

# Conduct Disorder/Oppositional Defiant Disorder and Attachment: A Meta-Analysis

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## Abstract

*Purpose* To summarize the literature on and clarify the magnitude of the association between conduct disorder/oppositional defiant disorder (CD/ODD) and attachment and to search for moderators of this relationship.

*Methods* A meta-analysis was conducted in order to elucidate the potential relationship between attachment style and CD/ODD symptoms and to establish the size of the effect. An extensive literature search was conducted through multiple databases for published and unpublished works.

*Results* The main finding from this study indicated that there is a moderate relationship between CD/ODD symptoms and attachment insecurity. The standardized mean difference in attachment insecurity between individuals with and without CD/ODD was large. There was a strong relationship between CD/ODD symptoms and disorganized

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attachment symptoms. The weighted odds ratio for the presence of disorganized attachment in individuals with and without CD/ODD was large. No significant moderators were identified.

*Conclusions* The results of this study demonstrate that individuals with CD/ODD are much more likely to have an insecure or disorganized attachment than individuals without CD/ODD, but that it is not assured.

**Keywords** meta-analysis · conduct disorder · oppositional defiant disorder · attachment · family systems

Oppositional defiant disorder (ODD) is the most common clinical disorder in children and adolescents [68], with a prevalence of 6.5 % in adolescents [50]. Children and adolescents with ODD struggle with respecting authority and often display animosity, noncompliance, and negativity towards those in authority [3]. Conduct disorder (CD), has a prevalence of 2.2 % in adolescents [50], but is considered to have more severe behavioral symptoms than ODD [71]. Children and adolescents with CD typically behave in ways that disrespect social norms and the rights of others, demonstrating aggression towards people, animals, and property, as well as engaging in deceit. A diagnosis of CD often follows a previous diagnosis of ODD in early childhood [3]. Earlier onset of CD/ODD has been found to be correlated with the development of antisocial personality disorder, substance-related disorders, increased rates of drug use (tobacco and alcohol), mood disorders, anxiety disorders, somatoform disorders, and higher accident rates [3]. Additionally, CD/ODD diagnoses are often comorbid with attention-deficit/hyperactivity disorder (ADHD) diagnoses [44, 57]. ADHD is a neurological disorder involving inattentiveness and/or hyperactive and impulsive behaviors that appear before the age of 12 years [3]. Until recently, these three disorders were classified together as the disruptive behavior disorders, in the Diagnostic and Statistical Manual of Mental Disorders (DSM; [2]), and are still quite commonly referred to as externalizing disorders. They also share a number of distinct neurological and physiological characteristics including executive functioning deficits and hyporesponsivity to stressors [37].

An individual who has been diagnosed with CD/ODD has a prognosis for low levels of success in school settings and later employment success [62]. In considering treatment for individuals diagnosed with CD and/or ODD, the impact to society increases as the child ages, and resources required increase exponentially [25]. It has been estimated that by the time children with CD reach 28 years of age, they access 10 times the amount of public/government-funded services as those without CD—totalling an estimated US\$140,000 in additional services for each individual with CD [62]. Research suggests that the most effective treatments for children with CD/ODD focus not on symptomology, but on factors, such as parenting, that promote the development of these disorders [25].

Some researchers have made the claim that intrafamilial social processes and familial risk factors are of primary importance when considering CD/ODD development [65]. Carr's wide-ranging review in [15] reported that family based interventions are effective for externalizing behavior problems. Marron [49] suggests specifically that attachment theory provides a sound theoretical framework for the development of CD/ODD in consideration of these intrafamilial social processes and familial risk factors.

He further suggests that as insecure attachments produce deficits in affective functioning—precisely empathetic functioning and modulation of unpleasant emotional states—they create an ideal risk factor for the development of CD/ODD [49]. This viewpoint is supported by DeKlyen and Speltz [21]; however, they hold that attachment insecurity will not on its own lead to conduct disorder. Burke et al. in their [13] review on ODD and CD reported that at that time, the findings on attachment and these disorders were equivocal and more research was needed. They did, however, find a great deal of support for contributions of parenting to CD and ODD. Given the passage of more than a decade since their seminal review, this study was able to access a greater literature base to explore the relationship between attachment and CD/ODD and provide quantitative support for DeKlyen and Speltz's viewpoint [21].

## Attachment Theory and its Connection to Psychopathology

Attachment theory holds that attachment patterns are determined by a parent and child's experience of a specific relationship [75]. Attachment refers to the tendency of humans to form strong, warm relational bonds with others [11]. This theory suggests that the internal working models of relationships that children develop as a result of their attachment relationships provide the foundation for the development of self-regulation skills [1]. Initially, attachment theory posited the existence of three categories of attachment styles: secure, insecure-avoidant, and insecure-ambivalent [1]. These three categories are often referred to as “organized” attachments as they result in children developing consistent, organized, or adaptive responses to attachment-activating situations, such as separation from the primary caregiver, unfamiliar situations, pain, illness, or presence of strangers [46]. More recently, a group of children has been designated “disorganized,” and this group has since been the one most highly associated with the later development of psychopathology and maladjustment [39, 73], although insecure attachments are also associated with the development of later difficulties (e.g., [5, 14, 67]). Insecure attachments are typically characterized by resistance to caregiver comfort or a constant need for it, without ever being soothed [45], while disorganized attachments are characterized by their lack of consistent (or organized) strategy, where a child will both seek and fear their caregiver [47, 66].

There is a large amount of empirical research linking attachment patterns and psychopathology. In his initial works, Bowlby saw a link between attachment and conduct problems (as cited in [21]). Van Ijzendoorn and Bakermans-Kranenberg [72] conducted a meta-analysis utilizing over 2000 participants. They examined clinical populations versus non-clinical populations employing the Adult Attachment Interview. They found that insecure attachment was overrepresented in the clinical group compared to the non-clinical group. Similar research was conducted by Ward et al. [77]. They examined the Adult Attachment Interview and the Structured Clinical Interview for the DSM-III (SCID). They concluded that a secure attachment was correlated with lower levels of psychopathology and insecure attachments were correlated with higher levels of psychopathology. Theule [69] conducted a meta-analysis examining the relationships between ADHD and attachment style. She found a moderate relationship between ADHD and insecure attachment. Given that CD and

ODD are frequently comorbid with ADHD, and ADHD has a moderate relationship with attachment style, one may expect that CD/ODD will also have a moderate relationship with attachment style.

## Attachment Theory and CD/ODD Pathology Research

Current research supports a connection between insecure attachments and the specific psychopathology of CD/ODD. Van Ijzendoorn et al. [73] examined the disorganized attachment literature over a period of 10 years. They found a moderate correlation ( $r=0.29$ ) between disorganized attachment and oppositional behavior problems [73]. Rosenstein and Horowitz [58] examined a clinical sample of adolescents. They found that CD/ODD diagnosis was correlated with a dismissing attachment categorization [58]. Greenberg et al. [29] also concluded that insecure attachment styles are a contributing factor to aggressive behavior disorders. Tomasic [71] additionally found an association between a comorbid diagnosis of CD and depression and a hostile anxious attachment style.

Some researchers, however, have argued against the idea that attachment is one of the primary factors implicated in the development of CD/ODD, citing biological factors as more important [56]. A large number of studies have suggested that genetic factors alone contribute to a large amount of the variance in the development of CD [4, 23, 35]. Nigg et al. [53] hypothesized that there may be a genotype which would protect against the development of ODD. Their research suggested that there may be a greater genetic influence on the functioning of the prefrontal cortex which may in turn promote or protect against psychosocial risk factors for CD/ODD [53]. Biological research has suggested that neurophysiological factors, such as irregular prefrontal cortex structure, under-arousal, and higher levels of androstenedione, play an important role in the development of CD/ODD [16, 17, 24, 55]. Given the importance of identifying and clarifying factors associated with the development of CD/ODD, a quantitative summary on the literature considering CD/ODD and attachment is needed.

## The Current Study

The purpose of this paper is to assess the association between attachment style and CD/ODD symptomology. It is important, in consideration of the financial resources required for assessment and treatment of CD/ODD, to know what factors are more strongly associated with the development of CD/ODD, as Frick and Loney [26] and Smith and Farrington [64] have suggested that targeting the factors contributing to the development of CD and ODD is most effective in the planning and implementation of treatment. A meta-analysis was therefore undertaken to clarify the presence and magnitude of this effect and to search for moderators of the effect. This enables us to quantitatively manage inconsistencies between studies in a manner that narrative reviews are unable to [38]. Moreover, it provides a systematic process for identifying reasons (moderators) for inconsistencies in the findings. Even where the number of studies is relatively small, meta-analysis provides the best way of integrating the data and improving precision in our findings [19]. Indeed, the median number of studies

included in Cochrane meta-analyses is three [20] and Cumming [19] indicates that meta-analysis is helpful even if only two primary studies are available.

In the current study, we investigated several potential moderator variables to assess whether they impact the association between CD/ODD symptomatology and attachment insecurity. Age is the first moderator we examined. The association between age and attachment may differ based on the different influences in one's life over time. Moreover, age of onset and temporal stability of CD/ODD are important prognostic factors [44]. Gender must also be considered given the large discrepancy in CD/ODD prevalence rates in boys compared to girls [13, 44]. In order to assess any presence of possible publication bias, publication type (journal article vs. thesis) was investigated. The following research questions were addressed and are grouped into those addressing insecure attachment and those addressing disorganized attachment.

Insecure attachment:

1. What is the prevalence of insecure attachment in individuals with CD/ODD?
2. What are the odds of individuals with CD/ODD having an insecure attachment compared to individuals without CD/ODD?
3. What is the degree of association between CD/ODD symptoms and attachment insecurity?
4. Do individuals with CD/ODD have higher levels of attachment insecurity than individuals without CD/ODD?

Disorganized attachment:

5. What is the prevalence of disorganized attachment in individuals with CD/ODD?
6. What are the odds of individuals with CD/ODD having a disorganized attachment compared to individuals without CD/ODD?

Moderators

7. Do the following moderators affect the relationship between CD/ODD symptoms and attachment insecurity?
  - a. Mean age of sample
  - b. Gender composition of sample
  - c. Publication type (journal articles vs. theses/dissertations)

## Method

### Overview

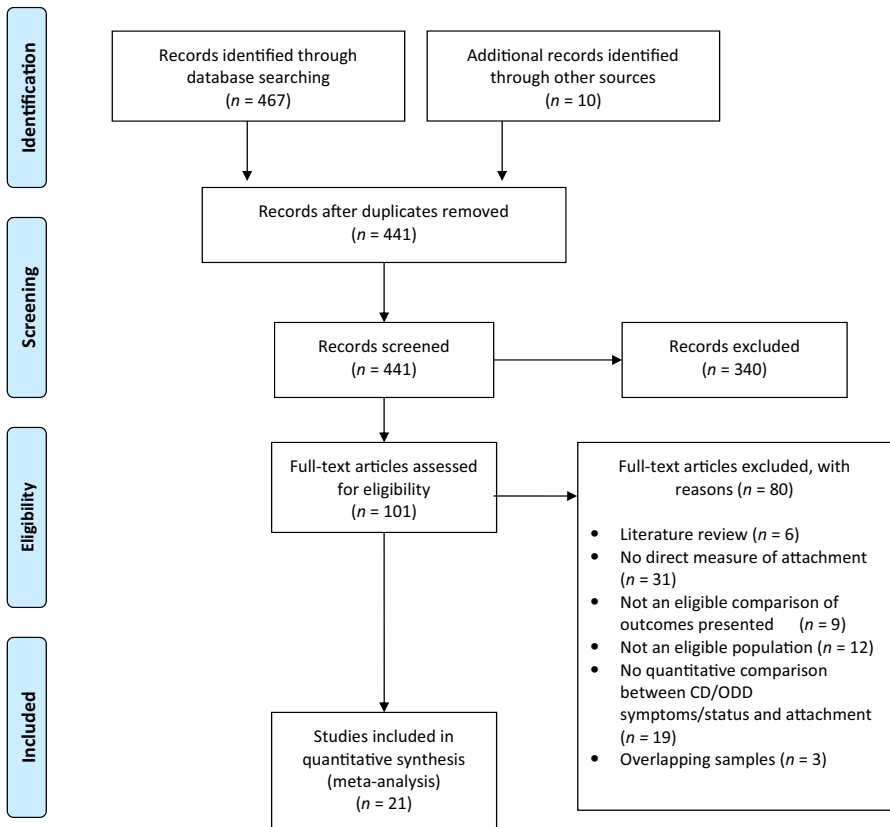
We conducted a systematic meta-analytic review of the existing studies on attachment and CD/ODD. We examined the attachment of individuals with previous diagnoses of CD/ODD or who displayed symptoms of CD or ODD to clarify the association between attachment style and CD/ODD symptomatology. Outcome measurements of attachment quality were obtained through self-reports or observation.

### Search Strategy

PsycINFO, Medline, ERIC, Dissertations & Theses (ProQuest), and Google Scholar were searched for published and unpublished studies prepared before August 2014. The following keywords were used to search all databases in order to obtain relevant articles: CD, conduct disorder, ODD, oppositional defiant disorder, attachment, and attachment behavior. The articles produced by the initial database search were then screened based on the titles and abstracts using a set of inclusion criteria. The studies that were found to be potentially eligible from this screening phase were then read in full to determine eligibility. The Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines (Fig. 1) were utilized throughout the gathering of studies as they provide methodological transparency and accurate/complete reporting by requiring data tracking and reporting on study searches, data sources, and inclusion and exclusion points [51].



**PRISMA 2009 Flow Diagram**



**Fig. 1** PRISMA flow diagram

## Criteria for Study Selection

**Inclusion Criteria** We included studies that involved quantitative consideration of the relationship between an individual's CD or ODD status or symptoms and attachment style addressing one or more of the specified research questions, either within a CD/ODD group (i.e., correlational or regression studies) or between a CD/ODD group and a comparison group (either a typically developing comparison group or some other clinical group). We included studies that consisted of some measure of CD/ODD symptomology or a previous diagnosis of CD/ODD by a qualified health professional. Studies that addressed behavior problems more generally were omitted to ensure consistency. We only included studies that included a direct measure of attachment style and only attachment measures using observation or participant's reports of attachment security were eligible. Finally, all studies must have been reported in English.

**Exclusion Criteria** We excluded studies that used parent–child interaction quality or emotion regulation skills as a measurement of attachment. We also excluded studies that focused on the relationship between CD/ODD and reactive attachment disorder or the relationship between children adopted from orphanages who later developed symptoms of CD/ODD. When multiple reports of the same study were available, unpublished reports were excluded (however, in all cases where both published and unpublished reports were available, the relevant results were identical).

## Data Extraction and Classification

After the systematic search, eligible studies were coded by the third author to extract all relevant data. The third author was provided with a comprehensive coding manual and was trained by the first author who was experienced with conducting meta-analyses. A second coder, a graduate student who was trained in meta-analysis, double-coded all of the eligible studies for reliability. Any disagreements were to be solved by consulting with the first author; however, no disagreements were identified. The data was entered into Comprehensive Meta-Analysis (CMA) Version 2 [7]. This software was designed specifically for the computation of statistics related to meta-analyses. In order to facilitate more sophisticated moderator analyses, all moderator analyses were completed using CMA Version 3 [10].

Any missing outcome data and clarification regarding attachment style classifications from otherwise eligible studies were requested from the corresponding authors via email. Two studies required author contact for additional study information [18, 67]. In the case of Constantino et al. [18], the needed information could not be provided. In the case of Speltz et al. [67], information regarding standard deviations was provided.

## Computation of Effect Sizes

To address each of the main research questions, a separate meta-analysis was conducted. This was done in CMA by first calculating the individual effect size for each study and then calculating the weighted mean effect size using the corresponding metric for

each question. All analyses used the random effects model, as it is assumed that there is non-random variation between studies [9]. Using the random effects model in CMA, weighting is done using the inverse of the study's variance, where the variance is made up of the within-study variance and the between-study variance [7]. Between-study variance was calculated using the method of moments.

Percent prevalence was used for research questions 1 and 5, which addressed rates of attachment insecurity and disorganization in individuals with CD/ODD. For these analyses, we converted the prevalence estimates to logit event rates, and retransformed them to percentages after analysis to facilitate reporting and interpretation. The odds ratio was used for research questions 2 and 6, which addressed the odds of insecure or disorganized attachment in individuals with CD/ODD compared to individuals without. Pearson's product-moment correlation coefficient was used to address research question 3, which addressed the size of the association between CD/ODD symptoms and level of insecurity. Cohen's *d* was used to address research question 4, which compared the level of attachment insecurity in individuals with and without CD/ODD. Moderator analyses were conducted to address research question 7 using meta-regression procedures on the association between CD/ODD symptoms and attachment insecurity. The meta-regressions were all conducted as univariate models.

When a study presented more than one eligible finding that was amenable to meta-analysis, these findings were both included in the meta-analysis by aggregating them in CMA. This aggregation was done using the mean of the outcomes, which assumes dependence between them, as was typical of our data. This was done in order to take advantage of all available information without violating statistical independence [8].

## Results

### Characteristics of Included Studies

Search results from the five databases produced 441 unique studies. Reference lists and a list of articles that had cited eligible studies were also searched for additional articles that met the inclusion criteria. Through this process, 10 additional articles were found that met our eligibility criteria. There were a total of 101 full-text articles that were reviewed and screened for eligibility. Twenty-one studies (12 published studies and 9 unpublished) met all the inclusion criteria to be included in the systematic review (refer to PRISMA flow diagram—Fig. 1). The studies included children with CD/ODD from 1 to 17 years. The majority of the studies were conducted in the USA ( $n = 16$ ), while three were conducted in Britain, one in Australia, and one in Canada. The studies were published from 1991 to 2013. Tables 1, 2, 3, 4, 5, and 6 provide an overview of the characteristics of the studies used to address each research question, including their sample size, gender composition, age range of participants, effect size, 95 % confidence interval, *p* value, and relative weights. Table 7 provides information about the measures used in each study and when they were collected. Table 8 provides information about the samples used in the group comparison studies (research questions 2, 4, 6), and how or if they were matched.



**Table 1** Characteristics of studies included in analysis of prevalence of insecure attachment in individuals with CD/ODD (research question 1)

Study	Number of participants	Publication type	% Female	Age range (years)	Prevalence (%)	95 % CI	Relative weight
Bridgman [12]	46	Thesis	23.00	14.00–19.00	75.00	60.62–85.40	10.69
DeKlyen et al. [22]	55	Journal article	0.00	3.92–5.67	36.36	24.80–49.74	11.60
Greenberg et al. [31]	25	Journal article	0.00	3.50–5.50	80.00	60.02–91.42	8.34
Helgesen [33]	62	Thesis	17.74	16.00–17.00	62.90	50.32–73.95	11.86
Muchmore [52]	40	Thesis	0.00	4.00–5.67	57.50	41.90–71.96	11.01
Pasalich et al. [54]	55	Journal article	0.00	3.00–9.00	49.00	36.15–61.98	11.76
Rosenstein and Horowitz [58]	7	Journal article	14.29	13.08–19.75	93.75	46.14–99.62	2.04
Scott et al. [61]	102	Journal article	24.00	9.00–17.00	48.00	38.50–57.65	12.75
Speltz et al. [67]	80	Journal article	0.00	4.00–5.50	30.00	20.99–40.88	12.13
Tomasic [71]	14	Thesis	0.00	10.00–16.00	57.14	31.64–79.35	7.81

**Table 2** Characteristics of studies included in analysis of odds ratios of individuals with CD/ODD having an insecure attachment compared to individuals without CD/ODD (research question 2)

Study	<i>n</i> with CD/ODD	<i>n</i> without CD/ODD	Publication type	% Female with CD/ODD	% Female without CD/ODD	Age range (years)	Odds ratio	95 % CI	<i>p</i> value	Relative weight
DeKlyen et al. [22]	55	55	Journal article	0.00	0.00	3.92–5.67	4.49	1.87–10.76	0.001	15.77
Greenberg et al. [31]	25	25	Journal article	0.00	0.00	3.50–5.50	10.29	2.77–38.21	0.001	9.60
Muchmore [52]	40	32	Thesis	0.00	0.00	4.00–5.67	2.08	0.98–4.41	0.056	18.18
Scott et al. [61]	102	50	Journal article	24.00	9.00–17.00	9.00–17.00	1.33	0.67–2.65	0.411	19.62
Speltz et al. [67]	80	80	Journal article	0.00	0.00	4.00–5.50	3.59	1.95–6.61	0.000	21.37
Tilbrook [70]	16	23	Thesis	0.00	0.00	7.58–9.83	3.16	1.30–7.70	0.011	15.46

**Table 3** Characteristics of studies included in analysis of the degree of association between CD/ODD and attachment insecurity (research question 3)

Study	<i>n</i>	Publication type	% Female	Age range (years)	Correlation	95 % CI	<i>p</i> value	Relative weight
Bennett [6]	225	Thesis	55.00	11.00–15.00	0.38	0.26–0.49	0.000	10.23
Greco [28]	136	Thesis	16.00	11.00–17.00	0.15	−0.01–0.31	0.074	7.97
Greenberg et al. [30]	160	Journal article	0.00	3.92–5.67	0.31	0.16–0.44	0.000	8.71
Jeffers and Oliver [36]	73	Journal article	0.00	3.00–5.92	0.44	0.23–0.61	0.000	5.19
Lavigne et al. [40]	796	Journal article	50.90	3.92–5.08	0.16	0.09–0.23	0.000	14.72
Lessard [41]	65	Thesis	32.31	10.00–17.00	0.09	−0.09–0.26	0.316	7.56
Pasalich et al. [54]	95	Journal article	0.00	4.00–12.00	0.23	0.02–0.41	0.028	6.40
Rothbaum et al. [59]	36	Journal article	50.00	6.33–7.42	0.50	0.21–0.71	0.002	2.99
Scott et al. [61]	248	Journal article	24.00	9.00–17.00	0.29	0.17–0.40	0.00	16.47
Scott et al. [63]	2101	Journal article	100.00	11.00	0.23	0.19–0.27	0.00	10.66
Tilbrook [70]	39	Thesis	0.00	7.58–9.83	0.51	0.23–0.71	0.001	3.21
Vando et al. [74]	84	Journal article	53.57	7.00	0.35	0.15–0.53	0.001	5.89

**Table 4** Characteristics of studies comparing the mean level of attachment insecurity of individuals with CD/ODD and without CD/ODD (research question 4)

Study	<i>n</i> with CD/ODD	<i>n</i> without CD/ODD	Publication type	% Female with CD/ODD	% Female without CD/ODD	Age range (years)	<i>d</i>	95 % CI	<i>p</i> value	Relative weight
DeKlyen et al. [22]	55	55	Journal article	0.00	0.00	3.92–5.67	0.95	0.56–1.34	0.000	17.40
Jefferis and Oliver [36]	23	50	Journal article	0.00	0.00	3.00–5.92	0.76	0.24–1.29	0.004	9.86
Marron [49]	24	22	Thesis	12.50	40.91	6.00–13.00	0.50	–0.09–1.09	0.097	7.70
Speltz et al. [67]	80	80	Journal article	0.00	0.00	4.00–5.50	0.62	0.39–0.84	0.000	53.31
Tilbrook [70]	16	23	Thesis	0.00	0.00	7.58–9.83	0.94	0.46–1.42	0.000	11.72

**Table 5** Characteristics of studies included in analysis of prevalence of disorganized attachment in individuals with CD/ODD (research question 5)

Study	<i>n</i>	Publication type	% Female	Age range (years)	Prevalence (%)	95 % CI	<i>p</i> value	Relative weight
DeKlyen et al. [22]	55	Journal article	0.00	3.92–5.67	41.82	29.61–55.12	0.227	22.94
Greenberg et al. [31]	25	Journal article	0.00	3.50–5.50	32.00	16.88–52.16	0.079	13.07
Muchmore [52]	40	Thesis	0.00	4.00–5.67	25.00	14.01–40.54	0.003	16.32
Pasalich et al. [54]	55	Journal article	0.00	3.00–9.00	36.00	24.49–49.38	0.041	22.30
Rosenstein and Horowitz [58]	7	Journal article	14.29	13.08–19.75	6.25	0.38–53.86	0.064	1.50
Speltz et al. [67]	80	Journal article	0.00	4.00–5.50	23.70	15.65–34.21	0.000	23.87

**Table 6** Characteristics of studies included in analysis of odds ratios of individuals with CD/ODD having a disorganized attachment compared to individuals without CD/ODD (research question 6)

Study	<i>n</i> with CD/ODD	<i>n</i> without CD/ODD	Publication type	% Female with CD/ODD	% Female without CD/ODD	Age range (years)	Odds ratio	95 % CI	<i>p</i> value	Relative weight
DeKlyen et al. [22]	55	55	Journal article	0.00	0.00	3.92–5.67	12.89	2.82–58.95	0.001	26.97
Muchmore [52]	40	32	Thesis	0.00	0.00	4.00–5.67	1.44	0.46–4.52	0.527	34.66
Speltz et al. [67]	80	80	Journal article	0.00	0.00	4.00–5.50	3.84	1.44–10.22	0.007	38.37

Table 7 Measures used in included studies and time of assessment

Study	CD/ODD measure	Time of assessment	Attachment measure	Time of assessment
Bennett [6]	CBCL; YSR	Current	AAQ	Current
Bridgman [12]	Checklist of conduct problems derived from the DSM-IV criteria CD	Current	ASQ; RQ	Current
DeKlyen et al. [22]	CTRS-39; DICA	Current	PAAS	Current
Greco [28]	CBCL; PCL; YV	Current	AAI; RSQ	Current
Greenberg et al. [31]	CBCL; CTRS; DICA	Current	Modification of the strange situation	Current
Greenberg et al. [30]	CBCL; CTRS-39; DSM-III-R diagnosis	Current	PAAS	Current
Helgesen [33]	Formal DSM-III-R conduct disorder diagnosis	Current	PBI	Current
Jeffers and Oliver [36]	RRPPSPC; revised Rutter teacher/nursery staff scale for preschool children	Current	PBI	Current
Lavigne et al. [40]	CSI; DISC-YC; ECBI	Current	AQS	Current
Lessard [41]	DICA-R-A	Current	Semi-structured intake interview with a clinical psychologist	Current
Marron [49]	K-SADS-PL	Current	CASI; Child PARQ	Current
Muchmore [52]	CBCL; CTRS; DISC	Current	PAAS	Current
Pasalich et al. [54]	Antisocial process screening device; DISCAP; SDQ	Current	MCAST	Current
Rosenstein and Horowitz [58]	Diagnosis by psychiatrists; SCID-P	Current	AAI	Current
Rothbaum et al. [59]	CBCL (externalizing); TRF (externalizing)	Current	Strange situation	7 years ago
Scott et al. [61]	CAPA; SDQ; Self-report delinquency instrument	Current	CAI	Current
Scott et al. [63]	CSI-4 (CD symptom severity)	At age 5–8	IPPA-R	At age 11

Table 7 (continued)

Study	CD/ODD measure	Time of assessment	Attachment measure	Time of assessment
Speltz et al. [67]	CBCL; CTRS-39; DISC	Current	PAAS	Current
Tilbrook [70]	SDQ (conduct problems subscale)	Current	SAT	Current
Tomasic [71]	K-SADS-PL	Current	IPPA; SAT	Current
Vando et al. [74]	CBCL (externalizing)	At age 4.5	Strange situation	At age 1

*AAQ* adolescent attachment questionnaire, *AAI* adult attachment interview, *AOS* attachment Q-sort, *ASQ* attachment style questionnaire, *CAPA* child and adolescent psychiatric assessment, *CAI* child attachment interview, *CASI* children's attachment style indices, *Child PARQ* child parental acceptance rejection questionnaire, *CSI* child symptom inventory, *CSI-4* child symptom inventory—fourth edition, *CBCL* childhood behavior checklist, *CTRS* Connors teacher rating scale, *CTRS-39* Connors teacher report scale, *DSM-III-R* diagnostic and statistical manual third edition—revised, *DSM-IV* diagnostic and statistical manual fourth edition, *DICA-R-A* diagnostic interview for children and adolescents—revised adolescent version, *DICA* diagnostic interview for children and adolescents, *DISC* diagnostic interview schedule, *DISCAP* diagnostic interview schedule for children, adolescents, and parents, *DISC-YC* diagnostic interview schedule for children-parent scale-young child version, *ECBI* eyberg child behavior inventory, *IPPA* inventory of parent and peer attachment, *IPPA-R* inventory of parent and peer attachment (revised), *MCAST* Manchester child attachment story task, *PBI* parental bonding instrument, *PAAS* preschool attachment assessment system, *PCL: YV* psychopathy checklist: youth version, *RQ* relationship scales questionnaire, *RRPSPC* revised Rutter parent scale for preschool children, *SADS-PL* schedule for affective disorders and schizophrenia for school-age children—present and lifetime version, *SAT* separation anxiety test, *SDQ* strengths and difficulties questionnaire, *SCID-P* structured clinical interview for diagnosis-patient version, *TRF* teacher report forms, *YSR* youth self-report



**Table 8** Characteristics of group comparison studies

Study	Clinical group	Comparison group	Case-matched based on
DeKlyen et al. [22]	Diagnosis of ODD; CBCL Aggression <i>T</i> scores of 65 or above	Did not meet criteria for ODD; CBCL Aggression <i>T</i> scores below 65	Age, ethnicity, SES
Greenberg et al. [31]	Primary diagnosis of ODD based on the DICA	Did not meet criteria for ODD based on the DICA; CBCL scores below 70	Age ( $\pm 6$ months), SES; and family structure (i.e., intact, single parent, or remarried)
Jeffers and Oliver [36]	Referred with conduct problems	Were not referred with conduct problems	
Marron [49]	Diagnosis of CD	Not diagnosed with CD	
Muchmore [52]	Primary diagnosis of ODD; Met DISC criteria for ODD; CBCL Aggression <i>T</i> scores of 70 or above	Did not meet diagnosis of ODD; No report of significant behavior problems; CBCL Aggression <i>T</i> scores below 70	Age ( $\pm 3$ months), SES; family structure (i.e., intact, single parent, or remarried)
Scott et al. [61]	Referred to mental health clinics due to antisocial behavior; youth who were in the top 41 % of the class on the SDQ conduct problems subscale	Characterized as typical youth; not referred to mental health clinics	
Speltz et al. [67]	Primary diagnosis of ODD; CBCL Aggression <i>T</i> scores of 65 or above	Did not receive clinical diagnoses; Characterized as typical preschool boys; CBCL Aggression <i>T</i> scores below 65	Age, ethnicity, family structure, and SES
Tilbrook [70]	Identified as children with emotional and behavioral disturbances; Teacher ratings above cutoff on the SDQ conduct problems subscale	Identified as children without significant conduct problems; Teacher ratings below cutoff on the SDQ conduct problems subscale	

CBCL childhood behavior checklist, DICA diagnostic interview for children and adolescents, DISC diagnostic interview schedule, SES socioeconomic status, SDQ strengths and difficulties questionnaire

## Relationship Between Insecure Attachment and CD/ODD

The results of 10 studies indicated that the weighted mean prevalence of insecure attachment in individuals with CD/ODD is 55.58 %, 95 % CI=44.57–66.06 %. See Table 1 for descriptive information on the component studies included in this analysis. The odds of individuals with CD/ODD having an insecure attachment compared to individuals without CD/ODD was odds ratio (OR)=3.01, 95 % CI=1.85–4.88,  $p < 0.001$ ,  $k=6$ . This indicates that this is a statistically significant effect. Additionally, there was statistically significant heterogeneity between the studies,  $Q=6.927$ ;  $p=0.031$ . See Table 2 for details on the studies included in this analysis. In examining the correlation between CD/ODD symptoms and attachment insecurity, the weighted mean effect based on 12 studies was  $r=0.27$ , 95 % CI=0.21–.33,  $p < 0.001$ ,  $Q=28.163$ ,  $p < 0.001$ . See Table 3 for details on the studies included in this analysis. Five studies were found that examined whether individuals with CD/ODD have higher levels of attachment insecurity than individuals without CD/ODD. These five studies produced a weighted mean effect of  $d=0.72$ , 95 % CI=0.55–0.88,  $p < 0.001$ ,  $Q=3.483$ ,  $p=0.480$ . See Table 4 for details on the studies included in this analysis.

## Relationship Between Disorganized Attachment and CD/ODD

The results of six studies indicated that the mean prevalence of disorganized attachment in individuals with CD/ODD is 30.97 %, 95 % CI=23.90–39.06 %. See Table 5 for descriptive information regarding these six studies. When considering the odds of individuals with CD/ODD having a disorganized attachment compared to those without CD/ODD, the weighted mean effect was significant based on three studies, OR=3.79, 95 % CI=1.25–11.50,  $p=0.018$ ,  $Q=5.175$ ,  $p=0.075$ . See Table 6 for information regarding the studies included in this analysis.

## Moderator Analyses

Four moderator analyses were conducted to investigate whether they could account for some of the variability in the meta-analytic findings. All moderator analyses were conducted on the effect investigating the relationship between CD/ODD symptoms and attachment insecurity (research question 3—please see Table 3 for information on each of these variables for the studies included in this analysis). This provided us with 12 studies on which to test these potential moderators. Mean age did not emerge as a significant moderator using the  $Q$  statistic and univariate models,  $Q=0.56$ ,  $R^2=0.00$  %,  $p=0.453$ ; neither did sample gender,  $Q=0.34$ ,  $R^2=0.00$  %,  $p=0.563$ ; nor publication type (thesis vs. journal article),  $Q=0.05$ ,  $R^2=0.00$  %,  $p=0.822$ . Visual inspection of the graphs of the moderator analyses supported these conclusions.

## Discussion

The results of this study, aggregating findings from 21 primary studies, indicated clearly that attachment insecurity/disorganization is associated with CD/ODD. Specifically, insecure and disorganized attachment styles are more likely to occur in

individuals with CD/ODD. These findings provide some support for the theoretical model proposed by Marron [49] of the development of CD/ODD symptomatology, whereby insecure attachments produce the characteristic traits of CD/ODD symptomatology. That said, our data do not allow for the drawing of causal explanations, and furthermore the majority of the studies included measure CD/ODD and attachment concurrently, making it unclear whether attachment insecurity/disorganization preceded CD/ODD. Our findings indicated that although attachment difficulties are not assured in individuals with CD/ODD, they are certainly more common than in the general population, and in fact, insecure attachment is present in the majority of individuals with CD/ODD. This is in contrast to Ainsworth et al. [1] and Main and Solomon's [48] seminal work, showing that insecure attachment is present in approximately 30 % of families and disorganized attachment in approximately 12 % of middle-class American families.

Unfortunately, none of our moderator analyses reached statistical significance, which limits our ability to predict more specifically which factors are associated with insecure attachment in individuals with CD/ODD despite the significant heterogeneity present in the sample of studies examined.

### **Strengths, Limitations, and Directions for Future Research**

To the best of our knowledge, this study was the first meta-analysis of CD/ODD and attachment insecurity and disorganization. One feature of this meta-analysis that could be considered both a strength and a limitation is the inclusion of unpublished studies. In fact, 43 % of included studies ( $k=9$ ) were theses/dissertations. The inclusion of unpublished studies reduces concerns about the "file-drawer" problem common to studies with null effects. On the other hand, unpublished studies have fewer assurances of methodological quality given that they have not been peer reviewed (Lipsey & Wilson, 2001). That said, publication type did not emerge as a significant moderator of effect size. Additionally, although a number of countries were represented in the sample of studies, they were all Westernized countries, and as such, it is not clear how our findings would apply to other cultures. It is also striking how recent this line of research is; the earliest study located on this topic was conducted in 1991 [31].

Another limitation of this research is the lack of information regarding the nature of the relationship between CD/ODD and attachment. The consensus of researchers is that the etiology of CD/ODD cannot be condensed down into a single-cause/main cause model—the disorder is far too complex [13, 34, 60]. While this study identifies parent–child attachment as an important correlate, it does not fully account for the variance in diagnosis of CD/ODD. Additionally, while we have found that insecure and disorganized attachments are more common in individuals with CD/ODD, it is not clear how these two constructs are related. CD/ODD may lead to insecure or disorganized attachment in some cases, or insecure/disorganized attachment may lead to the demonstration of CD/ODD symptoms in some cases. There may also be a third variable responsible for both CD/ODD symptoms and attachment difficulties. Finally, all three mechanisms may be at play. The present study was not able to untangle these important "how" questions, but it is hoped that this will be addressed through longitudinal studies in the future. Moreover, this study was limited to children with clinical levels of CD and/or ODD, or for whom data on symptoms of these specific disorders was available.

This may have limited the scope of the study somewhat given that behavior problems may be best considered as dimensional constructs [76]; however, this restriction was undertaken to ensure consistency in the data. Finally, the primary source data was inconsistent in the time at which attachment was assessed (infancy vs. childhood), which may have affected the findings; however, most research shows that attachment is stable from infancy without specific intervention or trauma (e.g., [27, 32]).

## Implications and Conclusions

This meta-analysis has important implications for clinicians working with individuals with suspected or probable CD/ODD. It provides a review of the literature and clear quantitative data on the prevalence of insecure and disorganized attachment within this group. This information bears important consideration in case conceptualization and treatment planning. Given Letourneau et al.'s [42] meta-analytic findings on the efficacy of interventions for improving attachment, it also provides hope for intervention in this domain. That being said, insufficient research exists on attachment-based interventions in school-aged children and adolescents to be able to recommend it based on our findings at this time.

For researchers and theorists, this study provides confirmation of a relationship between CD/ODD and attachment, but is clear that one does not explain the other in their entirety; that is, they are overlapping, but not equivalent descriptions. Future research should consider whether treating attachment issues in children with CD/ODD is effective.

Overall, this study has provided support for a partial association between CD/ODD and attachment insecurity/disorganization. It has also highlighted a number of gaps in the current research and identified directions for future research into models of CD/ODD and attachment, as well as treatment.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no competing interests.

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