



**Reciprocity Between Parental Psychopathology and
Oppositional Symptoms from Preschool to Middle Childhood**

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Running Head: Parental Psychopathology and Child ODD

**Reciprocity Between Parental Psychopathology and Oppositional Symptoms from
Preschool to Middle Childhood**

For Peer Review

Abstract

Objective: Oppositional Defiant Disorder (ODD) is a common disorder in preschool children.

Evidence indicates that maternal and paternal psychopathology, particularly aggressive behavior and anxious-depressed symptoms, contributes to the development of this disorder. The latest research also suggests that ODD symptoms may exacerbate the mental health problems of parents. Our aim was to establish the existence of a reciprocal association between paternal and maternal psychopathology (aggression, depression and anxiety) and child ODD at age 3 and age 8, using a longitudinal design in a community sample of preschoolers.

Method: The sample included 331 children evaluated at ages 3 and 8 through questionnaires and a semi-structured diagnostic interview with parents. Parents also informed about their own psychopathology.

Results: At age 3 years, higher levels of ODD symptoms in girls were concurrently associated with maternal anxious/depressed symptoms and paternal aggressive behavior, and higher levels of ODD symptoms in boys were concurrently associated with maternal aggressive behavior.

Longitudinally, for boys, higher levels of maternal anxious/depressed symptoms at age 3 predicted increases in ODD symptoms from age 3 to age 8. In addition, higher levels of ODD symptoms in boys from age 3 to age 8 predicted increases in fathers' anxious/depressive symptoms.

Conclusions: Children with ODD should be evaluated and treated promptly, but efforts should be extended to their parents. Mothers' and fathers' mental health must be explored, since the psychopathologies of children and parents reciprocally affect each other.

Keywords:

Oppositional defiant disorder · parental psychopathology · preschool · reciprocal effects

1. Introduction

Oppositional defiant disorder (ODD) is described as a persistent and repetitive pattern of oppositional, defiant, disobedient and disruptive behaviors towards figures of authority, which persists for at least six months (American Psychiatric Association, 2013). The ODD profile is characterized by the association of high novelty seeking and displaying patterns of behavior characterized by emotional instability (Melegari et al., 2015). It also includes problems with acting out of spite and annoying and blaming others for the consequences of one's actions or problems, and is associated with a variety of impairments in interactions with others (Burke, Rowe, & Boylan, 2014). ODD is a common disorder in preschool children, with prevalence rates varying between 6.9% and 13.4% (Ezpeleta, de la Osa, & Doménech, 2014; Lavigne, Lebailly, Hopkins, Gouze, & Binns, 2009). Prevalence is similar in boys and girls at an early age (Ezpeleta, de la Osa, Granero, & Trepát, 2014), but in older children more boys than girls are affected (Demmer, Hooley, Sheen, McGillivray, & Lum, 2016; Munkvold, Lundervold, & Manger, 2011). Evidence has shown that the presence of ODD symptoms is associated with higher impairment in boys than in girls (Ezpeleta, de la Osa, Granero, et al., 2014) and, for example, the combination with conduct disorders is stronger for boys and the association with emotional disorders is stronger for girls (Rowe, Maughan, Pickles, Costello, & Angold, 2002). Girls are possibly more sensitive than boys to less parental warmth or more aversive behaviors on the part of their parents (Goodman et al., 2011). Nevertheless, girls might be more protected than boys against the onset of psychopathological symptoms, due to factors like their earlier physical maturation and better developed social and emotional skills compared to boys (Crick & Zahn-Waxler, 2003).

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3 Numerous studies have shown a relationship between child ODD symptoms and parental
4 psychopathology. Aggressive behavior exhibited by parents, particularly the mother, is likely to
5 shape the externalizing behavior of children (Davies, Sturge-Apple, Cicchetti, Manning, &
6 Vonhold, 2012). Regarding maternal mental health problems, previous research indicates a
7 significant impact on child mental health. In particular, positive associations have been found
8 between maternal negativity, hostility and detachment and child ODD (Bertino, Connell, &
9 Lewis, 2012). Mothers with symptoms of depression may present evidence of higher rates of
10 irritability and aggression (Goelman, Zdaniuk, Boyce, Armstrong, & Essex, 2014) and,
11 depending on the severity of the symptoms, may increase or decrease behavioral problems in
12 children (Nicholson, Deboeck, Farris, Boker, & Borkowski, 2011). Maternal depression is linked
13 to higher levels of negative affect, externalizing problems and greater general psychopathology
14 in children (Goodman et al., 2011), and less maternal warmth could have an effect on child
15 ODD levels (E. a Harvey & Metcalfe, 2012). In the study by Choe, Olson, and Sameroff (2014),
16 maternal depressive symptoms at child age 3 predicted higher levels only in the externalizing
17 behavior of boys at age 10. Even recent data has reported that children with behavioral problems
18 who have a mother with more depressive symptoms exhibit fewer therapeutic changes after an
19 intervention (Dempsey, McQuillin, Butler, & Axelrad, 2016). Paternal psychopathology also
20 seems to have an impact on the development and behavior of children (Brown, McBride, Bost, &
21 Shin, 2011; Goelman et al., 2014). Previous research indicates that fathers with depression and
22 anxiety may also be significant predictors of behavioral problems and ODD symptoms in
23 preschoolers (Breux, Harvey, & Lugo-Candelas, 2013; Gross, Shaw, Moilanen, & Wilson,
24 2008; Kashdan et al., 2004). Specifically, Harvey and Metcalfe (2012) found that fathers'
25 depression at child age 3 predicted children's ODD symptoms at age 4 and recently Nath,
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3 Russell, Kuyken, Psychogiou and Ford (2016) found that higher paternal depressive symptoms at
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5 9 months were significantly associated with children's conduct problems at 7 years old. In
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7 addition, fathers with aggressive behavior seem to have an impact on the development of
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9 aggressive and hostile behavior in children, increasing ODD symptoms (Davies et al., 2012;
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11 Trepát, Granero, & Ezpeleta, 2014).
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15 Although research has been conducted into the effect of maternal and paternal
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17 psychopathology on child behavior problems and specifically on ODD, the evidence suggests
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19 that children's behavior also has a profound influence on parental psychopathology and behavior
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21 (Shaffer, Lindhiem, Kolko, & Trentacosta, 2013) and wellbeing (Davidov, Knafo-Noam, Serbin,
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23 & Moss, 2015). There is extensive support in the literature for the notion of children's behavioral
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25 problems affecting parenting style, parental functioning and family relations (Childs, Fite,
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27 Moore, Lochman, & Pardini, 2014; Combs-Ronto, Olson, Lunkenheimer, & Sameroff, 2009;
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29 Pardini, Fite, & Burke, 2008; Shaffer et al., 2013), but research has paid substantially less
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31 attention to potential bidirectional effects between children's disruptive behavior and parental
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33 mental health, such as anxiety and depressive symptoms or aggressive behavior (Gross, Shaw,
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35 Moilanen, et al., 2008).
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41 Evidence suggests that the prevalence of clinical depression in parents caring for children
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43 with developmental disabilities increases significantly compared to parents of typically
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45 developing children. (Gallagher & Hannigan, 2014; Singer, 2006). The most problematic child
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47 behaviors would represent an increased risk of depression in parents (Gallagher & Hannigan,
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49 2014; Resch, Elliott, & Benz, 2012). In particular, mothers with depression might be especially
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51 vulnerable, experiencing longer and more intense negative affect in response to negative
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53 expressions in their children (Forbes et al., 2008). Meanwhile, mothers whose children have
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3 more behavioral or emotional problems have higher rates of depressive symptoms (Civic & Holt,
4 2000). Also, in middle childhood, maternal depression has been strongly related to subsequent
5 increases in children's disruptive problems, specifically in boys of ages 5 to 6 (Gross et al.,
6 2008).
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12 Fathers have been widely underrepresented in the literature on parental psychopathology,
13 and there is little evidence of the impact of children's psychopathology on their mental health.
14 But there is some evidence that fathers' mental health can also be affected by their children's
15 behavior. Kane and Garber (2004) found significant associations between paternal depression
16 and the externalization of child conflict, and Harvey and Metcalfe (2012) found that paternal
17 depression is tied to early ODD symptoms in children. According to Gross et al. (2008), higher
18 levels of noncompliance at child age 2 have been significantly related to paternal depressive
19 symptoms. Evidence also indicates that fathers may be distressed when their children are
20 adolescents, due to their irritability and acting-out behaviors (Connell & Goodman, 2002).
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34 Due to the lack of specific empirical evidence on the issue, the aim of this study is to
35 establish the existence of a reciprocal association between paternal and maternal
36 psychopathology (anxious-depressed symptoms and aggressive behavior) and child ODD
37 symptoms at age 3 and age 8, using a longitudinal design in a community sample of
38 preschoolers.
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45 Based on research conducted up to the present, we made the following specific
46 hypotheses: a) Higher levels of paternal and maternal psychopathology will be associated with
47 higher levels of ODD in boys and girls at ages 3 and 8. b) Higher levels of ODD symptoms in
48 boys and girls at age 3 will be associated with greater paternal and maternal psychopathology
49 when these children are aged 8.
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2. Method

2.1. Participants

The sample data are from of a longitudinal study of psychopathological risk factors, interactions and mechanisms underlying the development of psychopathology in early childhood, starting at age 3 (Ezpeleta, et al., 2014). Data were collected from participants using a double-phase design. In the first phase, 2,283 families with 3-year-old children were randomly selected from early-childhood schools in Barcelona ($N = 13,578$), of which 1,341 families were willing to participate (58.7%). 63 families were excluded due to difficulties understanding or using Spanish or Catalan, or because the children presented developmental disorders such as autism spectrum disorder or intellectual disabilities, as they could have some difficulty responding appropriately to the assessment tools used along the longitudinal project and could have impact on the outcomes of interest. Children with other medical problems were not excluded while they attended school normally and could respond without problems. In the second phase, to ensure the participation of children with possible behavioral problems, the parents of the remaining 1,278 children were screened by answering the Strengths and Difficulties Questionnaire (SDQ³⁻⁴) (Goodman, 1997). All families of children that screened positively (with a raw score ≥ 4 on the SDQ³⁻⁴ conduct problems scale, which corresponds to 90th percentile, or with a response option of 2 -certainly true- in any of the 8 DSM-IV ODD symptoms) were invited to participate ($n = 522$, 42%), and 235 (30%) cases that screened negatively were selected to continue in the study. The final sample included 622 children, 417 with a positive screening score and 205 with a negative one, with an average age of 3.76 ($SD = 0.32$), of which 310 were male (49.8%) and 554 were identified as Caucasian (89.1%), that is, white European people.

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3 From the final sample of the project ($n=662$ children followed during the ages 3-8 years-
4 old), all the subjects who possessed complete information for both the diagnostic interview and
5 the analyzed questionnaires were selected and included in the statistical analysis of this study
6 ($n=331$). Table 1 contains the main sociodemographic features of the sample analyzed in this
7 work, concretely at the beginning of the follow-up (3 years-old). Table 1 also includes the
8 distribution of the main DSM-IV-TR (American Psychiatric Association, 2000) disorders at ages
9 3 and 8 (disorders non included in this table registered very few or null prevalences). There were
10 no statistically significant differences between subjects included in the final analysis or subjects
11 excluded due to incomplete information in terms of sex ($p = .20$), ethnicity ($p = .13$) or
12 socioeconomic status ($p = .23$).
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26 2.2. Measures

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29 2.2.1. *Diagnostic Interview of Children and Adolescents for Parents of Preschool and*
30 *Young Children (DICA-PPYC)* (Reich & Ezpeleta, 2009): The DICA-PPYC is a semi-structured
31 interview used to assess child psychopathology according to DSM-IV-TR criteria (American
32 Psychiatric Association, 2000). It was adapted and validated for the Spanish preschool
33 population, and the Spanish version presents adequate psychometric properties (Ezpeleta, de la
34 Osa, Granero, Domènech, & Reich, 2011). In the present study, DICA-PPYC is answered by one
35 of the two parents or both together, completing a single interview. The average administration
36 time is approximately 50 minutes. We used data collected from the DICA-PPYC at child ages 3
37 and 8. As regards the respondents, at child age 3, 211 (63.7%) mothers, 24 (7.3%) fathers and 96
38 (29.0%) both parents together, completed an interview. At child age 8, 241 (72.5%) mothers, 31
39 (9.4%) fathers and 59 (17.8%) both parents together answered the DICA-PPYC.
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3 At each follow-up, the number of ODD symptoms was used as a measure of ODD level.
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5 Additionally, the following comorbid diagnoses with ODD were defined as covariates in the
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7 analysis: Attention-deficit/hyperactivity disorder, conduct disorder, depression, separation
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9 anxiety, general anxiety, specific phobias and social phobia. These correspond to those that
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11 epidemiological studies most strongly have related to the onset and course of ODD at early ages
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13 and during the childhood age (Harvey, Breaux, & Lugo-Candelas, 2016; Martín, Granero, &
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15 Ezpeleta, 2014; Stringaris & Goodman, 2009). In addition, CD was included in the list of
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17 potential comorbid disorders although the low prevalence in the sample because the cross-
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19 sectional concurrence between ODD and CD diagnoses was not irrelevant at age 3 years-old
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21 (OR=6.9), and the presence of CD at age 3 was also strongly related to the longitudinally
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23 presence of ODD at age 8 years-old (OR=7.3). Since the aim of the study was to assess the
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25 relationship between parental psychopathology with the specific ODD diagnosis, adjusting by
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27 CD ensures the lack of potential biases due the presence of CD as a confounding variable.
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34 *2.2.2. Adult Self-Report (ASR)* (Achenbach & Rescorla, 2003): The ASR is a questionnaire that
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36 evaluates psychopathology levels in adults between ages 18 and 59. It features 126 items that
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38 inquire about the respondent's own behavior over the past six months, plus some items related to
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40 interpersonal relationships, work and educational matters. The measurement scale is ordinal,
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42 with 3 response options: 0 (not true), 1 (somewhat or sometimes true) and 2 (very true or often
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44 true). Mothers and fathers answered this questionnaire when the children were 3 and 8 years old,
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46 and for the purpose of this study, the anxiety-depression and aggressiveness scales were used for
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48 both mothers and fathers. The scales demonstrated high internal consistency in the sample (the
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50 first columns in Table 2 contain Cronbach's alpha at child ages 3 and 8).
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55 *2.3. Procedure*
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4 The study was approved by the ethics committee of the authors' home institution
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6 (*Comissió d'Ètica en l'Experimentació Animal i Humana, Universitat Autònoma de Barcelona:*
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8 CEEAH 1385). Families of children were contacted through recruitment at schools and invited to
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10 participate when the children were 3 years old; both parents and teachers were informed in detail
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12 about the study at the time of recruitment. After obtaining written parental consent, parents were
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14 asked to answer the SDQ³⁻⁴ at home and return the completed form to the school. Families who
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16 met the selection criteria were contacted by phone to be included in the study, and consenting
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18 parents participated in the diagnostic interview (DICA - PPYC) at their child's school. The other
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20 questionnaires were answered by the parents at home and then returned to the school.
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25 The DICA-PPYC was administered by interviewers previously trained in its use and in
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27 that of the other instruments applied. The team of interviewers consisted of psychologist with
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29 previous knowledge of the range of potential diagnoses and symptom clusters. Specifically, in
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31 the first assessment of the study (at children age 3 years-old), PhD clinical psychologists
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33 conducted 7.6% of the interviews, doctoral students 38.1% and masters' degree students 54.4%;
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35 at age 8 years-old, doctoral students coded 1% of the interviews, masters' degree students 86.1%
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37 and degree students 13.3%. All the interviewers were trained on a one week intensive program
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39 and included an overview of developmental psychology, children's psychopathology and
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41 interviewing skills. The characteristics of the symptoms and disorders, the methods for
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43 identifying these characteristics, and how to code the symptoms were also included.
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45 Subsequently, the interviewers completed a longer practical training period, mainly with role
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47 playing, listening and coding of audio-recorded real interviews followed by observation and
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49 coding of live interviews. The criterion for being ready for the field was to obtain a mean
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51 agreement with an expert kappa ≥ 0.80 for all the questions in at least eight live interviews. The
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3 whole training process lasted about three months. In addition, during the follow-up of the study,
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5 all the interviewers also went to periodical sessions (weekly) for listening and coding audio-
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7 recorded real interviews, with the aim to guarantee that their coding was correct.
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10 2.4. *Statistical analysis*

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12 Data were analyzed with Stata13 for Windows. Due to the double phase sampling, and
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14 the sample analyzed was selected through a screening procedure (all positively evaluated cases
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16 were invited to participate and only 30% of cases that screened negatively), sample weights
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18 were assigned and used to correct for the unequal probabilities of selection: Each child was
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20 weighted with the reciprocal of their probability of selection in the second phase of the sampling
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22 thus enabling the generalization of the results to the original general population.
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27 Structural equation modeling (SEM) was conducted to test the hypothesized pathway
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29 model that specifies the relationship between parental psychopathology measures (anxiety-
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31 depression and aggressive scores) and the child's number of ODD symptoms. Since a moderator
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33 effect of sex was expected, children's sex was defined as a group variable in the pathway. The
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35 model was also adjusted to the presence of other comorbid disorders different to ODD, which
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37 was defined and managed as a binary variable coding 0 to the children who did not met the
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39 DSM-4 criteria for any of the potential comorbid disorders and 1 to the remaining children who
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41 met DSM-4 criteria for at least one of the potential comorbid diagnoses. The Maximum
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43 Likelihood method of parameter estimation was used and goodness-of-fit was evaluated using
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45 the usual statistics: the Root Mean Square Error of Approximation (RMSEA), Bentler's
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47 comparative Fit Index (CFI), the Tucker-Lewis Index (TLI) and the Standardized Root Mean
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49 Square Residual (SRMR). Adequate model fit was considered for $RMSEA < .08$, $TLI > .90$,
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51 $CFI > .90$ and $SRMR < .10$.
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3. Results

3.1. Description of the study variables

Table 2 contains the distribution of the variables included in the SEM (range, mean and standard deviation) and Table 3 contains the matrix correlation (coefficients in this Table correspond to Pearson product-moment correlations) between this set of measures for the total sample and stratified by the children's gender.

--- Insert Tables 1-2-3 ---

3.2. Structural equation model

Figure 1 shows the SEM measuring the underlying process between parental psychopathology and ODD levels (Table 4 contains complete standardized coefficients with significance test and 95% confidence interval). Goodness-of-fit of the new model was achieved: RMSEA=.065, CFI=.974, TLI=.935 and SRMR=.031. To assess the potential differences in the SEM due to gender, measurement invariance across the groups was tested by comparing the previous unconstrained model with a new model in which structural and measurement coefficients and intercepts were constrained to be equal across boys and girls. Since the χ^2 difference statistic revealed a significant difference between both models (constrained versus unconstrained: $\chi^2=101.5, p=.001$), a lack of invariance across gender and consequently a moderator effect by child's sex was assumed.

Figure 1 includes the standardized coefficients obtained in the SEM, with straight-lines and black-font color representing statistically significant associations and dotted-lines and grey font color indicating non-significant indexes. The pathway diagram for girls showed that: a) Cross-sectionally, at age 3 the children's number of ODD symptoms was positively related to the parental psychopathological levels in anxiety-depression and aggression behavior in the mother

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3 (and only with aggressive behavior in the father) while at age 8 no relationship emerged between
4 child's ODD level and parental symptom levels b) Longitudinally, no predictive relationship was
5 found (only auto-correlation coefficients were significant).
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10 The pathway diagram for boys showed that: a) Cross-sectionally, at age 3 the number of
11 ODD symptoms was higher for children whose mothers reported higher aggressive behavior
12 levels, while at age 8 no association between ODD intensity level and parental psychopathology
13 was found; b) Longitudinally, the higher the number of ODD symptoms at age 3, the higher the
14 father's anxiety-depression level at child age 8, and higher levels in the mother's anxiety-
15 depression measure at child age 3 significantly predicted high ODD levels five years later.
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26 **4. Discussion**

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28 The present study aimed to investigate the reciprocal association between paternal and
29 maternal psychopathology and child ODD. A first hypothesis was that higher levels of paternal
30 and maternal psychopathology would be associated with higher levels of ODD in children at age
31 3 and 8. The data confirm this relationship only at 3 years, because we found that boys of
32 mothers with higher levels of anxiety and depression at age 3 had higher levels of ODD
33 symptoms at age 8. Our results also indicate that patterns of association at age 3 were different
34 for boys and girls in relation to their mothers and fathers. For girls there is an association
35 between ODD levels and anxiety, depression and aggression behavior in the mother, but only
36 with aggressive behavior in the father. In turn, in boys, there is only an association between
37 ODD levels and levels of aggressive behavior in the mother.
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52 A second hypothesis was that higher levels of ODD at child age 3 would be associated
53 with greater paternal and maternal psychopathology at child age 8. This was supported only
54 partially, because our findings indicate that fathers of boys with higher levels of ODD symptoms
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3 at age 3 suffer higher levels of anxiety and depression five years later. Our results suggest that
4 only for boys would levels of ODD at 3 years predict levels of anxiety and depression in fathers
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6 (not mothers) when these children are 8 years old.
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10 In that respect, evidence suggests that a child with behavioral problems, specifically with
11 ODD symptoms may have an impact on the emotional states and mental health problems of
12 parents and that raising a child with ODD is a major challenge for mothers and fathers (Burke,
13 Pardini, & Loeber, 2008; Charles, Bywater, Edwards, Hutchings, & Zou, 2013). On the other
14 hand, there is also evidence that child behavioral problems may actually affect negative parental
15 emotionality and behavior to a greater extent than parenting attitudes affect children (Childs et
16 al., 2014; Larsson, Viding, Rijdsdijk, & Plomin, 2008; Pardini et al., 2008). Particularly,
17 interactions with a troublesome child could exert mounting pressure on the mother (Forbes et al.,
18 2008) and in middle childhood, evidence was found for bidirectional effects between boys'
19 antisocial behavior and maternal depressive symptoms, with these bidirectional effects being
20 most pronounced during the transition to elementary school and the transition to adolescence
21 (Gross, Shaw, & Moilanen, 2008).
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39 Regarding the influence of child ODD on paternal psychopathology, there are practically
40 no studies indicating the effect child psychopathology could have on the mental health of their
41 fathers, although some studies suggest that different facets of child psychopathology seem to
42 exhibit unique bidirectional effects with specific parenting behaviors across development, such
43 as parenting behaviors and parental warmth (Pardini, 2008). The study by Gross, Shaw,
44 Moilanen, et al. (2008) is one of the first to present empirical evidence that fathers' depressive
45 symptoms are bidirectionally associated with their children's behavior in early childhood and to
46 suggest a reciprocal process between parental depression and child behavior. The evidence
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3 suggests that children's behavioral problems have an effect on parenting that is as strong as the
4 influence that parenting may have on changes in child behavior (Larsson et al., 2008; Pardini,
5 2008). Fite, Colder, Lochman, and Wells (2006) suggest that parents of children with behavioral
6 problems feel unable to discipline their children, which tends to decrease their closeness to them
7 and their supervision. Therefore, when children present challenging behavior, parents may have
8 less effective parenting strategies and lose their self-confidence in these skills, thus worsening
9 their depressive symptoms (Goodman & Gotlib, 1999; Nelson, Hammen, Brennan, & Ullman,
10 2003). Larsson et al. (2008), propose that a portion of the effect of parental negativity on later
11 child antisocial behavior could be attributed to environmental factors, but the child's genetically
12 influenced antisocial behavior evoked future changes in parental negativity.
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27 One explanation for this phenomenon focuses on the roles that fathers play with their
28 children, particularly with boys. Research suggests that fathers spend less time with their
29 children than mothers, but a lot of this time is spent playing, so they would have a better
30 relationship with them, experiencing for instance, fewer difficulties and conflicts with their
31 children than mothers (Driscoll & Pianta, 2011; Weaver, Shaw, Crossan, Dishion, & Wilson,
32 2014). Consequently, children that present very early behavioral problems may be more
33 responsive to the quality of their relationships with their fathers than with their mothers (Weaver
34 et al., 2014). Paternal involvement in children's development intensifies towards the end of the
35 pre-school period, narrowing the relationship with their children. This suggests that fathers
36 consider physical proximity and active play to be important components of their involvement
37 with their child (John, Halliburton, & Humphrey, 2012) and, as with mothers, everyday
38 engagement with a child who is hard to manage may challenge fathers' abilities to maintain
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3 positive nonconflictual interactions with their children (Aviram, Atzaba-poria, Pike, Meiri, &
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5 Yerushalmi, 2015).
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8 Furthermore, there is evidence that the effect on the father is different depending on the
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10 sex of the child. There are significant differences in the way that mothers and fathers experience
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12 closeness in their relationships with their boys and girls (Driscoll & Pianta, 2011). For example,
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14 Driscoll and Pianta (2011) found that fathers experience more nearness in their relationships with
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16 their daughters than with their sons. In the light of our findings, we hypothesize that the tendency
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18 of fathers to interact more with their children through playful activities creates greater closeness
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20 with their male children. However, this relationship is disturbed by the difficult behavior of
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22 children with ODD, affecting the mental health of their fathers. This would eventually be a
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24 reciprocal relationship, since depressed fathers would display more negative behaviors towards
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26 their children and less monitoring, and this overly-permissive behavior would have a direct
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28 impact on their children's behavioral problems, especially in preschoolers (Braza et al., 2013;
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30 Childs et al., 2014; Jewell, Krohn, Scott, Carlton, & Meinz, 2008)
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37 Additionally, the aforementioned results are aligned with findings by several authors who
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39 argue that aggressive, hostile or violent behavior in the mother or father has a major impact on
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41 the mental health of their children, particularly preschoolers, influencing the onset of ODD
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43 symptoms (Goelman et al., 2014; Nantel-Vivier, Pihl, Côté, & Tremblay, 2014; Trepât et al.,
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45 2014). Furthermore, recent data have indicated that maternal anxious and irritable temperaments
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47 and paternal cyclothymic temperaments may have influence on ODD symptoms in children and
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49 adolescents age 6 to 18 years (Bilgiç et al., 2016).
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54 Some previous research has studied the effects of maternal depression on children and it
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56 is reported that this is more strongly associated with problems in girls than in boys (Goodman et
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3 al., 2011; Cummings, Keller, & Davies, 2005). Girls may be more sensitive than boys to less
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5 warmth or more aversive behavior (Goodman et al., 2011). On the other hand, Hummel and Kiel
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7 (2014) argue that mothers with higher depression symptoms are more withdrawn with their boys.
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10 Additionally, our results indicate that the three-year old boys of mothers with higher levels of
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12 anxiety and depression present higher levels of ODD symptoms at 8 years of age, which supports
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14 ideas concerning the influence of mothers' mental health on their boys; it also supports the idea
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16 that mothers with anxiety and depression are more distant with their boys. Beyond any doubt,
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18 this may have consequences on development, such as the appearance of an ODD. Furthermore, it
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20 has been proposed that fathers and mothers with depression and anxiety are more focused on
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22 their own difficulties, and probably have less time to worry about their children (Forbes et al.,
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24 2008; Gross, Shaw, & Moilanen, 2008; Harvey & Metcalfe, 2012; Kane & Garber, 2004).
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30 Because most longitudinal studies on bidirectional parent-child influences have focused
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32 on brief time periods (Pardini, 2008) and have not considered possible gender differences
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34 (Hipwell et al., 2008), the principal strength of the present study is that it examines the interplay
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36 between parental psychopathology and ODD symptoms across the preschool years and until age
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38 8, making it possible to understand the development of ODD from preschool to middle
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40 childhood and its influence on the mental health of parents. This study included a large,
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42 representative longitudinal sample, and measured child psychopathology through diagnostic
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44 interviews. This study has some limitations as well and these should be considered when
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46 interpreting their results. One of the drawbacks of this study is that fewer fathers than mothers
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48 provided complete responses to the Adult Self-Report, which reduced our sample size, since we
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50 have only used cases with complete information. Another limitation of this study is that all data
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52 about children's ODD symptoms came from parent reports only. Regarding the parental
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3 psychopathology measures, they were based on parents' self-reports of their symptoms, which
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5 were not or not clinically diagnosed. Finally, the SES of the sample was higher than that of the
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7 general population and this could have led to bias. Thus, it should also be considered for
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9 generalization purposes.
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13 The results of this study have important implications for the prevention and treatment of
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15 ODD. According to our findings, it is important to detect a child with ODD symptoms, and to
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17 consider a different approach to treatment for girls and boys, as the evidence indicates that both
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19 manifest ODD differently (Munkvold et al., 2011). It is also essential for clinicians to inquire
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21 into the mental health of parents, and also integrate fathers, who tend to engage less in the
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23 treatment of children. At present there is evidence of treatments that include parents and that can
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25 significantly improve the behavior of children with ODD, such as Parent-Child Interaction
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27 Therapy (PCIT) (Eyberg, Nelson, & Boggs, 2008). This therapy works with parent-child
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29 interactions through play, allowing for both a more caring relationship between them and for
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31 parents to learn discipline strategies (Ferro, Vives, & Ascanio, 2010). Authors such as
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33 Abrahamse et al. (2012) and Niec, Barnett, Prewett, & Shanley Chatham (2016) have argued that
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35 with PCIT fathers can make great progress in their relationship with their children and benefit
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37 from treatment as much as mothers. Helping parents to interact with their children and build
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39 parenting skills benefits both children and the parents' own mental health (Barth, 2005).
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46 On the other hand, with regard to the mental health of parents, it would be interesting to
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48 conduct separate interventions for mothers and fathers, as our results indicate that they are
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50 affected differently by their children's symptomatology. It is important to address the role of
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52 paternal depression and anxiety, as few studies have focused on the influence of fathers on child
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54 development and even less on the influence of children on their fathers. Evidently, a child with
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3 oppositionality symptoms may have an impact on the emotional states of parents, and according
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5 to our findings, mainly fathers. Fathers should be encouraged to address and treat their own
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7 psychopathology, thus enhancing the mental health of the whole family unit.
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10 11 12 **Conflict of interest**

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15 The authors declare that there is no conflict of interest.
16

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Table 1. Descriptive (sociodemographic and clinical characteristics) of the sample ($n=331$).

Sociodemographic		3 years-old		*DSM4 disorders	3 yrs-old	8 yrs-old
Age (years)	<i>Mean (SD)</i>	3.29	0.45%	Disruptive disorders	6.9%	13.1%
Sex; n (%)	<i>Female</i>	174	52.6%	ADHD	4.4%	9.4%
Socioeconomic status; n (%)	<i>High</i>	117	35.3%	Oppositional defiant	4.4%	6.0%
	<i>Mean-high</i>	113	34.1%	Conduct disorder	0.5%	0.0%
	<i>Mean</i>	46	13.9%	Depressive disorders	0.2%	1.2%
	<i>Medio-low</i>	40	12.1%	Anxiety disorders	7.8%	10.3%
Ethnicity; n (%)	<i>Low</i>	15	4.5%	Separation anxiety	1.2%	1.6%
	<i>White</i>	309	93.4%	Generalized anxiety	0.0%	1.2%
	<i>Hispanic</i>	12	3.6%	Specific phobia	3.5%	6.7%
	<i>Other</i>	10	3.0%	Social phobia	2.3%	1.2%

Note. SD: standard deviation. *Weighted prevalences

Table 2. Distribution of the variables of the study: means and standard deviations (SD).

		Mother: Anx-depres.	Mother: aggressive	Father: Anx-depres.	Father: aggressive	Child: ODD-symptoms
Cronbach's- α	Age 3	.81	.79	.75	.80	.66
	Age 5	.80	.79	.77	.81	.73
Girls; $n=174$	Age 3					
	Mean	5.88	3.45	4.75	3.10	1.16
	SD	3.79	3.29	3.53	3.30	1.47
	Min	0	0	0	0	0
	Max	20	16	22	16	7
	Age 5					
	Mean	5.22	2.89	4.57	2.71	0.93
	SD	3.53	2.99	3.52	3.04	1.40
	Min	0	0	0	0	0
	Max	20	17	27	15	7
Boys; $n=157$	Age 3					
	Mean	6.53	4.33	5.20	3.50	0.68
	SD	4.54	3.41	3.65	3.32	1.14
	Min	0	0	0	0	0
	Max	22	17	22	14	6
	Age 5					
	Mean	5.63	3.41	4.31	2.66	0.93
	SD	4.19	3.18	3.28	3.04	1.55
	Min	0	0	0	0	0
	Max	22	15	18	14	7

Note. SD: standard deviation. ODD: oppositional

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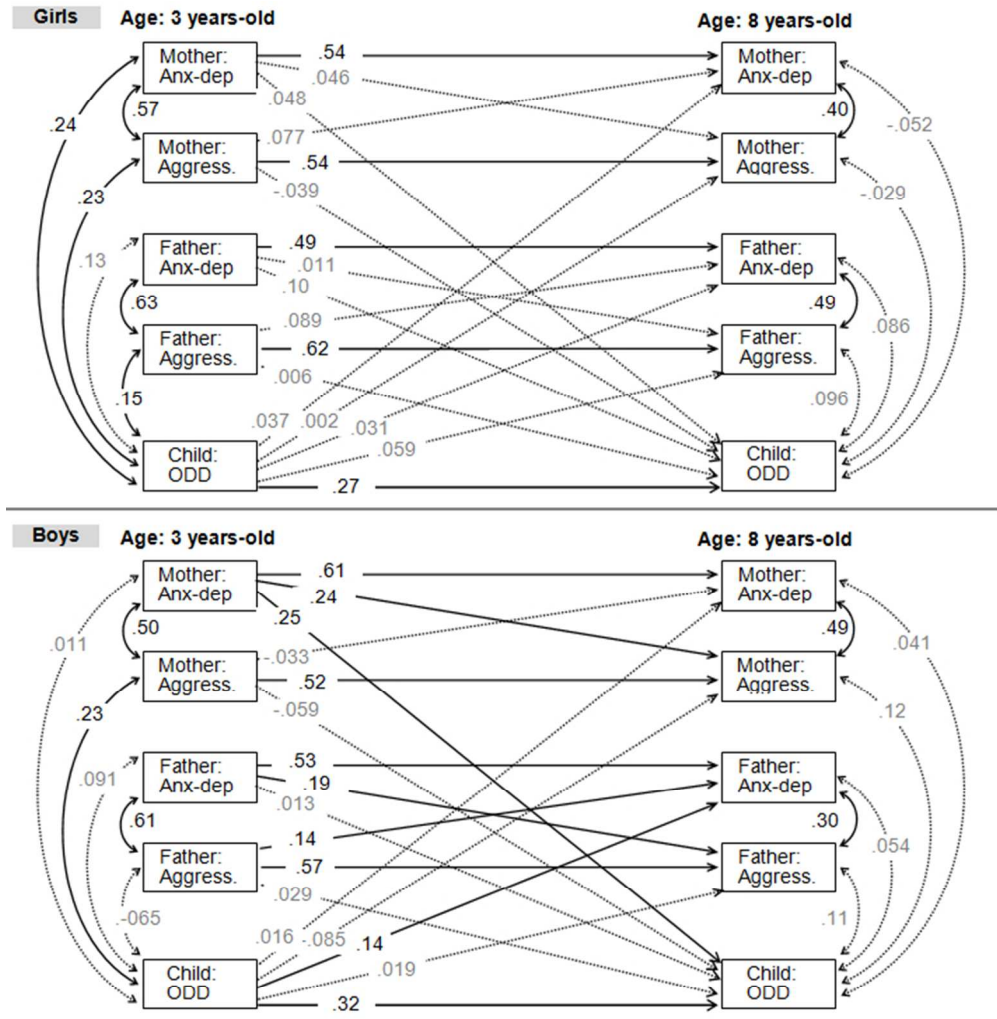
Table 3. Correlation matrix for the variables of the study: Pearson product-moment coefficients.

	Girls (n=174)										Boys (n=157)									
	2	3	4	5	6	7	8	9	10	2	3	4	5	6	7	8	9	10		
1 Age 3: Mother: anx-dep.	.57	.22	.18	.24	.59	.35	.11	.07	.10	.50	.18	.14	.01	.60	.50	.00	.00	.22		
2 Age 3: Mother: aggress.		.22	.21	.23	.39	.57	.08	.04	.06		.13	-.01	.23	.28	.62	.09	-.08	.14		
3 Age 3: Father: anx-dep			.63	.14	.14	.15	.55	.41	.14			.62	.09	.17	.16	.63	.54	.10		
4 Age 3: Father: aggress.				.15	.17	.09	.40	.63	.10			-.07	.11	.00	.46	.69	.05			
5 Age 3: Child: ODD-symp.					.18	.14	.11	.15	.28					.02	.04	.18	.00	.32		
6 Age 8: Mother: anx-dep.						.50	.17	.14	.04						.58	.17	.07	.17		
7 Age 8: Mother: aggress.							.21	.13	.03							.11	-.02	.18		
8 Age 8: Father: anx-dep								.58	.15								.55	.13		
9 Age 8: Father: aggress.									.15									.12		
10 Age 8: Child: ODD-symp.									--									--		

Note. Bold: significant correlation.

Table 4. Results of the SEM (standardized coefficients; $n=311$).

			Coeff	SE	t	p	95% CI (coeff)	
ODD-8	MotherAnxDep-3	Girl	0.048	0.0904	0.53	0.597	-0.129	0.225
		Boy	0.251	0.0808	3.11	0.002	0.093	0.410
	MotherAggre-3	Girl	-0.039	0.0911	-0.43	0.667	-0.218	0.139
		Boy	-0.060	0.0834	-0.72	0.474	-0.223	0.104
	FatherAnxDep-3	Girl	0.104	0.0959	1.08	0.28	-0.084	0.291
		Boy	0.013	0.0904	0.14	0.886	-0.164	0.190
	FatherAggre-3	Girl	0.006	0.0962	0.06	0.948	-0.182	0.195
		Boy	0.029	0.0897	0.33	0.744	-0.146	0.205
	ODD-3	Girl	0.268	0.0760	3.53	<0.001	0.119	0.417
		Boy	0.320	0.0696	4.60	<0.001	0.184	0.456
MotherAnxDep-8	MotherAnxDep-3	Girl	0.539	0.0683	7.90	<0.001	0.405	0.673
		Boy	0.616	0.0602	10.24	<0.001	0.498	0.734
	MotherAggre-3	Girl	0.077	0.0757	1.01	0.312	-0.072	0.225
		Boy	-0.033	0.0729	-0.45	0.653	-0.176	0.110
	ODD-3	Girl	0.037	0.0640	0.58	0.563	-0.088	0.162
		Boy	0.016	0.0630	0.26	0.796	-0.107	0.140
MotherAggre-8	MotherAnxDep-3	Girl	0.046	0.0779	0.59	0.557	-0.107	0.198
		Boy	0.241	0.0656	3.68	<0.001	0.113	0.370
	MotherAggre-3	Girl	0.539	0.0699	7.72	<0.001	0.402	0.676
		Boy	0.516	0.0624	8.27	<0.001	0.394	0.639
	ODD-3	Girl	0.002	0.0657	0.03	0.977	-0.127	0.131
		Boy	-0.085	0.0591	-1.43	0.152	-0.201	0.031
FatherAnxDep-8	FatherAnxDep-3	Girl	0.493	0.0762	6.47	<0.001	0.343	0.642
		Boy	0.527	0.0687	7.67	<0.001	0.392	0.662
	FatherAggre-3	Girl	0.089	0.0824	1.08	0.282	-0.073	0.250
		Boy	0.141	0.0744	1.89	0.050	0.005	0.287
	ODD-3	Girl	0.031	0.0647	0.48	0.633	-0.096	0.158
		Boy	0.141	0.0587	2.41	0.016	0.026	0.256
FatherAggre-8	FatherAnxDep-3	Girl	0.011	0.0766	0.14	0.886	-0.139	0.161
		Boy	0.190	0.0695	2.73	0.006	0.054	0.326
	FatherAggre-3	Girl	0.617	0.0676	9.13	<0.001	0.485	0.749
		Boy	0.569	0.0630	9.03	<0.001	0.445	0.693
	ODD-3	Girl	0.059	0.0602	0.99	0.324	-0.059	0.177
		Boy	0.019	0.0551	0.35	0.730	-0.089	0.127



Note. Dotted-line grey-font color: non-significant coefficients. Straight-line black-font color: significant coefficients. Results adjusted by other comorbid disorders different to ODD

SEM including children's sex as group variable (n=311).

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