



# The Mediation Effect of Affect Dysregulation on the Association Between Attachment to Parents and Oppositional Defiant Disorder Symptoms in Adolescents

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## Abstract

Oppositional defiant disorder (ODD) is a childhood disorder, commonly occurring in early school aged children with some symptoms becoming normative in adolescence (e.g., irritability, disagreeing). Affect dysregulation is a risk factor in the development of ODD. Affect regulation is nurtured within parent–child relationships, thus disruptions to attachment may derail children’s capacity to develop adaptive affect regulation, increasing the risk for ODD. Using a high-risk sample of adolescents, we investigated the association between attachment anxiety and attachment avoidance with ODD through affect dysregulation. Attachment anxiety, but not avoidance, was associated with affect dysregulation and ODD. Affect dysregulation was found to fully mediate the relationship between attachment anxiety and ODD concurrently and prospectively. Similar findings have been demonstrated among children; results show that attachment anxiety, and its effects on affect dysregulation, are associated with ODD symptoms well into adolescence.

**Keywords** Adolescence · Oppositional defiant disorder · Affect dysregulation · Attachment

Oppositional defiant disorder (ODD) is often regarded as a childhood specific disorder, most commonly occurring in early school aged children [1] with some symptoms becoming fairly normative behavior in adolescence (e.g., irritability, disagreeing with adults). However, high levels of ODD symptoms in adolescence have been negatively associated with critical developmental tasks such as academic achievement [2, 3], emotional development, and quality of peer relationships [2, 4–6]. Understanding what puts adolescents at risk of developing ODD symptoms is critical in the prevention and intervention of this disorder. Recently, Cavanagh et al. [7] proposed that ODD may be a disorder of regulation, and pointed to lack of affect regulation as a key risk factor in the development of ODD symptoms. The relationship between insecure attachment and affect regulation has been studied extensively in infancy and early childhood [8], however, research on the link between attachment and affect

regulation in adolescence is limited, especially in relations to negative outcomes, such as ODD symptoms. The aim of the current study is to explore whether affect regulation serves as a mediating process through which attachment insecurity is associated with an increased risk of ODD symptoms in mid to late adolescence.

Affect regulation is defined in this paper as the ability to modulate one’s emotions, moods, and feelings [9]. As there is greater integration between biological and psychological systems with development, children’s capacity for regulation increases from middle childhood into adolescence [10]. This integration allows for more emotional understanding and adaptive coping [10]. Affect regulation has been conceptualized as both a protective and risk factor for psychopathology [11]. Strong affect regulation skills are associated with adaptive behavior. When a child is regulated, they have the psychological resources available to help make decisions and respond to situations appropriately [12]. In contrast, poor affect regulation skills, or ‘affect dysregulation’ has been associated with mental health problems including depression [13], anxiety, borderline personality disorder, antisocial personality disorder, and post-traumatic stress disorder [14].

Children’s attachment relationships with their primary caregivers are central to the development of their ability

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to regulate affect [15, 16]. Secure attachment relationships develop when parents are sensitive and responsive to their children's emotional distress [17, 18] and are able to validate their child's emotions. Recognition and validation of children's emotions is thought to be the basis for the later development of affect regulation [19], which in turn protects children from the development of psychopathology. Secure attachment has been found to be related to affect regulation in infants [20], children [21], and adults [22].

There has also been evidence linking attachment and affect regulation in adolescence. For example, Pascuzzo et al. [23] found that more securely attached youth used more emotion-oriented coping strategies. Likewise, in a juvenile justice sample, secure attachment was related to adaptive affect regulation [24]. A recent meta-analysis found overall attachment security to be associated with stronger affect regulation in children and adolescents with an effect size of  $r=0.19$  [25]. Additionally, both attachment avoidance and attachment ambivalence (also recognized as attachment anxiety) was related to weaker affect regulation ( $r=-0.14$  and  $r=-0.33$ , respectively). Numerous other studies have found that affect regulation mediates the relationship between attachment and psychopathology, further supporting the association between attachment and affect regulation. These studies have found that higher degrees of affect dysregulation mediate the relationship between insecure attachment and adolescent psychopathology [e.g., 24, 26]. Thus, there is evidence across development, including adolescence, that the quality of interactions within secure parent-child relationships promotes the adaptive expression and regulation of affect.

Secure attachment has been found to predict lower levels of ODD symptoms in adolescents, independent of sociodemographic factors (e.g., gender, ethnicity, maternal level of education, family income) and specific parenting variables (i.e., positive/negative parenting, poor monitoring) [27]. Conversely, insecure attachment has been linked to externalizing problems, including ODD symptoms in high-risk adolescent girls [28]. Specifically, girls who exhibited externalizing problems had less secure attachment relationships with their parents. As attachment security in their relationships with parents decreased over time, behavior problems increased into late adolescence [28]. Complicating these findings, however, is the growing evidence of two distinct dimensions of ODD symptoms, an irritable and behavioral dimension [29, 30]. The irritable dimension has been found to be associated with internalizing problems, while the behavioral dimension has been found to predict externalizing problems from mid childhood to early adolescence [30, 31]. The irritable dimension has also been found to predict internalizing problems and the behavioral dimension to predict externalizing problems into early adulthood [32]. Using a similar measure of ODD symptoms as the current study,

Leadbeater and Homel [33] found the irritable dimension to predict internalizing problems and the behavioral dimension to predict conduct problems in early adulthood. However, the authors found that the irritable and behavioral dimensions of ODD both predicted internalizing symptoms more strongly than conduct problems cross-sectionally. Therefore, it is unclear whether ODD symptoms in adolescence may be indicative of an internalizing or externalizing disorder trajectory.

A recent meta-analysis on the relationship between attachment and disruptive behavior disorders confirmed that insecure and disorganized attachment styles are more likely to be present in children and adolescents with externalizing problems such as ODD and conduct disorder (CD) than in the general population [34]. Importantly, this meta-analysis was careful to include measures examining attachment organization and to exclude studies that used broad measures of parent-child relationship quality or affect regulation skills as a measure of attachment. This provides stronger evidence that attachment is the specific mechanism examined rather than the parent-child quality more broadly. Likewise, a comprehensive review found attachment security to be consistently related to anxiety and depressive symptoms in children and adolescents [35].

Although there is a consensus about the association between attachment insecurity and ODD symptoms, the mechanisms that underlie this relationship are less clear. As noted earlier, secure attachment promotes adaptive affect regulation and buffers against multiple forms of psychopathology [36] and specifically the emergence of ODD symptoms [7, 37]. Additionally, evidence supports the view that ODD is a disorder of regulation, with one study finding that both ODD symptoms and affect dysregulation load onto a single factor [7]. Given the established relationship between attachment security and affect regulation on one hand, and the relationship between in affect dysregulation and ODD symptom on the other, it stands to reason that affect dysregulation may mediate the relationship between attachment and ODD symptoms. There is support for this model in younger populations: more securely attached toddlers and school-aged children are better able to regulate their emotions than insecurely attached children, which is, in turn, related to lower levels of conduct problems and oppositional symptoms [38, 39]. This model has not been examined among adolescents in relation to ODD symptoms; however, research has shown that securely attached adolescents are better able to regulate their emotions, which also makes internalizing psychopathology less likely [38, 40].

The current study addresses two gaps in the literature. First, while there is emerging evidence of the association of attachment security and affect regulation and ODD symptoms in adolescents, this research is only beginning to focus on the unique roles of attachment anxiety versus attachment

avoidance, which are well established as two fundamental factors underlying attachment security. Current research suggests that attachment anxiety and avoidance differ in their associations with internalizing and externalizing symptoms: attachment anxiety has been associated with internalizing symptoms [35], whereas attachment avoidance has been associated with externalizing symptoms [41, 42]. As such, current empirical efforts focused on insecure attachment and their relationship with pathology should carefully examine the relevance of these insecure attachment styles in the research questions. Second, research has yet to examine the relationship between adolescent attachment, affect regulation and the two ODD dimensions as noted earlier [30–32]. This is of particular interest given the association between the irritable dimension and internalizing problems and the behavioral dimension and externalizing problems [29, 31, 33].

In this study we investigated the associations between parent–adolescent attachment anxiety and attachment avoidance, affect regulation, and ODD symptoms in a high-risk sample. Extending past research, we examined the links between two forms of insecure attachment, anxious and avoidant, and affect dysregulation with ODD symptoms concurrently and prospectively over 2 years. Given the increasing support for the two dimensions of ODD symptoms, we also explored whether the association between attachment and ODD differed for irritable and behavioral symptoms. We then examined whether affect dysregulation mediated this association. We did not have an a priori hypothesis as to whether attachment anxiety or avoidance would be related to ODD symptoms overall. As previous literature has linked ODD irritable symptoms with internalizing symptoms [35], and attachment anxiety has been shown to predict internalizing symptoms [41, 42] we hypothesized that attachment anxiety would be related to ODD irritable symptoms. Likewise, as ODD behavioral symptoms and attachment avoidance have been associated with externalizing problems, we predicted attachment avoidance would be related to ODD behavioral symptoms. We also hypothesized that affect dysregulation would be related to ODD symptoms overall, as well as both the irritable and behavioral dimension. Finally, we predicted that affect dysregulation would mediate the relationship between attachment anxiety and avoidance and ODD symptoms overall, and both dimensions of ODD symptoms.

## Methods

### Participants

Participants (N = 179; 46% female) were from a longitudinal project examining gender and psychopathology among

high-risk youth conducted in Vancouver and the Lower Mainland in British Columbia, Canada. The average age of participants was 15.34 years ( $SD_{age} = 1.53$ ; 12–18 years old) at Time 1 and 17.86 ( $SD_{age} = 1.48$ ; 14–22 years old) at Time 2, approximately 2 years later. The sample was primarily Caucasian (65.4%), with 22.2% self-identifying as Indigenous, and 10.7% self-identifying as African/Caribbean, Asian, Hispanic or another ethnicity. Approximately half (55%) of the participants were drawn from centers serving youth involved in the justice system and the remainder were drawn from a provincial assessment center that received referrals for youth with serious behavior problems and associated comorbid conditions. Youth reported on their mother's level of education; 19.2% indicated that their mother finished college, university, or vocational training; 14.4% completed some college or university; 35.9% completed high school; and 13.8% had not completed high school; 16.8% of respondents did not know how much education their mother had completed. Over half of the participants were in the legal care of their biological parents (57.5%); while others lived with family members (5.5%), foster parents (23.7%), or were living independently through youth-agreements and government support (2.2%); 11.1% did not specify their living circumstances.<sup>1</sup> Exclusionary criteria included IQ below 70 and the presence of Axis I psychotic symptoms based on file review. All research protocols and procedures received approval from the Office of Research Ethics at Simon Fraser University. Informed and voluntary parental consent and youth assent were secured at each data collection time until youth reached age 19, at which point they alone provided consent. Youth received a modest honorarium for their participation.

### Measures

*The Adolescent Attachment Anxiety & Avoidance Inventory* [AAAAI; previously referred to as the Comprehensive Adolescent Parent Attachment Inventory; 43]: The AAAAI is a self-report measure of adolescent-parent attachment adapted from Brennan, Clark and Shaver [44] Experiences in Close Relationships (ECR) scale to assess attachment avoidance and attachment anxiety dimensions in parent–adolescent relationships. Youth report on perceptions of their attachment with their mothers<sup>2</sup> at Time 1 by rating each statement on a 7-point scale ranging from 1—*Disagree strongly* to 7—*Agree strongly*. Consistent with the ECR and other

<sup>1</sup> No differences between the sites, or indicators of socio-economic status were found for any variable of interest.

<sup>2</sup> While the current paper focused on attachment with mothers for ease of reporting, we note here that models in the analysis were the same for mothers and fathers.

self-report measures of attachment, two superordinate factors emerge from the AAAAI: attachment anxiety (e.g., “I need a lot of reassurance that my mother loves or cares for me”;  $\alpha = 0.79$  from the current sample) and attachment avoidance (e.g., “I find it hard to depend on my mother.”  $\alpha = 0.70$  from the current sample). Other research has also shown the AAAAI has solid psychometric properties [45] and similar adaptations of the ECR have also shown to possess strong psychometric qualities [46, 47]

**Affect Regulation Checklist [ARC; 48]:** The Affect Regulation Checklist is a 12-item self-report measure adapted from published scales of emotion regulation [49] and augmented with supplementary items to tap into three aspects of affect regulation in adolescents. These aspects include two maladaptive factors (i.e., lack of control and suppression of affect) and one adaptive factor (i.e., reflection). The three-factor structure of the ARC has been confirmed in previous research [50] and the ARC yields three subscale scores, each corresponding to the theoretically and statistically supported factors of affect regulation. The ARC’s items were designed to assess regulatory processes independent of affect. Hence, items do not refer to specific emotions and avoid confounding regulatory processes with emotional states (e.g., “I have a hard time controlling my feelings”). Scale means are derived from responses on a three-point scale (0 = not like me to 2 = a lot like me). Good reliability has been previously established [13, 45]. In the current study, we focused on the affect dysregulation subscale (e.g., “It’s very hard for me to calm down when I get upset”), given its putative role as a mechanism in the link between insecure attachment with parents and the presence of ODD symptoms. Affect dysregulation was measured during both time points, with good reliability at Time 1 ( $\alpha = 0.80$ ) and Time 2 ( $\alpha = 0.79$ ).

**Ontario Child Health Study-Youth Self-Report [OCHS; 51]** The OCHS is a self-report measure used to assess ODD symptoms. This scale was developed based on the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition [DSM-IV; American Psychiatric Association, 52] and descriptions of childhood disorders and items contained in the widely used and well-validated Youth Self-Report [53]. All items are scored on a 3-point scale (0 = never or not true of me to 2 = often or very true of me), and ask about symptoms occurring in the present or in the past six months (e.g., *I am easily annoyed by others, and I am angry and resentful, I argue a lot, and I am defiant and talk back to people*). The scale had good reliability at times 1 and 2 ( $\alpha = 0.81$  and 0.80 respectively).

The ODD scale was also calculated using a two-factor model, splitting the items based on previously established constructs. Emotional items included “I have a hot temper”; “I am easily annoyed by others” and “I am angry and resentful”. Behavioral items included “I get back at people”, “I blame others for my mistakes”, “I do things to annoy others”,

“I argue a lot” and “I am defiant and talk back to people”. The two-factor model fit the data well in the current sample ( $\chi^2(19) = 30.14, p = 0.05, RMSEA = 0.06; CFI = 0.96$ ) and showed acceptable reliability ( $\alpha$ s range from 0.67 to 0.74).

## Missing Data

Analyses were conducted using MPlus 8 [54] and the Statistical Package for the Social Sciences 26.0 [SPSS; 55]. Of the 179 youth participating in Wave 1, 55% were retained at Time 2. This attrition rate is consistent with other research with similar high-risk populations [56]. Before completing the analyses, the impact of missingness was assessed by comparing participants who completed Time 2 with those who did not on demographic variables and scores on Time 1 measures. No significant differences were found on demographic variables, the level of initial maternal attachment anxiety, attachment avoidance, affect dysregulation, or ODD symptoms. There were no variables identified that were related to missingness. In addition, Little’s Chi-square ( $\chi^2(32) = 28.16, p = 0.66$ ) indicated data was missing completely at random.

Mplus 8 accounts for missing data using Full Information Maximum Likelihood Estimation (FIML) method [54]. This method assumes data are missing at random and uses all available data points to produce a vector of means and a covariance matrix that is model-dependent. This is considered to be one of the most robust and advanced methods of analyzing data with missing values. It has also been shown to be appropriate for use with longitudinal data and data missing due to attrition [57]. Comparison of variables of interest in our original data and FIML data revealed consistent estimates and associations among variables.

## Statistical Analysis

We first examined zero-order correlations to evaluate concurrent relationship between attachment anxiety, attachment avoidance, affect dysregulation, and ODD symptoms at both waves of data collection. Prospective and mediated associations were tested within a path analysis framework in Mplus 8 [54] controlling for gender in each model. Path analysis allows for testing of specified direct and indirect associations between variables of interest, considering all paths simultaneously [58]. Mediation path analysis was conducted with MODEL INDIRECT with a bootstrap in Mplus 8, which allows for a bias-corrected confidence interval (CI). Mplus 8 provides estimates for both direct and indirect pathways. A significant indirect pathway is indicated by a 95% CI that does not include 0. We created a dual mediation model, in which we tested whether Time 1 attachment anxiety had an indirect effect on Time 1 ODD symptoms as mediated through Time 1 affect dysregulation. In the same model,

**Table 1** Descriptive table for variables of interest

	<i>M (SD)</i>	Range	Skew (SD)	Kurtosis (SD)
T1 attachment anxiety	2.23 (1.67)	1–7	0.97 (0.19)	0.19 (0.39)
T1 attachment avoidance	3.72 (1.69)	1–7	0.34 (0.19)	0.19 (0.39)
T1 ODD symptoms	7.51 (3.52)	1–15	0.02 (0.19)	–0.83 (0.38)
T1 affect dysregulation	0.96 (0.60)	0–2	0.04 (0.19)	–1.07 (0.38)
T2 ODD symptoms	6.87 (3.49)	1–15	–0.06 (0.24)	–0.36 (0.48)
T2 Affect Dysregulation	2.83 (0.58)	0–2	0.17 (0.25)	–0.91 (0.49)
T1 ODD irritable	3.09 (1.62)	0–6	0.001 (0.19)	–0.84 (0.38)
T1 ODD behavioral	4.40 (2.92)	0–10	0.16 (0.19)	–0.64 (0.38)
T2 ODD irritable	2.92 (1.54)	0–6	–0.36 (0.24)	–0.59 (0.48)
T2 ODD behavioral	3.94 (2.33)	0–9	0.16 (0.24)	–0.68 (0.48)

**Table 2** Correlations among variables of interest

	1	2	3	4	5	6	7	8	9	10
1. T1 Attachment Anxiety										
2. T1 Attachment Avoidance	0.157*									
3. T1 ODD symptoms	0.23**	0.07								
4. T1 Affect Dysregulation	0.301**	0.09	0.52***							
5. T2 ODD symptoms	0.06	0.13	0.52***	0.37***						
6. T2 Affect Dysregulation	0.18*	0.05	0.23*	0.39***	0.44***					
7. T1 ODD irritable	0.19*	0.11	0.94***	0.51***	0.49***	0.21*				
8. T1 ODD behavioral	0.24**	–0.01	0.79***	0.37***	0.42***	0.16*	0.53***			
9. T2 ODD irritable	0.05	0.14	0.45***	0.33***	0.94***	0.44***	0.46***	0.29***		
10. T2 ODD behavioral	0.06	0.09	0.51***	0.35***	0.82***	0.32***	0.41***	0.53***	0.60***	
11. Gender	0.24*	0.04	0.07	0.11	–0.08	0.28*	0.05	0.02	–0.10	0.03

ODD oppositional defiant disorder

\*\*\* $p \leq 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$

we tested whether Time 1 attachment anxiety had an indirect effect on Time 2 ODD symptoms using a serial mediation pathway through the stability of affect dysregulation from Time 1 to Time 2. Autoregressive relationships were included (e.g., Time 1 attachment regressed onto Time 2 affect regulation and ODD symptoms). A strong indicator of a mediation effect occurs when there is an indirect effect and a non-significant direct effect from the independent variable to the outcome [58].

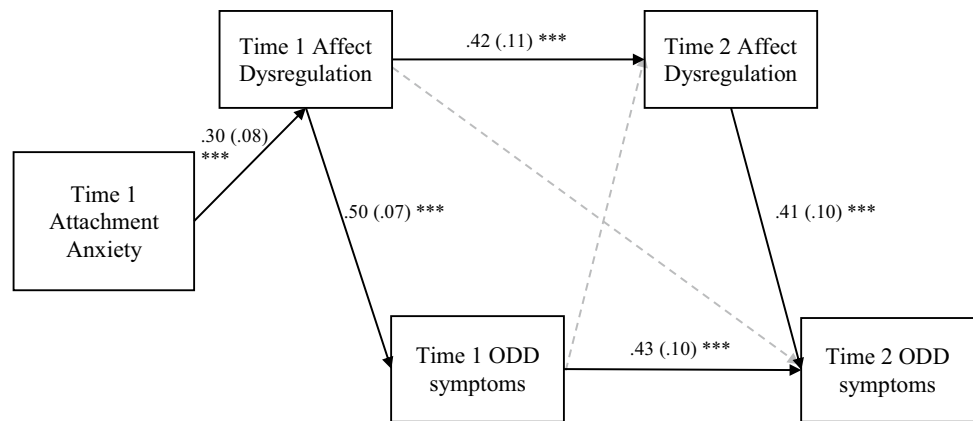
Models were evaluated according to the most commonly used critical values for the fit indices. Chi-square is a discrepancy function and represents the differences between the observed covariance matrix and the predicted covariance matrix. A non-significant chi-square is regarded as an acceptable model, such that the observed covariance matrix is similar to the predicted matrix. The root mean square error of approximation (RMSEA) is a parsimony-adjusted index which favors a parsimonious model. In addition, RMSEA allows for confidence intervals to be calculated to test for both a perfect fit and a close fit. A RMSEA is considered close if it is below 0.05, and acceptable if it is between 0.05

and 0.08 [59]. The Comparative Fit Index (CFI) is one of the most commonly used incremental fit indices, which attempts to assess the improvement of the proposed model to the null model, where all relationships are assumed to be 0 [59]. The CFI is also less affected by smaller sample sizes. A cutoff of 0.90 to 0.95 is suggested for an acceptable fit for the CFI [59].

## Results

Descriptive statistics for each variable of interest can be found in Table 1. All correlations between variables of interest can be found in Table 2. Age was not associated with any variables of interest (all  $p > 0.05$ ). Establishing the relationship from independent to mediator variable, attachment anxiety was related to affect dysregulation at Time 1 and 2. Attachment anxiety was also related to ODD symptoms at Time 1, however not at Time 2. Affect dysregulation was related to ODD symptoms concurrently at Time 1 and 2. Affect dysregulation at Time 1 was also associated

**Fig. 1** Longitudinal mediation model for attachment anxiety to ODD symptoms at Time 2. *Note* Not pictured, gender included as control variable. Dotted line indicates non-significant pathway. \*\*\* $p \leq 0.001$ , \*\* $p < 0.01$



with ODD symptoms at Time 2. Attachment avoidance was not associated with either affect dysregulation or ODD symptoms at Time 1 or Time 2. Gender was associated with attachment anxiety and affect dysregulation at Time 2 and was retained as a control variable. Age was not related to any of the variables of interest.

### Does Affect Dysregulation Mediate the Association Between Attachment Anxiety to ODD Symptoms?

A mediation path analysis model was created to see whether affect dysregulation mediated the effect of maternal attachment anxiety concurrently at Time 1, as well as longitudinally from Time 1 to Time 2 (see Fig. 1). As attachment avoidance was not related to the outcome variables, models only examined the mediational effect of affect dysregulation on attachment anxiety. Additionally, as age was not related to any of the variables, it was removed from the analysis. Gender was retained as a control variable. To determine pathways independent of previous levels of functioning, ODD symptoms at Time 1 were held constant for Time 2 ODD symptoms. The model was also developed to account for the effect of attachment anxiety on affect dysregulation from Time 1 to Time 2. Autoregressive pathways from affect dysregulation and ODD symptoms at Time 1 to Time 2 were included. Time 1 attachment anxiety was not associated with Time 2 affect dysregulation or ODD symptoms; thus, those pathways were removed from the analysis.

Controlling for gender, model fit statistics for the model were good ( $\chi^2(1) = 0.043$ ,  $p = 0.87$ , RMSEA = 0.00; CFI = 1.00), and accounted for 28% of the variance in ODD symptoms at Time 1 and 41% of the variance in ODD symptoms at Time 2. In support of a full mediation, attachment anxiety was no longer associated with ODD symptoms at Time 1, and the indirect path from attachment anxiety to concurrent ODD symptoms through affect dysregulation was significant. ( $\beta = 0.31$ , CI [95%] 0.14, 0.51). In addition, while controlling for Time 1 ODD symptoms, maternal attachment anxiety was found to have an indirect effect on

ODD symptoms at Time 2 through a double mediation from affect dysregulation at Time 1 to Time 2 ( $\beta = 0.09$ , CI [95%] 0.02, 0.20).

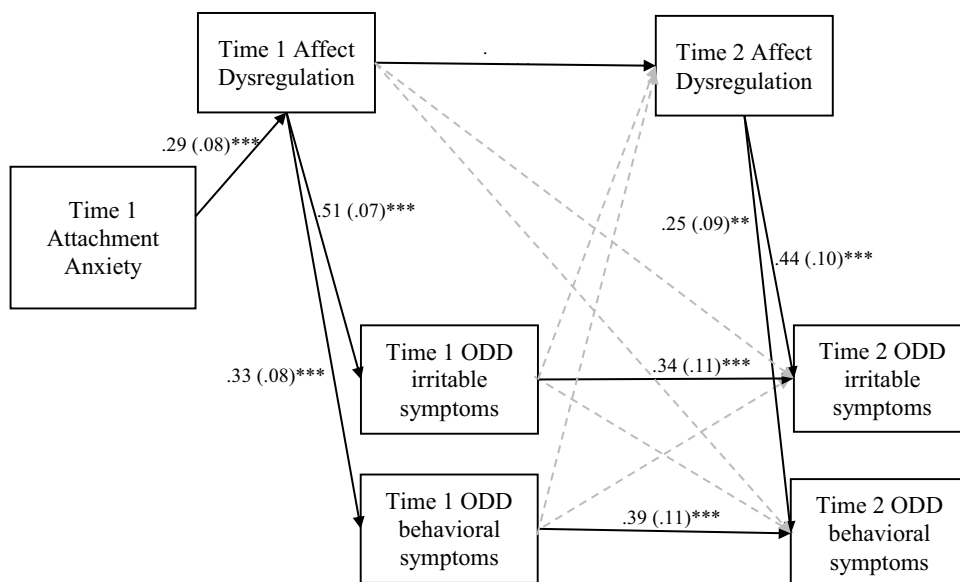
### Does the Model Differ for ODD Irritable and Behavioral Symptoms?

In the second model, ODD was split into irritable and behavioral symptoms (see Fig. 2). Similar to the first model, ODD irritable and behavioral symptoms at Time 1 were held constant for Time 2. Time 1 emotional symptoms were also set to predict Time 2 behavioral symptoms and vice versa. Controlling for gender, the model had good fit ( $\chi^2(7) = 1.67$ ,  $p = 0.97$ , RMSEA = 0.00; CFI = 1.00). The model accounted for 27% of variance in Time 1 ODD irritable symptoms, 16% of Time 1 ODD behavioral symptoms, 38% of Time 2 ODD irritable symptoms, and 33% of Time 2 ODD behavioral symptoms. The indirect effect from attachment anxiety to Time 1 ODD irritable symptoms was significant ( $\beta = 0.22$ , CI [95%] 0.01, 0.10). This was also the case for Time 1 ODD behavioral symptoms, but to a lesser degree ( $\beta = 0.08$ , CI [95%] 0.004, 0.06). Attachment anxiety had a significant indirect effect on Time 2 ODD irritable symptoms ( $\beta = 0.07$ , CI [95%] 0.01, 0.10), but not on Time 2 ODD behavioral symptoms ( $\beta = 0.02$ , CI [95%] -0.003, 0.08).

## Discussion

This study focused on the concurrent and longitudinal associations between attachment anxiety and avoidance, affect dysregulation, and ODD symptoms from mid- to late-adolescence in a high-risk sample. Although attachment and affect dysregulation have been examined separately as risk factors in the development of ODD symptoms, we examined them together, modelling the pathway from insecure attachment to ODD symptoms through affect dysregulation. We further disaggregated attachment anxiety and avoidance, investigating their effects separately in relation to ODD symptoms.

**Fig. 2** Longitudinal model for attachment anxiety to ODD irritable and behavioral symptoms at Time 2. *Note* Not pictured, gender included as control variables. \*\*\* $p \leq 0.001$ , \*\* $p < 0.01$ . Dotted line indicates non-significant path



This distinction was important in the current study as attachment avoidance was not found to be related to affect dysregulation or ODD symptoms. The current analysis indicates that attachment anxiety with mothers was related to ODD symptoms. Importantly, and as predicted, this association was mediated through adolescents' affect dysregulation concurrently and longitudinally. We furthered this model by examining the mediational effect of affect dysregulation on ODD irritable and behavioral symptoms. We found significant indirect effects from attachment anxiety to ODD irritable symptoms at Time 1 and two years later at Time 2. Although we found a small indirect effect for ODD behavioral symptoms at Time 1, this indirect effect was no longer significant at Time 2.

Building on findings of similar effects in childhood, the current study demonstrates that attachment anxiety with mothers continues to influence ODD symptoms from mid- to late-adolescence through its effects on affect dysregulation. This finding is particularly important as ODD symptoms have been found to interfere with adolescent health outcomes, including academic achievement, social and emotional development [2, 4–6]. High levels of ODD symptoms are viewed by parents, teachers and peers as irritating and disrespectful, increasing risk of social rejection from peers, and deepening conflict in relationships with adults [60]. Rejection by peers and adults can perpetuate and deepen adolescents' attachment insecurity, increasing their sense of social alienation. It also curtails corrective experiences and opportunities for acquiring more adaptive affect regulation strategies. This puts youth at risk for developing other forms of psychopathology including anxiety, depression and substance use, which can continue well into adulthood [60, 61].

Our study highlights the continued importance of the attachment relationship with parents well into adolescence.

The expression of anxious attachment can include fear and anger directed at the primary attachment figure [62], which may explain why anxious attachment was associated with affect dysregulation and ultimately ODD symptoms in the current study. Ainsworth and colleagues [63] posited that the negative behavior displayed by youth with anxious attachment provokes dismissing parents to respond, albeit harshly, thus reinforcing the behavior. Over time, a transactional pattern may evolve between parents and adolescents in which parents experience and interpret the adolescents' behaviors as oppositional, rather than seeing the underlying dysregulation and distress that is leading to the problem behaviors. With this misinterpretation, parents respond by attempting to contain and control their adolescents' problem behaviors, and distance themselves from the aversive interactions with their struggling adolescent [62, 64]. This pattern creates a low threshold for distress in the adolescent [62] and restricts opportunities for the adolescent to learn to tolerate and understand challenging emotions, thereby curtailing the development of skills that are essential for affect regulation and effective social interactions. The findings from the current study align with other research that has found affect dysregulation to mediate the relationship between attachment insecurity and other forms of psychopathology such as anxiety [65], borderline personality disorder [66], and substance use [67].

The lack of association between attachment avoidance and affect dysregulation and ODD symptoms is also of interest, especially given that previous research has found an association between these constructs [41, 42]. A theoretical explanation of this finding can be offered. Adolescents with avoidant attachment are more likely to minimize their negative emotions, particularly when they interact with their caregivers [68]. This masking of

negative emotions allows the youth to maintain a relationship with an attachment figure who may not respond to attachment behaviors, such as angry outbursts. In support of this notion, children with avoidant attachment have been found to engage in suppression of affect, which may lead to less intense experiences of affect dysregulation [45]. There is also evidence that attachment avoidance is related to dysregulation and suppression of specific emotions. Brenning and Braet [69] found that attachment avoidance was related to suppression of sadness, but not anger dysregulation. Thus, it could be that there are different associations between attachment avoidance and affect regulation based on specific emotions. By design, the current study used a measure of affect regulation that is distinct from specific emotions. Further research on dysregulation versus suppression of specific emotions in relation to attachment anxiety versus avoidance may provide insight into these complex processes. Further, irritability is noted as a symptom of both ODD and depression in adolescents. If ODD is best characterized as a disorder of affect regulation and not a uniquely externalizing disorder as previously suggested [7], then it makes sense that attachment anxiety, and not attachment avoidance, would relate to the irritability symptoms of ODD. In addition, research has found ODD irritable and behavior dimensions to be more strongly associated with internalizing problems rather than conduct problems [33] and internalizing problems have been linked to attachment anxiety [35], providing further support for this finding. This proposal remains tentative, however, pending future research.

Our study furthers the research on attachment, affect dysregulation, and ODD symptoms by exploring ODD irritable and behavioral symptoms. We found ODD irritable and behavioral symptoms to have similar correlations with attachment anxiety and affect dysregulation. Neither ODD irritable nor behavioral symptoms were associated with attachment avoidance. The effect of attachment anxiety was fully mediated by affect dysregulation concurrently for both ODD irritable and behavioral symptoms, as well as for ODD irritable symptoms from mid to late adolescence. This effect was not found for ODD behavioral symptoms. It is possible that the irritable dimension is more susceptible to changes in affect regulation; thus, attachment may have a greater impact on these symptoms. Several studies have indicated that the irritable dimension of ODD is associated with stress related disorders [i.e., anxiety and affective disorders; 70]. Differences in the predictors of the ODD dimension are important given that the irritable dimension has been linked to more severe psychopathological outcomes compared to the behavioral symptoms [29]. Both the irritable and behavioral dimensions have been linked to externalizing symptoms [29, 71], however, this result is not consistent [33]. Our results lend support to the notion that ODD symptoms may need to

be re-considered as not only a behavior disorder, but also as a broader indicator of psychopathology.

Our findings suggest important intervention implications. Interventions for behavior problems have focused primarily on behaviorally oriented interventions [72], which have demonstrated positive results in reducing the irritable and behavioral symptoms of ODD in school aged children [73]. The results from this study, nonetheless, suggest that relational interventions may represent effective intervention alternatives for these problems during adolescence. Interventions that focus on promoting parental sensitivity and enhancing the capacity of parents to serve as a safe haven and secure base for their adolescents are likely to reduce adolescents' distress and resulting irritability and oppositional behavior. Evidence suggests that attachment-based interventions, including *Connect Parent Group* [43, 45] and *Attachment-Based Family Therapy* [74] lead to increases in parental sensitivity and attachment security, promote the ability of adolescents to manage difficult emotions, and reduce both internalizing and externalizing problems in adolescents [45]. Attachment based interventions may also assist parents in recognizing their adolescents' behaviors as bids for connections rather than as a means to annoy or bother. There has been support for these programs in reducing ODD symptoms in youth including evidence that changes brought about by these interventions effectively decrease youths' affect dysregulation [45], and internalizing and externalizing symptoms [75, 76]. The effectiveness of attachment-based interventions on ODD symptoms requires further focused research. Further, examination of ODD dimensions may be warranted as there is preliminary evidence of differential treatment effects for the irritable and behavioral dimensions [73], however, ODD dimensions have yet to be explored in an attachment-based intervention.

## Limitations

Several limitations of the current study temper our conclusions. The nature of our high-risk sample allowed us to examine the associations between the variables of interest for those exhibiting high levels of oppositional behavior. Our results, however, may not generalize to a typically developing population. As is common in research involving high-risk samples, retention within the sample was a challenge; however, it was on par with other studies of high-risk samples [56]. We were able to employ robust missing data procedures, which indicated that basic findings were similar in the original and imputed data. In addition, participants who completed both time points of the study did not differ on Time 1 variable means and correlations from those who completed one time points. The study also relied only on self-report instruments to assess adolescents' experiences of attachment anxiety, affect regulation, and



oppositional-defiant emotional and behavioral symptoms. Multi-informant perspectives, such as from parents and teachers would have provided more information on the processes being analyzed. Finally, we were only able to test attachment at Time 1 and not at Time 2. It is possible that ODD symptoms predict later attachment anxiety longitudinally, perpetuating the cycle.

## Conclusion

Our study adds to the growing literature on the importance of the parent–child attachment relationship through adolescence. Although most research on attachment and ODD symptoms has focused on childhood [e.g., 39], our results suggests that similar mechanisms continue into adolescence. In addition, although it has been suggested that ODD is a disorder of affect regulation [7], our findings suggest that it may also be described as a behavioral expression of insecurity, namely anxious attachment, within the parent–child relationship. What continues to be unclear is whether ODD symptoms emerge in childhood and are persistent through adolescence or whether this is a disorder that can also emerge in adolescence. Longitudinal research from childhood through youth adulthood is needed to answer these questions.

## Summary

This study examined the associations between Oppositional Defiant Disorder (ODD), affect regulation, and attachment. ODD is a childhood disorder, commonly occurring in early school aged children with some symptoms becoming normative in adolescents (e.g., irritability, disagreeing). Affect dysregulation the ability to modulate one's emotions, moods, and feelings and has been found to be a risk factor in the development of ODD. Affect regulation is nurtured within parent–child relationships, thus disruptions to attachment may derail children's capacity to develop adaptive affect regulation, increasing the risk for ODD. Using a high-risk sample of adolescents, we investigated the association between two dimensions of attachment, anxiety and avoidance, with ODD through affect dysregulation. We furthered this by also examining two dimensions of ODD symptoms (i.e., irritable and behavioral symptoms). We found that attachment anxiety, but not avoidance, was associated with affect dysregulation and ODD. Affect dysregulation was found to fully mediate the relationship between attachment anxiety and ODD concurrently and prospectively over a 2-year period. These results were consistent for ODD irritable and behavioral symptoms concurrently. When examined longitudinally over 2 years, attachment anxiety continued to

have a significant indirect effect on irritable symptoms but not behavioral symptoms. Our study adds to the growing literature on the importance of the parent–child attachment relationship through adolescence. Although most research on attachment and ODD symptoms has focused on childhood, our results suggest that similar mechanisms continue into adolescence. In addition, although it has been suggested that ODD is a disorder of affect regulation, our findings suggest that it may also be described as a behavioral expression of insecurity, namely anxious attachment, within the parent–child relationship.

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## Compliance with Ethical Standards

**Conflict of interest** No authors have any conflicts of interest to declare.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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