

# Disruptive behavior disorders in children: a narrative review

## Abstract

**Method:** This narrative review summarizes research from the years 2019-2024 on disruptive behavior disorders in children that include conduct disorder and oppositional defiant disorder.

**Results:** This recent research suggests a prevalence rate of 3% for conduct disorder and a higher rate of 14% for the less severe oppositional defiant disorder. Correlates/comorbidities of disruptive behavior disorders have included callous unemotional traits, ADHD, and depression. Predictors/risk factors in this literature have included negative parenting, child maltreatment, slow recognition of facial expressions and excessive screen time. Studies on potential underlying biological mechanisms include low skin conductance reactivity, co-inhibition of parasympathetic/sympathetic activity, low white and grey matter volume, and low connectivity and activation in various brain regions. Interventions have included cognitive behavioral therapy, and parenting programs.

**Discussion:** The studies in this review highlight the prevalence and severity of disruptive behavior disorders in children. However, they are limited by being primarily based on mixed-age child and adolescent samples as well as including conduct and oppositional disorder youth in the same groups, and results that have varied by the correlates/comorbidities of the disorders.

**Keywords:** disruptive behavior disorders, conduct disorder, oppositional defiant disorder

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## Introduction

Disruptive behavior disorders in children include conduct disorder and oppositional defiant disorder. This narrative review is focused on conduct disorder and oppositional defiant disorder in children and adolescents and summarizes 36 papers that were derived from a search on PubMed and PsycINFO using the terms conduct disorder in children and the years 2019–2024. Although the terms conduct disorder in children were entered, that disorder is now grouped with oppositional disorder under the umbrella term of disruptive disorders. And, although the focus of this paper is on those disorders in children, many of the research samples have included both children and adolescents. Exclusion criteria for this review included papers on proposed protocols, case studies and non-English language papers. The publications can be categorized as prevalence data, correlates/comorbidities, predictors/risk factors, potential underlying biological mechanisms and interventions. This review is accordingly divided into sections that correspond to those categories. Although some papers can be grouped in more than one category, 4 papers are focused on prevalence rates, 6 on correlates/comorbidities, 9 on predictors/risk factors, 11 on potential underlying biological mechanisms and 4 on interventions.

## Definitions and prevalence

The definition of **conduct disorder (CD)** given by the DSMV (Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition) is severe behaviors that violate the rights of others or societal norms that may involve aggression towards others and animals and /or destruction of property. Conduct disorder is now included along with oppositional defiant disorder under the umbrella term of disruptive behaviors. In a recent review of seven meta-analyses including 138 primary studies and more than 48 million conduct disorder cases, the prevalence of conduct disorder in children and adolescents was given

as 3%.<sup>1</sup> Boys were said to have 2.6 times the prevalence rate as girls (see Table 1). This gender discrepancy has been noted in most of the studies reviewed here, suggesting that being male is a risk factor for conduct disorder.

**Table 1** Prevalence, correlates and comorbidities of disruptive behavior disorders in children (and first authors)

Prevalence	First author
Conduct disorder (CD)- 3%	Ayano
Oppositional defiant disorder (ODD)-14%	Lowct
<b>Correlates/comorbidities</b>	
Callous-unemotional traits	Paul, Todorov, Rizeq, Craig, Cardozo, Rosa-Justicia
CD/ODD comorbidity	Eskandervet
CD plus depression in females	Lowct
CD plus attention deficit hyperactivity disorder in males	Lowct
ODD and CD predicted depression	Blain-Acaro
Somatic symptoms	Kerekes

**Oppositional defiant disorder (ODD)** according to the DSMV is a pattern of negativistic, hostile and defiant behavior lasting at least six months during which four or more of the following are present: loss of temper, arguments with adults, defiance or refusal to comply with adults' requests or rules and often deliberate annoyance of people. Oppositional defiant disorder is typically considered less severe than conduct disorder, suggesting a greater prevalence for ODD versus CD. Recent data confirm a greater prevalence of 14% for ODD (versus 3% for CD).<sup>2</sup> However, this was in a sample that was seen at a two-year follow-up assessment after traumatic brain injury, suggesting that the prevalence rate may be inflated.

Most of the recent studies referring to **disruptive behavior disorders** have been defined by the DSMV as conditions involving problems in the self-control of emotions and behaviors which result in the violation of another one's rights and or cause significant conflict with societal norms or authority figures. As already mentioned, this diagnostic category includes CD and ODD. Frequently the samples are referred to as CD, ODD or CD/ODD, suggesting that the children have been diagnosed with either CD or ODD or both, reflecting a continuum of conduct problem severity as well as a comorbidity of the two disorders.

### Correlates/comorbidities of disruptive behavior disorders

Several correlates/comorbidities have been noted for disruptive behavior disorders (see Table 1). These include callous-unemotional traits, neurodevelopmental conditions, ADHD and depression.

More severe forms of disruptive behavior are accompanied by **callous-unemotional traits** that occur across multiple settings and relationships.<sup>3</sup> Callous-unemotional traits have been defined as the lack of remorse or guilt, the callous lack of empathy, and deficient concern for the feelings of others. This profile can lead to a severe and persistent form of antisocial behavior.<sup>4</sup> This correlate has appeared as the dependent variable and the focus of many of the studies that have appeared in this literature on disruptive disorders in children. In a study entitled "Callous – unemotional traits and executive function are unique correlates of disruptive behavior in children", callous unemotional traits were correlated with elevated conduct problems (N= 81 children 6-12- years-old).<sup>5</sup> In addition, executive dysfunction was correlated with oppositional defiant disorder.

In a meta-analysis of primary and secondary callous-unemotional traits in youth, the primary traits were underpinned by insufficient arousal to emotional cues.<sup>6</sup> Secondary callous-unemotional traits were thought to develop as a coping mechanism in response to trauma exposure. These findings are consistent with those reported in a meta-analysis of 29 studies (N=9,894 youth 3- to-18-years-old).<sup>4</sup> These authors also suggested that primary callous-unemotional traits are genetically underpinned and secondary callous unemotional traits are environmentally influenced. These authors also reported that all types of maltreatment (except sexual abuse) were related to callous-unemotional traits. However, the subtypes, the definitions, and the relationships reported in the separate studies were inconsistent. And, the genetics data reported in this literature are highly variable likely as a function of the authors' interest in several different genes.

In a systematic review on callous-unemotional traits, the traits have been noted as precursors to the development of female psychopathy.<sup>7</sup> The authors suggested that callous-unemotional traits were precursors only because they enhanced conduct problems, disruptive behavior disorders and a possible outcome of delinquency and antisocial traits that could lead to future psychopathy.

In a paper entitled "Subgrouping of children and adolescents with disruptive behaviors: symptom profiles and the role of callous – unemotional traits", the children with disruptive behavior (N=121 8-to18-year-old youth plus 100 control youth) had significantly more callous- unemotional traits.<sup>8</sup> They also exhibited proactive aggression. The comorbid conditions of CD plus ODD plus ADHD (attention deficit hyperactivity disorder) led to greater antisocial behavior. That the combination of these three disorders led to greater antisocial behavior is not surprising given that each of the disorders has been associated with significant antisocial behavior.

In a paper entitled "The psychosocial outcome of conduct disorder and oppositional defiant disorder in children", **CD and ODD comorbidity** was high.<sup>9</sup> ODD was a strong predictor of CD in boys and ODD plus ADHD was a significant predictor of adolescent CD. Although ODD was a significant predictor of CD in both boys and adolescents, the developmental trajectories from ODD to CD were unfortunately not traced to identify specific risk behaviors. Those with CD had increased criminal behavior, violence, and asocial behavior and were at risk for substance use disorder and antisocial personality disorder. These results are not surprising inasmuch as the diagnosis of CD includes criminal behavior, violence and asocial behavior.

In a large sample of 20,302 twins, phone interviews were conducted on disruptive behavior and breaking society rules.<sup>10</sup> **Neurodevelopmental conditions** were comorbid with conduct disorder which led to somatic symptoms including gastrointestinal problems. More somatic symptoms were noted in females. More somatic symptoms are typically reported by females likely because they generally report more personal problems in surveys.

Gender differences were also reported in a two-year follow-up of children and adolescents who experienced a traumatic brain injury (N= 95 youth).<sup>2</sup> In this study, ODD and CD were significantly associated with psychosocial adversity. The odds ratio for CD plus depression was greater for females and the odds ratio for CD plus **ADHD** was greater for males.

In contrast, no gender differences were noted in a longitudinal study on disruptive behavior disorders (N= 640 10-year-old children who were assessed across seven years).<sup>11</sup> ODD led to depression at most time points. In contrast, CD at time one negatively predicted depression at times three. CD is a more severe externalizing disorder that as a result may be more prone to reduce comorbid internalizing disorders like depression.

### Risk factors/ predictors of disruptive disorders in children

Several risk factors/predictors have been identified in this recent literature on disruptive behavior disorders in children (see Table 2). They include negative parenting (1 study), child maltreatment (2 studies), slower recognition of faces, more frequently negative faces (3 studies), and excessive screen time (1 study).

**Table 2** Risk factors/predictors of disruptive behavior disorders in children (and first authors)

Risk factors/predictors	First authors
Negative parenting	Levantini
Child maltreatment	Todorov
Slower recognition of negative faces	Hartmann, Aggensteiner
Slower recognition of negative and positive faces	Moore, Fantozzi

In research entitled "Parenting practices moderate the link between attention to the eyes and callous unemotional traits in children with disruptive behavior disorders", different facial expressions were presented and gaze patterns were recorded in a sample of boys with conduct disorder (N= 92) and oppositional defiant disorder (N=80).<sup>12</sup> **Negative parenting** reduced the negative association between callous-unemotional traits and fixation count as well as fixation duration on negative faces. Although this effect is difficult to interpret, the authors concluded that negative parenting may lead to low attention or avoidance of negative facial expressions (i.e. eyes

of those expressions) and may be risk factors for disruptive behavior disorders in youth.

**Child maltreatment** with the surprising exception of sexual maltreatment has been associated with callous-unemotional traits in youth, as already mentioned in the meta-analysis on 29 studies.<sup>4</sup> In another large sample (N = 4,579) based on the National Survey of Child and Adolescent Well-being, child maltreatment predicted callous-unemotional traits. However, this relationship was only noted for males, again likely because those traits appear more frequently in males who are more often diagnosed with conduct disorder.<sup>13</sup>

**Slower recognition of negative emotional expressions** (angry, sad and fearful expressions) has been reported for children and adolescents with conduct problems by a few research groups. In one project entitled “Emotion processing in children with conduct problems and callous-unemotional traits”, children with conduct problems and varying levels of callous-unemotional traits were oversampled (N=94 8-14-year-old youth) which likely inflated the relationships reported.<sup>14</sup> The callous-unemotional traits were associated with slower recognition of angry, sad and fearful expressions but not with greater error rates.

**Slower recognition of even positive facial expressions** including happiness and surprise has also been reported in a large study on twins (N=1214).<sup>15</sup> In this research, the Facial Expression Labeling Task was given along with the Inventory of Callous Unemotional Traits. The uncaring/callous dimension of the inventory was associated with impaired recognition of happiness, sadness, fear, surprise and disgust expressions. The unemotional dimension of the inventory was associated with recognition of surprise and disgust. The authors suggested that there was a significant concordance between identical twins for uncaring/callous traits and distress cue recognition, especially the cues of fear and sadness.

In contrast, no specific emotional expression was identified in a review of 16 studies on children less than 12-years-old.<sup>12</sup> In this review, facial expression recognition problems were noted in children with conduct disorders and callous unemotional as well as externalizing problems.

**Excessive screen time** is still another risk factor for disruptive behavior disorder in children. In a paper entitled “Contemporary screen time modalities and disruptive behavior disorders in children: a prospective cohort study”, children were seen in the Adolescent Brain and Cognitive Development (ABCD) study (N=11,875 9-to-11-year-old children).<sup>16</sup> The children reported screen time at baseline and then at a one-year follow-up assessment, the Kiddie’s Schedule for Affective Disorders and Schizophrenia was given. Greater than four hours of screen time per day was associated with a 69% greater prevalence of CD and a 46% greater prevalence of ODD. Each hour of social media led to a greater prevalence of CD and each hour of video chat, texting, TV and video games led to a greater prevalence of ODD.

### Potential underlying biological mechanisms for disruptive behavior disorders in children

Several potential underlying biological mechanisms for disruptive behavior disorders have been explored in this recent literature (see Table 3). The physiological mechanisms include low skin conductance reactivity and co-inhibition of parasympathetic/sympathetic activity. Low magnesium intake has also been studied and several mechanisms involving the brain have been researched. These include low white and gray matter volume, low connectivity, and low activation.

**Table 3** Potential underlying biological mechanisms for disruptive behavior disorders in children (and first authors)

Mechanism	First author
Low skin conductance reactivity	Georgio
Co-inhibition parasympathetic and sympathetic activity	Fanti
Low magnesium intake	Portnoy
Low white matter volume left inferior frontal-occipital region	Menon
Low grey matter volume in 7 cortical and sub-cortical regions	Zhang
Low grey matter volume left ventral medial prefrontal cortex	Ibrahim
Less amygdala volume related to greater proactive aggression	Naiijen
Less insula volume related to greater reactive aggression	Naiijen
Altered functional connectivity in frontal regions	Werbahn
Greater activation amygdala and dorsal anterior cingulate cortex	Mawes

In a study on physiological reactivity in children with high callous-unemotional traits (N=163), **low skin conductance reactivity** to sad and fearful stimuli was shown by males, but not females.<sup>17</sup> However, the sample was selected for low empathy.

In a review of 66 studies (N= 10,227) on physiological activity and reactivity in children and adolescents with conduct problems, **low parasympathetic and sympathetic reactivity** were noted to emotional tasks.<sup>18</sup> These results suggested co-inhibition of parasympathetic and sympathetic activity.

**Low magnesium intake** has also been associated with callous – unemotional traits in children (N=446 11-to-12-year-old children from the Healthy Brain and Behavior study).<sup>19</sup> In this research, three 24-hour dietary recall interviews were given with the children and CU Traits and Social Behavior Questionnaires were given to their caregivers. Less magnesium intake was associated with more CU traits.

**Lower white matter volume** has been reported by two research groups in this recent literature on children with disruptive behavior disorders. In one fMRI study, males (N= 550 males with disruptive behavior disorder and 550 without) were assessed for the Adolescent Brain and Cognitive Development (ABCD) study.<sup>20</sup> Lower white matter volume was noted for the left inferior fronto-occipital area. Interesting other data come from an intervention study on rapid white matter changes noted following a 14-week parenting intervention for a group of boys with conduct problems (N=67).<sup>21</sup> Callous unemotional traits were reduced but not conduct problems. These data suggest not only that white matter volume may be associated specifically with callous unemotional traits, but also that both white matter and CU traits can be altered by intervention

**Lower gray matter volume** has also been reported in two studies. In a structural MRI study on children and adolescents with conduct disorders (N= 60 children with conduct disorder and 60 healthy control children), seven cortical and subcortical regions showed significantly lower gray matter volume.<sup>22</sup> These areas included the cerebellum posterior lobe, the temporal lobe, the para-hippocampal

gyrus, the lingual gyrus, the insula, the parietal lobe and the medial frontal gyrus. The authors suggested that these spatial patterns would be useful in classifying children with conduct disorder.

In a paper entitled “Sex differences in medial prefrontal and parietal cortex structures in children with disruptive disorder” (N= 88 with disruptive behavior disorder and 50 healthy control children 8-to-16-years-old), boys with DBD had less gray matter volume.<sup>23</sup> This was noted in the left ventral medial prefrontal cortex. Cortical thickness was also lower in the supramarginal gyrus for the boys with DBD.

Different types of aggression have been studied in children and adolescents with disruptive behavior disorder (158 children with CD/ODD and 96 healthy control children 8-to-18-years-old).<sup>24</sup> In this study, proactive aggression was negatively associated with amygdala volume (the region associated with empathy) and reactive aggression was negatively associated with insula volume (a region involved in threat responsivity). The close correspondence between these specific types of aggression and their associated brain regions is notable.

Proactive and reactive aggression have also been related to **altered functional connectivity** in frontal areas in children and adolescents with disruptive behaviors (N=207 8-to-18-year-old boys, including 80 with ODD and/or CD).<sup>25</sup> Both reactive and proactive aggressions were associated with global and local functional connectivity in the central gyrus and precuneus regions that are linked to aggression-related impairment.<sup>26,27</sup>

**More and less activation** have been reported for different regions of the brain during reward – related activation, specifically a monetary incentive delay task. In this study, entitled “Reward processing in children with disruptive behavior disorders and callous – unemotional traits in the ABCD study”, children (mean age= 9.5) were divided into groups of typically developing children (N=693) and those with disruptive behavior disorders (N=995).<sup>28</sup> Disruptive children were further divided into those with callous-unemotional traits (N= 198) and those without CU traits (N= 276). During reward anticipation, the behavior disorder group with and without CU traits showed decreased dorsal anterior cingulate cortex activation. The disruptive behavior disorder plus CU traits group showed greater activation in the amygdala and the dorsal anterior cingulate cortex. The authors referred to these as unique neuroetiologic pathways.

### Interventions for disruptive behavior disorders in children

A surprisingly large range of interventions has appeared in this literature (see Table 4). The interventions include having pets, cognitive behavioral therapy, and parenting training.

**Table 4** Interventions for children with disruptive behavior disorders (and first authors)

Intervention	First author
Positive engagement with pets	Murphy
Cognitive behavioral therapy	Ross
Parent training	Leijten

In a paper entitled “Positive engagement with pets buffers the impact of intimate partner violence on callous unemotional traits in children”, the children (N= 204 7-to-12-year-old children) were recruited from domestic violence agencies.<sup>29</sup> The relationship between intimate partner violence and callous unemotional traits was moderated by high levels of **engagement with pets**. Although equine

therapy has been effective for children with emotional disorders, pets have been used less frequently. These therapies may be effective for calming the nervous system via stimulation of pressure receptors. Other alternative therapies that involve the stimulation of pressure receptors and a calming of the nervous system in children with other disorders include massage therapy, tai chi, yoga and exercise.

**Cognitive behavioral therapy (CBT)** has been the most frequent intervention for children with disruptive behavior disorder. In a meta-analysis entitled “Cognitive behavioral therapy for externalizing disorders in children and adolescents in clinical care”, 51 studies were included (N=5395).<sup>8</sup> The meta-analysis yielded large treatment effects of cognitive behavioral therapy (CBT) for the remission rate following treatment of children with CD/ODD (48%). In addition, a low attrition rate was noted for children experiencing CBT (14%).

**Parent training** has also been effective. In a review of 10 randomized controlled trials of a program called Incredible Years Parenting Program for children with conduct problems and their depressed mothers, parent training was provided and repeated assessments were made of the mothers and their children (N= 1280 children 2-to-10-years-old).<sup>30</sup> This program resulted in a significant reduction of conduct problems in the children but, surprisingly, no change in maternal depression.

### Methodological limitations and future research directions

This recent literature on disruptive behavior disorders in children has several methodological limitations that relate to different definitions/diagnoses, sampling, measures, and methods across studies. These limitations are highlighted by several systematic reviews that have been conducted but could not be submitted to meta-analyses because of significant variability of methods and measures across studies that resulted in their failure to meet criteria for meta-analysis. Although there is a sufficient literature for meta-analyses to be conducted, the authors of the meta-analyses suggest that they were limited by small samples and the heterogeneity of the samples on age and the severity of their disruptive behavior disorder.

The definitions and diagnostic criteria for disruptive behavior disorders have varied across studies with some researchers sampling children who have oppositional defiant disorder or who have a more severe conduct disorder. And, in many studies CD and ODD were comorbid and in others they were recruited for the same group, thus confounding the results by the severity of the disruptive behavior problems. Further, the outcome variable was callous-unemotional traits in many of the studies that were located in this literature on disruptive behavior disorders. And in those studies that further explored those with and without callous-unemotional traits, differences were noted including brain region involvement differences.<sup>31</sup>

Most of the studies are cross-sectional, making it difficult to determine directionality. And very few researchers have traced the longitudinal course from ODD to CD or from one of the disruptive disorders to a comorbid ODD/CD disorder in the same children. Typically, the samples have been a combination of children and adolescents, making it difficult to determine the problems, effects and comorbidities that are unique to the children versus the adolescents. The studies have often lacked comparison groups of children without ODD and CD.

The use of different scales in different studies has also made it difficult to compare results across studies. Both types of self-report data are more subjective and less definitive than the more objective



physiological measures like the autonomic data and the fMRIs that appeared in studies on potential underlying biological mechanisms.

In the risk factor/predictor variable studies, researchers have typically measured one versus multiple variables even though the children and adolescents have frequently experienced multiple risk factors. Those few multiple variable studies have lacked logistic/linear regression analysis or structural equations modeling to determine the relative significance of the different variables contributing to the ODD and the CD. The significant mediating/moderating variables in some of the studies suggest the importance of assessing multiple variables in the same samples.

The limited literature on the comorbidities of disruptive behavior disorder, aside from the comorbidity of callous unemotional traits, ADHD and depression, was surprising given that research on other disorders of children and adolescents has shown that they are often accompanied by sleep problems, anxiety and PTSD. The absence of research on peer influences, and internet use (except for the one study on excessive social media use) in this literature was also surprising given the frequency of these effects on other disorders in children and adolescents.<sup>32</sup>

That the meta-analysis on 51 studies on cognitive behavioral therapy (CBT) revealed its effectiveness, was not surprising given that it has been effective for many other disorders in children. Although parenting problems like negative parenting and child maltreatment have been risk factors for disruptive behavior disorders in children and adolescents, parents, surprisingly, were not involved in these CBT studies. And, it was surprising that only one study appeared on parent training in this recent literature. Although that intervention was effective for reducing disruptive behavior in the children, it did not reduce maternal depression possibly because it was more focused on changing the children's than the mothers' behaviors. Although pet therapy appeared in this literature, surprisingly, other alternative therapies that have been effective for reducing other childhood disorders like massage therapy, tai chi, yoga and exercise have not appeared in this literature.

The potential underlying biological mechanism literature has been primarily fMRI research, although those samples are small likely due to the expense of the research. The results have been highly variable in terms of the activated areas of the brain and whether there was more or less activation and whether white or gray matter was reduced. These mixed findings likely relate to the different age groups and the different severity of the disruptive behavior disorders being measured in the children and adolescents.

Despite these methodological limitations, this literature has highlighted the prevalence of disruptive behavior disorders in children and adolescents. The prevalence may have recently increased as the overuse of social media and the internet has increased. The prevalence of disruptive behavior disorders highlights the need for more intervention research. The data on risk variables have helped identify children and adolescents who need therapy and the intervention data have informed clinicians on potential treatments for those with disruptive behavior disorders. Further research is needed to specify the relative significance of the risk variables for identifying those children and adolescents and the specific intervention techniques that are effective in reducing disruptive behavior disorders and their comorbidities.

## Conclusion

This narrative review suggests a prevalence rate of 3% for conduct disorder and a higher rate of 14% for the less severe oppositional defiant disorder. Comorbidities of disruptive behavior disorders include callous unemotional traits, ADHD, and depression. Risk factors for disruptive behavior disorders include negative parenting, child maltreatment, slow recognition of facial expressions and excessive screen time. Several potential underlying mechanisms have been suggested including low skin conductance reactivity, co-inhibition of parasympathetic/sympathetic activity, low white and grey matter volume, and low connectivity and activation in various brain regions. Cognitive behavioral therapy and parenting programs have been effective interventions. Although this review highlights the prevalence and severity of disruptive behavior disorders in children, many of the studies are limited by being based on mixed-age child and adolescent samples as well as including conduct and oppositional disorder youth in the same groups, and results have varied by the correlates/comorbidities of the disorders. Future research is needed to specify the intervention protocols that are effective in treating disruptive behavior disorders.<sup>33–37</sup>

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## Conflicts of interest

The authors declare that there is no conflict of interest.

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