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Interpretive Understanding, Sympathy, and Moral Emotion Attribution in
Oppositional Defiant Disorder Symptomatology

Caterina Dinolfo and Tina Malti

University of Toronto

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Correspondence concerning this article should be addressed to Tina Malti, Department of Psychology, University of Toronto, 3359 Mississauga Road North, Mississauga, ON L5L 1C6.

E-mail: tina.malti@utoronto.ca

Phone: +1-416-709-9146

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Abstract

This study examined the relations between interpretive understanding, sympathy, and moral emotion attribution in the prediction of oppositional defiant disorder (ODD) symptomatology in an ethnically diverse sample of 128 4- and 8-year-old children (49% girls). Caregivers rated the children's ODD symptoms. Interpretive understanding was assessed using an advanced theory-of-mind task. Sympathy was measured via caregiver- and child-report. Strength of moral emotion attribution (MEA) was assessed utilizing the children's responses to six hypothetical moral transgressions. Results revealed that interpretive understanding, sympathy, and strength of MEA in the exclusion domain predicted ODD symptoms negatively. Caregiver-reported sympathy partially mediated and moderated the relation between interpretive understanding and ODD symptoms. Strength of MEA in the rule violation domain moderated the relation between interpretive understanding and ODD symptoms. The findings shed light on the importance of social-cognitive and affective-moral antecedents of ODD symptoms.

Keywords: oppositional defiant disorder, interpretive understanding, sympathy, moral emotion attribution, childhood

Interpretive Understanding, Sympathy, and Moral Emotion Attribution in Oppositional Defiant Disorder Symptomatology

Oppositional defiant disorder (ODD) is a form of antisocial behavior characterized by the presence of a constellation of argumentative, defiant, antagonizing, and/or vindictive behaviors which generate substantial functional impairment [1]. To date, there is a general consensus that prevalent treatment methods for ODD have achieved limited success [2]. One reason for this may be that the developmental antecedents underlying ODD, as a distinct disorder, have been largely unexplored empirically (e.g., [3]); that is, although ODD and conduct disorder (CD), another type of antisocial behavior, are considered to be distinct disorders [1], to a very great extent, ODD has been examined concomitantly with CD under the umbrella terms “disruptive behavior disorders” or “conduct problems” (e.g., [3]). Indeed, clinical-developmental scientists have argued that identifying the developmental precursors of antisocial conduct in children is of critical importance to the further development of both theory and treatment [4, 5].

The present study aimed to fill this research gap, in part, by investigating social-cognitive and affective-moral factors that may contribute to ODD symptomatology. We focused on social-cognitive development (i.e., interpretive understanding) and moral emotions (i.e., sympathy and moral emotion attribution [MEA]) as antecedents of ODD symptoms, as developmental scientists have argued that these are key components in the genesis of various types of antisocial behavior [6, 7]. We studied these relations in an ethnically diverse sample of 4- and 8-year-old children, as research indicates that the first symptoms of ODD typically emerge at approximately 4 years of age and increase until approximately 8 years of age, at which point they become relatively stable [8], and a similar developmental trajectory (i.e., an increase between 4 and 8 years of age) is suggested for interpretive understanding, sympathy, and MEA [9, 10, 11, 12]. Thus, studying

developmental antecedents in these developmental periods appears particularly relevant to deepening our understanding of the social-cognitive and affective precursors of ODD symptoms.

Oppositional Defiant Disorder, Interpretive Understanding, and Sympathy

The first aim of the present study was to investigate the link between ODD symptoms and interpretive understanding. Developmental scientists have utilized interpretive understanding as a means of assessing advanced perspective-taking, or theory-of-mind, skills in children [9, 13]. Interpretive understanding, which emerges between the ages of 4 to 8 years, involves the coordination of one's own with more than one "other" perspective (i.e., second-order theory of mind; [14]) and the capacity to recognize that two other people, although exposed to the same information and, thus, possessing the same knowledge, may have completely different interpretations [9]. It has been argued that deficient perspective-taking skills are associated with various forms of antisocial behavior in children (e.g., [15]). Despite this argument, several recent studies have found that antisocial children may not be deficient in perspective-taking skills (e.g., [16-18]) and may, in fact, even be superior in these skills (e.g., [19, 20]). Moreover, limited studies have suggested that preschoolers with antisocial behavior have perspective-taking skills similar to preschoolers who are not antisocial (e.g., [21, 22]).

Additionally, we aimed to investigate the link between ODD symptoms and sympathy. Sympathy (i.e., other-oriented concern), like empathy (i.e., emotional contagion), involves the sharing of an emotional experience with another; however, unlike empathy, sympathy entails the distancing of oneself from the other, as it does not involve the sharing of the same/similar emotion as the other [23, 24]. Developmentally, it has been suggested that sympathy is more mature than empathy, as it requires a higher degree of distinction between the self and others (i.e., a higher degree of perspective-taking; e.g., [10]); it has been suggested that sympathy

emerges when one feels connected to others and views others positively [11]. Hence, sympathy may require the ability to take more than one “other” perspective, which, as previously stated, emerges at the age of 6 to 7 years (i.e., second-order ToM).

There is empirical evidence for the notion that children with antisocial behavior are deficient in sympathy (e.g., [25, 26]). However, in the limited studies with preschool-aged children, no relation between a deficiency in sympathy and disruptive behavior disorders has been documented (e.g., [27, 28]). In general, the literature appears to be inconsistent with respect to when a deficiency in sympathy in disruptive children becomes evident; whereas some argue that a deficiency is apparent in the early elementary school years (e.g., [27]), others argue for the idea that a deficiency becomes increasingly noticeable with age [10].

We investigated the relations between ODD and interpretive understanding, and ODD and sympathy, in 4- and 8-year-olds to disentangle some of these inconsistencies.

Oppositional Defiant Disorder, Interpretive Understanding, and Moral Emotions

One reason for the inconsistent findings in previous research regarding the relations between perspective taking and antisocial behavior, and sympathy and antisocial behavior, may be the failure of previous studies to take into account the effects of a mediating variable(s) in regards to these relationships [29]. We were therefore interested in examining the mediating role of sympathy on the relation between ODD symptoms and interpretive understanding. As already stated, it has been suggested that sympathy requires a high degree of distinction between the self and others [10]. Thus, sympathy may require interpretive understanding; as such, children with antisocial behavior may be deficient in sympathy as a result of being deficient in interpretive understanding. Theoretically, the idea that sympathy requires interpretive understanding has been supported (e.g., [30, 31, 32]). However, Shechtman [18] discovered that aggressive 7- to

14-year-old boys were deficient in sympathy but not in perspective taking; nevertheless, a moderate positive correlation between perspective taking and sympathy was found, suggesting that although perspective taking and sympathy are associated, there nonetheless exists the possibility that each has a direct link to antisocial behavior.

We were also interested in investigating the mediating role of MEA on the relation between ODD symptoms and interpretive understanding. Moral emotion attribution has been defined as the assignment of a negative (i.e., moral) emotion(s), such as guilt, to the self as a hypothetical victimizer [33]. Moral emotion attribution requires the capacity to coordinate another's perspective with one's own perspective [34]; thus, first-order theory of mind [35] may be required for MEA. Indeed, there is evidence that children 3 to 4 years of age, who are at the age of acquisition of first-order theory of mind, comprehend the moral norms of justice and care [36] and, as such, may be able to attribute moral emotions following rule violations [13]. However, research has shown that children younger than 8 years of age tend to attribute positive emotions (e.g., happy) to the self-as-victimizer (i.e., "the happy victimizer phenomenon"; see [12] for a review). Conceptually, researchers have suggested that this is due to the fact that in elementary school, children acquire the ability to coordinate the perspectives of the victimizer and the victim (i.e., second-order theory of mind), resulting in sympathy for the victim and, consequently, MEA [31, 32]. Therefore, interpretive understanding may be required for MEA [7] which, in turn, may result in decreased antisocial behavior. Indeed, previous studies have documented a positive link between the attribution of positive emotions to the self-as-victimizer and antisocial behavior (see [7]). However, research with preschoolers concerning the association between antisocial behavior and MEA has not yet been conducted. Empirically, the only study to date which has examined the relation between interpretive understanding and MEA

found no significant association between interpretive understanding and MEA in 5-, 7-, and 9-year olds, regardless of social behavior [13].

Empirical studies regarding the relation between interpretive understanding and sympathy, and interpretive understanding and MEA, are scarce, and, with respect to the mediating roles of sympathy and MEA on the relation between ODD symptoms and interpretive understanding, non-existent. The present study is the first to address these relations in a sample of 4- and 8-year-olds.

Oppositional Defiant Disorder, Sympathy, and Moral Emotion Attribution

Furthermore, we were interested in examining the mediating role of MEA on the relation between ODD symptoms and sympathy. Researchers have argued for the importance of sympathy for MEA (e.g., [31, 32]) and some studies have supported this link. For example, Blair [25] documented that children with psychopathic tendencies display a deficiency in attributing moral emotions and in sympathy. Theoretically, it has also been suggested that MEA mediates feelings of sympathy and prosocial behaviors [37]. Hence, a deficiency in sympathy may not necessarily lead to antisocial behavior; rather, a deficiency in MEA, resulting from a deficiency in sympathy, may motivate antisocial behavior. Furthermore, the question of whether or not sympathy and MEA interact to predict antisocial behavior remains unanswered; there is limited evidence that this may be the case for the prediction of prosocial behavior. For example, findings from two studies with 6-year-olds showed that only in cases in which MEA was low or moderate was sympathy significantly associated with prosocial behavior, with low sympathy associated with lower prosocial behavior than high sympathy [38, 39].

In summary, the extant literature suggests that links exist between ODD and interpretive understanding, ODD and sympathy, sympathy and interpretive understanding, MEA and

interpretive understanding, and sympathy and MEA; nevertheless, research has not examined ODD symptomatology specifically. The present study, therefore, aimed at investigating the relations between interpretive understanding, sympathy, and MEA in predicting ODD symptomatology. Specifically, we investigated the following research questions: First, we examined if there is a direct link between ODD symptoms and interpretive understanding, and a direct link between ODD symptoms and sympathy. Second, we investigated the mediating roles of sympathy and MEA on the relation between ODD symptoms and interpretive understanding. Third, we examined the mediating role of MEA on the relation between ODD symptoms and sympathy. Lastly, we tested whether there were interactive effects between interpretive understanding, sympathy, and MEA on ODD.

Based on the literature, we hypothesized that both interpretive understanding and sympathy would predict ODD symptoms negatively. We also expected that both sympathy and MEA would mediate the relationship between ODD symptoms and interpretive understanding, and that MEA would mediate the relationship between ODD and sympathy. Finally, based on related research, we hypothesized that MEA would moderate the relationship between ODD and sympathy.

Method

Participants

A total of 128 children and one of their caregivers (84% mothers) participated in the current study. There were 67 4-year-olds ($M = 4.43$ years, $SD = .27$, 30 girls [45%]) and 61 8-years-olds ($M = 8.48$ years, $SD = .27$, 32 girls [52.5%]). Participants were recruited from the suburbs of a major Canadian city, primarily from recreation and community centers, and from a pre-existing participant database, through direct interaction and telephone recruitment methods,

respectively. In order to participate in the study, children had to comprehend and speak English, and caregivers had to comprehend, read, and write English. The only exclusion criterion was an autism spectrum disorder in the child.

The majority of caregivers noted completing university (55%), followed by college (23%), grad school (13%), and high school (9%). According to Census data, this distribution is fairly representative of the community [40]; hence, our sample was only representative of the community from which it was drawn. Ninety-six percent of the caregivers indicated having a partner. The ethnic origins reported by the caregivers were Western European (36%), South Asian (16%), Eastern European (10%), East Asian (4%), West, Central, and Southeast Asian (5%), African (3%), Latin, Central, and South American (5%), and other/multiple origins (21%).

Approval for the study was obtained from the Office of Research Ethics.

Measures

Oppositional defiant disorder (ODD). Caregiver ratings were used to assess ODD symptomatology in the children. Specifically, to assess ODD symptoms in 4-year-olds, the DSM-oriented scale for ODD from the Child Behavior Checklist for 1.5- to 5-year-olds (CBCL/1½-5; [41]) was utilized. An example of an item is “My child is disobedient”. To assess ODD symptoms in 8-year-olds, the DSM-oriented scale for ODD from the Child Behavior Checklist for 6- to 18-year-olds (CBCL/6-18; [42]) was used. An example of an item is “My child is disobedient at school”. Caregivers rated items on a 6-point Likert scale ranging from 1 to 6 (i.e., *not at all true to always true*). Cronbach’s α for the ODD symptoms scale was .85 and mean scale scores were computed.

Interpretive understanding. The interpretive understanding task from Lalonde and Chandler [9] was employed. The child was shown two hand puppets, Tim and Jane, by the

interviewer and was told the following: “I want you to pretend that these dolls are real people just like you and me. That means that they see and hear and know things just like real people. Okay? They live together in this box, their house. When Tim and Jane are inside their house, they cannot hear what we're saying, and they cannot see what we're doing”. After the child agreed that when the puppets were inside their house they could not hear what the interviewer and the child were saying or doing, the child was told that the interviewer and the child were now going to look at some pictures together that Tim and Jane had never seen before. The interviewer then took a line drawing of an elephant and an orange out of an envelope and presented it to the child; the child was asked to describe the full picture in detail. Next, the picture was placed back in the envelope (which had a small rectangular cutout) so only a very small part of it could be seen (i.e., the restricted view). Subsequently, the child was told to remember that Tim and Jane had never seen this picture before and that they (i.e., the child and the interviewer) were going to show it to them, but that all Tim and Jane would see was the small part (the interviewer pointed to the restricted view). The interviewer then took Tim out of the house and said, “So Tim has never seen this picture before. What will Tim say this is?” The same procedure was repeated for the other puppet. Next, the interviewer took a line drawing of a ship and a witch out of an envelope and the procedure was repeated. All of the child’s answers were recorded verbatim by the interviewer.

Coding. The coding of each child’s responses was adapted from the coding procedure established by Lalonde and Chandler [9] and Malti et al. [13]. That is, for each picture, for each puppet, if the child mentioned none of the original elements of their description of the full picture for their description of the puppet’s restricted view, it was coded as “no error” (i.e., 0). However, if for their description of the puppet’s restricted view the child mentioned either all the

original elements of their description of the full picture or trace elements of their description of the full picture, it was coded as a “reality error” (i.e., 1) or a “contamination error” (i.e., 2), respectively. Next, for each picture, the equality of descriptions (i.e., the child’s description of Tim’s restricted view and the child’s description of Jane’s restricted view) was coded; if the child gave the same descriptions for both puppets, the code “equal interpretations” was used (i.e., 0) and if the child gave different descriptions for both puppets, the code “different interpretations” was used (i.e., 1). Third, response pairs for each picture were coded for interpretive understanding. To elaborate, if the child’s description of Tim’s restricted view and of Jane’s restricted view both had “no error”, and the interpretations were “different”, the code “interpretive” was utilized (i.e., 0). However, if the child’s description of Tim’s restricted view and/or the child’s description of Jane’s restricted view contained an error, and/or if the interpretations were “equal”, the code “non-interpretive” was used (i.e., 1). Finally, the interpretive understanding on both pictures was coded to derive an overall score of the child’s interpretive understanding: If the child scored “non-interpretive” on both pictures, the code “overall non-interpretive” was used (i.e., 0), if the child scored “non-interpretive” on one picture and “interpretive” on the other, the code “overall transitional” was used (i.e., 1), and, if the child scored “interpretive” on both pictures, the code “overall interpretive” was (i.e., 2).

A random sample ($n = 34$) of responses was coded by two independent raters to calculate inter-rater reliability. Cohen’s κ was .97 and all disagreements were discussed until a consensus was obtained.

Sympathy. Caregiver- and child self-reports of sympathy were utilized.

Caregiver-reports. The caregiver sympathy scale consisted of five items from Zhou, Valiente, and Eisenberg [43]. An example of an item is “My child usually feels sorry for other

children who are being teased". Caregivers rated items on a 6-point Likert scale ranging from 1 to 6 (i.e., *not at all true* to *always true*). Cronbach's α for the scale was .86 and mean scores were computed.

Child self-reports. The child self-report scale consisted of six items from Zhou et al. [43]. The child self-report scale of sympathy [43] had been extensively validated in very similar age groups by other researchers (e.g., [38, 44]). An example of a sentence is "When I see someone being picked on, I feel kind of sorry for them". The child was read each sentence by the interviewer and asked whether the sentence was like them or not and, if the child answered that the sentence was like them, they were then asked if it was really like them or sort of like them. The child's responses were coded as 0 ("No, this does not sound like me"), 1 ("This is sort of like me"), or 2 ("This is really like me"). Cronbach's α for the scale was .76 and sum scores were calculated.

Moral emotion attribution (MEA). Six hypothetical vignettes representing three moral transgression domains (i.e., rule violation, exclusion, not prosocial) were read to each child by the interviewer. The stories had been extensively validated in previous research examining children of similar ages as in the present study (see [13, 39, 45, 46]), and were accompanied by colored drawings and matched to the sex of the child. An example of the boys' version of a vignette in the rule violation domain is: "Marc brought a chocolate bar to school. He shows the chocolate to James and puts it back in his jacket. James really likes chocolate so when nobody is watching he takes the chocolate bar from Marc's jacket and eats it".

Following the reading of each vignette to the child by the interviewer, the child was asked the following two questions: (1) Emotion attribution(s) to the self as a hypothetical victimizer: "How would you feel if you had done what (*hypothetical victimizer's name*) did?" If

the child said “I don’t know”, the child was then asked “If you had (*behavior of hypothetical victimizer*), would you feel a little good, a little bad, or a little good and bad?” The child’s answer(s) to this question was recorded verbatim; and (2) Strength of the emotion attribution(s) to the self as a hypothetical victimizer: “You said you would feel (*emotion attribution from Question 1*). How strong would you feel (*emotion attribution from Question 1*)?” In order to answer this question, we used a 3-point numerical Likert scale that the child had to point to. Before using this scale, however, we ensured that the child understood that they would be using the different-sized squares to tell us about the strength of their emotions.

Coding. For Question 1, only the first emotion reported by the child was recoded as 0 (*positive/amoral*) versus 1 (*negative/moral*), as, typically, children in these age groups do not frequently attribute more than one emotion [39]. This coding procedure was consistent with previous studies (e.g., [39, 46]). For Question 2, the strength of the reported emotion was coded as 1 if the child pointed to the smallest square (i.e., *not strong*), 2 if the child pointed to the middle square (i.e., *quite a bit*), and 3 if the child pointed to the largest square (i.e., *very strong*).

Thereafter, for each of the six stories, the *positive* (0) or *negative* (1) score was combined with its strength to derive a continuous emotional intensity score which ranged from 1, reflecting a high intensity amoral emotion, to 6, reflecting a high intensity moral emotion. The emotional intensity scores were then aggregated within domain to derive an emotional intensity score for each domain (i.e., rule violation, exclusion, not prosocial). This aggregation was justified, as the emotional intensity scores for the stories representing the rule violation, exclusion, and not prosocial domains were significantly correlated, $r = .34$ ($p < .01$), $r = .20$ ($p < .05$), and $r = .37$ ($p < .01$), respectively.

Procedure

The child and their caregiver visited the research laboratory for one session. Written informed consent was obtained from the caregiver and oral assent was obtained from the child. Each child was then individually interviewed in a laboratory room. The interviews lasted, on average, 45 minutes. The interviewers were psychology undergraduate students extensively trained in the interview technique and procedures. While the child was being interviewed, the caregiver remained in a waiting area at the laboratory and filled in a questionnaire. At the completion of the child interview, the caregiver was debriefed and the child was given a certificate and an age-appropriate book.

Results

Descriptive Analyses

Table 1 displays the means and standard deviations of the study variables by age group. Eight-year-olds showed more sympathy and interpretive understanding than 4-year-olds, $t(126) = 8.74, p < .001, d = 1.56$ and $t(124) = 6.61, p < .001, d = 1.19$, respectively. Furthermore, the strength of MEA in the exclusion domain was significantly higher in 8-year-olds than in 4-year-olds, $t(117) = 2.45, p < .05, d = .45$, as was the strength of MEA in the not prosocial domain, $t(119) = 2.78, p < .01, d = .51$.

The correlations among the variables are displayed in Table 2. Oppositional defiant disorder symptoms were negatively associated with caregiver-reported sympathy, child-reported sympathy, and strength of MEA in the exclusion domain. Interpretive understanding was positively related to child-reported sympathy, strength of MEA in the not prosocial domain, and age group. Furthermore, child-reported sympathy was positively associated with strength of MEA in the exclusion domain, sex, and age group. Moreover, strength of MEA in the rule violation, exclusion, and not prosocial domains were positively correlated with each other, and

strength of MEA in the exclusion and not prosocial domains was positively associated with age group.

Interpretive Understanding, Sympathy, and Moral Emotion Attribution: Direct and Moderator Effects on Oppositional Defiant Disorder

In order to examine main and moderator effects on ODD symptoms, a series of hierarchical multiple linear regression analyses were performed in SPSS version 19. All predictor variables had been centered at the mean, with the exclusion of age group and sex. ODD was the dependent variable in all regression models. The predictor variables were interpretive understanding, child self-reported sympathy, caregiver-reported sympathy, strength of MEA in each of the three domains, age group, sex, and their interactions. Preliminary analyses revealed no significant interactions between age group or sex and the other predictors on ODD symptoms, and no significant interaction between age group and sex on ODD symptoms; thus, developmental and sex differences were not further examined.

In the first step of each regression, age group and sex of the child were entered as control variables, as previous studies have revealed developmental and sex differences in the main study variables (e.g., [8, 13, 30, 46]). In the second step, two variables were entered as predictors (e.g., interpretive understanding and caregiver-reported sympathy). In the third step, the interaction term for the two respective predictor variables was entered as a predictor (e.g., interpretive understanding x caregiver-reported sympathy); each interaction term was created by calculating the product of the two variables being tested in the second step.

The results of the regression analyses for ODD symptoms, interpretive understanding, and sympathy revealed that child- and caregiver-reported sympathy, as well as an interaction between interpretive understanding and caregiver-reported sympathy, predicted ODD symptoms

negatively (Table 3). Utilizing unstandardized, centered predictor variables, the interaction was plotted following the procedure by Aiken and West (1991) and Dawson and Richter (2006; see [47]; Figure 1). In order to interpret the interaction, simple slope analyses were performed; to obtain the b , the formula described by Aiken and West ([48]; i.e., $b = b_1 + b_3Z$) was utilized. In order to obtain the significance of the slope, the worksheet for unstandardized, centered variables with simple slopes developed by Dawson [47] was used. As displayed in Figure 1, in cases in which caregiver-reported sympathy was low, both low and high interpretive understanding had no implications for ODD symptoms (simple slope $b = .08$, *ns*); however, in cases in which caregiver-reported sympathy was high, interpretive understanding was associated with ODD, with low interpretive understanding associated with higher ODD symptoms than high interpretive understanding (simple slope $b = -.25$, $p < .05$).

The results of the regression analyses for ODD symptoms, interpretive understanding, and MEA showed that interpretive understanding and strength of MEA in the exclusion domain, as well as an interaction between interpretive understanding and strength of MEA in the rule violation domain, predicted ODD symptoms negatively (Table 4). The interaction was plotted and interpreted utilizing the same procedures outlined in the aforementioned interaction (Figure 2). In cases in which there was high strength of MEA in the rule violation domain, both low and high interpretive understanding had no implications for ODD symptoms (simple slope $b = .17$, *ns*); however, in cases in which there was low strength of MEA in the rule violation domain, interpretive understanding was associated with ODD symptoms, with low interpretive understanding associated with higher ODD symptoms than high interpretive understanding (simple slope $b = -.58$, $p < .01$).

Interpretive Understanding, Sympathy, and Moral Emotion Attribution: Direct and Mediator Effects on Oppositional Defiant Disorder

To test the mediating effects of sympathy and strength of MEA on the relation between interpretive understanding and ODD symptoms and the mediating effect of MEA on the relation between sympathy and ODD symptoms, we employed structural equation modeling (SEM) using SPSS Amos version 19. Maximum likelihood bootstrapping with a 95 percent bias-corrected confidence level and 2000 bootstrap samples was used to obtain the significance of the indirect effects. Missing values in the original dataset were replaced with expectation-maximization (EM) imputation [49]; EM was acceptable, as only 2% percent of our data was missing [50].

Table 5 displays the standardized regression weights of the paths. Age group, sex, and caregiver education (a measure of socioeconomic status; see [39]) were utilized as control variables in each model. Overall, for all models, model fit was excellent to adequate [51]. For Model 1, CMIN (3) = 2.43 ($p = .49$); RMSEA = .00. Similarly, for Model 2, CMIN (3) = 2.43 ($p = .49$); RMSEA = .00. For Models 3 and 4, CMIN (13) = 19.70 ($p = .10$); RMSEA = .06, and CIMN (13) = 20.78 ($p = .08$); RMSEA = .07, respectively. For Model 5, CMIN (13) = 15.64 ($p = .27$); RMSEA = .04.

In Model 1, interpretive understanding predicted caregiver-reported sympathy positively which, in turn, predicted ODD symptoms negatively; the negative indirect (i.e., mediated) effect from interpretive understanding to ODD symptoms was significant. However, it was partial mediation, as the direct effect controlling for the mediator (Path c') had a regression weight greater than 0 [52]; our results indicated a regression weight of -0.15 for the total effect not controlling for the mediator and a regression weight of -0.12 for the direct effect controlling for the mediator (Path c'). An additional way of testing for complete mediation is by using the

formula ab/c (indirect effect divided by total effect); if the number is at least .80, complete mediation is indicated [52]. In our mediation, the value representing the latter formula was .27, indicating partial mediation. As our regression analysis indicated that caregiver-reported sympathy also moderated the effect of interpretive understanding on ODD symptoms, caregiver-reported sympathy was both a moderator and a mediator of interpretive understanding on ODD symptoms [49]. Preacher, Rucker, and Hayes [53] discuss the concept of a three-variable moderated mediation and refer to it as a conditional indirect effect; they define it as “the magnitude of an indirect effect at a particular value of a moderator (or at particular values of more than one moderator)” (p. 186). Models 2-5 did not reveal any further mediating effects.

Discussion

The present study investigated the relations between ODD symptomatology and interpretive understanding, sympathy, and MEA in an ethnically diverse sample of 4- and 8-year-old children. To date, empirical studies regarding social-cognitive and affective-moral antecedents of ODD symptoms in these age groups have remained scarce. Our study, therefore, makes a useful contribution to the clinical-developmental literature in this area.

Regarding age differences in the study variables, ODD symptomatology in 4-year-olds was not significantly different from ODD symptomatology in 8-year-olds, supporting the idea that ODD remains stable throughout childhood (e.g., [54, 8]). Additionally, the fact that 8-year-olds demonstrated significantly more interpretive understanding than 4-year-olds was expected, as with typical cognitive development, interpretive understanding emerges between 4 to 8 years of age, typically at 6 years of age [9] and involves second-order false belief understanding which typically emerges at the age of 6 to 7 years [9, 14]). Moreover, a significant difference existed between 4- and 8-year-olds on self-reported sympathy, with 8-year-olds reporting higher

sympathy; this supports the developmental literature regarding the trajectory of sympathy development [10, 11]. However, no difference was found between 4- and 8-year-olds on caregiver-reported sympathy; with multiple informant data, if there is discordance on the results obtained with the measurements (in this case, sympathy), one explanation may be that each measurement is accessing a diverse and unique facet of the variable being measured [55]. Last, strength (i.e., intensity) of MEA in the exclusion and not prosocial domains was significantly higher in 8-year-olds than in 4-year-olds, suggesting that these domains require past experience with such situations in order to anticipate the consequences [56, 13] and the development of working memory which allows the accessing of memories of these past situations [57, 58].

One significant finding was that interpretive understanding predicted ODD symptoms negatively. This finding indicates that advanced perspective-taking skills (i.e., interpretive understanding) may decrease ODD symptoms by allowing the child to predict how others will respond to his/her behavior [59]. This finding extends the argument that deficient perspective-taking skills are associated with antisocial behavior (e.g., [15]) and contradicts studies suggesting that intact or superior perspective-taking skills are associated with antisocial behavior (e.g., [16-18]). The contradictory findings may be due to different methodologies utilized to assess perspective taking and/or to different forms of antisocial behavior examined across studies. Future studies are required to further disentangle how different measures of perspective-taking skills are associated with ODD symptoms. Moreover, no interaction was found between age group and interpretive understanding on ODD symptoms, disconfirming the idea that in preschool-aged children, perspective taking and antisocial behavior are not related (e.g., [21]). Rather, our findings implicate that a more differentiated social understanding is negatively associated with ODD symptoms in both early and middle childhood.

As expected, both caregiver- and child-reported sympathy directly predicted ODD symptoms negatively. These results support and extend the literature associating antisocial behavior with a deficiency in sympathy (e.g., [25, 26]). Thus, lower concern for others may motivate ODD symptoms by decreasing or eliminating the desire to improve the state of others or prevent harm to others [10, 60]. These findings implicate that one plausible underpinning of sympathy is emotional regulation; although not examined in the present study, the ability to regulate one's emotions has been found to have a positive relation with sympathy (e.g., [23]). Additionally, there was no significant interaction between age group and sympathy on ODD symptoms, disconfirming the notion that in preschool-aged children, antisocial behavior is not associated with a deficiency in sympathy (e.g., [27]). The inconsistent findings may be due to differences in the measures utilized to assess sympathy. For example, Miller and Eisenberg [10] argue that, in contrast to vignette/behavioral measures, questionnaire methods, such as the one utilized in the present study, measure overt sympathy in the individual (i.e., trait sympathy) and, thus, are more valid [30]. The contradictory findings may also be due to the diverse types of antisocial behavior investigated across studies; different forms of antisocial behavior may be associated with diverse trajectories of sympathy development.

Our hypothesis on the mediating role of sympathy in the relationship between ODD symptoms and interpretive understanding was partially confirmed. More specifically, we found that the negative indirect (i.e., mediated) effect from interpretive understanding to ODD symptoms was significant when caregiver-reported sympathy was the mediator. These results provide evidence for the notion that sympathy requires interpretive understanding (e.g., [32]); that is, interpretive understanding allows the child to predict how others will respond to his/her behavior which may produce in the child the desire to improve the state of others or prevent

harm to others (i.e., concern), and this concern may then predict social behavior (i.e., decrease ODD symptoms).

Interestingly, caregiver-reported sympathy also moderated the effect of interpretive understanding on ODD symptoms. This moderation supports the partial mediation discovered. More specifically, interpretive understanding predicted caregiver-reported sympathy positively which then predicted ODD symptoms negatively. However, caregiver-reported sympathy also moderated the direct effect of interpretive understanding on ODD symptoms, such that only in cases in which caregiver-reported sympathy was high was interpretive understanding associated with ODD, with low interpretive understanding associated with higher ODD symptoms than high interpretive understanding. Therefore, a direct effect from interpretive understanding to ODD symptoms still existed even though the mediation was present. This moderated mediation is in line with the idea of sympathy as a motivator of social behavior [33, 39]. Moreover, it supports the idea that sympathy is underpinned by diverse antecedents [23]; in the case of mediation, we found that interpretive understanding underlies sympathy and, in the case of moderation, other variables not examined in the present study, for example, emotional regulation, may underpin sympathy. These different underpinnings may produce diverse pathways to ODD.

In sum, although caregiver- and child-reported sympathy directly predicted ODD symptoms negatively, caregiver-reported sympathy was also a mediator and moderator of interpretive understanding on ODD symptoms. Possibly, other- versus self-reports access different underpinnings of sympathy, producing different routes to the same outcome (i.e., ODD; see [55]).

Contrary to our expectation, we did not find a mediating effect of MEA on the relationship between ODD symptoms and interpretive understanding. This result contradicts the

assumption that interpretive understanding is required for MEA (e.g., [31]). However, in the present study, we utilized intensity of the attributed emotion and not just the positive (i.e., amoral) and negative (i.e., moral) distinction in the attributed emotion as in previous research (e.g., [46]). Thus, advanced perspective taking may predict the valence of an emotion but not the intensity of the emotional valence. Nonetheless, our findings support Malti et al. [13] who found no significant association between interpretive understanding and MEA in early and middle childhood, regardless of social behavior.

Another important finding was that less intense moral emotions in the exclusion domain predicted higher ODD symptoms. This suggests that exclusion is the domain which represents ODD the most in terms of emotional deficits, for example, hostility, defiance, and anger towards others. This is in line with social domain research which has shown that children's sociomoral development is domain-dependent in relation to social behavior [61]. Future studies are warranted to determine whether specific MEA domains mediate the relation between ODD symptoms and interpretive understanding.

In addition, we found that MEA intensity in the rule violation domain moderated the effect of interpretive understanding on ODD symptoms; only in cases in which there was low strength of MEA in the rule violation domain was interpretive understanding associated with ODD, with low interpretive understanding associated with higher ODD symptoms than high interpretive understanding. Hence, intensity of MEA in the rule violation domain may be an important motivating mechanism in the prevention of ODD symptoms.

Contrary to our expectation, our findings revealed no mediating role of MEA in the relation between ODD symptoms and sympathy. This finding contradicts the idea that sympathy is important for MEA (e.g., [32]) and the notion that a deficiency in MEA, resulting from a

deficiency in sympathy, motivates antisocial behavior. Rather, our finding provides evidence for the idea that sympathy and MEA develop in a distinct fashion and are likely to predict social behavior differentially over the course of development [33]. Nevertheless, the possibility of moral reasoning and/or specific domains of MEA mediating the relation between ODD symptoms and sympathy still exists and should be examined empirically in future studies.

Moreover, we did not find an interaction between sympathy and MEA on ODD symptoms. Again, this implicates that sympathy and MEA develop in a distinct fashion and have differential relations to antisocial behavior [33]. Our results contradict related findings in previous studies with prosocial behavior [38, 39]; yet, previous studies examined moral motivation. Furthermore, the predictors of antisocial and prosocial behavior may vary. Future research on the role of different moral emotions in prosocial and antisocial behavior is warranted.

In sum, the present study provides novel information on the social-cognitive and affective-moral antecedents of ODD symptoms in early and middle childhood. Nevertheless, this study was not without limitations. First, we measured ODD symptoms in a community sample of children. ODD symptomatology is found in community samples but with less intensity, or to a lesser degree; as per the *DSM-IV-TR* diagnosis criteria for ODD [1], “a criterion is met only if the behavior occurs more frequently than is typically observed in individuals of comparable age and developmental level and the disturbance in behavior must cause clinically significant impairment in social, academic, or occupational functioning” (p. 100). Hence, future studies are required in order to determine whether these findings replicate in clinically-referred children with ODD. Second, this study was cross-sectional and does not allow for causal conclusions; longitudinal studies are necessary to examine intra-individual differences in ODD

symptoms, interpretive understanding, and moral emotions. Third, we relied on caregiver measures of ODD symptoms; the reliability of measurement of ODD may be improved by utilizing multiple informants [55]. Future studies should include teacher-reports, as well as observational measures, of ODD. Fourth, we changed the response format on the CBCL items from a 3-point Likert scale to a 6-point Likert scale which may have impacted the psychometrics of the measure; however, considering our reliability coefficient (i.e., Cronbach's α), reliability among the scale items did not suffer. Furthermore, other researchers (e.g., [46]) have used a 6-point Likert scale format to assess children's behavior and it appears to work quite well. Fifth, the socioeconomic status of our sample, as determined by education level, was only representative of the community from which the sample was drawn; thus, the study necessitates replication using a more diverse sample with respect to socioeconomic status in order to determine if the results would hold. Sixth, as the majority of caregivers in our sample reported having a partner, it remains equivocal whether the same results would have been obtained had our sample been more varied with respect to family composition. Seventh, we used interpretive understanding as a measure of perspective-taking ability; interpretive understanding typically emerges at the age of 6 years [9] and, hence, this task may have been very complex for 4-year-olds, limiting the generalizability of our findings with respect to the age x interpretive understanding effect on ODD; assessments of both standard ToM and this more complex task may have added to the generalizability of the findings. Nevertheless, other studies have provided evidence that some children below the age of 6 years are indeed able to pass the interpretive understanding task (e.g., [62, 63]), and the interpretive understanding task has been used by other researchers in similar age groups and similar results have been obtained (e.g., [13]); thus, we believe that the interpretive understanding task is still a valid measure to assess advanced

perspective-taking skills in young children. Future research that utilizes perspective-taking measures with varying degrees of complexity is required to further disentangle the relations between ODD, perspective-taking, and moral emotions.

Despite these limitations, our study demonstrated the effects of interpretive understanding, sympathy, and MEA on ODD symptomatology in an ethnically diverse sample of 4- and 8-year-olds. Investigating the social-cognitive and affective-moral antecedents of ODD symptoms may contribute to a more profound understanding of the developmental precursors of ODD symptoms. Further empirical knowledge is critical for both theory and application.

Summary

The present study examined interpretive understanding, sympathy, and strength of moral emotion attribution in the prediction of oppositional defiant disorder symptomatology. Based on an ethnically diverse sample of 4- and 8-year-old children and one of their caregivers, we found evidence for the direct effects of interpretive understanding, sympathy, and strength of moral emotion attribution in the exclusion domain on oppositional defiant disorder symptomatology. There was also evidence for the mediating and moderating role of caregiver-reported sympathy on the relation between interpretive understanding and oppositional defiant disorder symptoms. Furthermore, strength of moral emotion attribution in the rule violation domain moderated the effect of interpretive understanding on oppositional defiant disorder symptoms. The findings emphasize the need to investigate both social-cognitive (i.e., advanced theory of mind) and affective-moral (i.e., sympathy, MEA) factors as antecedents of oppositional defiant disorder symptomatology.

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Table 1

Means (Ms) and Standard Deviations (SDs) of Main Study Variables by Age Group

Variable	4-Year-Olds (<i>n</i> = 67)		8-Year-Olds (<i>n</i> = 61)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Oppositional defiant disorder	2.59	0.99	2.49	0.99
Interpretive understanding	0.12	0.45	0.84	0.73
Caregiver-reported sympathy	4.61	0.83	4.79	0.81
Child-reported sympathy	2.81	2.42	6.64	2.54
Strength of MEA in rule violation domain	3.75	1.68	4.21	1.66
Strength of MEA in exclusion domain	3.53	1.52	4.19	1.41
Strength of MEA in not prosocial domain	3.92	1.62	4.68	1.37

Note. MEA = Moral emotion attribution.

Table 2

Correlation Matrix of Study and Control Variables (N = 128)

Variable	1	2	3	4	5	6	7	8	9
1. Oppositional defiant disorder	-								
2. Interpretive understanding	-.14	-							
3. Caregiver-reported sympathy	-.22*	.17	-						
4. Child-reported sympathy	-.22*	.32**	.13	-					
5. Strength of MEA in rule violation domain	-.15	.11	.17	.09	-				
6. Strength of MEA in exclusion domain	-.21*	.05	-.06	.25**	.42**	-			
7. Strength of MEA in not prosocial domain	.01	.22*	.05	.15	.43**	.52**	-		
8. Age group of child	-.05	.51**	.11	.61**	.14	.22*	.25**	-	
9. Sex of child	.15	.05	-.12	-.18*	-.06	.06	.04	-.08	-

Note. MEA = Moral emotion attribution. Age group was dummy-coded as 0 being the 4-year-old age group and 1 being the 8-year-old age group. Sex was dummy-coded as 0 being female and 1 being male.

* $p < .05$. ** $p < .01$.

Table 3

Hierarchical Multiple Regression Analyses Predicting Oppositional Defiant Disorder From Interpretive Understanding and Sympathy

Predictor	Source of reported child sympathy			
	Caregiver		Child	
	$\Delta R^2/\Delta F^2$	β	$\Delta R^2/\Delta F^2$	β
Step 1	.02/1.46		.02/1.46	
Age group		-.04		-.04
Sex		.15		.15
Step 2	.06/3.77*		.07/4.53*	
Interpretive understanding		-.14		-.17
Sympathy		-.19*		-.28*
Step 3	.04/4.98*		.02/2.55	
Interpretive understanding x sympathy		-.20*		-.15
Total R^2	.12**		.11*	
N	125		125	

* $p < .05$. ** $p < .01$.

Table 4

Hierarchical Multiple Regression Analysis Predicting Oppositional Defiant Disorder From Interpretive Understanding and Strength of Moral Emotion Attribution (MEA)

Predictor	$\Delta R^2/\Delta F^2$	β
Step 1	.04/2.17	
Age group		-.09
Sex		.16
Step 2	.09/2.67*	
Interpretive understanding		-.22*
Strength of MEA in rule violation domain		-.08
Strength of MEA in exclusion domain		-.26*
Strength of MEA in not prosocial domain		.17
Step 3	.05/1.94	
Interpretive understanding x strength of MEA in rule violation domain		-.22*
Interpretive understanding x strength of MEA in exclusion domain		-.14
Interpretive understanding x strength of MEA in not prosocial domain		-.03
Total R^2	.17*	
N	113	

* $p < .05$.

Table 5

Parameter Estimates (Standard Errors) for the Mediation Models

Model	Oppositional defiant disorder (Outcome variable)				
	Path a	Path b	Direct effect (Path c')	Indirect effect	Total effect
1 IV IU; Med S	0.17* (0.08)	-0.22* (0.08)	-0.12 (0.10)	-0.04* (0.03)	-0.15 (0.10)
2 IV IU; Med CS	0.02 (0.08)	-0.24* (0.09)	-0.15 (0.10)	-0.00 (0.02)	-0.15 (0.10)
3 IV IU; Med MEA	0.02 (0.14)	-0.16 (0.12)	-0.15 (0.10)	-0.00 (0.03)	-0.15 (0.10)
4 IV S; Med MEA	0.01 (0.11)	-0.16 (0.13)	-0.23* (0.08)	-0.00 (0.02)	-0.23** (0.08)
5 IV CS; Med MEA	0.13 (0.14)	-0.15 (0.11)	-0.22* (0.09)	-0.02 (0.03)	-0.24* (0.09)

Note. IV = Independent variable. Med = Mediator. IU = Interpretive understanding. S = Caregiver-reported sympathy. CS = Child-reported sympathy. MEA = Strength of moral emotion attribution. In Models 3, 4, and 5, MEA was a latent variable composed of strength of MEA in the rule violation, exclusion, and not prosocial domains; initial factor analysis confirmed that the variables loaded onto one factor.

For all models: Path a: IV → Med. Path b: Med → Outcome variable. Direct effect (Path c'): IV → Outcome variable. Indirect effect = Path a x Path b. Total effect = Direct effect + Indirect effect.

* $p < .05$. ** $p < .01$.

Figure Captions.

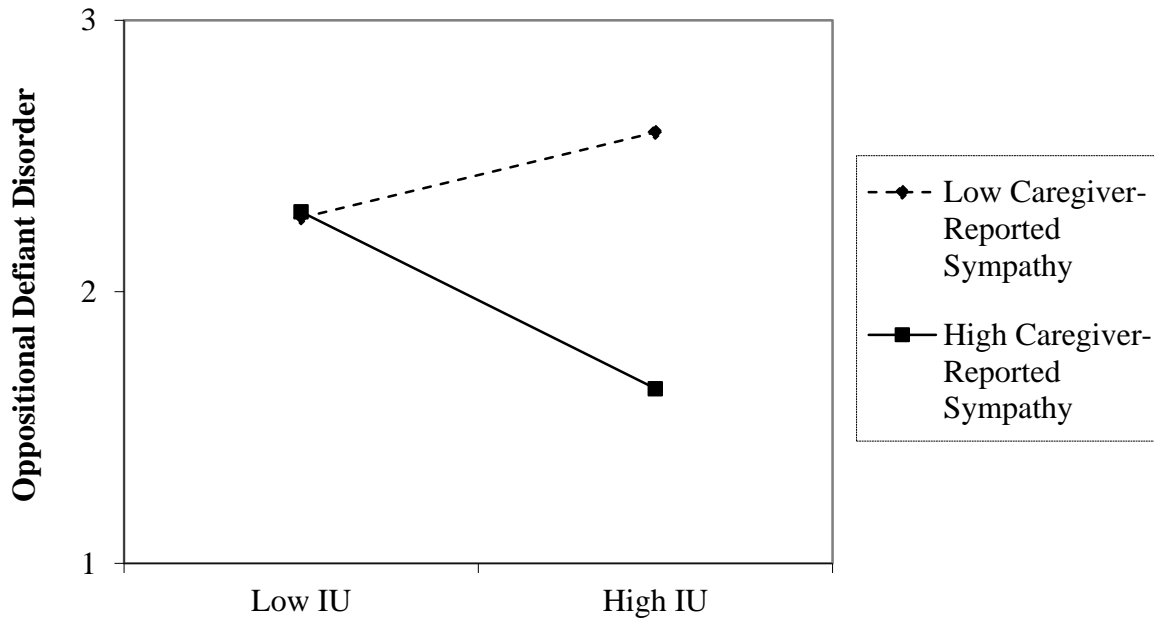


Figure 1. IU = Interpretive understanding. Caregiver-reported sympathy moderates the effect of interpretive understanding on oppositional defiant disorder. Age group and sex were control variables (not shown in figure). The solid line reflects a significant simple slope; the dashed line reflects a nonsignificant simple slope.

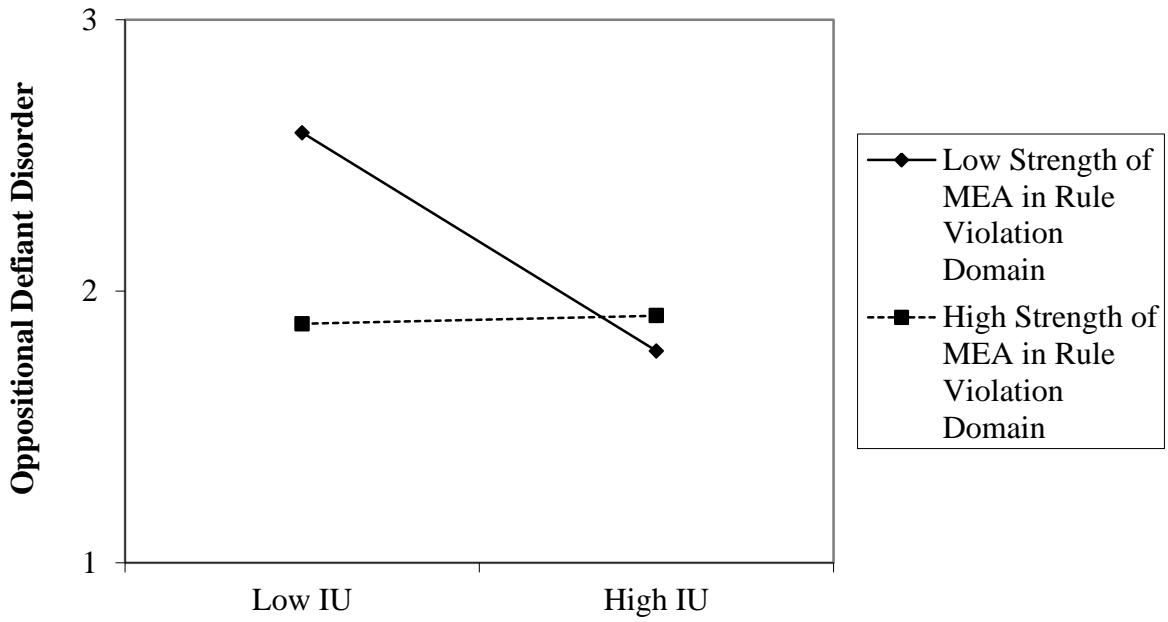


Figure 2. IU = Interpretive understanding. MEA = Moral emotion attribution. Strength of MEA in the rule violation domain moderates the effect of interpretive understanding on oppositional defiant disorder. Age group and sex were control variables (not shown in figure). The solid line reflects a significant simple slope; the dashed line reflects a nonsignificant simple slope.