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Anger and Irritability Symptoms among Youth with ODD: Cross- Informant Versus Source-Exclusive Syndromes

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Abstract

We examined differences in co-occurring psychological symptoms and background characteristics among clinically referred youth with oppositional defiant disorder (ODD) with and without anger/irritability symptoms (AIS) according to either parent or teacher (source-exclusive) and both informants (cross-informant), youth with noncompliant symptoms (NS) of ODD, and non-ODD clinic controls. Parents and teachers evaluated 1127 youth (ages 6–18) with a *DSM-IV*-referenced rating scale to assess ODD and co-occurring psychological symptoms. Parents also completed a background questionnaire (demographic, developmental, treatment, relationship, and academic characteristics) and teachers rated school functioning. Source-exclusive AIS groups were associated with different clinical features, and there was some evidence that cross-informant youth had more mental health concerns than source-exclusive groups. Findings varied to some extent among older (12–18 years) versus younger (6–11 years) youth. In general, the NS group (youth without AIS) was the most similar to clinic controls. AIS and NS are likely candidates for component phenotypes in ODD and continued research into their pathogenesis may have important implications for nosology, etiology, and intervention.

Keywords

Oppositional defiant disorder; Anger; Irritability; Informant; Nosology; *DSM-5*; Attention-deficit/hyperactivity disorder

A commonly encountered conundrum for clinicians is clients whose problem behaviors are clearly an issue according to one but not another informant (e.g., parent vs. teacher) or in one setting versus another (home vs. school), variously referred to as source-exclusive or source-, setting-, or situation-specific (De Los Reyes 2011; De Los Reyes and Kazdin 2005; Drabick et al. 2007, 2008; Gadow et al. 2004a; Munkvold et al. 2009; Offord et al. 1996; Schachar et al. 1981). Conversely, symptoms that are problematic according to multiple informants (e.g., parent and teacher) or present in both home and school are said to be cross-informant, cross-situational, pervasive, or occasionally “true” (Campbell et al. 1977; De Los Reyes and Kazdin 2005; Drabick et al. 2007; Gadow et al. 2004a; Offord et al. 1996; Schachar et al. 1981). This phenomenon has been pursued for several decades in the attention-deficit/hyperactivity disorder (ADHD) literature in response to concerns about the use of pharmacotherapy. It was generally believed that cross-informant impairment was useful in making a differential diagnosis of primarily organic versus primarily

environmental “hyperactivity” and that pharmacotherapy may be more appropriate in the case of the former. Eventually, cross-situational symptoms became a diagnostic criterion for ADHD (American Psychiatric Association 1994). Nevertheless, there were no consensus-driven, operationalized criteria for combining information from multiple informants, and a variety of different procedures are now used in research and clinical applications (De Los Reyes and Kazdin 2005; Drabick et al. 2007; Gadow et al. 2004a; Munkvold et al. 2009).

Informant Discrepancy

Findings from several influential early studies conducted in the UK (e.g., Schachar et al. 1981), Canada (e.g., Campbell et al. 1977; Cohen and Minde 1983; Schleifer et al. 1975), and the US (Campbell 1994) indicated important differences in the clinical features of cross-informant versus source-exclusive hyperactivity. Whereas some investigations examined only one source-exclusive group (Campbell et al. 1977; Schleifer et al. 1975), others combined two source-exclusive groups into one subgroup (e.g., Cohen and Minde 1983; Schachar et al. 1981). In general, the cross-informant youth were more easily differentiated from controls than source-exclusive groups (Campbell et al. 1977; Schachar et al. 1981), and the cross-informant group evidenced more severe oppositional defiant disorder (ODD) and conduct disorder (CD) behaviors, peer aggression, negative maternal discipline, cognitive impairment, early onset of symptomatology, and neurological abnormalities than source-exclusive groups (Campbell et al. 1977; Cohen and Minde 1983; Sandberg et al. 1978; Schachar et al. 1981; Schleifer et al. 1975). Cross-informant hyperactivity also was associated with poorer outcomes at follow-up than source-exclusive hyperactivity (Campbell et al. 1977; Schachar et al. 1981). Curiously, *DSM-IV* diagnostic criteria for other child psychiatric disorders do not require cross-setting difficulties, including conditions commonly associated with ADHD in referred samples, such as ODD.

There has been a long-standing tendency to dismiss informant discrepancies as “measurement error” or “methodological nuisances” (see De Los Reyes 2011). However, studies that specifically compared different strategies for considering parent- and teacher-reported ODD symptoms found informant-specific (Drabick et al. 2007; Offord et al. 1996) and source-exclusive (Drabick et al. 2007) syndromes demonstrated better internal validity and were more differentiated in psychosocial correlates and co-occurring symptoms than cross-informant ODD (Drabick et al. 2007; Offord et al. 1996). Moreover, there is some evidence that teachers’ ratings (a) may have better predictive power for the diagnosis of ODD indexed by structured interview (Owens and Hoza 2003) and (b) are more strongly related to peer-reported impairment criteria (Hart et al. 1994). Consistent with these findings, additional research indicates informant-specific, source-exclusive, and cross-informant ODD differ in associations with a wide range of important environmental, biological, and behavioral variables known to impact emotional expression and, moreover, to have implications for clinical management (Dirks et al. 2011; Drabick et al. 2007, 2008, 2011; Gadow et al. 2008; Gadow and Sprafkin 2008; Gadow et al. 2010; Gadow and Nolan 2002; Hart et al. 1994; Munkvold et al. 2009; Offord et al. 1996; Severa et al. 2010; Wood et al. 2009).

Although the specific mechanisms that underlie phenotypic flexibility (e.g., Piersma and Drent 2003; Wilson 1998) are poorly understood among humans, differences in child (e.g., cognitive abilities, temperaments, experiential learning, genes; e.g., Belsky et al. 2009; Drabick et al. 2011; Marwit and Stenner 1972) and environmental (e.g., task demands, social milieu, presence of an adult; e.g., Whalen et al. 1978; Zentall and Zentall 1976) characteristics influence children’s responses to environmental settings and thus, to a certain extent, the types of behaviors that are likely to be observed by informants in different settings. Moreover, phenotypic flexibility is a phylogenetically pervasive characteristic of

life (Piersma and van Gils 2010) and provides a useful model for conceptualizing potential contextual variation in emotional expression, which in turn is reflected in informant discrepancy based on the setting(s) in which informants observe children's behaviors (Drabick and Gadow 2012; Gadow and Drabick 2012). In other words, because the same child can behave very differently in different settings (intra-individual variation), it is not surprising that caregivers (e.g., parents, teachers) who have differential access to children's behaviors in different settings disagree about the occurrence of specific behaviors. Moreover, as children also vary in their ability to modulate their own behavior according to the demands of the situation (inter-individual variation), this may in part explain the existence of source-exclusive vs. cross-informant syndromes, as well as behavioral variation within clinical phenotypes (e.g., Roohi et al. 2009).

Anger/Irritability

Recent efforts to deconstruct ODD into component phenotypes raise new questions about informant discrepancies and their attendant clinical implications. For example, the *DSM-5* Disruptive Behavior Disorders Workgroup (see Pardini et al. 2010) recently concluded that ODD is likely multi-factorial both phenomenologically and etiologically, based on the findings of several studies (e.g., Burke et al. 2005, 2010; Burke and Loeber 2010; Leibenluft et al. 2006; Mick et al. 2005; Rowe et al. 2010; Stringaris and Goodman 2009a, 2009b). This Workgroup further recommended differentiating "affective" (loses temper, touchy or easily annoyed, and angry or resentful) and "behavioral" (e.g., argues, defies, annoys, blames others) symptoms of ODD because they are associated with different clinical features (www.dsm5.org). For example, Stringaris and Goodman (2009a, 2009b) created three a priori dimensions of ODD symptoms (irritable, headstrong, spiteful) and examined their prognostic significance in a large mental health survey of youth aged 5 to 16 years. The 3-item irritable dimension (i.e., loses temper, angry and resentful, touchy or easily annoyed) predicted parent- and teacher-reported depressive and anxiety disorders at both baseline (Stringaris and Goodman 2009b) and 3-year follow-up (Stringaris and Goodman 2009a). The headstrong dimension (i.e., argues, defies, deliberately annoys, blames others) was associated with parent- and teacher-reported ADHD at baseline (Stringaris and Goodman 2009b) and 3-year follow-up (Stringaris and Goodman 2009a). All three dimensions were associated with parent- and teacher-reported CD at baseline; however, at 3-year follow-up, only the headstrong and hurtful (i.e., vindictive) dimensions predicted CD (Stringaris and Goodman 2009a).

Others have used different strategies for parsing ODD symptoms. For example, using factor analysis, Rowe et al. (2010) identified an "irritable" factor identical to Stringaris and Goodman (2009a, 2009b) and a "headstrong" factor comprised of the remaining five ODD symptoms. Rowe et al. indicated that both dimensions predicted CD and depressive disorders, but only the irritable dimension predicted anxiety disorders. Conversely, Mick et al. (2005) reported that although a 3-item irritability cluster (same items as Rowe et al. and Stringaris and Goodman) was common among youth with co-morbid ADHD, it was not associated with increased risk for mood disorders. Burke and colleagues used factor analysis to identify a "negative affect" (i.e., touchy, angry, spiteful) and "behavioral" (i.e., argues, defies, loses temper) dimension of ODD among clinic-referred boys (Burke and Loeber 2010) and nonreferred girls (Burke et al. 2010). The behavioral dimension predicted CD (both samples), whereas negative affect predicted major depressive disorder (both samples) and CD (Caucasian girls). Collectively, the aforementioned studies provide preliminary evidence for a distinction between anger/irritability symptoms (AIS) and noncompliant behavior symptoms (NS).

The results of own prior research (Drabick and Gadow 2012) with the present study's sample of clinically-referred youth (ages 6–18 years) also supports the differential validity of AIS versus NS. To examine within-informant differences (source-specific) in symptom perceptions, participants with ODD were classified as AIS or NS and compared with controls with minimal ODD behaviors. Consistent with the findings of other investigators and with the notion that AIS may be a distinct ODD clinical phenotype, youth with AIS were rated as exhibiting higher levels of anxiety and mood symptoms than those with NS. Moreover, this was true for both parent- and teacher-defined groups, as well as both younger (6–11 years) and older (12–18 years) youth. AIS and NS groups also differed in ADHD and CD symptom severity, as well as background characteristics (developmental, psychosocial, treatment) shown in prior research to be associated with ODD; however, group differences varied as a function of informant and youth's age. Although these findings demonstrate informants do in fact differentiate youth with AIS and NS and associate these symptoms with different clinical features (differential validity), they offer less insight into differences between informants, and there are no studies comparing source-exclusive (parent-only or teacher-only) and cross-informant (both parent and teacher) AIS.

The Present Study

The primary aim of the present study was to compare source-exclusive and cross-informant AIS in a large sample of clinically referred youth based on ratings completed by their parents (P) and teachers (T). AIS was of particular interest as youth with these symptoms comprised a disproportionately larger segment of our ODD sample and have been shown to exhibit a greater range of co-occurring conditions in previous work (e.g., Drabick and Gadow 2012; Rowe et al. 2010; Stringaris and Goodman 2009b). Participants were classified AIS using the same symptoms as recommended by the *DSM-5* Workgroup and the majority of investigators in this area (Mick et al. 2005; Rowe et al. 2010; Stringaris and Goodman 2009a, 2009b).

Validators of group differences were variables previously shown to be associated with (a) ODD or AIS in prior research (e.g., co-occurring anxiety, mood, and CD symptoms; Burke et al. 2010; Drabick et al. 2008; Rowe et al. 2010; Stringaris and Goodman 2009a, 2009b) or (b) source-specific ODD based on information from parents and/or teachers. In keeping with a clinically oriented model, we also sought to include variables that can be readily obtained in routine clinical evaluations. For example, we considered variables that were potentially more representative of source-exclusive concerns in the home and thus more likely to be observed by parents (e.g., relationship-oriented variables such as child temperament, discipline, and sibling difficulties) or the school and consequently more likely to be observed by teachers (e.g., task-oriented variables such as completion of seatwork and academic grades, peer difficulties), as well as cross-situational variables likely to contribute to problem behaviors in multiple settings (e.g., language difficulties) (Burke et al. 2002; Carpenter and Drabick 2010; Drabick et al. 2007, 2008, 2010; Gadow and Nolan 2002; Hart et al. 1994; Lanza and Drabick 2011; Loeber et al. 2000; Munkvold et al. 2009; Offord et al. 1996). Most of these variables are, nevertheless, unstudied with regard to source-exclusive AIS.

Because there are no previously reported studies of source-exclusive AIS, the aims (and associated hypotheses) of the present study were extrapolated from the extant ODD and more general informant-discrepancy literatures. First, we expected AIS groups to differ from cross-informant, clinically-referred Controls (Aim 1). Second, cross-informant (parent and teacher) AIS youth were predicted to have more *clinical* concerns than either of the source-exclusive (parent only, teacher only) groups (Aim 2), as the cross-informant group was expected to experience a more pervasive and less phenotypically flexible emotion

dysregulation syndrome. Third, source-exclusive groups were predicted to evidence a different pattern of clinical features linked to variables that might be more readily observed by a particular informant (Aim 3). For example, we expected parent-exclusive AIS to be associated with relationship variables (e.g., child temperament, discipline), and teacher-exclusive AIS to be more associated with task-related variables (e.g., completing seatwork, academic grades). Fourth, older (12–18 years) and younger (6–11 years) youth with AIS were predicted to differ in terms of variables previously shown to be associated with symptom chronicity (e.g., early onset, developmental difficulties) (Aim 4). A secondary aim (Aim 5) was to compare source-exclusive and cross-informant AIS groups to youth with NS. Based on our prior analyses (Dabrick and Gadow 2012), AIS groups (regardless of informant) were expected to be more clinically impaired than the multi-informant NS group, but only when AIS group status and correlates were derived from the same informant.

Method

Participants

Participants were parents (primarily mothers) and teachers of 1127 youth, aged 6–18 years ($M=12.1$, $SD=3.4$; 70% male) who were consecutive intakes (2004–2010) in a university hospital child and adolescent psychiatry outpatient clinic that serves an economically diverse clientele. All youth were included in the study sample if they were within the specified age range, had IQs ≥ 70 (range=70–144), and were not diagnosed as having autism spectrum disorder or schizophrenia spectrum disorder. (Twenty youth did not meet inclusion criteria). The sample was divided into a younger (6–11 year olds; $n=538$; 73% male) and older (12–18 year olds; $n=589$; 68% male) cohort. Self-identified ethnicities were as follows: European-American ($n=949$, 84%); African-American ($n=81$, 7%); Hispanic-American ($n=126$, 11%); Native-American ($n=12$, 1%); Asian-American ($n=29$, 3%); and Other ($n=11$, 1%). In terms of family configurations, 85% of participants lived with their biological mothers, 63% lived with their biological fathers, and 66% of parents were married. Maternal education was as follows: less than a high school degree (7%), completed high school and no college (24%), and at least some college (69%). Among fathers, 10% reported less than a high school degree, 27% reported completing high school and no college, and 63% reported at least some college. With regard to family income, 12% of families reported income $<$ \$20,001/year, 15% reported income from \$20,001–\$40,000/year, 23% reported income from \$40,001–\$70,000/year, and 50% reported income $>$ \$70,001. The two most common clinician-assigned diagnoses were ADHD and ODD; many youth with ODD were also comorbid for ADHD (30%). This retrospective chart review study was approved by a university Institutional Review Board, and appropriate measures were taken to protect client (and rater) confidentiality.

Procedure

Prior to scheduling their initial intake evaluation, parents were mailed a packet of materials including behavior rating scales for both parent and teacher; background information questionnaire; and permission for release of school, psycho-educational, and special education evaluation records. In the majority of cases (84%), the youth's mother completed the assessment battery. Teacher ratings were given to the school by parents, completed by teachers (96%), and mailed directly to the clinic prior to the evaluation. Procedures for evaluating participants are described in detail elsewhere (Gadow and Nolan 2002; Gadow and Sprafkin 2002, 2008).

Measures

DSM-IV symptoms—Parents and teachers rated youth's symptoms using the Child and Adolescent Symptom Inventory-4R (CASI-4R; Gadow and Sprafkin 2005). The CASI-4R is

a parent- (163-item) and teacher (120-item) completed behavior rating scale for evaluating youth 5 to 18 years old and combines the symptom modules from the Child Symptom Inventory-4 (Gadow and Sprafkin 1986, 2002) and the Adolescent Symptom Inventory-4 (Gadow and Sprafkin 1995, 2008). Individual items bear one-to-one correspondence with *DSM-IV* (American Psychiatric Association 1994) symptoms (i.e., high content validity), are rated on a 4-point scale ranging from *never* (0) to *very often* (3), and summed to generate a global severity score for each disorder separately. The teacher version includes academic performance and classroom functioning. We considered the following scales (parent/teacher alphas in the present sample): ADHD, Inattentive type (ADHD:I, $\alpha=0.92/0.93$); ADHD, Hyperactive-Impulsive type (ADHD:HI, $\alpha=0.90/0.95$); ODD ($\alpha=0.93/0.95$); CD ($\alpha=0.86/0.83$); Generalized Anxiety Disorder (GAD, $\alpha=0.80/0.75$); Social Anxiety Disorder ($\alpha=0.87/0.85$); Separation Anxiety Disorder (parent only: $\alpha=0.84$); Major Depressive Disorder (MDD, $\alpha=0.88/0.79$); and Manic symptoms ($\alpha=0.89/0.86$). Findings of numerous studies (Gadow et al. 2004b; Gadow and Sprafkin 2010) indicate that CASI-4R subscales demonstrate adequate psychometric properties, including internal consistency, test-retest reliability, convergent and divergent validity with respective scales of other relevant measures, agreement with structured interview or clinician diagnoses, sensitive indicators of treatment effects, and clinical utility (e.g., Gadow and Sprafkin 1995, 2002, 2005, 2008). CASI-4R global symptom scores are minimally correlated with age, gender, IQ, and SES.

Difficult infant—Parents completed the Parent Questionnaire (Gadow et al. 2008, 2010), which obtains information about demographic characteristics, social and academic functioning, treatment history, and developmental history. One section asks parents whether their child experienced any of 7 behaviors during the first year of life (e.g., sleep problems, feeding problems, excessive crying, difficult to comfort). Items are rated as 0 (*no*) or 1 (*yes*) and summed to create an index of difficult behaviors during infancy ($\alpha=0.75$; $M=0.85$, $SD=1.44$; range=0–7).

Difficult preschooler—Parents reported whether their child had any of 6 problems during the preschool period, including aggressive toward peers, nightmares, temper tantrums, sleeping problems, or eating problems (Parent Questionnaire). Items were scored as 0 (*no*) or 1 (*yes*) and summed to create an index of behavior problems in preschool ($\alpha=0.60$; $M=1.11$, $SD=1.33$; range=0–6).

Language difficulties—Parents reported whether their child had difficulties with speech and language skills in the past or at present using 15 items (e.g., stammering, speech delays, hard to understand, echolalia, pronoun reversal, perseveration, pragmatic difficulties) in the Parent Questionnaire. Items are scored as 0 (*no*) or 1 (*yes*) and summed to create an index of past language problems: $\alpha=0.79$; $M=1.37$, $SD=2.12$; range=0–14; and present language problems: $\alpha=0.77$; $M=1.19$, $SD=1.92$; range=0–14.

Parental discipline—Parents were asked to endorse whether they used any of 7 strategies to discipline their child (i.e., spanking, scolding, slapping, withdrawing love, isolation, deprivation, and loss of privileges) (Parent Questionnaire). Items are scored as 0 (*no*) or 1 (*yes*) and summed to create an index of parental discipline ($\alpha=0.51$; $M=2.13$, $SD=1.29$; range=0–7).

Peer difficulties—Parents were asked to rate how their child gets along with other children using 5 items in the Parent Questionnaire, including “is very bossy and controlling,” “has frequent arguments,” “has frequent physical fights,” “teases them,” and

“is teased by them.” Items are scored as 0 (*no*) or 1 (*yes*) and summed to create an index of peer difficulties ($r = 0.69$; $M = 1.02$, $SD = 1.32$; range = 0–5).

Sibling difficulties—Parents were asked to rate how their child gets along with brothers and sisters using 4 items in the Parent Questionnaire, which included “has frequent arguments,” “has frequent physical fights,” “teases them,” and “is teased by them” ($r = 0.75$; $M = 1.06$, $SD = 1.30$; range = 0–4).

Familial stress—Parents rated whether they had experienced any of 10 stressors (Parent Questionnaire). Examples include remarriage, death of family member, move to new home, birth of sibling, and major illness or hospitalization of a family member. Items are rated as 0 (*no*) or 1 (*yes*) and summed to create an index of lifetime stressors ($r = 0.61$; $M = 0.99$, $SD = 1.39$; range = 0–9).

Treatment—Parents indicated whether their child had ever received 7 different types of treatment (Parent Questionnaire), which reflected a range of possible formats and settings (e.g., individual, family, group, hospital, medication). Items are rated as 0 (*no*) or 1 (*yes*) and summed to create an index of treatment history ($r = 0.67$; $M = 1.64$, $SD = 1.62$; range = 0–7).

Academic functioning—Using the Parent Questionnaire, parents reported on 4 items related to special education: whether their child had been evaluated by a child study team, received an educational handicapping label, received special educational services, and was in a classroom that was not considered regular education. Parents also reported whether their child experienced current difficulties in any of 8 subjects (e.g., reading, spelling, math, science, social studies); all items are rated as 0 (*no*) or 1 (*yes*). These 12 items are summed to create a parent-reported school functioning score ($r = 0.77$; $M = 4.69$, $SD = 2.98$; range = 0–12).

The teacher version of the CASI-4R asks teachers to rate academic performance in 5 subjects (English/reading, writing, math, social studies, and science) on a scale that included 0 (2 or more years below grade level), 1 (1–2 years below grade level), 2 (at or about grade level), 3 (1–2 years above grade level), and 4 (2 or more years above grade level). Items are summed to create a teacher-reported academic performance score ($r = 0.94$; $M = 7.20$, $SD = 3.80$; range = 0–20). Teachers also rated the youth’s classroom performance for 4 items (i.e., tests, homework, participation, behavior) on a 5-point scale from 0 (*poor*) to 4 (*superior*), which are summed to create a classroom functioning variable ($r = 0.78$; $M = 5.12$, $SD = 3.15$; range = 0–16).

Subgrouping

Participants were classified AIS if they met *DSM-IV* symptom criteria for ODD and obtained severity ratings of *often* or *very often* for each of three anger/irritability symptoms: “loses temper,” “is angry and resentful,” and “is touchy or easily annoyed by others.” When parents’ ratings were the basis of group classification, 210 younger and 275 older youth met criteria for ODD of whom 53% and 64%, respectively, were AIS. Using teachers’ ratings to construct groups, 204 younger and 192 older youth were ODD of whom 61% in each age group were classified AIS. To be considered cross-informant, youth had to meet criteria for AIS according to both parents’ and teachers’ ratings (AIS:P+T; younger cohort: $n = 38$, 68% male; older cohort: $n = 52$, 83% male). Source-exclusive groups were constructed on the basis of one (but not both) informant indicating AIS status: parent only (AIS:P; younger cohort: $n = 76$, 60% male; older cohort: $n = 131$, 66% male) and teacher only (AIS:T; younger cohort: $n = 89$, 89% male; older cohort: $n = 68$, 74% male).

Of remaining youth, those who met *DSM-IV* symptom criteria for four ODD symptoms from either informant (i.e., the “or” rule), but neither informant endorsed more than two AIS symptoms, were classified as the noncompliant symptom group (NS; younger cohort: $n=21$, 81% male; older cohort: $n=22$, 77% male). All remaining youth who were rated as having three or fewer ODD symptoms from each informant served as Controls (C; younger cohort: $n=314$, 71 % male; older cohort: $n=316$, 65% male). Subgroups did not differ in IQ among the younger ($F=1.0$, $p=0.42$) and older ($F=1.8$, $p=.13$) cohorts.

Statistical Analyses

For count (background) variables, we conducted nonparametric Kruskal-Wallis tests with follow-up Bonferroni-corrected Mann–Whitney U-tests to localize differences among groups. For co-occurring symptom variables, we conducted one-way ANOVAs with follow-up Scheffe tests and, if variances across groups were not homogeneous, Games-Howell tests. We used a Bonferroni correction within measure. Effect sizes (η^2) are reported for the main effects of the ANOVAs and can be interpreted as follows: 0.01 (small), 0.06 (medium), and 0.14 (large; Cohen 1988).

Results

Background Characteristics and School Functioning

Younger youth—As expected (Aim 1), the AIS:P and the AIS: P+T groups had a greater number and higher levels of risk factors than Controls, but the AIS:T group differed from Controls for only three variables (AIS:T>C): difficult as a preschooler, peer difficulties, and treatment history (Table 1). Contrary to expectation (Aim 2), the cross-informant AIS:P +T group generally was *not* associated with more risk characteristics than the AIS:P group; these groups differed only on difficult as an infant (AIS:P>AIS:P+T) and peer difficulties (AIS:P+T>AIS:P). Nevertheless and consistent with predictions (Aim 2), youth in the AIS:P +T group had higher levels of risk than the AIS:T group. The two source-exclusive AIS groups (AIS:P and AIS:T, Aim 3) also differed on many variables (e.g., difficult as infant and preschooler, language problems, parent discipline, peer and sibling difficulties, and treatment history); in each case, the AIS:P group had higher levels of risk than the AIS:T group.

Older youth—As predicted (Aim 1), both parent-defined AIS groups had more developmental and relationship risk factors than Controls (Table 1). This was generally *not* the case for the AIS:T group with two exceptions, peer difficulties and ever in treatment (AIS:T>C). The cross-informant AIS:P+T group differed from the AIS:P group on three variables (AIS:P+T>AIS:P): present language problems, parental discipline, and peer difficulties. Youth in the AIS:P+T group generally had higher levels of risk than the AIS:T group (Aim 2). Consistent with findings among younger youth (Aim 4), the source-exclusive AIS:P group had higher levels of difficult as an infant and preschooler, language problems, parent discipline, sibling difficulties, and treatment history compared to the AIS:T group (Aim 3).

NS group—The younger multi-informant NS group had higher rates of parent-reported difficult as preschooler, present language problems, peer and sibling difficulties, familial stress, and treatment history than Controls (Table 1). There were few significant differences between AIS and NS groups (Aim 5), with the notable exceptions of present language problems, sibling difficulties, and treatment history (NS>AIS:T). Older youth with NS received higher ratings of (a) present language difficulties and negative parental discipline than the AIS:T group and Controls, (b) sibling difficulties than the AIS:T group, and (c) peer difficulties and treatment history than Controls.

Summary—In general, results support developmental and relationship variables as important differentiating features of parent- and teacher-defined AIS, with youth in the parent-defined AIS groups scoring higher than the teacher-defined AIS groups for most risk factors (Aim 2). Source-exclusive groups were clearly divergent, with the AIS:P group associated with more negative developmental and relationship correlates than the AIS:T group (Aim 3). The cross-informant group had higher levels of most risk factors than the source-exclusive AIS:T group, and in the case of peer difficulties, even the AIS:P group (both age cohorts; Aim 2). NS and AIS:T groups differed on present language difficulties and sibling difficulties (both age cohorts); however, the NS group did not differ from the other AIS groups and had fewer differences from Controls than the AIS groups (Aim 5).

Co-occurring Psychiatric Symptoms

Younger youth—As predicted, the AIS:P and AIS:P+T groups had more severe symptoms of most parent-rated disorders than either the teacher-exclusive AIS group or Controls (Table 2; Aims 1 and 2). The AIS:T group had more severe parent-rated ODD, ADHD:HI, and CD symptoms than Controls (Aim 1). There were no differences in parent-rated co-occurring symptom severity between the cross-informant AIS:P+T and AIS:P youth. In every instance, the AIS:P group was rated as exhibiting more severe parent-reported symptoms than the AIS:T group (Aim 3).

In terms of teacher-reported co-occurring symptoms, the AIS:T and AIS:P+T groups had more severe symptoms of most disorders than the AIS:P group and Controls (Table 2; Aims 1 and 2). Similar to findings for parent-reported co-occurring symptoms, the AIS:P group differed from Controls for only two variables: teacher-rated ADHD:I (C>AIS:P) and ODD (AIS:P>C) symptoms (Aim 1). There were no differences in teacher-rated co-occurring symptom severity between AIS:T and cross-informant AIS:P+T youth. In all cases and parallel to the parent-reported co-occurring symptoms, the AIS:T group was rated by teachers as exhibiting more severe co-occurring symptoms than the AIS:P group (Aim 3).

Older youth—In terms of parent-rated co-occurring symptoms, as predicted in Aims 1 and 2, the AIS:P and AIS:P+T groups had more severe symptoms of most disorders compared with the AIS:T group and Controls (Table 3). The cross-informant AIS:P+T group differed from the AIS:P group in terms of parent-rated ADHD:HI symptom severity only (Aim 2). The AIS:T group had more severe parent-rated ODD and ADHD:HI symptoms than Controls (AIS:T>C), but the converse was true for social anxiety disorder (C>AIS:T) (Aim 1).

As for teacher-reported co-occurring symptoms, the AIS:T and AIS:P+T groups had more severe symptoms of all disorders compared with the AIS:P group and Controls (Table 3; Aims 1 and 2). The AIS:P group differed from Controls for teacher-rated ODD only (AIS:P>C). As was the case among younger youth (Aim 4), the older cross-informant AIS:P+T group did not have more severe teacher-reported co-occurring symptoms than the AIS:T group, and the two source-exclusive groups differed for most symptom dimensions (AIS:T>AIS:P; Aim 3).

NS group—The younger multi-informant NS group had more severe parent-rated ODD, ADHD:I, ADHD:HI, and CD than the AIS:T group and Controls, and more GAD symptoms than Controls (Table 2; Aim 5). Compared to the parent-defined AIS groups, the younger NS group had less severe parent-rated ODD (AIS:P+T, AIS:P>NS) and GAD (AIS:P>NS) symptoms. Teachers similarly rated the younger NS group as having more severe ODD, ADHD:HI, GAD, and Manic symptoms than either the AIS:P group or Controls; more severe CD than Controls; and more severe ADHD:I than the AIS:P group (Table 2).

With regard to parent-reported co-occurring symptoms, the older NS group had more severe parent-rated ODD, ADHD:HI, and CD symptoms than Controls, and higher levels of ODD and ADHD:I than the AIS:T group (Table 3). The AIS:P and AIS:P+T groups had more severe parent-reported ODD symptoms, and the AIS:P group had higher MDD symptoms, than the NS group. In terms of teacher-reported co-occurring symptoms, the older NS youth had more severe teacher-rated ODD, CD, and Manic symptoms than the AIS:P group and Controls, and more severe ADHD:HI symptoms than Controls. However, and somewhat counter to parent-reported co-occurring symptoms, the AIS:T and AIS:P+T groups were not rated more severely than the NS group with the exception of ODD symptoms.

Summary—In general, the AIS groups obtained more severe within-informant ratings than Controls or the other-informant, source-exclusive group (Aims 1 and 3), but the AIS:P+T and source-exclusive groups did not differ from each other (Aim 2). The pattern of group differences was generally just the reverse for parents' and teachers' ratings of co-occurring symptoms, with the AIS:T group having less severe symptoms when rated by parents, and the AIS:P group having less severe symptoms when rated by teachers. Regardless of age or informant (Aim 4), the multi-informant NS group had more severe ODD, ADHD, and CD than Controls but generally less severe symptoms than the AIS:P group (Aim 5). There was little evidence that the NS group differed from the AIS:T group.

ODD Symptoms

Within-rater group differences in the severity of each NS symptom were examined using the Kruskal-Wallis test. The only significant between-group differences (Mann-Whitney) involved comparisons with Controls. This was true for both symptom count (*never/sometimes=0, often/very often=1*) and symptom severity (*never=0, very often=3*) scoring procedures, and for both parent-defined (AIS:P, AIS:P+T, NS>C) and teacher-defined (AIS:T, AIS:P+T, NS>C) groups.

Discussion

Findings of the present study speak to rarely addressed but important and commonly encountered clinical issues; namely, the differential validity of source-exclusive and cross-informant syndromes and their potential implications for etiology and client management. In general, findings support the notion that youth with AIS and whose symptoms were problematic for one informant (parent or teacher but not both) differ from clinic-referred Controls (Aim 1) on a range of clinically relevant variables. To some extent, evidence supported our prediction that cross-informant AIS groups would have more severe co-occurring symptomatology and a greater number of mental health risk factors than their respective source-exclusive AIS groups (Aim 2). In addition, parent- and teacher-exclusive AIS groups were highly divergent in background characteristics and co-occurring symptoms (Aim 3). Nevertheless, the pattern of group differences was mixed, and findings varied as a function of youth's age (Aim 4) and the informant who rated co-occurring psychiatric symptoms, all of which illustrate the heterogeneity of the ODD clinical phenotype. Although ODD is generally characterized in terms of conflict with authority figures, perhaps its single most defining characteristic (regardless of informant or age) based on the background variables considered in this study was peer difficulties (i.e., all ODD subgroups were more severe than Controls). One of the more curious (and generally underappreciated) aspects of source-exclusivity is that the constellation of elevated co-occurring symptoms (ADHD, CD, anxiety, depression) in source-exclusive AIS groups versus Controls was similar despite the fact the parent- and teacher-exclusive groups were comprised largely of different youth. However, this was only the case when the same informant's data were used both to define

group status and rate co-occurring symptom severity. Because ODD subgroups had comparable levels of NS severity, this variable is an unlikely explanation for our findings.

Source-Exclusivity

As predicted (Aim 3), source-exclusive groups clearly differed from (a) Controls, supporting their status as clinical constructs, and (b) each other, supporting the notion of differential validity. Moreover, the correlates of source-exclusive groups were generally variables for which each informant was more likely to have direct knowledge. For example, teacher-exclusive AIS groups were best differentiated from parent-exclusive groups by variables of special significance to teachers, such as peer difficulties and co-occurring symptoms known to influence academic productivity (e.g., teacher-rated ADHD symptoms; Pardini and Fite 2010). Academic grades and classroom functioning were not distinguishing clinical features, consistent with prior research with referred and non-referred samples that examined the differential validity of mono-morbid ODD (e.g., Drabick et al. 2006, 2007, 2008) and associations among these academic variables and ODD symptom severity (Gadow et al. 2004a; Sprafkin et al. 2002). Conversely, younger and older parent-exclusive AIS groups were characterized by relationship (early onset, difficult temperament; sibling difficulties; discipline issues), developmental (language problems), and treatment variables, as well as a wide range of parent-rated co-occurring psychiatric symptoms. However, when considering teacher ratings of psychiatric symptoms, the parent-exclusive AIS groups were generally similar to Controls, regardless of age, and the converse was true for parents' ratings of teacher-exclusive groups. Importantly, although parent- and teacher-exclusive AIS youth differed from Controls in the severity of a wide range of emotional reactions, they also differed from each other, suggesting the possibility a phenotypically flexible, broad-based emotion dysregulation syndrome.

Cross-Informant AIS

We expected that youth with cross-informant AIS would experience higher levels of clinical risk than source-exclusive AIS groups because the former were thought to be less able to modulate their emotional reactions (reduced phenotypic flexibility) and therefore would encounter a greater number of problem situations. To some extent our results were consistent with this prediction, but findings varied as a function of informant, age, and outcome measure. In the case of background characteristics, the cross-informant AIS groups had a greater number and higher levels of risk factors than their respective teacher-exclusive AIS groups, but this was much less evident among youth with parent-exclusive AIS. For example, cross-informant and parent-exclusive groups were comparable in terms of prior history of treatment and severity of co-occurring symptoms, with the exception of ADHD hyperactive-impulsive behaviors among older youth (AIS:P+T>AIS:P). Nevertheless, both younger and older cross-informant groups were rated by their parents as having more severe peer difficulties than *either* of their respective parent- and teacher-exclusive groups.

Multi-Informant NS Group

A secondary objective of the study was to compare the clinical features of AIS and NS (Aim 5). Findings indicated that younger and older NS groups generally had a greater number and higher levels of risk factors than their respective Controls, but there were few differences between AIS and NS groups, perhaps owing to the fact the latter were defined by multiple informants. NS groups were rated worse than their respective teacher-exclusive AIS groups for several background variables (e.g., language problems, sibling difficulties, treatment history, parental discipline). AIS groups had more severe co-occurring symptoms, but the pattern of results was generally consistent with the rater who completed the forms. In other words, if the parent was the informant, then the NS group was generally more severe than the teacher-exclusive AIS group, and vice versa.

As indicated in Table 2 (parents' ratings) and Table 3 (teachers' ratings), the AIS groups obtained more severe global ratings of ODD symptoms than the NS groups. This was not unexpected as NS status was based on the "or rule" (i.e., four ODD symptoms endorsed by either parent or teacher), which allowed less severe within-informant youth to be classified NS and consequently may have resulted in conservative estimates of diagnostic group divergence (cf., Drabick and Gadow 2012). We considered inclusion of source-exclusive NS groups, but there were too few children ($n=43$, about 50% in each age cohort) for meaningful analyses. It also warrants repeating that to be classified AIS, youth had to have at least one NS to meet *DSM-IV* ODD symptom criteria, and youth in the NS groups were allowed to have some AIS. For these reasons, we are not able to unambiguously determine if AIS/NS group differences are quantitative, qualitative, or both, despite the fact they exhibited comparable levels of NS severity.

Strengths, Limitations, and Future Directions

Strengths of the study include consideration of empirically driven ODD symptom subgroups; large study sample; consideration of different developmental periods; and a range of relevant background characteristics and co-occurring symptoms. Moreover, our strategy for parsing ODD symptoms was based on recommendations for *DSM-5* (Pardini et al. 2010) and the majority of research to date in this area (e.g., Mick et al. 2005; Rowe et al. 2010; Stringaris and Goodman 2009b). Nevertheless, alternative strategies (e.g., Burke et al. 2010) are equally compelling and warrant measured consideration in future research. Moreover, different symptom configurations are likely associated with different pathogenic mechanisms, and source-exclusive syndromes may be better characterized by separate (but overlapping) criteria, differentially weighted criteria, or at least initially, specific *DSM* symptom severity cutoff scores for different informants (Gadow and Sprafkin 1997). In other words, our reported findings are likely conservative estimates of source-specificity and should not be interpreted as endorsing proposed revisions to *DSM-5* but rather as informing future research.

The present study examined variables that are readily obtained in routine clinical evaluations and reflect real-world concerns of clinicians in formulating treatment plans. Nevertheless, more fine-grained (e.g., life stressors) and developmentally relevant (e.g., parenting behavior) correlates of ODD symptoms may reveal more pronounced group differences and generate a better understanding of etiology. Future research also may benefit from the inclusion of external validators (i.e., independent of parent or teacher report) of negative affect linked to specific neurobiologic processes (e.g., Gadow et al. 2010; Kirley et al. 2004; Sanislow et al. 2010) and specific environmental triggers (Lanza and Drabick 2011), as well as consideration of their interactions (Martel et al. 2010; Sheese et al. 2007).

As the primary aim of the present study was to characterize the clinical correlates of source-exclusivity, the exact mechanisms that underlie inter- and intra-individual variation in ODD behaviors and their relation to informant discrepancy remain topics for future study. For example, it could be argued that some youth in the present study with severe source-exclusive AIS may not have exhibited setting-specific disruptive behavior disorder. Although it seems unlikely that parents and teachers would not know whether clinically referred youth frequently lost their temper and were angry and irritable, informants may in some cases have markedly different standards for severity, as well as different opportunities to observe children's behavior. Therefore, future investigations may wish to consider direct observation and laboratory analog procedures to augment their examination of informant discrepancy and validity of rating scale data (e.g., De Los Reyes et al. 2009; De Los Reyes and Kazdin 2005; Nolan and Gadow 1994).

Although age was an important variable in the pattern of group differences, a cross-sectional design cannot address developmental processes; nevertheless, findings do provide important information about youth referred for clinical evaluation. There were too few females to examine gender differences in correlates of emotion dysregulation; therefore, this remains an important consideration in future research as etiologic factors *may* be sexually dimorphic.

Summary

Our results provide additional support for the notion that ODD is multi-factorial, as source-exclusive and cross-informant AIS subgroups were associated with different risk factors, co-occurring symptoms, and treatment histories, suggesting links with different pathogenic processes. Marwit and Stenner (1972) hypothesized that multiple cognitive and social cognition variables may allow some youth to inhibit their home-based disruptive behaviors in the school setting, but the mechanisms that explain cross-informant and source-exclusive emotion dysregulation remain largely unexplored and confound efforts to better understand pathogenesis. The distinction between AIS and NS phenotypes will likely play a clinically useful role in furthering nosology through the eventual development of emotional endophenotypes (Panksepp 2006) and explication of their neurobiologic substrates and interactions. It is reasonable to speculate, for example, that NS also represent affective responses, possibly more linked to exploratory/novelty-seeking behavior (see Alcaro et al. 2007). Future research will need to address competing models for ODD-derived clinical phenotypes, and as is the case with all idiopathic neurobehavioral syndromes, these efforts will likely prove challenging but certainly fruitful as we seek to better characterize youth with severe interpersonal conflicts.

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Table 1
 Mean (SD) background characteristics for youth with anger/irritability symptoms (AIS) or noncompliant symptoms (NS) and controls

Variable	AIS:P n=76	AIS:T n=89	AIS:P+T n=38	NS n=21	Controls n=314	K-W ²	Post hoc
Younger youth (<12 years)	1.5 (1.7)	0.7 (1.3)	0.8 (1.4)	1.0 (1.5)	0.7 (1.2)	18.2***	P>P+T,T,C
Difficult as infant	2.2 (1.5)	1.3 (1.3)	2.1 (1.6)	1.9 (1.6)	1.0 (1.2)	71.8***	P+T,P>T>C; NS>C
Difficult as preschooler	2.2 (2.6)	1.6 (2.4)	2.1 (2.3)	2.4 (3.2)	1.3 (2.0)	13.3**	P+T,P>C
Past language problems	2.2 (2.8)	1.2 (1.8)	1.8 (1.9)	2.4 (2.7)	1.1 (1.8)	27.2***	P+T,P,NS>T,C
Present language problems	2.6 (1.5)	2.2 (1.2)	2.7 (1.5)	2.4 (1.1)	2.1 (1.2)	13.1*	P+T,P>T,C
Parent discipline	1.9 (1.6)	1.4 (1.3)	2.7 (1.4)	2.0 (1.6)	0.7 (1.0)	109.1***	P+T>P>T>C; NS>C
Peer difficulties	2.1 (1.5)	0.9 (1.2)	1.7 (1.4)	2.2 (1.6)	0.9 (1.2)	59.6***	P+T,P,NS>T,C
Sibling difficulties	1.2 (1.7)	0.9 (1.3)	1.4 (1.7)	1.6 (1.8)	0.8 (1.2)	14.9**	P+T,P,NS>C
Familial stress	2.2 (1.5)	1.3 (1.1)	2.4 (1.8)	2.3 (1.6)	1.0 (1.3)	85.7***	P+T,P,NS>T>C
Treatment history	4.7 (3.4)	4.7 (2.9)	4.8 (3.2)	5.7 (3.2)	4.6 (2.8)	2.5	NA
School functioning (parent)	7.0 (3.5)	7.3 (4.3)	6.1 (3.8)	8.9 (4.1)	7.3 (4.0)	4.5	NA
Academic performance (teacher)	4.6 (3.3)	4.8 (3.3)	4.3 (3.0)	6.8 (2.8)	5.2 (3.3)	9.9*	NA [†]
Classroom functioning (teacher)	n=131	n=68	n=52	n=22	n=316		
Older youth (12 years)	1.1 (1.7)	0.6 (1.2)	1.4 (1.7)	1.1 (1.8)	0.7 (1.4)	23.7***	P+T,P>T,C
Difficult as infant	1.2 (1.3)	0.7 (1.0)	1.6 (1.3)	1.2 (1.7)	0.6 (1.0)	51.0***	P+T,P>T,C
Difficult as preschooler	1.1 (1.7)	0.9 (1.5)	1.4 (2.1)	1.9 (2.4)	0.9 (1.8)	10.3*	NA [†]
Past language problems	1.1 (1.7)	0.6 (1.2)	1.8 (2.3)	1.9 (2.2)	0.7 (1.4)	34.6***	P+T,P,NS>T,C; P+T>P
Present language problems	2.4 (1.4)	1.8 (1.2)	2.8 (1.4)	2.5 (1.4)	1.8 (1.2)	35.3***	P+T,P,NS>T,C; P+T>P
Parent discipline	1.1 (1.3)	1.1 (1.4)	2.1 (1.7)	1.7 (1.5)	0.5 (0.9)	80.4***	P+T>P,T>C; NS>C
Peer difficulties	1.5 (1.4)	0.7 (1.1)	1.6 (1.5)	1.3 (1.2)	0.8 (1.1)	42.2***	P+T,P>T,C; NS>T
Sibling difficulties	1.3 (1.5)	1.0 (1.3)	1.6 (1.6)	1.3 (1.7)	1.0 (1.3)	9.5*	NA [†]
Familial stress	2.5 (1.7)	2.0 (1.8)	2.7 (1.6)	2.7 (1.7)	1.7 (1.7)	36.4***	P+T,P>T>C; NS>C
Treatment history	4.8 (3.2)	5.0 (3.1)	5.7 (2.7)	5.5 (2.9)	4.8 (3.0)	5.5	NA
School functioning (parent)	7.4 (3.2)	6.8 (3.6)	7.2 (4.6)	7.8 (4.4)	7.1 (3.8)	2.0	NA
Academic performance (teacher)							

Variable	AIS:P	AIS:T	AIS:P+T	NS	Controls	K-W ²	Post hoc
Classroom functioning (teacher)	4.9 (3.0)	4.5 (3.0)	4.7 (2.6)	5.4 (3.2)	5.5 (3.1)	7.2	NA

P parent, T teacher, C control, K-W Kruskal-Wallis, post hoc Mann-Whitney U-test, NA not applicable

† Main effect was not significant based on the Bonferroni-corrected p-value; post hoc tests were not performed

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$

Table 2

Mean (SD) CASI-4R ratings for younger (<12 Years) youth with anger/irritability symptoms (AIS) or noncompliant symptoms (NS) and controls

Variable	AIS:P n=76	AIS:T n=89	AIS:P+T n=38	NS n=21	Controls n=314	F	eta ²	Post-hoc
Parent-rated symptoms								
Oppositional defiant disorder	18.7 (3.8)	9.0 (4.5)	19.3 (3.7)	15.0 (3.0)	6.7 (4.8)	160.2 ***	0.55	P+T,P>NS>T>C
ADHD: Inattentive	17.8 (6.7)	14.6 (6.1)	18.2 (5.9)	20.3 (4.1)	14.8 (6.6)	8.2 ***	0.06	P,NS>T,C; P+T>C
ADHD: Hyperactive-impulsive	17.0 (8.3)	13.0 (8.0)	18.6 (7.6)	20.0 (6.4)	9.6 (7.1)	29.6 ***	0.19	P+T,P,NS>T>C
Conduct disorder	11.0 (7.1)	4.6 (3.7)	10.3 (5.5)	10.1 (5.2)	3.2 (3.7)	60.6 ***	0.33	P+T,P,NS>T>C
Generalized anxiety disorder	11.7 (4.0)	6.3 (4.2)	10.1 (4.8)	8.9 (3.9)	6.0 (3.7)	38.5 ***	0.23	P+T,P>T,C; P>NS>C
Obsessive-compulsive disorder	1.6 (1.7)	0.7 (1.1)	1.1 (1.6)	1.2 (1.4)	0.7 (1.2)	9.0 ***	0.06	P>T,C
Social anxiety disorder	4.7 (3.6)	1.8 (2.6)	2.9 (3.3)	2.8 (2.9)	2.4 (2.9)	11.0 ***	0.08	P>T,C
Separation anxiety	5.2 (5.1)	2.3 (2.8)	4.1 (5.1)	4.7 (4.9)	2.6 (3.6)	9.1 ***	0.06	P>T,C
Major depressive symptoms	12.9 (7.9)	5.4 (5.5)	12.4 (8.3)	8.2 (6.3)	4.7 (5.4)	34.0 ***	0.21	P+T,P>T,C
Manic symptoms	7.7 (7.2)	3.1 (4.0)	5.9 (5.6)	6.2 (6.3)	2.0 (3.3)	29.2 ***	0.18	P+T,P>T,C
Teacher-rated symptoms								
Oppositional defiant disorder	7.2 (6.2)	19.3 (3.6)	19.1 (4.0)	14.5 (2.4)	4.7 (5.1)	207.2 ***	0.61	P+T,T>NS>P>C
ADHD: Inattentive	12.1 (8.0)	19.1 (5.6)	17.6 (6.3)	19.3 (6.3)	16.5 (7.5)	11.0 ***	0.08	P+T,T,NS,C>P; T>C
ADHD: Hyperactive-impulsive	9.3 (8.5)	18.7 (8.6)	15.7 (7.7)	18.0 (8.1)	10.0 (8.8)	23.4 ***	0.15	P+T,T,NS>P>C
Conduct disorder	2.6 (3.9)	6.8 (6.2)	7.6 (5.4)	4.5 (4.5)	1.5 (2.8)	44.9 ***	0.26	P+T,T>P>C; NS>C
Generalized anxiety disorder	6.0 (3.9)	10.8 (3.6)	10.8 (3.8)	8.6 (3.2)	6.1 (3.6)	39.2 ***	0.23	P+T,T,NS>P>C
Obsessive-compulsive disorder	0.5 (1.1)	1.2 (1.6)	1.3 (1.8)	0.6 (1.1)	0.6 (1.2)	5.0 **	0.04	T>P,C
Social anxiety disorder	2.2 (2.9)	2.6 (3.0)	2.8 (3.0)	1.4 (2.1)	2.4 (3.2)	0.8	0.01	NA
Major depressive symptoms	7.4 (6.4)	12.1 (7.7)	13.1 (6.2)	7.4 (5.1)	6.7 (6.0)	18.2 ***	0.13	P+T,T>P,NS,C
Manic symptoms	5.7 (4.9)	12.4 (5.0)	10.2 (4.9)	11.1 (4.7)	5.8 (4.9)	38.5 ***	0.23	P+T,T,NS>P>C

CASI child and adolescent symptom inventory, ADHD attention-deficit/hyperactivity disorder, P parent, T teacher, C control, NA not applicable

** P<0.01

*** P<0.001

Mean (SD) CASI-4R ratings for older (12 Years) youth with anger/irritability symptoms (AIS) or noncompliant symptoms (NS) and controls

Table 3

Variable	AIS:P n=131	AIS:T n=68	AIS:P+T n=52	NS n=22	Controls n=316	F	eta ²	Post-hoc
Parent-rated symptoms								
Oppositional defiant disorder	18.8 (4.2)	9.5 (3.9)	19.3 (3.9)	14.5 (3.0)	7.3 (4.5)	218.7***	0.60	P+T,P>NS>T>C
ADHD: Inattentive	18.7 (6.2)	13.6 (5.8)	20.8 (5.2)	17.8 (5.5)	14.4 (6.8)	20.5***	0.13	P+T,P>T,C; NS>T
ADHD: Hyperactive-impulsive	11.5 (7.2)	8.7 (6.6)	15.0 (7.3)	12.3 (7.2)	6.1 (6.0)	31.5***	0.18	P+T>P,T>C; NS>C
Conduct disorder	13.1 (7.0)	7.8 (5.7)	16.1 (8.1)	12.0 (7.3)	5.9 (5.5)	49.7***	0.27	P+T,P>T,C; NS>C
Generalized anxiety disorder	10.7 (4.3)	6.3 (3.8)	11.1 (4.4)	8.2 (4.2)	7.2 (4.4)	23.6***	0.14	P+T,P>T,C
Obsessive-compulsive disorder	1.0 (1.6)	0.5 (1.1)	0.8 (1.4)	0.8 (1.2)	0.8 (1.4)	1.5	0.01	NA
Social anxiety disorder	3.6 (3.7)	1.4 (2.0)	3.0 (3.0)	2.0 (2.4)	2.6 (3.2)	5.9***	0.04	P+T,P,C>T
Separation anxiety disorder	2.5 (3.8)	1.4 (2.7)	2.7 (3.6)	1.0 (1.5)	1.7 (3.4)	2.6*	0.02	NA [†]
Major depressive symptoms	17.5 (9.9)	8.8 (7.1)	17.0 (8.4)	11.7 (7.8)	9.5 (8.4)	24.9***	0.15	P+T,P>T,C; P>NS
Manic symptoms	6.5 (5.4)	4.0 (4.2)	8.9 (6.3)	5.0 (5.3)	2.8 (3.6)	30.0***	0.17	P+T,P>T,C
Teacher-rated symptoms								
Oppositional defiant disorder	6.1 (5.6)	18.8 (3.6)	19.1 (3.8)	15.0 (2.1)	4.4 (4.9)	218.3***	0.60	P+T,T>NS>P>C
ADHD: Inattentive	14.5 (7.6)	19.5 (6.3)	17.7 (6.2)	17.6 (5.9)	13.8 (7.4)	11.6***	0.08	P+T,T>P,C
ADHD: Hyperactive-impulsive	6.6 (7.6)	14.6 (9.0)	13.2 (8.5)	12.3 (9.2)	5.3 (6.5)	32.2***	0.19	P+T,T>P,C; NS>C
Conduct disorder	3.3 (4.3)	8.6 (6.2)	9.3 (6.4)	6.8 (4.0)	2.6 (3.4)	45.6***	0.25	P+T,T,NS>P,C
Generalized anxiety disorder	5.9 (3.9)	10.0 (4.0)	10.1 (3.4)	8.2 (3.8)	5.8 (3.8)	29.7***	0.17	P+T,T>P,C
Obsessive-compulsive disorder	0.3 (0.8)	0.7 (1.3)	0.8 (1.2)	0.4 (0.6)	0.5 (1.1)	2.1	0.01	NA
Social anxiety disorder	1.8 (2.5)	2.0 (2.5)	1.7 (2.5)	1.7 (2.5)	2.1 (3.0)	0.5	0.00	NA
Major depressive symptoms	8.3 (6.3)	11.2(6.7)	11.0 (7.1)	8.7 (6.4)	7.6 (6.0)	6.7***	0.05	P+T,T>C; T>P
Manic symptoms	5.0 (5.1)	10.6 (5.9)	9.9 (5.2)	9.3 (5.3)	4.1 (4.4)	40.1***	0.22	P+T,T,NS>P,C

CASI child and adolescent symptom inventory. ADHD attention-deficit/hyperactivity disorder, P parent, T teacher, C control, NA not applicable

[†]Main effect was not significant based on the Bonferroni-corrected p-value; post hoc tests were not performed

* p<0.05.

100.000

 $p < .001$

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