. M. (2009). Altered connections on the road to psychopathy. *Molecular Psychiatry*, 14, 946–953. <https://doi.org/10.1038/mp.2009.40>.
- Craig, R. L., Gray, N. S., & Snowden, R. J. (2013). Recalled parental bonding, current attachment, and the triarchic conceptualisation of psychopathy. *Personality and Individual Differences*, 55, 345–350. <https://doi.org/10.1016/j.paid.2013.03.012>.
- Dadds, M. R., Allen, J. L., McGregor, K., Woolgar, M., Viding, E., & Scott, S. (2014). Callous-unemotional traits in children and mechanisms of impaired eye contact during expressions of love: A treatment target? *Journal of Child Psychology and Psychiatry*, 55, 771–780. <https://doi.org/10.1111/jcpp.12155>.
- Dadds, M. R., Cauchi, A. J., Wimalaweera, S., Hawes, D. J., & Brennan, J. (2012). Outcomes, moderators, and mediators of empathic-emotion recognition training for complex conduct problems in childhood. *Psychiatry Research*, 199, 201–207. <https://doi.org/10.1016/j.psychres.2012.04.033>.
- Dadds, M. R., Jambak, J., Pasalich, D., Hawes, D. J., & Brennan, J. (2011). Impaired attention to the eyes of attachment figures and the developmental origins of psychopathy. *Journal of Child Psychology and Psychiatry*, 52, 238–245. <https://doi.org/10.1111/j.1469-761.201.02323.x>.
- Dadds, M. R., Moul, C., Cauchi, A., Dobson-Stone, C., Hawes, D. J., Brennan, J., & Ebstein,

¹ References marked with an asterisk are included in the meta-analysis.

- R. E. (2014). Methylation of the oxytocin receptor gene and oxytocin blood levels in the development of psychopathy. *Development and Psychopathology*, 26, 33–40. <https://doi.org/10.1017/S0954579413000497>.
- Dadds, M. R., Perry, Y., Hawes, D. J., Merz, S., Riddell, A. C., Haines, D. J., ... Abeygunawardane, A. I. (2006). Attention to the eyes and fear-recognition deficits in child psychopathy. *The British Journal of Psychiatry*, 189, 280–281. <https://doi.org/10.1192/bjp.bp.105.018150>.
- Dadds, M. R., & Salmon, K. (2003). Punishment insensitivity and parenting: Temperament and learning as interacting risks for antisocial behavior. *Clinical Child and Family Psychology Review*, 6, 69–86. <https://doi.org/10.1023/A:1023762009877>.
- Daversa, M. T. (2010). Early environmental predictors of the affective and interpersonal constructs of psychopathy. *International Journal of Offender Therapy and Comparative Criminology*, 54, 6–21. <https://doi.org/10.1177/0306624X08328754>.
- Dawel, A., O'Kearney, R., McKone, E., & Palermo, R. (2012). Not just fear and sadness: Meta-analytic evidence of pervasive emotion recognition deficits for facial and vocal expressions in psychopathy. *Neuroscience and Biobehavioral Reviews*, 36, 2288–2304. <https://doi.org/10.1016/j.neubiorev.2012.08.006>.
- Duval, S., & Tweedie, R. (2000a). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, 56, 455–463. <https://doi.org/10.1111/j.0006-341X.200.00455.x>.
- Duval, S., & Tweedie, R. (2000b). A nonparametric “trim and fill” method of accounting for publication bias in meta-analysis. *Journal of the American Statistical Association*, 95(449), 89–98. <https://doi.org/10.1080/01621459.200.10473905>.
- Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, 315, 629–634. Retrieved from <http://www.jstor.org/stable/25175671>.
- Farrington, D. P. (2005). The importance of child and adolescent psychopathy. *Journal of Abnormal Child Psychology*, 33, 489–497. <https://doi.org/10.1007/s10802-005-5729-8>.
- Fearon, R. P., Bakermans-Kranenburg, M. J., Van IJzendoorn, M. H., Lapsley, A.-M., & Roisman, G. I. (2010). The significance of insecure attachment and disorganization in the development of children's externalizing behavior: A meta-analytic study. *Child Development*, 81, 435–456. <https://doi.org/10.1111/j.1467-8624.2009.01405.x>.
- Fearon, R. P., & Belsky, J. (2011). Infant–mother attachment and the growth of externalizing problems across the primary-school years. *Journal of Child Psychology and Psychiatry*, 52, 782–791. <https://doi.org/10.1111/j.1469-761.201.0235.x>.
- Field, A. P. (2001). Meta-analysis of correlation coefficients: A Monte Carlo comparison of fixed-and random-effects methods. *Psychological Methods*, 6, 161–180. <https://doi.org/10.1037/1082-989X.6.2.161>.
- Fite, P. J., Greening, L., & Stoppelbein, L. (2008). Relation between parenting stress and psychopathic traits among children. *Behavioral Sciences & the Law*, 26, 239–248. <https://doi.org/10.1002/bsl.803>.
- *Flight, J. I., & Forth, A. E. (2007). Instrumentally violent youths. *Criminal Justice and Behavior*, 34, 739–751. <https://doi.org/10.1177/0093854807299462>.
- Fontaine, N. M., McCrory, E. J., Boivin, M., Moffitt, T. E., & Viding, E. (2011). Predictors and outcomes of joint trajectories of callous–unemotional traits and conduct problems in childhood. *Journal of Abnormal Psychology*, 120, 730–742. <https://doi.org/10.1037/a0022620>.
- Forth, A. E., Kosson, D. S., & Hare, R. D. (2003). Hare Psychopathy Checklist: Youth Version. *Multi-Health Systems*.
- Frick, P. J., & Hare, R. D. (2001). The Psychopathy Screening Device. *Toronto: Multi-Health Systems*.
- *Frodi, A., Dernevik, M., Sepa, A., Philipson, J., & Bragesjö, M. (2001). Current attachment representations of incarcerated offenders varying in degree of psychopathy. *Attachment & Human Development*, 3, 269–283. <https://doi.org/10.1080/14616730110096889>.
- Gao, Y., Raine, A., Chan, F., Venables, P. H., & Mednick, S. (2010). Early maternal and paternal bonding, childhood physical abuse and adult psychopathic personality. *Psychological Medicine*, 40, 1000–1016. <https://doi.org/10.1017/S0033291709991279>.
- George, C., Kaplan, N., & Main, M. (1985). *Attachment Interview for Adults*. Unpublished manuscript/Berkeley: University of California.
- Groh, A. M., Fearon, R. M., Van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., & Roisman, G. I. (2017). Attachment in the early life course: Meta-analytic evidence for its role in socioemotional development. *Child Development Perspectives*, 11, 70–76. <https://doi.org/10.1111/cdep.12213>.
- Guastella, A. J., Einfeld, S. L., Gray, K. M., Rinehart, N. J., Tonge, B. J., Lambert, T. J., & Hickie, I. B. (2010). Intranasal oxytocin improves emotion recognition for youth with autism spectrum disorders. *Biological Psychiatry*, 67, 692–694. <https://doi.org/10.1016/j.biopsych.2009.09.020>.
- Guastella, A. J., Mitchell, P. B., & Dadds, M. R. (2008). Oxytocin increases gaze to the eye region of human faces. *Biological Psychiatry*, 63, 3–5. <https://doi.org/10.1016/j.biopsych.2007.06.026>.
- Guttman-Steinmetz, S., & Crowell, J. A. (2006). Attachment and externalizing disorders: A developmental psychopathology perspective. *Journal of the American Academy of Child & Adolescent Psychiatry*, 45, 440–451. <https://doi.org/10.1097/01.chi.0000196422.42599.63>.
- Hare, R. D. (2003). *Hare psychopathy checklist-revised (PCL-R)* (2nd ed.). North Tonawada, NY: Multi-Health Systems Inc.
- Hawes, D. J., Dadds, M. R., Frost, A. D. J., & Hasking, P. A. (2011). Do childhood callous-unemotional traits drive change in parenting practices? *Journal of Clinical Child & Adolescent Psychology*, 40, 507–518. <https://doi.org/10.1080/15374416.2011.581624>.
- Herpers, P., Scheepers, F. E., Bons, D., Buitelaar, J. K., & Rommelse, N. N. (2014). The cognitive and neural correlates of psychopathy and especially callous–unemotional traits in youths: A systematic review of the evidence. *Development and Psychopathology*, 26, 245–273. <https://doi.org/10.1017/S0954579413000527>.
- Hicks, B. M., Carlson, M. D., Blonigen, D. M., Patrick, C. J., Iacono, W. G., & McGue, M. (2012). Psychopathic personality traits and environmental contexts: Differential correlates, gender differences, and genetic mediation. *Personality Disorders: Theory, Research, and Treatment*, 3, 209–227. <https://doi.org/10.1037/a0025084>.
- Hoeve, M., Stams, G. J. J. M., Van der Put, C., Semon, E., Dubas, J., Van der Laan, P. H., & Gerris, J. R. M. (2012). A meta-analysis of attachment to parents and delinquency. *Journal of Abnormal Child Psychology*, 40, 771–785. <https://doi.org/10.1007/s10802-011-9608-1>.
- Högström, J., Enebrink, P., & Ghaderi, A. (2013). The moderating role of child callous-unemotional traits in an internet-based parent-management training program. *Journal of Family Psychology*, 27, 314–323. <https://doi.org/10.1037/a0031883>.
- Holmqvist, R. (2008). Psychopathy and affect consciousness in young criminal offenders. *Journal of Interpersonal Violence*, 23, 209–224. <https://doi.org/10.1177/0886260507309341>.
- Hyde, L. W., Shaw, D. S., Gardner, F., Cheong, J., Dishion, T. J., & Wilson, M. (2013). Dimensions of callousness in early childhood: Links to problem behavior and family intervention effectiveness. *Development and Psychopathology*, 25, 347–363. <https://doi.org/10.1017/S0954579412001101>.
- *Isaak, R. (2012). *Early antisocial markers and attachment styles: their influence on psychopathic characteristics in high-risk boys and girls* (Master's thesis) Simon Fraser University, Canada Arts & Social Sciences: School of Criminology. Retrieved from <http://summit.sfu.ca/item/12126>.
- Kerig, P. K., & Wenar, C. (2006). *Developmental psychopathology: from infancy through adolescence* (5th ed.). New York, New York: McGraw-Hill.
- Kimonis, E. R., Cross, B., Howard, A., & Donoghue, K. (2012). Maternal care, maltreatment and callous-unemotional traits among urban male juvenile offenders. *Journal of Youth and Adolescence*, 42, 165–177. <https://doi.org/10.1007/s10964-012-9820-5>.
- Kimonis, E. R., Fantí, K. A., Isoma, Z., & Donoghue, K. (2013). Maltreatment profiles among incarcerated boys with callous-unemotional traits. *Child Maltreatment*, 18, 108–121. <https://doi.org/10.1177/1077559513483002>.
- Kochanska, G. (1995). Children's temperament, mothers' discipline, and security of attachment: Multiple pathways to emerging internalization. *Child Development*, 66, 597–615. <https://doi.org/10.2307/1131937>.
- *Kochanska, G., Barry, R. A., Stellern, S. A., & O'Bleness, J. J. (2009). Early attachment organization moderates the parent-child mutually coercive pathway to children's antisocial conduct. *Child Development*, 80, 1288–1300. <https://doi.org/10.1111/j.1467-8624.2009.01332.x>.
- Kolla, N. J., Malcolm, C., Attard, S., Arenovich, T., Blackwood, N., & Hodgins, S. (2013). Childhood maltreatment and aggressive behaviour in violent offenders with psychopathy. *The Canadian Journal of Psychiatry*, 58, 487–494. <https://doi.org/10.1177/070674371305800901>.
- *Kosson, D. S., Cyterski, T. D., Steuerwald, B. L., Neumann, C. S., & Walker-Matthews, S. (2002). The reliability and validity of the psychopathy checklist: Youth version (PCL: YV) in nonincarcerated adolescent males. *Psychological Assessment*, 14, 97–109. <https://doi.org/10.1037/1040-359.14.1.97>.
- Kroneman, L. M., Hipwell, A. E., Loeber, R., Koot, H. M., & Pardini, D. A. (2011). Contextual risk factors as predictors of disruptive behavior disorder trajectories in girls: The moderating effect of callous-unemotional features. *Journal of Child Psychology and Psychiatry*, 52, 167–175. <https://doi.org/10.1111/j.1469-7610.2010.02300.x>.
- Larsson, H., Viding, E., & Plomin, R. (2008). Callous-unemotional traits and antisocial behavior: Genetic, environmental, and early parenting characteristics. *Criminal Justice and Behavior*, 35, 197–211. <https://doi.org/10.1177/0093854807310225>.
- Liu, J. C. J., McErlean, R. A., & Dadds, M. R. (2012). Are we there yet? The clinical potential of intranasal oxytocin in psychiatry. *Current Psychiatry Reviews*, 8, 37–48. <https://doi.org/10.2174/157340012798994902>.
- Lynam, D. R., Charnigo, R., Moffitt, T. E., Raine, A., Loeber, R., & Stouthamer-Loeber, M. (2009). The stability of psychopathy across adolescence. *Development and Psychopathology*, 21, 1133–1153. <https://doi.org/10.1017/S0954579409990083>.
- MacDonald, K., Berlow, R., & Thomas, M. L. (2013). Attachment, affective temperament, and personality disorders: A study of their relationships in psychiatric outpatients. *Journal of Affective Disorders*, 151, 932–941. <https://doi.org/10.1016/j.jad.2013.07.040>.
- Mack, T. D., Hackney, A. A., & Pyle, M. (2011). The relationship between psychopathic traits and attachment behavior in a non-clinical population. *Personality and Individual Differences*, 51, 584–588. <https://doi.org/10.1016/j.paid.2011.05.019>.
- Madigan, S., Atkinson, L., Laurin, K., & Benoit, D. (2013). Attachment and internalizing behavior in early childhood: A meta-analysis. *Developmental Psychology*, 49, 672–689. <https://doi.org/10.1037/a0028793>.
- Madigan, S., Brumariu, L. E., Villani, V., Atkinson, L., & Lyons-Ruth, K. (2016). Representational and questionnaire measures of attachment: A meta-analysis of relations to child internalizing and externalizing problems. *Psychological Bulletin*, 142, 367–399. <https://doi.org/10.1037/bul0000029>.
- Manders, W. A., Deković, M., Asscher, J. J., Van der Laan, P. H., & Prins, P. J. (2013). Psychopathy as predictor and moderator of multisystemic therapy outcomes among adolescents treated for antisocial behavior. *Journal of Abnormal Child Psychology*, 41, 1121–1132. <https://doi.org/10.1007/s10802-013-9749-5>.
- Mann, F. D., Briley, D. A., Tucker-Drob, E. M., & Harden, K. P. (2015). A behavioral genetic analysis of callous-unemotional traits and Big Five personality in adolescence. *Journal of Abnormal Psychology*, 124, 982–993. <https://doi.org/10.1037/abn0000099>.
- *Mazzarello, T. (2007). The intergenerational transmission of attachment and child externalizing behavior problems in a sample of adolescent mothers and their pre-school/early-school aged children. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 68(3-B), 1962.

- McCord, W. M., & McCord, J. (1956). *Psychopathy and delinquency*. New York, NY: Grune & Stratton.
- McDonald, R., Dodson, M. C., Rosenfield, D., & Jouriles, E. N. (2011). Effects of a parenting intervention on features of psychopathy in children. *Journal of Abnormal Child Psychology*, 39, 1013–1023. <https://doi.org/10.1007/s10802-011-9512-8>.
- Mikulincer, M., & Shaver, P. R. (2012). An attachment perspective on psychopathology. *World Psychiatry*, 11, 11–15. <https://doi.org/10.1016/j.wpsyc.2012.01.003>.
- Nakash-Eisikovits, O., Dutra, L., & Westen, D. (2002). Relationship between attachment patterns and personality pathology in adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41, 1111–1123. <https://doi.org/10.1097/01.CHI.0000020258.43550.BD>.
- O'Connor, T. G., Humayun, S., Briskman, J. A., & Scott, S. (2016). Sensitivity to parenting in adolescents with callous/unemotional traits: Observational and experimental findings. *Journal of Abnormal Psychology*, 125, 502–513. <https://doi.org/10.1037/abn0000155>.
- *Pasalich, D. S., Dadds, M. R., Hawes, D. J., & Brennan, J. (2012). Attachment and callous-unemotional traits in children with early-onset conduct problems. *Journal of Child Psychology and Psychiatry*, 53, 838–845. <https://doi.org/10.1111/j.1469-761.2012.02544.x>.
- Patrick, C. J. (2005). *Handbook of psychopathy*. New York: Guilford Press.
- Peltola, M. J., Forssman, L., Puura, K., Van Ijzendoorn, M. H., & Leppänen, J. M. (2015). Attention to faces expressing negative emotion at 7 months predicts attachment security at 14 months. *Child Development*, 86, 1321–1332. <https://doi.org/10.1111/cdev.12380>.
- Phillips, D. M. (2004). Developmental pathways for children with disruptive behavior disorders. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 65(2-B), 1053.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>.
- Ribeiro da Silva, D., Rijo, D., & Salekin, R. T. (2013). Child and adolescent psychopathy: Assessment issues and treatment needs. *Aggression and Violent Behavior*, 18, 71–78. <https://doi.org/10.1016/j.avb.2012.10.003>.
- Rowe, R., Maughan, B., Moran, P., Ford, T., Briskman, J., & Goodman, R. (2010). The role of callous and unemotional traits in the diagnosis of conduct disorder. *Journal of Child Psychology and Psychiatry*, 51, 688–695. <https://doi.org/10.1111/j.1469-7610.2009.02199.x>.
- Russell, L. A. (2004). Examination of the psychopathic personality inventory-revised and the psychopathy construct in a college sample. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 65(8-B), 4303.
- Salekin, R. T. (2002). Psychopathy and therapeutic pessimism: Clinical lore or clinical reality? *Clinical Psychology Review*, 22, 79–112. <https://doi.org/10.1016/S0272-7358%2801%2900083-6>.
- Salekin, R. T., & Lochman, J. E. (2008). Child and adolescent psychopathy: The search for protective factors. *Criminal Justice and Behavior*, 35, 159–172. <https://doi.org/10.1177/0093854807311330>.
- Saltaris, C. (2002). Psychopathy in juvenile offenders: Can temperament and attachment be considered as robust developmental precursors? *Clinical Psychology Review*, 22, 729–752. <https://doi.org/10.1016/S0272-7358%2801%2900122-2>.
- Savage, J. (2014). The association between attachment, parental bonds and physically aggressive and violent behavior: A comprehensive review. *Aggression and Violent Behavior*, 19, 164–178. <https://doi.org/10.1016/j.avb.2014.02.004>.
- Schimmenti, A., Di Carlo, G., Passanisi, A., & Caretti, V. (2015). Abuse in childhood and psychopathic traits in a sample of violent offenders. *Psychological Trauma Theory Research Practice and Policy*, 7, 340–347. <https://doi.org/10.1037/tra0000023>.
- Schimmenti, A., Passanisi, A., Pace, U., Manzella, S., Di Carlo, G., & Caretti, V. (2014). The relationship between attachment and psychopathy: A study with a sample of violent offenders. *Current Psychology*, 33, 256–270. <https://doi.org/10.1007/s12144-014-9211-z>.
- *Smith, L. (2011). An exploration of the relationship between poor parent-child attachment and callous-unemotional traits in a sample of high-risk young offenders. (Master's thesis). Retrieved from <http://discovery.ucl.ac.uk/1332281/>.
- Strathearn, L. (2011). Maternal neglect: Oxytocin, dopamine and the neurobiology of attachment. *Journal of Neuroendocrinology*, 23, 1054–1065. <https://doi.org/10.1111/j.1365-2826.2011.02228.x>.
- Strathearn, L., Fonagy, P., Amico, J., & Montague, P. R. (2009). Adult attachment predicts maternal brain and oxytocin response to infant cues. *Neuropsychopharmacology*, 34, 2655–2666. <https://doi.org/10.1038/npp.2009.103>.
- Swain, J., Kim, P., Spicer, J., Ho, S., Dayton, C., Elmadih, A., & Abel, K. (2014). Approaching the biology of human parental attachment: Brain imaging, oxytocin and coordinated assessments of mothers and fathers. *Brain Research*, 1580, 78–101. <https://doi.org/10.1016/j.brainres.2014.03.007>.
- Timmerman, I. G. H., & Emmelkamp, P. M. G. (2006). The relationship between attachment styles and Cluster B personality disorders in prisoners and forensic inpatients. *International Journal of Law and Psychiatry*, 29, 48–56. <https://doi.org/10.1016/j.ijlp.2005.04.005>.
- Tuvblad, C., Bezdjian, S., Raine, A., & Baker, L. A. (2014). The heritability of psychopathic personality in 14-to 15-year-old twins: A multitrait, multimeasure approach. *Psychological Assessment*, 26, 704. <https://doi.org/10.1037/a0036711>.
- Van den Noortgate, W., López-López, J. A., Marín-Martínez, F., & Sánchez-Meca, J. (2015). Meta-analysis of multiple outcomes: A multilevel approach. *Behavior Research Methods*, 47, 1274–1294. <https://doi.org/10.3758/s13428-014-0527-2>.
- Viding, E., Price, T. S., Jaffee, S. R., Trzaskowski, M., Davis, O. S. P., Meaburn, E. L., ... Plomin, R. (2013). Genetics of callous-unemotional behavior in children. *PLoS One*, 8, e65789. <https://doi.org/10.1371/journal.pone.0065789>.
- Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software*, 36, 1–48. <https://doi.org/10.18637/jss.v036.i03>.
- Viechtbauer, W. (2016). Model selection using the glmulti Package. Retrieved from http://www.metafor-project.org/doku.php/tips:model_selection_with_glmulti.
- Wagner, N. J., Mills-Koonce, W. R., Willoughby, M. T., Zvara, B., & Cox, M. J. (2015). Parenting and children's representations of family predict disruptive and callous-unemotional behaviors. *Developmental Psychology*, 51, 935–948. <https://doi.org/10.1037/a0039353>.
- Waller, R., Gardner, F., & Hyde, L. W. (2013). What are the associations between parenting, callous-unemotional traits, and antisocial behavior in youth? A systematic review of evidence. *Clinical Psychology Review*, 33, 593–608. <https://doi.org/10.1016/j.cpr.2013.03.001>.
- Waller, R., Gardner, F., Hyde, L. W., Shaw, D. S., Dishion, T. J., & Wilson, M. N. (2012). Do harsh and positive parenting predict parent reports of deceitful-callous behavior in early childhood? *Journal of Child Psychology and Psychiatry*, 53, 946–953. <https://doi.org/10.1111/j.1469-7610.2012.02550.x>.
- Weisman, O., Zagoory-Sharon, O., & Feldman, R. (2014). Oxytocin administration, salivary testosterone, and father-infant social behavior. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 49, 47–52. <https://doi.org/10.1016/j.pnpbp.2013.11.006>.
- Wibbelink, C. J. M., & Assink, M. (2015). *Handleiding voor het uitvoeren van een drie-level meta-analyse in R (Versie 3.0)*. (Unpublished manual).
- Wilkinson, S., Waller, R., & Viding, E. (2016). Practitioner review: Involving young people with callous unemotional traits in treatment – Does it work? A systematic review. *Journal of Child Psychology and Psychiatry*, 57, 552–565. <https://doi.org/10.1111/jcpp.12494>.
- *Willoughby, M. T., Mills-Koonce, W. R., Gottfredson, N. C., & Wagner, N. J. (2014). Measuring callous unemotional behaviors in early childhood: Factor structure and the prediction of stable aggression in middle childhood. *Journal of Psychopathological Behavior Assessment*, 36, 30–42. <https://doi.org/10.1007/s10862-013-9379-9>.