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Oppositional Defiant Disorder Symptoms and Children's Feelings of Happiness and Depression: Mediating Roles of Interpersonal Relationships

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Abstract

Children with oppositional defiant disorder (ODD) are at increased risk for developing severe negative emotional outcomes later in life. However, positive emotional outcomes are less studied. In the current study, we examine the longitudinal effects of ODD symptoms on both children's feelings of happiness and depression from the dual-factor perspective of mental health. According to interpersonal perspectives of psychological symptoms, poor interpersonal relationships often play a critical role in the process of how children's behavioral problems develop into severe emotional outcomes. Thus, Children's relationships with parents, teachers, and peers were tested as mediators in these effects. Participants included 256 children with ODD were recruited in North, Middle, and South of Mainland China, along with their parents and teachers, and were assessed at three time points roughly two years apart. Results revealed that more severe ODD symptoms at Time 1 were related to more subsequent depressive symptoms and less happiness at Time 3. Moreover, father-child attachment, mother-child attachment, and peer relationships mediated the link between ODD symptoms and feelings of happiness while father-child attachment mediated the link between ODD symptoms and depressive symptoms. These findings reveal the importance of focusing on ODD-children's feelings of happiness as well as depression and highlight the critical role of improving interpersonal functioning for children with ODD in protecting children from developing emotional impairments. Moreover, among all interpersonal relationships, high quality of father-child relationship needs to be mostly valued for Chinese families of children with ODD.

Keywords Oppositional defiant disorder symptoms · Happiness · Depression · Interpersonal relationships · Longitudinal mediation

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1 Introduction

Oppositional defiant disorder (ODD) is among the most common developmental disorders in children, with community prevalence rates ranging between 2.6% and 15.6% (Boylan et al. 2007). Children who are diagnosed with ODD exhibit a recurrent pattern of emotional and behavioral symptoms, including angry/irritable mood, argumentative/defiant behavior, and vindictiveness toward authority figures (American Psychiatric Association 2013). To meet diagnostic criteria, these emotional and behavioral symptoms must negatively influence children's social, academic, or other important domains of functioning (APA 2013), especially in interpersonal functioning (Greene et al. 2002). Early ODD onset is believed to be a precursor to developing subsequent internalizing problems, such as depression (Burke et al. 2010; Copeland et al. 2009) and anxiety (Drabick and Kendall 2010; Lavigne et al. 2001). From the dual-factor model of mental health, positive indicators of wellbeing (i.e., happiness) should be incorporated with psychopathological symptoms to comprehensively determine an individual's emotional adjustment (Antaramian et al. 2010). Although the relationship between childhood ODD and psychological problems has been well documented (Hazell 2010), limited research is available on the influence of ODD symptoms on positive emotional outcomes, such as happiness.

According to interpersonal perspectives of psychological symptoms, poor interpersonal relationships often play a critical role in the process of how children's behavioral problems develop into severe emotional outcomes (Burke et al. 2014; Sullivan 2013). However, whether ODD symptoms in children develop into more depressive symptoms and low happiness through interpersonal relationships is less examined. In an effort to further understand ODD symptoms and treatment outcomes with children, our study aimed to examine the longitudinal effect of ODD symptoms on both childhood depression and happiness, taking into account the mediating effect of interpersonal relationships (i.e., father-child attachment, mother-child attachment, teacher-student relationship, and peer relationships). In particular, these children struggled with impaired interpersonal relationships (Burke et al. 2014), including interpersonal relationships as mediation is more valued (Kim and Choi 2014).

1.1 The Dual-Factor Model of Mental Health

Traditional mental health models focus on psychological problems and distress and oftentimes view mental health as the absence of psychological difficulties. Recently, challenges to this traditional model have emerged with increasing emphasis that the absence of mental illness does not equate with the presence of positive mental health (Antaramian et al. 2010). The recent emergence of positive psychology has placed increased emphasis on the positive factors, such as life satisfaction and happiness (Seligman and Csikszentmihalyi 2000). In this context, the dual-factor model of mental health incorporates both indicators of positive health, like happiness, and psychopathological symptoms, like symptoms of depression, to comprehensively determine an individual's psychological adjustment (Antaramian et al. 2010). Given the importance of positive indicators of emotional well-being, particularly acknowledging that high happiness contributes to determining remission of psychological symptoms and

preventing episodes of relapse in clinic or at high risk children (Albieri et al. 2009), both depression and happiness should be considered when examining effect of ODD symptoms on children's mental health and adjustment.

Despite the widespread use of the Center for Epidemiologic Studies Depression (CES-D) scale, the inclusion of the happiness items in calculating a total depression score poses problems of interpretation. It has been suggested (Joseph and Lewis 1998; Joseph 2006, 2007; Joseph and Wood 2010) that a score of zero in CES-D does not represent the absence of depression, but rather the high presence of happiness. Schroevers et al. (2000) examined the reliability and validity of the CES-D scale (Radloff 1977), and found that depressed affect items (e.g. 'I felt depressed') and positive affect items (e.g. 'I was happy', 'I enjoyed life') in this scale measured two relatively independent factors. Furthermore, Shafer (2006) identified 28 studies performing factor analysis of the CES-D between 1977 and 2001 (total $N = 22{,}340$) and presented meta-analytical evidence supporting separate negative and positive factors. Therefore, these items should not be combined into an overall sum score, but should be summed to create two affect scores: depression and happiness, respectively (Schroevers et al. 2000; Shafer 2006).

1.2 ODD Symptoms and children's Depression Symptoms and Happiness

ODD symptoms have long been observed to be the early precursor to developing emotional problems (Boylan et al. 2007; Nock et al. 2007; Lavigne et al. 2015), particularly developing into depression symptoms. A longitudinal research among boys in a clinical sample found that ODD symptoms are linked with higher depression symptoms in the following year (Burke et al. 2005). Similar patterns between ODD and later depression have emerged in longitudinal studies with girls (Hipwell et al. 2011). ODD symptoms in adolescence have been also found to predict depression in adulthood (Copeland et al. 2009). Similarly, within community samples, ODD symptoms have been found to have the strongest effect on depression symptoms, compared to conduct disorder and delinquency (Rowe et al. 2006).

Although limited research has focused on examining happiness in children with ODD, prior research has examined happiness in children with other externalizing problems, such as attention-deficit/hyperactivity disorder (ADHD), and emotional and behavioral problems (Martin et al. 2017; Peasgood et al. 2016). In particular, previous studies have discovered that children with ADHD are less happy with their lives overall, suggesting that ADHD is a precursor and possible risk factor for later poor quality of life (Peasgood et al. 2016). Sacks and Kern (2008) reported that children with emotional and behavioral problems had significantly lower quality of life scores in all domains than their peers without emotional and behavioral disorders. Similarly, the subjective well-being of children with emotional and behavioral problems was negatively influenced by maladaptive behaviors (Lynn et al. 2013; Martin et al. 2017). Compared with depressive symptoms, almost no attention has been paid to examining feelings of happiness in children with ODD. Interestingly, no previous study has applied the dual-factor perspective of mental health to the study of developmental outcomes in children ODD, and no study has focused on examining both depression and feelings of happiness as outcomes.

1.3 Interpersonal Relationships as Mechanisms between ODD Symptoms and Emotional Outcomes

According to interpersonal perspectives of psychological symptoms, it is common that behavioral problems develop into emotional outcomes through interpersonal processes (Sullivan 1968, 2013). Specifically, individuals with psychological symptoms frequently demonstrate a range of maladaptive behaviors during their interactions with others (Sullivan 1968, 2013), leading to their maladaptive interpersonal relationships; then these impaired interpersonal relationships are believed to promote and maintain depressive symptoms or any other emotional outcomes (Beck 1967; Paykel and Weissman 1973). These interpersonal perspectives suggest that behavioral problems strongly contribute to the development of depression or other emotional problems through poor interpersonal relationships. This developmental trajectory of ODD and later emotional problems may be particularly true for Chinese families in where interpersonal harmony is an important cultural value (Leung et al. 2011).

There is empirical support to suggest that maladaptive interpersonal interactions associated with ODD may be key mediators between the links of ODD symptoms and emotional difficulties (Burke et al. 2014; Lavigne et al., 2014). Specifically, for children with ODD, their irritable mood combined with defiant-oppositional behaviors strain and jeopardize interpersonal relationships (Burke et al. 2014; Cohn and Adesman 2015). Subsequently, these strained relationships tend to further exacerbate emotional problems and depressive symptoms (Lavigne et al., 2014). These findings implicate that children's feelings of happiness may be also influenced by ODD symptoms through a similar pathway.

1.4 Child ODD Symptoms and Interpersonal Relationships

Previous studies found that, children with ODD experience impairment across the majority domains of social functioning (e.g., school behavior, relationship with parents, activity with peers; Greene et al. 2002). Notably, these children struggle with impaired interpersonal relationships because of their oppositional, angry, resentful, and aggressive behaviors toward others (Burke et al. 2014). In comparison to children without ODD, children with ODD have more conflicts with their parents, which leads to poorer parent–child relationships (Munkvold et al. 2011; Theule et al. 2016). Children with ODD are also found to have problems with both father and mother relationships (Tseng et al. 2011).

At school, because of defiant, disobedient, and hostile behaviors, it is not surprising that teachers report impaired relationships with children who met diagnostic criteria for ODD (Hamilton and Armando 2008; Li et al. 2014; Munkvold et al. 2011). Although the targets of oppositional defiant behaviors are usually defined as authority figures such as parents and teachers, children with ODD often also exhibit hostility toward their peers (Frankel and Feinberg 2002; Taylor et al. 2006). For example, children with ODD prefer to react aggressively when solving peer-related problems (Coy et al. 2001), and these responses often result in negative peer interactions (Tseng et al. 2011). Generally, compared to typically developing children, children diagnosed with ODD tend to disrupt interpersonal harmony by displaying oppositional and aggressive behaviors (Burke et al. 2014; Tseng et al. 2011).

It is important to understand these behaviors in the context of culture. In the western culture of individualism, children's autonomy and independence were mostly respected and encouraged (Newland et al. 2010), so that western parents place relatively less emphasis on discipline and children's obedience and cooperativeness (Gershoff et al. 2010; Newland and Coyl 2010). In contrast, under the influence of Confucianism, interpersonal harmony and conflict avoidance was highly emphasized within collectivistic orientations in Chinese cultural values (Wei and Li 2013). Accordingly, Chinese families highly praise children who are modest, cooperative, and obedient by calling them "*Guai Hai Zi*" in Mandarin, which means "good" or "well-behaved" kids (Chen et al. 1998). Conversely, children who behave ODD symptoms are labelled as "bad kids." Their frequent disruption for interpersonal harmony is not well tolerated in China and is intensely disliked by both children and adults. Therefore, the interpersonal consequences of oppositional defiant symptons may be even worse for Chinese children than in other cultures (Xu et al. 2004).

1.5 Interpersonal Relationships and Depression Symptoms

Child emotional development occurs primarily within family and peer contexts as they are provided with learning and socialization opportunities through repeated interactions within these relationships, including parent-child attachment, peer relationships, and teacher-student relationships (Adrian, Zeman, Erdley, Lisa, & Sim, 2011). Although positive interpersonal relationships are understood to protect children from developing emotional difficulties, the opposite is also true, such that poor interpersonal relationships precipitate internalizing problems in childhood and adolescence, such as depression (Santini et al. 2015).

Well established among Western samples, poor parent-child attachment is linked with child depressive symptoms (Carter et al. 2014; Groh et al. 2012). Bowlby (1973, 1982) suggested that children with an insecure attachment develop a negative internal working model, which makes the development of a negative self-representation and interaction with others, resulting in high cognitive vulnerability to emotional problems. A study demonstrated a significant relationship between mother-child attachment and children's depressive symptoms, and a significant relationship between father-child attachment and boy's depressive symptoms (Branje et al. 2010). Although several studies suggest that father- and mother-child attachments have a comparable impact on children's depressive symptoms, relatively few studies examine their joint effect and differential predictive power (Brumariu and Kerns 2010).

Besides family, school is a significant social context that strongly influences children's development and adjustment, in which teacher–student relationships and peer relationships are two important aspects of a child's school experience. Strong evidence has implicated that teacher–student relationships influence childrens' individual adjustment (Buyse et al. 2008; Hamre and Pianta 2010). In particular, a growing body of research views positive teacher–student relationships as support for children who are at high risk for later maladjustment (Liu et al. 2015; Zimmerman and Arunkumar 1994). In addition, poor peer relationships contribute to problematic outcomes in childhood, such as depressive symptoms (Kiesner 2002). Negative peer relationships, like peer rejection, create risk for the development of depression (Alto et al. 2018; Nolan et al. 2003; Rudolph et al. 2008).

1.6 Interpersonal Relationships and Happiness Feelings

According to the bottom-up theory of subjective well-being (Brief et al. 1993), a person's level of happiness depends upon their experiences with those close to them. Based on this model, poor relationships with parents, teachers, and peers are noted as key risk factors contributing to children's low happiness (Navarro et al. 2017).

In line with previous studies, relationships with parents (both father and mother; Amato 1994; Theule et al. 2016; Videon 2005), teachers (Munkvold et al. 2011; Taylor et al. 2006), and peers (Demir et al. 2007; McClowry et al. 2013) have been demonstrated to have a significant impact on children' feelings of happiness (Migliorini et al. 2018; Walsh et al. 2010). For example, Migliorini and colleagues (Migliorini et al. 2018) found that secure relationships with a family member, satisfaction with friend, and being treated fairly and kindly by teachers all predict children's happiness. Navarro et al. (2017) analyzed how children define their own perceptions of happiness and the factors influencing it at their age and found that happiness is related to many factors, with relationships with family and friends being the top two, for both high and low-happy children (Navarro et al. 2017). Another qualitative longitudinal study showed that poor family relationships (i.e. not having anyone in the family to ask for help) and peer relationships (i.e. not communicating with friends) are regarded as the top two key factors contributing to feelings of low well-being (González-Carrasco et al. 2018).

Particularly, because interpersonal harmony is emphasized within collectivistic orientations in Chinese cultural values (Wei and Li 2013), child emotional outcomes would be more strongly influenced when the interpersonal relationships are impaired. Because parents, teachers, and peers are the main sources of children's social support, poor relationships may isolate children from support systems, which may place them at even higher risk for subsequent low happiness and more emotional problems in Chinese culture (Herres and Kobak 2015; Kochanska et al. 2015).

Based on the interpersonal perspectives of psychological symptoms and all empirical findings above, it is reasonable to assume ODD symptoms increase depressive symptoms and decrease happiness feelings through interpersonal relationships among Chinese families. However, the mediating role of interpersonal relationships has not been previously studies, particularly in the context of ODD and emotional well-being in Chines families. Moreover, the majority of studies have only focused on one interpersonal relationship, such as parent-child relationship, and have neglected to consider other important relationships, like teacher-student relationships or peer relationships. As such, the roles of children's interpersonal relationships with almost all significant others, including parents, teachers, and peers remain unrevealed.

1.7 The Present Study

The current study, conducted with children, teachers, and parents in Mainland China used a three-wave longitudinal design, focused on the developmental trajectories of ODD symptoms on children's depression and feelings of happiness, with examining interpersonal relationships as mediator variables. From the dual-factor perspective of mental health, we considered both positive and negative emotions and include both depression and feelings of happiness as outcomes. We hypothesize that ODD symptoms predicted more symptoms of depression and less feelings of happiness over time.

Second, we propose that the link between ODD symptoms and feelings of depression and happiness will be mediated by impaired interpersonal relationships with father, mother, teacher, and peers. The hypothesized model is presented in Fig. 1.

2 Method

2.1 Participants

First, all invalid questionnaires (e.g., questionnaires that exceeded 20% missing values) were excluded, yielding to 256 families ($n = 186$ boys) that completed the first year (T1) assessment. Of the 256 families who participated at Time 1, 245 (95.7% retention) participated at Time 2, and 208 (81.25% retention) participated at Time 3. Age of children at T1 ranged between 6 and 13 years old ($M = 9.52$, $SD = 1.60$) and a majority (79.4%) of the children were the only child in their families. Most mothers (76.5%) and fathers (78.1%) had high school diplomas or higher levels of educational attainment. Families were from diverse socioeconomic backgrounds; at T1, 56.1% families had a monthly income over 5000 Chinese Yuan (the average monthly income for Chinese urban families is about 5485 Chinese Yuan; National Health and Family Planning Commission of the PRC, 2015).

2.2 Procedure

Data for the current study were collected from 14 elementary schools in northern (Beijing), eastern (Shandong Province) and southwestern (Yunnan Province) areas in Mainland China between 2013 and 2014. After acquiring the support of the school principal and school psychologist from each primary school, invitation letters, consisting of a study introduction and an informed consent, were delivered through school psychologists to all of the class master teachers from grade one to six of their schools. A total of 187 master teachers signed the informed consent and agreed to participate in the study. Next, the 187 master teachers were asked to nominate children in their classrooms who

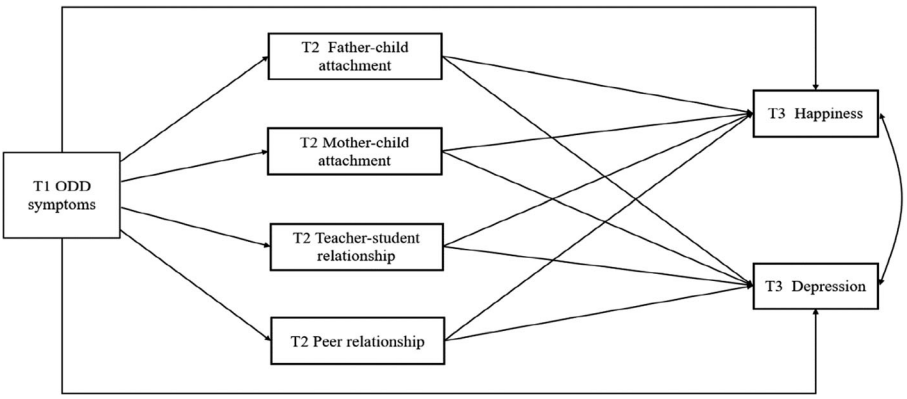

Fig. 1 The conceptual model: children's ODD symptoms impacted their feelings of happiness and depression through interpersonal relationships

might have ODD symptoms, based on the ODD symptom assessment sheet (Diagnostic and Statistical Manual of Mental Disorders, DSM-IV-TR; American Psychiatric Association, 2000). Only those children who were rated to display four or more symptoms could be considered as candidates for further investigation. Then, two clinical psychologists from Beijing Normal University interviewed class master teachers to individually confirm each candidate child's ODD diagnosis, using a semi-structured interview. Inclusion criteria were the following: (a) the child exhibits four or more symptoms of ODD described in DSM-IV-TR; (b) the child's identified symptoms have lasted for six months or more; and (c) the child demonstrates significant impairment across psychosocial functional domains.

Of the total 7966 children in the 14 participating primary schools, 305 (3.8%) were identified as displaying the characteristics of ODD, excluding those with intellectual disability and other disorders. Invitation letters and informed consent forms were sent to parents of the 305 identified children, the vast majority (282, 92.5%) signed the informed consent. Each participating child was asked to forward a package containing a parent survey to his or her primary caregiver. The primary caregiver (either the mother or the father) were invited to fill out the survey and to return their completed surveys to the class master teacher within one week. As instructed by the testers, children completed questionnaires in conference rooms or music rooms on weekdays at school. The class master teachers completed the questionnaires for evaluating the ODD symptoms of every child participant at their office. Each participant, including parents, children, and teachers, received a small payment (equal to $8 USD) in compensation for their participation. Data were collected from the participants again through similar process approximately 1 and 2 year later. We also invited the same parent of the child (i.e. the primary caregiver) to participate our follow-up study in the second and third year.

Each participating family was provided with the opportunity for consultation or treatment from psychiatrists in Anding Hospital, or from psychological counselors and family therapists at the Center of Family Study and Therapy, Beijing Normal University. The Institutional Review Board of Beijing Normal University in China approved the protocol of the present study, including the consent procedure.

2.3 Measures

ODD Symptoms (Parent and teacher Rated) Children's ODD symptoms at T1 were rated by parents and teachers using an 8-item scale derived from the DSM-IV-TR (APA, 2000). Sample items included "Is often touchy or easily annoyed by others" and "Often actively defies or refuses to comply with adults' requests or rules." Response to each of the eight items was indicated on a dichotomous scale (0 = no, 1 = yes). The scores of eight items were summed to create a total score (ranged from 0 to 8), with higher scores indicating severe ODD symptoms. The measure has been used in prior studies of ODD symptoms (Lin et al., 2016). The Cronbach's α of the scale was 0.85 in this study. The total scores of teacher and parent's ratings were calculated to represent child ODD symptoms, given that the teacher and parent ratings were significantly correlated ($r = 0.21$, $p < 0.05$).

Father-child attachment and Mother-child attachment (Child Rated) The 15-item version of the Chinese Version Inventory of Parent and Peer Attachment (IPPA; Armsden and Greenberg 1987; Jin et al. 2010) was utilized to assess children's perceptions of their attachment with their father and mother at T2. Children were asked

to rate attachment with their mother and father respectively on Trust (5 items; e.g., "'My father/mother respects my feelings"), Communication (5 items; e.g., "If my father/mother knows something is bothering me, he/she asks me"), and Alienation (5 items; e.g., "I am angry with my father/mother") using a 5-point scale (1 = never, 5 = always). A composite score was created for each father- and mother-child attachment by summing the relevant items, with higher scores indicating stronger parent-child attachment. In the current study, the Cronbach's α were 0.84 and 0.86 for father/mother-child attachment, respectively.

Teacher-student relationships (Child Rated) The teacher-student relationships at T2 were measured using Student-Teacher Relationship Scale (STRS; Pianta 2001; Zou et al. 2007). The student-report version contains 23 items (Zou et al. 2007). Students are asked to rate their perceptions of teacher-student relationships across four aspects: Closeness (7 items; e.g., "I share an affectionate, warm relationship with teacher"), Conflict (7 items; e.g., "I feel my teacher is unfair to me"), Supportiveness (6 items; e.g., "Teacher often listens carefully to my comments or suggestions"), and Satisfactoriness (3 items; e.g., "Overall, I am satisfied with the relationship with my teacher"). All items were rated on a 5-point scale (1 = not true at all, 5 = always true). Total scores of STRS were calculated by subtracting the scores of Conflict subscale from the sum scores of Closeness, Supportiveness, and Satisfactoriness subscales (Zou et al. 2007). Higher total scores indicate better teacher-student relationships. In the current study, the Cronbach's α of STRS was 0.94.

Peer relationships (Child Rated) We used the Children's Loneliness Scale (CLS; Asher et al. 1984) to measure children's satisfaction with their peer relationships at T2. It included 24 items, which include 8 filler items, which are not included in the scoring. Valid items include statements such as "I do not get along with other children" (reversed). All items were rated on a 5-point scale (1 = not true at all, 5 = always true). Scores of 16 items were summed to create a composite score for peer relationships, with higher scores indicating worse peer relationships. In this study, Cronbach's α was 0.90.

Children's depression symptoms(Child Rated) The 16 items of Center for Epidemiologic Studies Depression Scale (CES-D; Radloff 1977) was used to assess children's depressive symptoms at T1 and T3. It includes, affective, cognitive, behavioral, and somatic symptoms associated with depression (e.g., "I was bothered by things that usually don't bother me"). Children were asked to assess the frequency of the symptoms using a 4-point scale, ranging from 0 (less than a day) to 3 (5 to 7 days of the past week). Items were summed to create a composite score, and higher score indicates more depressive symptoms. In current study, the Cronbach's α was 0.92.

Children's feelings of happiness (Child Rated) The happiness subscale of the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff 1977; Schroevers et al. 2000) was used to rate children's feelings of happiness at T1 and T3. Four items are included, (e.g., 'felt as good as others' [item 4], 'hopeful future' [item 8], 'happy' [item 12], and 'enjoyed life' [item 16]. Children were asked to assess the frequency of each item using a 4-point scale, ranging from 0 (less than a day) to 3 (5 to 7 days of the past week). Items were summed to create a composite score, and a higher score indicates a higher level of feelings of happiness. In current study, the Cronbach's α was 0.92.

Demographic questionnaire (Parent Rated) Children's gender was obtained from parent and coded as a dichotomous variable respectively. Boys were coded to be 1 and girls were coded to be 2. Children's age and parental age (both father and mother's) was obtained from parent and coded in years. Family income was reported by parent and coded for five types (1 = less than 2000 Chinese yuan; 2 = 2000–5000 Chinese yuan; 3 = 5000–10,000 Chinese yuan; 4 = 10,001–30,000 Chinese yuan; 5 = greater than 30,001 Chinese yuan).

2.4 Data Analyses

In preliminary analyses, attrition analyses, involving independent-samples *t* tests, revealed that families who completed three waves of data did not differ significantly from those with fewer than three waves of data across demographic variables (i.e., child gender, family monthly income, and parental education level; $ps > 0.05$) and ODD symptoms at Time 1 ($p > 0.05$). However, child age was significant (t (254) = 3.89, $ps < 0.001$), such that children who did not complete all three waves of data ($M = 10.33$, $SD = 1.68$) were older than those who completed ($M = 9.40$, $SD = 1.50$). We conducted MCAR (Missing completely at random) test to examine whether the missing is at random. Results showed that the missing is inclined to be not completely at random ($\chi 2 = 71.174$, $df = 55$, $p = .07$). Meanwhile, we conducted the Kolmogorov-Smirnov test of normality to examine the distribution of variables. Results shows that the variables (e.g. happiness) is slightly negative skew distributed ($p < 0.05$, skewness = −.376). Therefore, maximum likelihood estimation with robust standard errors (MLR) was used to handle missing data (Enders 2010). Descriptive statistics and correlations among study factors were also examined in SPSS 20.0.

To examine the longitudinal influences of ODD symptoms on children's feelings of happiness and symptoms of depression through interpersonal relationships (father-child attachment, mother-child attachment, teacher-student relationship, and peer relationship), Structure Equal Models (SEM) were conducted using Mplus version 7.0 (Muthén and Muthén 2012). Indexes of the model fit included maximum-likelihood chi-square statistic (χ^2), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Model fit was considered acceptable when the values of χ^2 were not significant or a ratio of $\chi^2/df < 3.0$, and CFI > 0.90, RMSEA <0.08, and SRMR <0.08 (Hu and Bentler 1999).

3 Results

3.1 Descriptive Statistics

The means, standard deviations, and correlations among study variables are presented in Table 1. Significant negative associations were observed between ODD symptoms at Time 1 and father-child attachment, mother-child attachment, teacher-student relationship, and peer relationship at Time 2, and children's feelings of happiness and depression at Time 3. Additionally, children's poor relationships with

father, mother, teachers, and peers at Time 2 were associated with lower level of children's happiness and higher level of depression at Time 3.

3.2 Interpersonal Relationships as Mediator

Before examining the mediator models, the direct impact of ODD symptoms at Time 1 on children's happiness and depression at Time 3 were examined. More ODD symptoms at Time 1 significantly predicted children's lower feelings of happiness at Time 3 ($\beta = -0.25$, $SE = 0.08$, $p < 0.01$), while controlling for children's gender and age, parental age, and family income at Time 1. When controlling for demographic variables, more ODD symptoms at Time 1 predicted children's more depressive symptoms at Time 3 ($\beta = 0.44$, $SE = 0.07$, $p < 0.01$).

Further, we examined whether ODD symptoms at Time 1 predicted children's happiness and depression at Time 3 through father-child attachment, mother-child attachment, teacher-student relationship, and peer relationships (see Fig. 2). Covariates, containing child gender, age, father age, mother age, family monthly income, children's happiness, children's depression at Time 1, were also included in the model. This model fit the data, $\chi^2(33) = 69.39$, $p < 0.05$, CFI = 0.92, RMSEA = 0.06 (90%CI = 0.04–0.09), SRMR = 0.07. The results showed that ODD symptoms at Time 1 had a direct association with happiness feelings and depressive symptoms at T3 ($\beta = -0.14$, $SE = 0.07$, $p < 0.05$; $\beta = 0.33$, $SE = 0.07$, $p < 0.01$), and had four significant indirect associations with happiness feelings and depressive symptoms via the interpersonal relationships.

Overall, children's more ODD symptoms at Time 1 significantly predicted poor father-child attachment ($\beta = -0.23$, $SE = 0.08$, $p < 0.01$), mother-child attachment ($\beta = -0.23$, $SE = 0.08$, $p < 0.01$), teacher-student relationship ($\beta = -0.17$, $SE = 0.08$, $p < 0.05$), and peer relationship ($\beta = -0.15$, $SE = 0.08$, $p = 0.08$) at Time 2. In turn, poor father-child attachment ($\beta = 0.21$, $SE = 0.09$, $p < 0.01$), mother-child attachment ($\beta = 0.19$, $SE = 0.09$, $p < 0.05$), and peer relationship ($\beta = 0.15$, SE = 0.07, $p < 0.05$) at Time 2 significantly predicted children's less happiness at Time 3. In addition, only poor father-child attachment ($\beta = -0.30$, $SE = 0.09$, $p < 0.001$) significantly predicted children's more depression at Time 3. However, teacher-student relationship did not significantly predict children's happiness and depression at Time 3 ($ps > 0.05$); mother-child attachment and peer relationships at Time 2 did not significantly predict children's depression at Time 3 ($ps > 0.05$).

Indirect effect analyses revealed that father-child attachment ($\beta = -0.05$, $SE = 0.03$, $p < 0.05$), and mother-child relationships ($\beta = -0.04$, $SE = 0.03$, $p < 0.05$) mediated the effects of ODD symptoms on children's feelings of happiness. Additionally, father-child attachment mediated the link between ODD symptoms and children's depression ($\beta = -0.07$, $SE = 0.03$, $p < 0.05$). The indirect effect of ODD symptoms on children's feelings of happiness via peer relationships was marginally significant ($\beta = -0.02$, $SE = 0.02$, $p = 0.09$). However, teacher-student relationship was not a significant mediator of the effects of child ODD symptoms on children's happiness ($\beta = -0.002$, $SE = 0.02$, $p > 0.05$). The indirect effect of child ODD symptoms on children's depression through mother-child attachment ($\beta = 0.03$, $SE = 0.02$, $p > 0.05$), teacher-student relationship ($\beta = 0.01$, $SE = 0.02$, $p > 0.05$), and peer relationship ($\beta = -0.001$, $SE = 0.01$, $p > 0.05$) were not statistically significant.

Table 1 Means, Standard Deviations, and Correlations Among Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Child gender	1														
2. Child age	0.02	1													
3. Father's age	−0.23**	0.17**	1												
4. Mother's age	−0.18**	0.21**	0.80***	1											
5. Family monthly income	−0.25***	−0.22**	0.23***	0.23***	1										
6. T1 Children's feelings of happiness	0.26	−0.05	−0.17*	−0.12	0.06	1									
7. T1 Children's depressive symptoms	0.09	−0.05	−0.15	−0.10	−0.10	−0.46***	1								
8. T1 ODD symptoms (parent reported)	−0.16	−0.03	0.09	0.04	−0.02	−0.34***	0.37	1							
9. T1 ODD symptoms (teacher reported)	0.26***	0.14*	0.24***	0.20**	0.17**	−0.08	0.11	0.21***	1						
10. T2 Father-child attachment	0.16	−0.04	−0.03	−0.02	0.07	0.29***	0.23***	−0.30***	0.18**	1					
11. T2 Mother-child attachment	0.14	−0.03	−0.05	0.00	0.00	0.30***	0.26***	−0.32***	−0.09	0.70***	1				
12. T2 Teacher-student relationship	0.08	0.03	−0.20**	−0.17*	−0.14	0.18**	0.23***	−0.30***	−0.16*	0.35***	0.37***	1			
13. T2 Peer relationships	0.12	0.02	−0.07	−0.06	−0.02	−0.14	−0.21***	−0.31***	−0.27***	0.23***	0.25***	0.40***	1		
14. T3 Children's feeling of happiness	0.10	−0.02	0.06	0.06	−0.07	0.36***	−0.29***	−0.20**	0.08	0.37***	0.37***	0.23***	0.27***	1	
15. T3 Children's depressive symptoms	−0.14	−0.08	0.05	−0.03	0.15	−0.22**	0.40***	0.16*	0.08	−0.45***	−0.39***	−0.22**	−0.33***	−0.29***	1
M	–	9.59	38.45	36.67	–	11.56	27.67	2.65	5.48	53.33	56.24	45.80	30.75	7.42	11.09
SD	–	1.58	5.11	4.27	–	3.16	8.49	2.53	1.38	13.38	12.87	17.61	13.28	3.25	9.32

Note. ODD = Oppositional Defiant Disorder, T1 = Time 1, T2 = Time 2, T3 = Time 3. *$p < .05$, **$p < .01$, ***$p < .005$

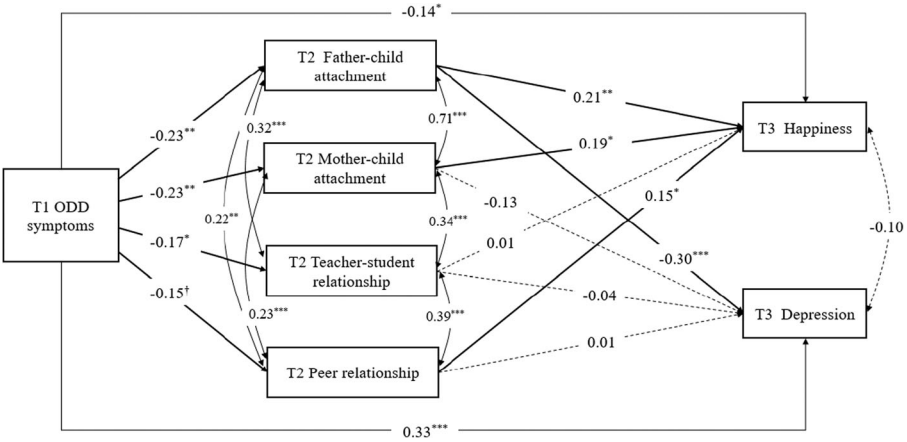

Fig. 2 The indirect links between children's ODD symptoms and their feelings of happiness and depression through interpersonal relationships. *Note*. Demographic variables that include children's gender and age, father's and mother's age, and family monthly income, happiness at T1, and depression at T1 are controlled in the model (not shown). All the coefficients are standardized estimates

4 Discussion

We aimed to examine the longitudinal effects of ODD symptoms on Chinese children's depression and feelings of happiness over a two-year period, and to examine the potential mediators of the relationships with parents, teachers, and peers. The current study deepened our understanding of the emotional outcomes related to ODD symptoms and the mechanisms underlying the influences of ODD symptoms on children's depression and feelings of happiness in the Chinese culture. As expected, Chinese children with ODD were at risk of increasing depressive symptoms and decreasing feelings of happiness when considering the adverse influences of ODD symptoms on emotion well-being. The multiple mediators of children's relationships with significant others (father, mother, and peers) were salient for the longitudinal link between ODD symptoms and later emotional outcomes. Specifically, father-child attachment, mother-child attachment, and peer relationship mediated the link between ODD symptoms and happiness feelings and only father-child attachment mediated the link between ODD symptoms and depressive symptoms. Our current study supported the dual-factor perspective of mental health, and revealed the importance of focusing on happiness of children with ODD as well as depression. Furthermore, our data provides evidence for the interpersonal perspectives of psychological symptoms that ODD is a risk factor that leads to less happiness and more emotional impairments via poor interpersonal relationships. Overall, these findings suggest strongly that attention must be paid on improving interpersonal relationships for children with ODD, to mitigate the risk of developing further emotional impairments.

In this study, we found that children's ODD symptoms were found to increase their depressive symptoms and decrease their feelings of happiness. This result extends previous findings that ODD is linked with the development of depressive symptoms (Burke et al. 2010; Rowe et al. 2006) because we also found that ODD symptoms are also linked with lower ratings of happiness. This adds to our understanding of the emotional outcomes related to ODD symptoms from the dual-factor perspective of mental health by considering

both positive and negative indicators of emotional health (Antaramian et al. 2010; Keyes 2005). As showed in the mediation model (Fig. 2), symptoms of depression and feelings of happiness at the third year are not significantly associated. The results supported Schroevers et al. (2000)'s and Shafer (2006)'s findings for the CES-D scale that depressed and happy affect are two relatively independent factors.

Our findings also highlight the salient role that relationships with parents and peers play in the association between ODD symptoms and emotional outcomes among Chinese children. This deepens our understanding of the mechanisms for how behavioral difficulties in children develop into emotional outcomes, particularly within Chinese culture, such that ODD symptoms contribute to poor relationships with parents and peers, which subsequently worsen emotional problems. These findings may help to explain the high comorbidity between ODD and depression (Burke et al. 2005). Results supported the interpersonal perspectives of psychological symptoms (Sullivan 1968, 2013), highlighting that impaired interpersonal relationships are both the significant results and causes of psychological problems. Based on these findings, early intervention for children with ODD symptoms may be helpful for preventing negative cycles of maladaptive interpersonal relationships and psychological difficulties. For example, parents, teachers, and children may learn skills aimed to help children with ODD improve their interpersonal relationships. Other skills can be targeted to help reduce child emotional problems, either via formal clinical training programs or informal ways such as watching educational videos (note that treatment for disruptive disorder is still rare in China). After all, it is easier to improve poor interpersonal interactions than to remove individual psychological problems.

In addition, we also found that ODD symptoms impair relationships with father, mother, teachers, and peers. The results suggested the widening impact of ODD symptoms across a range of interpersonal domains in Chinese children (Coy et al. 2001; Burke et al. 2014; Theule et al. 2016; Li et al. 2018). This finding appears consistent with Chinese culture, in which children's oppositional and aggressive behaviors to disrupt interpersonal harmony are not well tolerated and is strongly disliked by both adults and children. Particularly, interpersonal harmony was highly emphasized within collectivistic orientations in Chinese cultural values. Thus, in the context of Chinese culture, children with ODD are more vulnerable to have various difficulties with interpersonal relationships with others.

Similarly, children's feelings of happiness were decreased by poor father- and mother-child attachment, and peer relationships, while children's depressive symptoms demonstrate to be predicted by poor father-child attachment. These findings indicated that for children with ODD, happiness is impacted by relationships with significant others, while depression significantly results from negative events with father. We have enough evidence to believe that happiness was relatively more vulnerable to be influenced than depression by interpersonal interactions. This has important clinical implications that interventions should focus on depression and happiness when treating children with ODD (Antaramian et al. 2010), as focusing on both can have the advantage of building for positive psychological resources (Albieri et al. 2009; Sin and Lyubomirsky 2010).

One novel finding was that father-child attachment was the strongest predictor of depression and feelings of happiness, which is inconsistent with previous research suggesting the stronger effect of mother-child attachment on child emotional outcomes (Branje et al. 2010). One possible explanation may be the cultural differences between

China and the West. In the Western culture, the consistency between father and mother's parenting style was advocated, and both parents were asked to hold the balance between warmth and demandingness/discipline (Chao 1994; Pilkington et al. 2019). There are no obvious trends in the Western culture that father and mother play distinct roles and adopt parenting patterns (Kim and Fong 2013; Seward and Stanley-Stevens 2014). In contrast, Chinese mothers usually take on more responsibilities for daily child care and warmth, and Chinese fathers are commonly made responsible for the disciplining and correcting children (Shwalb et al. 2010; Wu 2006), particularly for children frequently exhibiting defiant, disobedient, and hostile behaviors. Just as the old saying goes in China, "strict father, kind mother" (*Yan Fu, Ci Mu*). That is, to prevent children from being spoiled, father's harshness (i.e. White face, *Bai Lian*) was frequently emphasized to work with mother's warmth (i.e. Red face, *Hong Lian*) (Kim and Fong 2013; Li and Lamb 2015). It is possible that mother's warmth and support may be taken for granted, while intimate attachment with father, when present, is more salient in the lives of Chinese children (Behnke et al. 2011). In addition, fathers are regarded as the authority figure in Chinese families, and the may be less tolerant of children's defiant and disobedient behaviors. Thus, the conflictual and intense interaction with Chinese fathers would greatly influence children's emotional outcomes, making other interpersonal interactions appear as less significant. Previous findings about the unique influence of fathers on child psychological health supported this explanation (Videon 2005). Accordingly, among all interpersonal relationships, improving the father-child relationship would highly benefit most children with ODD, which has been commonly ignored before. For example, more parenting training for fathers should be encouraged to improve the fathers' parent-child communication skills and the knowledge about the ODD children.

We also found that parent-child attachment, peer relationships, and teacher-student relationship ranked the top, middle, and bottom in predicting emotional well-being of children with ODD. This was consistent with Navarro et al. (2017) and González-Carrasco et al. (2018) findings in qualitative studies that family relationships and peer relationships are regarded as the top two key factors that contribute to child well-being. The present findings also supported the bottom-up theory of subjective well-being that the happiness of children result from their experiences with those close to them, such as parents and friends (Brief et al. 1993; Navarro et al. 2017). However, the reasons for why teacher-child relationship didn't significantly predict child emotional well-being, may be partially explained by the fact that elementary school teachers in China are often saddled with large classes with forty or more students, so that every child in class has relatively shorter periods to interact with their teacher. Moreover, school teachers primarily focus on children's academic development rather than on the teacher-student relationship (Verschueren et al. 2012), which might explain why we didn't find a significant link between teacher-student relationship and child emotional outcomes.

4.1 Limitations

These findings should be interpreted with a few limitations in mind. First, the rating for quality of interpersonal relationships relied solely on children's self-report. In order to improve the reliability of the data and provide a stronger test of the model, parents, teachers, and peers' reports should be collected, and multiple methods (e.g. clinical

observations) are encouraged in future studies. Second, we could not examine whether the models in this study differ across child gender because the subsample of girls was too small. Future research may benefit from extending these analyses in a larger sample and further examining children's gender differences. Finally, we did not exclude children who also met diagnostic criteria of ADHD or conduct disorder, so the results may not be specific to ODD symptoms. Yet the comorbidity is sufficiently high across these domains (Boylan et al. 2007; Nock et al. 2007) that enforcing such exclusions would have resulted in a completely unrepresentative sample.

4.2 Implications

Despite these limitations, the current findings about the emotional well-being related to ODD symptoms imply that focusing on both negative and positive aspects from the dual-factor perspective of mental health would be a great help for interventions of children with ODD (Albieri et al. 2009; Antaramian et al. 2010). Moreover, the current study reveals the mechanisms underlying the influences of ODD symptoms on children's emotional outcomes in the Chinese culture. It is highly likely that vicious cycles of psychological problems and interpersonal problems develop, through which more severe ODD symptoms impair interpersonal relationships, which, in turn, escalate the severity of emotional problems over time for ODD children. This emphasizes the importance of improving the interactions with significant others, particularly with fathers, for children displaying serious ODD symptoms at an early age. Accordingly, therapies aimed to teach these children and their parents' effective strategies to cope with ODD symptoms may protect these children from experiencing interpersonal functional impairments and later severe emotional outcomes.

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