Peer relationships and prosocial behaviour differences across disruptive behaviours

Running head: PEER RELATIONSHIPS AND DISRUPTIVE BEHAVIOURS

Abstract

It is unclear if impairments in social functioning and peer relationships significantly differ across common developmental conditions such as attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), conduct disorder (CD), and associated callous-unemotional traits (CU traits). The current study explored gender differences and symptoms of parent and teacher reported psychopathology on peer relationships and prosocial behaviour in a sample of 147 referred children and adolescents (aged 5-17 years; 120m). The results showed that increases in parent reported ADHD inattentive symptoms and teacher reported ADHD hyperactive-impulsive symptoms, CD, ODD, and CU traits were significantly associated with peer relationship problems across gender. Additionally, teacher reported symptoms of ODD and both parent and teacher reported CU traits were related to difficulties with prosocial behaviour. Overall, our findings show a differential association of the most common disruptive behaviours to deficits in peer relationships and prosocial behaviour. Moreover, they highlight that different perspectives of behaviour from parents and teachers should be taken into account when assessing social outcomes in disruptive behaviours. Given the questionable separation of conduct problem related constructs, our findings not only point out the different contribution of those aspects in explaining peer relationships and prosocial behaviour, but furthermore the variance from different informants about those aspects of conduct problems.

 *Keywords:* Attention-deficit/ hyperactivity disorder; Oppositional defiant disorder; Conduct disorder; Callous-unemotional traits; Gender; Peer relationship problems; Prosocial behaviour

Peer relationships and prosocial behaviour differences across disruptive behaviours

 A large body of research has found that children and adolescents diagnosed with externalising disorders, including attention-deficit/hyperactivity disorder (ADHD), conduct disorder (CD), oppositional defiant disorder (ODD), and callous-unemotional traits (CU) are at increased risk of experiencing relationship difficulties with peers [1,2]. Further, research has shown that impairments in social functioning affect both males and females (Greene et al., 2001) and predict negative outcomes later in their lives, such as the development of CD [3] and interpersonal relationship problems, including those with members of the opposite sex [4]. As peer interactions present a promising area for interventions due to a potentially easier way of approaching youth with their peers in their everyday environments [5], we need to first get a better understanding of the relationship between peer interactions (pro-social behaviour vs peer relationship problems) and different forms of externalising behaviours (ADHD, ODD, CD, and CU traits), and whether these differ for males versus females.

**Peer Difficulties and ADHD/ODD**

All the three core symptoms of ADHD (i.e., inattention, hyperactivity, and impulsivity) can impact the development of social relationships [6]. Additionally, children with ADHD are more likely to display negative, aversive, and disruptive behaviour and, as such, can be viewed by peers as being argumentative and inappropriate in their interactions [7,8], so peer rejection can occur very quickly after entering a new peer group [9]. As for ODD, which is often comorbid with ADHD, further studies have found that children diagnosed with this disorder have more pervasive problems with social functioning compared with children who are diagnosed with other psychiatric diagnoses, including ADHD and CD [10,1] and ODD [11]. Early behaviours linked to ODD have been associated with parenting behaviour. Burke et al. [10], for example, found a reciprocal relationship between timid parental discipline and worsening ODD symptoms, with ODD also predicting poorer communication, and decreased parental involvement. The same study also showed that CD was predicted by poor parental supervision, while ADHD was not associated with parenting behaviour [10]. Difficulties with social functioning in ODD is pervasive across all relationships and contexts (i.e., with peers, parents, siblings, and at home or in school), and this impairment remains significant even after controlling for comorbid conditions, including CD [12]. Further evidence indicates that females with ODD experience more difficulties with peers than males. For example, Carlson, Tamm, and Gaub [13] found that females, on average, received higher peer dislike scores than males, and were rated as displaying more social problems.

**Peer Difficulties and CD/CU**

Children and adolescents diagnosed with CD and those who report elevated CU traits, also experience peer relationship problems [14,15], where difficulties are evident for both genders and are most acute for those individuals with CD [16]. Interestingly, adolescent offenders reporting relationships of high quality showed lower psychopathic traits (callous-unemotional and grandiose aspects), while those high on psychopathic traits reported more antisocial behaviour and antisocial influence in relationships [17]. Additionally, youths from the community with high stable psychopathic traits report more peer conflict, while their peers do not share that perception [18].

**Prosocial Behaviour and ADHD/ODD**

 One element of peer relationships is prosocial behaviour, defined as behaviour undertaken voluntarily and intended to help or benefit another person or a group of individuals [19]. There is some evidence, which indicates that prosocial behaviour is adversely affected (i.e., less apparent) in children diagnosed with ADHD [20,21] or ODD [22]. Paap et al. [22] found that children displaying clinical levels of ADHD or ODD, and without evident peer relationship difficulties, showed very little prosocial behaviour (even when given an opportunity to practice social skills with peers). The study also found that parents (and not teachers) reported that males with ODD symptoms showed less prosocial behaviours than females with a similar number of ODD symptoms. Similarly, Hay, Hudson, and Liang [23] found that gender was a significant predictor of prosocial behaviour in children diagnosed with ADHD, with females receiving significantly higher teacher (and not parent) reported prosocial scores.

**Prosocial Behaviour and CD/CU**

 Both CD and CU traits are associated with fewer prosocial behaviours [24] and this relationship tends to be stronger for individuals with both CD and elevated CU traits [e.g., 16,15]. CU traits (specifically the uncaring and callous subscales) are also related to low prosocial beliefs in terms of a disapproval of antisocial behaviour [25]. Eisenbarth et al. [16], for example, found that the relationship with prosocial behaviour was most evident for CU traits compared to CD symptoms. Furthermore, the study showed that the negative association between CU traits and prosocial behaviour was mediated by increased negative emotional symptoms and lower cognitive ability. This study also found that females reported more prosocial behaviour, compared with males. Another community-based investigation however found prosocial behaviour to be predicted by narcissism, impulsivity, and CU, but not by gender [26].

Thus, considering the impact of externalising difficulties (ADHD, CD, ODD) and CU traits on social relationships, one study found only ADHD and ODD as significant predictors of peer relationship difficulties [27]. However, this study only considered boys and collapsed informant assessment across teachers and parents.

**Variation Based on Informants**

Assessment of ADHD, ODD, CD, and CU symptoms is based on at least one informant, usually parent or teacher. Ideally, the different reports show high inter-rater reliability and the assessment of those traits is based on this assumption. However, in reality there is some variance between the sources and this can contribute to variance in findings. For example, a recent study investigated the consistency of different informants as well as their stability over time, focussing on the assessment of CU, and found weak consistency between parents and teachers [28]. Similarly, teacher and parent rating discrepancies have been reported for ADHD [29], and for conduct problems more generally [30]. Thus, it seems sensible to investigate the relationships between externalising symptoms and peer interaction variables using both parent and teacher reports.

**The Current Study**

 While previous research indicates associations between psychopathology in childhood and adolescence with indices of social functioning, it remains unclear how externalising disorders (ADHD, CD, and ODD) and CU traits are differentially associated with impairments in parent and teacher reported peer interactions and prosocial behaviour, and whether agender moderates this association. The present study investigated the extent to which externalising symptoms and CU traits reported from different sources are associated with peer relationship difficulties and prosocial behaviour, and whether these associations are consistent between males and females.

**Method**

**Participants**

 The sample was drawn from the \*\*\* project (\*\*\*), a database that was initiated in 2010 with the aim of establishing a standardised recruitment and assessment protocol and clinical and genetic database for children and adolescents with ADHD living in \*\*\* and that includes information about children and adolescents (and their relatives) who are reported to have elevated symptoms of ADHD, or anxiety or conduct disorder (CD). At the time of data extraction the sample included 521 children/adolescents aged 3- to 18-years-old (*M* = 9.34, *SD* = 3.20; *n* = 492 males). Selected participants with complete data for the variables of interest for both parent and teacher reports, consisted of 147 children and adolescents aged 5- to 17-years-old (*M* = 9.78, *SD* = 2.71, *n* = 120 males). For descriptive variables, see Table 1. An independent samples t-test revealed that those included and those excluded from analyses did not significantly differ according to their ages at time of assessment, *t*(491) = -1.78, *p* = .075. A chi-square test of goodness-of-fit showed that between those excluded and those included in analyses, gender did not significantly differ, *χ*2 (1, *N* = 507) = 1.72, *p* = .189. Independent samples t-tests also revealed that those included and those excluded from analyses did not significantly differ on any of the predictor measures: parent reported symptoms of ADHD Inattentive, *t*(457) = 1.25, *p* = .210; parent reported symptoms of ADHD Hyperactive-Impulsive, *t*(459) = 1.66, *p* = .098; parent reported symptoms of CD, *t*(455) = 1.61, *p* = .109; parent reported symptoms of ODD, *t*(459) = 1.02, *p* = .307; parent reported CU traits, *t*(470) = -.67, *p* = .505; teacher reported symptoms of ADHD Inattentive, *t*(318) = -1.16, *p* = .249; teacher reported symptoms of ADHD Hyperactive-Impulsive, *t*(320) = .23, *p* = .821; teacher reported symptoms of CD, *t*(306) = -.02, *p* = .982; teacher reported symptoms of ODD, *t*(320) = -.13, *p* = .894; teacher reported symptoms of CU traits, *t*(316) = -.56, *p* = .577.

**Measures**

 **Symptoms of ADHD, ODD and CD.** Symptoms of ADHD, ODD, and CD were measured using the Conners Comprehensive Behaviour Rating Scales (CBRS) [31], including both parent and teacher reports (Conners CBRS-P and Conners CBRS-T, respectively). The CBRS is a questionnaire that asks parents and teachers to rate on a four-point scale how well a behaviour describes a child/ adolescent and how frequently they have shown this behaviour over the past month. Responses are coded on a 4-point Likert scale from 0 (Not true at all/ Never, Seldom), to 3 (Very much true/ Very often, Very frequently). CBRS subscales that were included in analyses are CBRS ADHD Inattentive, CBRS ADHD Hyperactive-Impulsive, CBRS ODD, CBRS CD (see Table 1).

 **Callous-unemotional traits (CU traits).** The Inventory of Callous-Unemotional Traits (ICU) [32] was used to measure the presence of CU traits. The ICU is a questionnaire consisting of 24 questions in which parents and teachers are asked to rate how well a statement describes the child 0 (Not at all true) to 3 (Definitely true), making a total score range from 0 – 72.

 **Peer relationship problems and prosocial behaviour.** These two outcomes were assessed using the Strengths and Difficulties Questionnaire (SDQ) [33]. The SDQ asks parents and teachers to rate how applicable a statement is to the child from 0 (Not true) to 2 (Certainly true). The 25 items of the SDQ comprises five scales and the current study focus on items related to the “Peer problems” (e.g., “Has at least one good friend”), and prosocial (e.g., “Helpful if someone is hurt”) subscales, making a possible score range for each scale from 0-25. SDQ subscales that were included in analyses were SDQ peer relationship problems, and SDQ prosocial behaviour (see Table 1).

**Statistical Analyses**

 Separate forced entry multiple regressions were conducted using SPSS (Version 24.0; IBM Corp, 2016) for the parent and teacher reports with peer relationship problems and prosocial behaviour as the dependent variables, and with the aforementioned psychopathology measures (ADHD, ODD, and CD; and ICU scores for CU traits) as predictors. The statistical predictive powers of gender and age were also examined through the sex of the participants and their ages at assessment also being entered as predictors. A probability level of *p* < .05 was used to indicate statistical significance.

**Results**

**Correlations between Parent and Teacher Reports**

 Pearson’s correlations were used to explore the association between parent and teacher reports for all of the variables of interest (CBRS ADHD Inattentive, CBRS ADHD Hyperactive-Impulsive, CBRS ODD, CBRS CD, ICU- CU traits, SDQ peer relationship problems, and SDQ prosocial behaviour) generally found an agreement between the parent and teacher reports, as shown by the significant positive correlations between their respective reports (*r*s = .18 - .42; *p*s < .029). However, parent and teacher reports of externalising behaviour did not correlate regarding CU traits and prosocial behaviour (see Table 2). Correlations between all of the variables of interest are shown in Table 3.

**Parent Reports: Peer Relationship Problems and Prosocial Behaviour**

 A regression model in which gender, age, ADHD Inattentive, ADHD Hyperactive-Impulsive, CD, ODD, and CU traits predicted peer relationship problems was significant (*F*(7,139) = 2.44, *p* = .022, *R*2 = .11). ADHD Inattentive was a significant predictor of scores pertaining to peer relationship difficulties over and above the other predictor variables and indicated that with one standard unit increase in ADHD Inattentive symptoms, the predicted score on the SDQ peer relationship problems scale increased by .28 units, when the other predictors were held constant. All of the other predictors were non-significant (see Table 4).

A regression model in which gender, age, ADHD Inattentive, ADHD Hyperactive-Impulsive, CD, ODD, and CU traits predicted prosocial behaviour was significant (*F*(7,139) = 8.63, *p* < .001, *R*2 = .30). Gender was a significant predictor of prosocial behaviour scores over and above the other variables, indicating that parents generally reported more prosocial behaviour for girls (see Table 1). CU traits was also a significant predictor of scores pertaining to prosocial behaviour over and above the other variables; with one standard unit increase in CU traits, the predicted score on the SDQ prosocial scale decreased by .39 units when the other predictors were held constant (see Table 5).

**Teacher Reports: Peer Relationship Problems and Prosocial Behaviour**

 A regression model in which gender, age, ADHD Inattentive, ADHD Hyperactive-Impulsive, CD, ODD, and CU traits predicted peer relationship problems from teacher reports was significant (*F*(7, 139) = 5.51, *p* < .001, *R*2 = .22). ADHD Hyperactive-Impulsive was a significant predictor of peer relationship problems over and above the other variables; with one standard unit increase in ADHD Hyperactive-Impulsive, the predicted score on the SDQ peer relationship problems scale decreased by .24 units when the other predictors were held constant. ODD was also a significant predictor over and above the other variables; with one standard unit increase in ODD, the predicted score for peer relationship problems increased by .36 units when the other predictors were held constant. CU traits were also a significant predictor over and above the other variables. With one standard unit increase in CU traits, the predicted peer relationship problems score increased by .24 units. All of the other predictors were non-significant (see Table 4).

A regression model in which gender, age, ADHD Inattentive, ADHD Hyperactive-Impulsive, CD, ODD, and CU traits predicted prosocial behaviour from teacher reports was significant (*F*(7,139) = 18.16, *p* < .001, *R*2 = .48). Gender was a significant predictor of prosocial behaviour scores over and above the other variables. On average, teachers reported that females displayed more prosocial behaviour than males (see Table 1). ODD was also a significant predictor of prosocial behaviour scores over and above the other variables; with one standard unit increase in ODD, the predicted score on the SDQ prosocial scale decreased by .26 units, when the other predictors were held constant. CU traits was also a significant predictor over and above the other variables, with one standard unit increase in CU traits, the predicted score on the SDQ prosocial scale decreased by .55 units when the other predictors were held constant. All of the other predictors were non-significant (see Table 5).

**Discussion**

The present study is the first to explore the extent to which gender, teacher and parent reported symptoms of externalising psychopathology (ADHD, ODD, CD), and CU traits were related to peer relationship difficulties and prosocial behaviour. The results showed that parent reported ADHD Inattentive symptoms, and teacher reported ODD symptoms, and CU traits were significantly related to increased peer relationship problems, whilst teacher reported Hyperactive-Impulsive behaviour was significantly related to decreased peer relationship problems when controlling for other variables, indicating that this might be a protective factor. Parent and teacher reported CU traits and teacher reported ODD symptoms were significantly related to prosocial behaviour and gender was also found to be a significantly related to prosocial behaviour in both parent and teacher reports. In addition, parent and teacher reported CU traits and teacher reported ODD symptoms were significantly related to reduced prosocial behaviour. The results extend existing findings to demonstrate that ADHD subtypes predicted peer relationship difficulties and how this association was dependent on the source of information- teacher or parent. Moreover, they highlight that teacher reports of behaviour were more broadly associated with challenges around social functioning.

Previous research has similarly found differences between the predictive validity of parent and teacher reports of psychopathology with respect to behavioural outcomes in children and adolescents. McLoughlin et al. [34], for example, found that although parents and teachers shared similar views of the behaviours of the two subtypes of ADHD- Inattentive and Hyperactive-Impulsive, they also highlighted a diverse profile. The authors suggest that such results might be attributable to the different environments in which the respective raters observe children and young people (i.e., the classroom versus the home environment). While the positive associations data in the current study indicated that reports of symptoms of psychopathology were generally consistent [see also: 35], they associated these symptoms with social behaviour differently. These informant discrepancies are also relevant in terms of decisions related to forensic questions [36], and therefore need more attention not only in research but also in practical contexts.

The results link to previous studies that have raised the possibility that inattention is likely to limit opportunities to acquire necessary social skills through observational learning [37], and to attend to the social cues necessary for effective interactions with peers [38,39]. However, the results are inconsistent with the proposition that hyperactivity and impulsivity reflect unrestrained behaviour that is found aversive by peers [40,8], with our results suggesting that, from the teacher reports, such symptoms may even act as a protective factor against difficulties with peer relationships, when controlling for oppositional and conduct problem behaviours, as well as for callous-unemotional traits. Thus, teacher reported pure inattentive symptoms can be seen as protective, however, when in combination with conduct problems, these symptoms have the expected positive association with peer relationship difficulties. In contrast, the results for ODD, as it is characterised by symptoms of oppositional, defiant, aggressive, and non-compliant behaviours [41], are consistent with past research, with such problem behaviours often resulting in peer rejection [42]. Additionally, regarding prosocial behaviour, children who score highly on CU traits would have a lack of empathy [43] and, therefore, would be expected to engage less in prosocial behaviour.

With respect to CU traits, whilst there was no significant relationship between parent and teacher reports of these traits, they were significantly associated with reduced prosocial behaviour in both parent and teacher reports, highlighting that increased CU traits across the sample were associated with fewer prosocial behaviours [16,15]. Regarding the predictive role of teacher reported CU traits on peer relationship problems, this is in line with the results of Eisenbarth et al. [16], but from the results of the former study a predictive role of CD would also have been expected and this finding was not replicated in this study. However, the research by Eisenbarth et al. did benefit from a larger sample of 337 and, therefore, had greater statistical power than the present study. Our current findings are in line with the results from Pardini and Fite’s [27], who utilised a far larger sample (1,517 youth) and did not find a significant predictive power of CD traits. Yet this study also failed to establish a relationship with CU traits on peer relationship problems. As Pardini and Fite [27] used an all-male sample, whereas Eisenbarth et al. [16] and the present study utilised mixed gender samples, the diverse findings could also be related to gender discrepancies. Thus, future research should incorporate the role of gender when investigating the relationship between CD, CU traits, and peer relationship difficulties.

Gender was found to be significantly related to prosocial behaviour in both parent and teacher reports, with females being rated as displaying higher prosocial behaviour, on average, than males. These findings are consistent with previous research highlighting that both parents and teachers reported that females display more prosocial behaviour across development compared with males [44]. Prosocial behaviour is typically reported to be more important to girls because of its link to peer acceptance [45]. It is also possible that parents and teachers conformed gender stereotypes in their report of prosocial behaviour and expectations that girls will engage with this more [46].

In conclusion, our study investigated the role of parent and teacher reported symptoms of ADHD (Inattentive and Hyperactive-Impulsive subtypes), CD, ODD, and CU traits, as well as gender, in relation to peer relationships and prosocial behaviour. Our results are important in highlighting the differential predictive validity of parent and teacher reports on social behaviour. While these results are important in understanding the developmental context of psychopathology and its impact, the use of a cross-sectional design precluded any inference of causal relationship. However, the study sets the ground for further longitudinal research aimed at elucidating causality between externalising symptoms and associated constructs with key indices of developmental outcomes between males and females. Our study suggests that practitioners should systematically screen for difficulties with peer relationship prosocial behaviour in children referred for disruptive behaviours, and take into account both parents and teachers’ views, as well as gender differences.

**Ethical approval:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institution (ERGO ID: 23218) and national research committee (REC reference 14/WA/0149; IRAS ID: 138982) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

References

1. Frankel F, Feinberg D (2002) Social problems associated with ADHD vs. ODD in children referred for friendship problems. Child Psychiatry Hum Dev 33 (2):125-146. doi:10.1023/a:1020730224907

2. Haas SM, Becker SP, Epstein JN, Frick PJ (2018) Callous-Unemotional Traits are Uniquely Associated with Poorer Peer Functioning in School-Aged Children. J Abnorm Child Psychol 46 (4):781-793. doi:10.1007/s10802-017-0330-5

3. Greene RW, Biederman J, Faraone SV, Sienna M, Garcia-Jetton J (1997) Adolescent outcome of boys with attention-deficit/hyperactivity disorder and social disability: results from a 4-year longitudinal follow-up study. J Consult Clin Psychol 65 (5):758-767. doi:10.1037/0022-006x.65.5.758

4. Young S, Heptinstall E, Sonuga-Barke EJ, Chadwick O, Taylor E (2005) The adolescent outcome of hyperactive girls: self-report of psychosocial status. J Child Psychol Psychiatry 46 (3):255-262. doi:10.1111/j.1469-7610.2004.00350.x

5. Capaldi D, DeGarmo D, Patterson GR, Forgatch M (2002) Contextual risk across the early life span and association with antisocial behavior. In: Reid JB, Patterson GR, Snyder J (eds) Antisocial behavior in children and adolescents: A developmental analysis and model for intervention  pp 123-145. doi:10.1037/10468-000

6. Hoza B (2007) Peer functioning in children with ADHD. J Pediatr Psychol 32 (6):655-663. doi:10.1093/jpepsy/jsm024

7. Wehmeier PM, Schacht A, Barkley RA (2010) Social and emotional impairment in children and adolescents with ADHD and the impact on quality of life. The Journal of adolescent health : official publication of the Society for Adolescent Medicine 46 (3):209-217. doi:10.1016/j.jadohealth.2009.09.009

8. Whalen CK, Henker B, Collins BE, McAuliffe S, Vaux A (1979) Peer interaction in a structured communication task: comparisons of normal and hyperactive boys and of methylphenidate (Ritalin) and placebo effects. Child Dev 50 (2):388-401. doi:10.1111/j.1467-8624.1979.tb04120.x

9. Erhardt D, Hinshaw SP (1994) Initial sociometric impressions of attention-deficit hyperactivity disorder and comparison boys: predictions from social behaviors and from nonbehavioral variables. J Consult Clin Psychol 62 (4):833-842. doi:10.1037//0022-006x.62.4.833

10. Burke JD, Pardini DA, Loeber R (2008) Reciprocal relationships between parenting behavior and disruptive psychopathology from childhood through adolescence. J Abnorm Child Psychol 36 (5):679-692. doi:10.1007/s10802-008-9219-7

11. Janssens A, Van Den Noortgate W, Goossens L, Verschueren K, Colpin H, Claes S, Van Heel M, Van Leeuwen K (2017) Adolescent externalizing behaviour, psychological control, and peer rejection: Transactional links and dopaminergic moderation. Br J Dev Psychol 35 (3):420-438. doi:10.1111/bjdp.12184

12. Greene RW, Biederman J, Zerwas S, Monuteaux MC, Goring JC, Faraone SV (2002) Psychiatric comorbidity, family dysfunction, and social impairment in referred youth with oppositional defiant disorder. Am J Psychiatry 159 (7):1214-1224. doi:10.1176/appi.ajp.159.7.1214

13. Carlson CL, Tamm L, Gaub M (1997) Gender differences in children with ADHD, ODD, and co-occurring ADHD/ODD identified in a school population. J Am Acad Child Adolesc Psychiatry 36 (12):1706-1714. doi:10.1097/00004583-199712000-00019

14. Kimonis ER, Frick PJ, Barry CT (2004) Callous-unemotional traits and delinquent peer affiliation. J Consult Clin Psychol 72 (6):956-966. doi:10.1037/0022-006X.72.6.956

15. Viding E, Simmonds E, Petrides KV, Frederickson N (2009) The contribution of callous-unemotional traits and conduct problems to bullying in early adolescence. J Child Psychol Psychiatry 50 (4):471-481. doi:10.1111/j.1469-7610.2008.02012.x

16. Eisenbarth H, Kovshoff H, Rose S, Fanti K, Hadwin JA (2017) The mediating role of cognitive and emotional factors for predicting peer relationship by conduct disorder and callous-unemotional traits. Paper presented at the Workshopkongress Klinische Psychologie und Psychopatherapie, Chemnitz,

17. Backman H, Laajasalo T, Jokela M, Aronen ET (2018) Interpersonal Relationships as Protective and Risk Factors for Psychopathy: A Follow-up Study in Adolescent Offenders. J Youth Adolesc 47 (5):1022-1036. doi:10.1007/s10964-017-0745-x

18. Munoz LC, Kerr M, Besic N (2008) The peer relationships of youths with psychopathic personality traits - A matter of perspective. Criminal Justice and Behavior 35 (2):212-227. doi:10.1177/0093854807310159

19. Eisenberg N, Mussen PH (1989) The roots of prosocial behaviour in children. Cambridge University Press, Cambridge

20. Diamantopoulou S, Henricsson L, Rydell AM (2005) ADHD symptoms and peer relations of children in a community sample: Examining associated problems, self-perceptions, and gender differences. International Journal of Behavioral Development 29 (5):388-398. doi:10.1080/01650250500172756

21. Young S, Gudjonsson GH (2006) ADHD symptomatology and its relationship with emotional, social and delinquency problems. Psychology Crime & Law 12 (5):463-471. doi:10.1080/10683160500151183

22. Paap MC, Haraldsen IR, Breivik K, Butcher PR, Hellem FM, Stormark KM (2013) The Link between Peer Relations, Prosocial Behavior, and ODD/ADHD Symptoms in 7-9-Year-Old Children. Psychiatry J 2013:319874. doi:10.1155/2013/319874

23. Hay DF, Hudson K, Liang WT (2010) Links between preschool children's prosocial skills and aggressive conduct problems: The contribution of ADHD symptoms. Early Childhood Research Quarterly 25 (4):493-501. doi:10.1016/j.ecresq.2010.01.003

24. Fontaine NM, McCrory EJ, Boivin M, Moffitt TE, Viding E (2011) Predictors and outcomes of joint trajectories of callous-unemotional traits and conduct problems in childhood. J Abnorm Psychol 120 (3):730-742. doi:10.1037/a0022620

25. Roose A, Bijttebier P, Claes L, Lilienfeld SO (2011) Psychopathic traits in adolescence: Associations with the revised Reinforcement Sensitivity Theory systems. Personality and Individual Differences 50 (2):201-205. doi:10.1016/j.paid.2010.09.028

26. Wendt GW, Bartoli AJ, Arteche A (2017) Dimensions of youth psychopathy differentially predict concurrent pro- and antisocial behavior. Rev Bras Psiquiatr 39 (3):267-270. doi:10.1590/1516-4446-2016-2143

27. Pardini DA, Fite PJ (2010) Symptoms of conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and callous-unemotional traits as unique predictors of psychosocial maladjustment in boys: advancing an evidence base for DSM-V. J Am Acad Child Adolesc Psychiatry 49 (11):1134-1144. doi:10.1016/j.jaac.2010.07.010

28. Seijas R, Servera M, García-Banda G, Leonard Burns G, Preszler J, Barry CT, Litson K, Geiser C (2018) Consistency of limited prosocial emotions across occasions, sources, and settings: Trait- or state-like construct in a young community sample? Journal of Abnormal Child Psychology. doi:10.1007/s10802-018-0415-9

29. Kennerley S, Jaquiery B, Hatch B, Healey M, Wheeler BJ, Healey D (2018) Informant discrepancies in the assessment of attention-deficit/hyperactivity disorder. Journal of Psychoeducational Assessment 36 (2):136-147. doi:10.1177/0734282916670797

30. Sulik MJ, Blair C, Greenberg M (2017) Child conduct problems across home and school contexts: A person-centered approach. Journal of Psychopathology and Behavioral Assessment 39 (1):46-57. doi:10.1007/s10862-016-9564-8

31. Conners CK (2013) Conners Comprehensive Behavior Rating Scales. Multi-Health Systems Inc., North Tonawanda, NY

32. Frick PJ (2003) The Inventory of Callous-Unemotional Traits. University of New Orleans,

33. Goodman R (1997) The Strengths and Difficulties Questionnaire: a research note. J Child Psychol Psychiatry 38 (5):581-586. doi:10.1111/j.1469-7610.1997.tb01545.x

34. McLoughlin G, Rijsdijk F, Asherson P, Kuntsi J (2011) Parents and teachers make different contributions to a shared perspective on hyperactive-impulsive and inattentive symptoms: a multivariate analysis of parent and teacher ratings on the symptom domains of ADHD. Behav Genet 41 (5):668-679. doi:10.1007/s10519-011-9473-2

35. Bied A, Biederman J, Faraone S (2017) Parent-based diagnosis of ADHD is as accurate as a teacher-based diagnosis of ADHD. Postgrad Med 129 (3):375-381. doi:10.1080/00325481.2017.1288064

36. Penney SR, Skilling TA (2012) Moderators of informant agreement in the assessment of adolescent psychopathology: extension to a forensic sample. Psychol Assess 24 (2):386-401. doi:10.1037/a0025693

37. Cunningham CE, Siegel LS, Offord DR (1985) A developmental dose-response analysis of the effects of methylphenidate on the peer interactions of attention deficit disordered boys. J Child Psychol Psychiatry 26 (6):955-971. doi:10.1111/j.1469-7610.1985.tb00609.x

38. Dodge KA, Pettit GS, Bates JE, Valente E (1995) Social information-processing patterns partially mediate the effect of early physical abuse on later conduct problems. J Abnorm Psychol 104 (4):632-643. doi:10.1037//0021-843x.104.4.632

39. Landau S, Milich R (1988) Social communication patterns of attention-deficit-disordered boys. J Abnorm Child Psychol 16 (1):69-81. doi:10.1007/bf00910501

40. Whalen CK, Henker B (1985) The Social Worlds of Hyperactive (Addh) Children. Clinical Psychology Review 5 (5):447-478. doi:Doi 10.1016/0272-7358(85)90004-2

41. Reid MJ, Webster-Stratton C, Hammond M (2003) Follow-up of children who received the incredible years intervention for oppositional-defiant disorder: Maintenance and prediction of 2-year outcome. Behavior Therapy 34 (4):471-491. doi:Doi 10.1016/S0005-7894(03)80031-X

42. Bierman KL, Miller CL, Stabb SD (1987) Improving the social behavior and peer acceptance of rejected boys: effects of social skill training with instructions and prohibitions. J Consult Clin Psychol 55 (2):194-200. doi:10.1037/0022-006X.55.2.194

43. Hawes DJ, Dadds MR (2005) The treatment of conduct problems in children with callous-unemotional traits. J Consult Clin Psychol 73 (4):737-741. doi:10.1037/0022-006X.73.4.737

44. Rose AJ, Rudolph KD (2006) A review of sex differences in peer relationship processes: potential trade-offs for the emotional and behavioral development of girls and boys. Psychol Bull 132 (1):98-131. doi:10.1037/0033-2909.132.1.98

45. Crick NR (1996) The role of overt aggression, relational aggression, and prosocial behavior in the prediction of children's future social adjustment. Child Dev 67 (5):2317-2327. doi:10.1111/j.1467-8624.1996.tb01859.x

46. Zimmer-Gembeck MJ, Geiger TC, Crick NR (2005) Relational and physical aggression, prosocial behavior, and peer relations - Gender moderation and bidirectional associations. Journal of Early Adolescence 25 (4):421-452. doi:10.1177/0272431605279841

Table 1

*Descriptive Statistics for Parent and Teacher Reports for Each of the Variables of Interest*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Measure | All(*N* = 147) | Male (*n* = 120) | Female(*n* = 27) | α |
| *Parent reports* |  |
| CBRS ADHD Inattentive | 81.59 (10.95) | 80.95 (10.94) | 84.41 (10.77) | .88 |
| CBRS ADHD Hyperactive-Impulsive | 82.44 (11.13) | 82.14 (11.59) | 83.74 (8.83) | .88 |
| CBRS Conduct Disorder | 73.43 (17.81) | 73.10 (17.93) | 74.89 (17.53) | .84 |
| CBRS Oppositional Defiant Disorder | 81.57 (13.68) | 81.47 (13.71) | 82.04 (13.76) | .89 |
| Callous-Unemotional Traits | 36.15 (9.60) | 35.97 (9.54) | 36.93 (10.02) | .76 |
| SDQ Peer Relationship Problems | 4.87 (2.39) | 4.81 (2.42) | 5.15 (2.82) | .63 |
| SDQ Prosocial Behaviour | 5.36 (2.41) | 5.21 (2.45) | 6.04 (2.10) | .75 |
| *Teacher reports* |  |
| CBRS ADHD Inattentive | 66.73 (12.92) | 65.07 (12.15) | 74.11 (13.86) | .67 |
| CBRS ADHD Hyperactive-Impulsive | 71.70 (16.48) | 71.38 (16.13) | 73.11 (18.21) | .80 |
| CBRS Conduct Disorder | 66.83 (18.53) | 66.29 (18.40) | 69.22 (19.27) | .70 |
| CBRS Oppositional Defiant Disorder | 73.51 (17.77) | 73.70 (17.79) | 72.67 (17.96) | .62 |
| Callous-Unemotional Traits | 31.56 (10.04) | 31.61 (10.11) | 31.37 (9.92) | .84 |
| SDQ Peer Relationship Problems | 3.48 (2.46) | 3.52 (2.53) | 3.33 (2.17) | .73 |
| SDQ Prosocial Behaviour | 4.67 (2.69) | 4.47 (2.72) | 5.59 (2.36) | .84 |

Table 2

*Correlations Between the Parent and Teacher Reports for Each of the Variables of Interest*

|  |  |  |  |
| --- | --- | --- | --- |
| Measure |   | *r* | *p* |
| CBRS ADHD Inattentive |   | .18 | .029 |
| CBRS ADHD Hyperactive-Impulsive |   | .32 | < .001 |
| CBRS Conduct Disorder |   | .36 | < .001 |
| CBRS Oppositional Defiant Disorder |   | .34 | < .001 |
| Callous-Unemotional Traits |   | .16 | .059 |
| SDQ Peer Relationship Problems |  | .42 | < .001 |
| SDQ Prosocial Behaviour |  | .15 | .075 |

*Note. N* = 147, and *r* refers to the Pearson’s correlation coefficient

Table 3

*Correlations Between All Variables of Interest*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1. CBRS Parent ADHD Inattentive | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. CBRS Parent ADHD Hyperactive-Impulsive | .48\*\* | - |  |  |  |  |  |  |  |  |  |  |  |  |
| 3. CBRS Parent Conduct Disorder | .39\*\* | .49\*\* | - |  |  |  |  |  |  |  |  |  |  |  |
| 4. CBRS Parent Oppositional Defiant Disorder | .34\*\* | .60\*\* | .72\*\* |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5. CBRS Teacher ADHD Inattentive | .18\* | .10 | - .02 | - .02 | - |  |  |  |  |  |  |  |  |  |
| 6. CBRS Teacher ADHD Hyperactive-Impulsive | .11 | .32\*\* | .17\* | .23\*\* | .58\*\* | - |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7. CBRS Teacher Conduct Disorder | .10 | .28\*\* | .36\*\* | .34\*\* | .38\*\* | .60\*\* | - |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8. CBRS Teacher Oppositional Defiant Disorder | .20\* | .32\*\* | .33\*\* | .34\*\* | .44\*\* | .67\*\* | .77\*\* | - |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9. Parent Callous-Unemotional Traits | .36\*\* | .41\*\* | .54\*\* | .46\*\* | - .004 | .06 | .06 | .15 | - |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10. Teacher Callous-Unemotional Traits | .15 | .22\*\* | .24\*\* | .30\*\* | .47\*\* | .54\*\* | .60\*\* | .65\*\* | .16 | - |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11. Parent SDQ Peer Relationship Problems | .31\*\* | .15 | .18\* | .16\* | .001 | - .01 | .01 | .17\* | .20\* | .11 | - |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12. Teacher SDQ Peer Relationship Problems | .10 | .12 | .06 | .10 | .21\* | .17\* | .30\*\* | .39\*\* | .04 | .37\*\* | .42\*\* | - |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 13. Parent SDQ Prosocial Behaviour | - .21\* | - .28\*\* | - .39\*\* | - .38\*\* | .10 | .03 | - .06 | - .16 | - .50\*\* | - .16 | - .17\* | - .05 | - |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14. Teacher SDQ Prosocial Behaviour | - .04 | - .18\* | - .13 | - .16 | - .29\*\* | - .42\*\* | - .40\*\* | - .53\*\* | - .06 | - .65\*\* | - .20\* | - .33\*\* | .15 | - |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

*Note.* *N* = 147, \* *p* ≤ .05 \*\* *p* ≤ .001

Table 4

*Forced Entry Multiple Regression Results Predicting Peer Relationship Problems from Parent and Teacher Reports*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Predictors |  | *b* | *SE b* | β | *sr*2 |
| *Parent reports* |
| Gender |  | .10 | .50 | .02 |  < .001 |
| Age |  | .04 | .07 | .04 | .002 |
| CBRS ADHD Inattentive |  | .06 | .02 | .28\*\* | .06 |
| CBRS ADHD Hyperactive-Impulsive |  | - .01 | .02 | - .06 |  .002 |
| CBRS Conduct Disorder |  | .003 | .02 | .02 | < .001 |
| CBRS Oppositional Defiant Disorder |  | .009 | .02 | .05 | .001 |
| Callous-Unemotional Traits |  | .02 | .02 | .09 | .005 |
| *Teacher reports* |
| Gender |  | - .18 | .51 | - .03 | .001 |
| Age |  | .12 | .08 | .13 | .01 |
| CBRS ADHD Inattentive |  | .01 | .02 | .04 | .001 |
| CBRS ADHD Hyperactive-Impulsive |  | - .04 | .02 | - .24\* | .02 |
| CBRS Conduct Disorder |  | - .001 | .02 | - .005 | < .001 |
| CBRS Oppositional Defiant Disorder |  | .05 | .02 | .36\*\* | .04 |
| Callous-Unemotional Traits |  | .06 | .03 | .24\* | .03 |

*Note.* \**p* < .05 \*\* *p* < .01

Table 5

*Forced Entry Multiple Regression Results Predicting Prosocial Behaviour from Parent and Teacher Reports*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Predictors |  | *b* | *SE b* | β | *sr*2 |
| *Parent reports* |
| Gender |  | .95 | .44 | .15\* | .02 |
| Age |  | .03 | .07 | .03 | .001 |
| CBRS ADHD Inattentive |  | - .001 | .02 | - .01 |  < .001 |
| CBRS ADHD Hyperactive-Impulsive |  | .001 | .02 | .003 | < .001 |
| CBRS Conduct Disorder |  | - .01 | .02 | - .09 | .003 |
| CBRS Oppositional Defiant Disorder |  | - .02 | .02 | - .14 | .007 |
| Callous-Unemotional Traits |  | - .10 | .02 | - .39\*\* | .10 |
| *Teacher reports* |
| Gender |  | .99 | .45 | .14\* | .02 |
| Age |  | .006 | .07 | .006 | < .001 |
| CBRS ADHD Inattentive |  | .001 | .02 | .006 | < .001 |
| CBRS ADHD Hyperactive-Impulsive |  | - .007 | .02 | - .04 | .001 |
| CBRS Conduct Disorder |  | .02 | .01 | .14 | .007 |
| CBRS Oppositional Defiant Disorder |  | - .04 | .02 | - .26\* | .02 |
| Callous-Unemotional Traits |  | - .15 | .02 | - .55\*\* | .15 |

*Note.*\* *p* < .05 \*\* *p* < .001