

Journal of Child and Family Studies

Parental psychopathology levels as a moderator of temperament and oppositional defiant disorder symptoms in preschoolers --Manuscript Draft--

Manuscript Number:	JCFS-D-15-00280R3
Full Title:	Parental psychopathology levels as a moderator of temperament and oppositional defiant disorder symptoms in preschoolers
Article Type:	Original research
Keywords:	Oppositional defiant disorder; parental psychopathology; preschool; temperament
Corresponding Author:	Zayra Antúnez Universitat Autònoma de Barcelona Cerdanyola del Valles, Barcelona SPAIN
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	Universitat Autònoma de Barcelona
Corresponding Author's Secondary Institution:	
First Author:	Zayra Antúnez
First Author Secondary Information:	
Order of Authors:	Zayra Antúnez Nuria de la Osa Roser Granero Lourdes Ezpeleta
Order of Authors Secondary Information:	
Funding Information:	
Abstract:	<p>Oppositional Defiant Disorder (ODD) is among the most prevalent disorders in preschoolers. It has been linked to temperament, since characteristics such as elevated surgency and negative affect, as well as low levels of effortful control, contribute to the development of this disorder. Evidence also indicates that parental psychopathology can accentuate temperamental traits. Our aim was to assess whether the levels of psychopathology of mothers and fathers acts as a moderator of the relationship between temperament and ODD symptoms in preschoolers, both cross-sectionally at ages 3, 4 and 5, and longitudinally between ages 3 and 5. The sample included 550 children evaluated at ages 3, 4 and 5 through questionnaires and a semi-structured diagnostic interview with parents. Parents also answered a questionnaire about their own psychopathology. The results indicated that negative affect and effortful control are associated with higher levels of ODD symptoms in preschoolers. At child age 5, higher levels of paternal depression and anxiety increased the effect of low effortful control on ODD. High levels of negative affect and low levels of effortful control at age 3 were statistical predictors of ODD levels at age 5, and this relationship was also moderated by paternal anxiety and depression. The results have important clinical implications for the proper orientation of interventions, suggesting that interventions should integrate the paternal caregiver in the treatment.</p>
Response to Reviewers:	<p>May, 9th, 2016</p> <p>Parental psychopathology levels as a moderator of temperament and oppositional defiant disorder symptoms in preschoolers</p> <p>Thank you for considering our manuscript "Parental psychopathology levels as a moderator of temperament and oppositional defiant disorder symptoms in preschoolers" for publication by the Journal of Child and Family Studies. I am pleased</p>

to resubmit the revised version. We have addressed each of the latest reviews as outlined below.

Best regards,
Zayra Antúnez Sanhueza
Dep. Psicología Clínica y de la Salud
Facultat de Psicologia
Universitat Autònoma de Barcelona

Revisions

Q1. Consolidate the last 2 paragraphs of the Introduction into one paragraph
Reply: We have consolidated the last 2 paragraphs of the Introduction into one paragraph.

Q2. Reformat the Method section with these headings and in this sequence:
Participants, Procedure, Measures, and Data Analyses.
Reply: We have reformed the Method section, as suggested.

Q3. Avoid the use of single-sentence paragraphs, as per APA Publication Manual
Reply: We have eliminated single-sentence paragraphs.

Q4. Omit the sub-section headers in the Results section.
Reply: We have omitted the sub-sections headers in the Results section.

Q5. There are a few paragraphs that are far too long to hold the reader's attention and follow a line of thinking. Ensure that no paragraph is longer than a half page throughout the manuscript.
Reply: We have reduced the size of some excessively long paragraphs.

Q6. Ensure that all references cited in the text are listed in the Reference section and all references listed in the Reference section are cited in the text.
Reply: We have ensured that the references correspond.

1 **Running Head: Parental psychopathology, temperament and ODD**

2 **Parental psychopathology levels as a moderator of temperament and oppositional defiant disorder symptoms**
3 **in preschoolers**

4 Zayra Antúnez · Nuria de la Osa · Roser Granero · Lourdes Ezpeleta

5

6

7

8

9

10

11

12

13

14 Z. Antúnez

15 Department of Clinical and Health Psychology. Universitat Autònoma de Barcelona, Barcelona, Spain

16 University Health Centre. Universidad Austral de Chile, Valdivia, Chile.

17

18 N. de la Osa · Lourdes Ezpeleta

19 Unit of Epidemiology and Diagnosis in Developmental Psychopathology (2014 SGR 312). Department of Clinical
20 and Health Psychology. Universitat Autònoma de Barcelona, Barcelona, Spain

21

22 R. Granero

23 Unit of Epidemiology and Diagnosis in Developmental Psychopathology (2014 SGR 312). Department of
24 Psychobiology and Methodology of Health Sciences. Universitat Autònoma de Barcelona, Spain

25

1 **Abstract**

2 Oppositional Defiant Disorder (ODD) is among the most prevalent disorders in preschoolers. It has been linked to
3 temperament, since characteristics such as elevated surgency and negative affect, as well as low levels of effortful
4 control, contribute to the development of this disorder. Evidence also indicates that parental psychopathology can
5 accentuate temperamental traits. Our aim was to assess whether the levels of psychopathology of mothers and
6 fathers acts as a moderator of the relationship between temperament and ODD symptoms in preschoolers, both
7 cross-sectionally at ages 3, 4 and 5, and longitudinally between ages 3 and 5. The sample included 550 children
8 evaluated at ages 3, 4 and 5 through questionnaires and a semi-structured diagnostic interview with parents. Parents
9 also answered a questionnaire about their own psychopathology. The results indicated that negative affect and
10 effortful control are associated with higher levels of ODD symptoms in preschoolers. At child age 5, higher levels of
11 paternal depression and anxiety increased the effect of low effortful control on ODD. High levels of negative affect
12 and low levels of effortful control at age 3 were statistical predictors of ODD levels at age 5, and this relationship
13 was also moderated by paternal anxiety and depression. The results have important clinical implications for the
14 proper orientation of interventions, suggesting that interventions should integrate the paternal caregiver in the
15 treatment.

16 **Keywords:** Oppositional defiant disorder · parental psychopathology · preschool · temperament

17

18

19

20 **Corresponding author:**

21 Zayra Antúnez

22 Department of Clinical and Health Psychology, Edifici B. Universitat Autònoma de Barcelona

23 08193 Bellaterra (Barcelona), Spain.

24 E-mail: ZayraAntunez@uach.cl

25 Telephone number: +34 935 868 259

1 Parental psychopathology, temperament and ODD

4 1 **Introduction**

2 Oppositional Defiant Disorder (ODD) is among the most prevalent disorders in childhood with rates
3 varying between 6.9% and 13.4% in preschoolers (Ezpeleta, de la Osa, & Doménech, 2014; Lavigne, LeBailly,
4 Hopkins, Gouze, & Binns, 2009). It is described as a persistent pattern of anger and irritability, along with
5 oppositional, defiant and hostile behavior toward adults and authority figures (American Psychiatric Association,
6 2013). The symptoms of ODD include behaviors such as acting out of spite or revenge, blaming others for the
7 consequences of one's actions or problems, presenting deficits in self-control, and displaying patterns of behavior
8 characterized by emotional instability (Burke, Rowe, & Boylan, 2014; Melegari et al., 2015).

9 Individual differences in behavior patterns, emotional reactivity and self-regulation have been identified as
10 some of the earliest biological differences emerging in children, factors that explain why people may respond
11 differently to the same stimulus (Derryberry & Rothbart, 1997; Rothbart & Posner, 2006). The concept of
12 temperament refers to the individual differences already manifest in the period between infancy and early school
13 years (Stringaris, Maughan, & Goodman, 2010).

14 There is a general consensus among previous studies regarding the stability of temperament throughout the
15 lifespan, with support from genetic and biological models (Buss & Plomin, 1975; Derryberry & Rothbart, 1997;
16 Goldsmith & Campos, 1982; Thomas & Chess, 1977). However, the expression and development of temperament
17 can be mitigated, intensified or modified according to interactions with the environment (Rothbart & Bates, 2006;
18 Thomas & Chess, 1977).

19 Rothbart, Ahadi, Hershey and Fisher (2001) proposed a three-part model of temperament, involving
20 surgency (positive emotionality and extraversion), negative affect (high levels of negative emotions) and effortful
21 control (planning and self-regulation of behavior). Evidence suggests that the individual dimensions of temperament
22 proposed in this model may differentially contribute to the risk for ODD in young children (Lavigne, Gouze,
23 Hopkins, Bryant, & LeBailly, 2012; Stringaris & Goodman, 2009). For instance, studies on preschoolers suggest
24 that children with high levels of negative affect and low levels of effortful control are at risk for temperamental
25 difficulties. In particular, they would have trouble regulating intense emotional reactivity (Stringaris et al., 2010), as
26 well as modulating behavior and attention in a flexible and adaptive way (Crawford, Schrock, & Woodruff-Borden,
27 2011; Nigg, 2006), all of which would increase the risk of displaying more externalizing symptoms (Rothbart &

Parental psychopathology, temperament and ODD

1 Bates, 2006), such as ODD symptoms (Lavigne et al., 2012) or behavioral problems (Dougherty et al., 2011;
2 Eisenberg et al., 2009). Researchers have also found associations between high surgency and symptoms of defiance
3 (Lavigne et al., 2012; Martel, Gremillion, & Roberts, 2012; Stringaris et al., 2010).

4 Despite the demonstrated biological nature of temperament, environmental factors such as parental
5 psychopathology create gene-environment interactions that significantly affect the developing temperament
6 (Burnette, Oshri, Lax, Richards, & Ragbeer, 2012). Since parents not only transmit genetic information, but also
7 shape the rearing environment (Jaffee, Moffitt, Caspi, & Taylor, 2003), the poor mental health and behavior of
8 parents has been demonstrated to adversely affect the mental health of children and accentuate traits associated with
9 a difficult temperament (Childs, Fite, Moore, Lochman, & Pardini, 2014; Weitzman, Rosenthal, & Liu, 2011; Yoo,
10 Adamsons, Robinson, & Sabatelli, 2013). For example, parents with mental health problems such as depression are
11 likely to have a relationship with their children characterized by tough or distant parenting. These parental attitudes
12 may create a cooler rearing environment, which could influence child behavioral problems (Lovejoy, Graczyk,
13 O'Hare, & Neuman, 2000).

14 Researchers have also looked separately at the effect of maternal and paternal psychopathology on child
15 temperament and behavior problems. There is extensive support in the literature for the notion that maternal mental
16 health and child care quality have a significant impact on child development (Goelman, Zdaniuk, Boyce, Armstrong,
17 & Essex, 2014). The evidence suggests that both maternal negative affect and maternal psychopathology may
18 predict increased internalizing and externalizing problems in children, behavior problems in particular (Crawford et
19 al., 2011; Goelman et al., 2014), especially, in children characterized by high surgency or negative affect (Chen,
20 Deater-Deckard, & Bell, 2014). Negative affect and greater negative emotionality of the mother can put children at
21 risk for low self-regulation (Gartstein, Bridgett, Young, Panksepp, & Power, 2013).

22 Mother's psychopathology—in particular depression—may influence children's behavior problems, which
23 may increase or decrease depending on the severity of maternal symptoms (Nicholson, Deboeck, Farris, Boker, &
24 Borkowski, 2011). Maternal depression may also cause children to have a greater negative affect and undergo more
25 general psychopathology (Goodman et al., 2011).

26 Although fathers have been vastly underrepresented in the literature on parent psychopathology and their
27 influence on children, previous research also indicates that paternal psychopathology can have important

1 Parental psychopathology, temperament and ODD
2
3

4 1 implications for the mental health of the children. Like the mother-child relationship, the father-child relationship
5 2 may affect a child's cognitive and socio-emotional development (Brown, McBride, Bost, & Shin, 2011; Goelman et
6 3 al., 2014). It has been found that more father engagement was related to fewer externalizing problems (Flouri,
7 4 Midouhas, & Narayanan, 2015). And conversely, fathers' aggressive behavior seems to have an impact on the
8 5 development of aggressive and hostile behavior in children, increasing the symptoms of ODD (Davies, Sturge-
9 6 Apple, Cicchetti, Manning, & Vonhold, 2012; Trepap, Granero, & Ezpeleta, 2014).

10 7 In addition, paternal psychopathology and especially depression has been associated with displays of
11 8 greater hostility toward children, and consequently, with increases in child adjustment problems (Reeb, Conger, &
12 9 Wu, 2010). As a result, paternal depression and anxiety may also be significant predictors of behavior problems and
13 10 ODD symptoms in preschoolers (Breux, Harvey, & Lugo-Candelas, 2013; Gross, Shaw, Moilanen, Kishion and
14 11 Wilson, 2008; Kashdan et al., 2004), and it continues to influence emotional and behavioral problems in older
15 12 children and adolescents (Davé, Sherr, Senior & Nazareth, 2008; Weitzman, Rosenthal & Liu, 2011).

16 13 Furthermore, considering that maternal and paternal psychopathology may have different consequences in
17 14 children with a difficult temperament and symptoms of oppositionism, the moderating role of parental
18 15 psychopathology in the relationship between temperament and the ODD symptoms should be considered.
19 16 Nevertheless, there is a lack of empirical evidence in this respect. However, there is some evidence that a mother's
20 17 depression can be a significant moderator of effects in the child's conduct problems, and these children tend to
21 18 respond better to intervention (Gardner, Hutchings, Bywater, & Whitaker, 2010). Regarding fathers, positive
22 19 interaction with their children, specifically, their levels of engagement and accessibility can moderate the effect of
23 20 intervention on the mental health of children with serious emotional disturbances (Bernard, Whitson, & Kaufman,
24 21 2015).

25 22 With this in mind, the aim of this study was to determine whether the type and/or severity of paternal or
26 23 maternal symptomatology (specifically aggression, depression and anxiety) interacts with the relationship between
27 24 child temperament (surgency, negative affect and effortful control) and the level of ODD in a community sample of
28 25 preschoolers, both cross-sectionally and longitudinally, between the ages of 3 and 5. Based on research conducted to
29 26 date, we formulated the following empirical hypotheses: a) levels of surgency, negative affect and effortful control
30 27 would have an effect on ODD levels in preschoolers, in such a way that higher levels of surgency and negative
31 28 affect and low levels of effortful control would be associated with greater ODD; b) Paternal and maternal
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

1 Parental psychopathology, temperament and ODD

2
3
4 1 aggression, depression and anxiety would moderate the relationship between ODD and temperament, in such a way
5
6 2 that higher levels of parental aggression, depression and anxiety would be associated with a stronger effect of
7
8 3 temperament (high surgency, high negative affect and low effortful control) on ODD symptoms.
9

10 4 **Method**

11 12 13 5 *Participants*

14
15
16 6 The sample was obtained as part of a longitudinal study investigating potential risk factors, interactions and
17
18 7 mechanisms underlying the development of psychopathology in early childhood (Ezpeleta, de la Osa, & Doménech,
19
20 8 2014). Data was collected from participants using a double-phase design. In the first phase, an initial sample of
21
22 9 2,283 families of 3-year-old children from Barcelona were randomly contacted from those in the census (N =
23
24 10 13,578). In total, 1,341 families agreed to participate (58.7%) and 63 children were excluded on account of having
25
26 11 difficulties understanding or using Spanish or Catalan, or because they presented a pervasive developmental disorder
27
28 12 or intellectual disability.
29

30
31 13 In the second phase, a screening was used to identify children with possible psychological problems.
32
33 14 Parents of the remaining 1,278 children answered the Strengths and Difficulties Questionnaire (SDQ³⁻⁴) (Goodman,
34
35 15 1997) and all families of children screening positive (with a raw score ≥ 4 on the SDQ³⁻⁴ conduct problems scale,
36
37 16 which corresponds with percentile 90, or with a response option of 2 -certainly true- in any of the 8 DSM-IV ODD
38
39 17 symptoms) were invited to participate (n = 522), with 105 families declining. Additionally, of the 756 cases that
40
41 18 screened negative on the SDQ³⁻⁴, 235 (30%) were selected to continue in the study; 30 of them refused. The final
42
43 19 sample included 622 children with an average age of 3.76 (SD = 0.32), of whom 310 were male (49.8%) and 554
44
45 20 identified as Caucasian (89.1%). The left side of Table 1 shows the sociodemographic characteristics of the initial
46
47 21 sample, and the right side shows the prevalence of the most frequent DSM-IV disorders at follow-up.
48

49
50 22 --- Insert Table 1 ---
51

52 23 From the initial sample, subjects who possessed complete information for both the diagnostic interview and
53
54 24 the analyzed questionnaires (n = 550 at 3 years, n = 540 at 4 years, and n = 496 at 5 years) were included in the
55
56 25 statistical analysis. Parents answered about their own psychopathology at first follow-up (mothers: n = 599 and
57
58 26 fathers: n = 561). There were no statistically significant differences between subjects included in the final analysis
59
60
61
62
63
64
65

1 Parental psychopathology, temperament and ODD

2
3
4 1 and subjects excluded due to incomplete information in terms of sex ($p = .22$), ethnicity ($p = .09$) or socioeconomic
5
6 2 status ($p = .24$). Table 1 describes the sample of children who were part of the statistical analysis at the first follow-
7
8 3 up.

10 4 *Procedure*

11
12
13
14 5 The study was approved by the ethics committee of the authors' home institution (*Comissió d'Ètica en*
15
16 6 *l'Experimentació Animal i Humana, Universitat Autònoma de Barcelona*: CEEAH 1385). The families of children
17
18 7 were contacted through recruitment at schools and invited to participate when the children were 3 years old; both
19
20 8 parents and teachers were informed in detail about the investigation at the time of recruitment. After obtaining
21
22 9 written parental consent, parents were asked to answer the SDQ³⁻⁴ at home and return the completed form to the
23
24 10 school. Families who met the selection criteria were contacted by phone to be included in the study, and consenting
25
26 11 parents participated in the diagnostic interview (DICA - PPYC) at the child's school. The DICA-PPYC was
27
28 12 administered by interviewers previously trained in the use of this diagnostic interview and in the other instruments
29
30 13 applied. The intensive training period lasts one week and includes an overview about developmental psychology,
31
32 14 children's psychopathology and interviewing skills. Principally, future interviewers conducted practical training with
33
34 15 role playing and then, observation and coding of live interviews. The criterion for being ready for the field is to
35
36 16 obtain a mean agreement with an expert kappa ≥ 0.80 for all the questions in at least eight interviews. The other
37
38 17 questionnaires were answered by the parents at home and then returned to be collected at the school.

40 18 *Measures*

41
42
43 19 *Diagnostic Interview for Children and Adolescents for Parents of Preschool and Young Children (DICA-*
44
45 20 *PPYC)* (Reich & Ezpeleta, 2009): The DICA-PPYC is a semi-structured interview used to assess child
46
47 21 psychopathology according to DSM-IV-TR criteria (American Psychiatric Association, 2000). It was adapted and
48
49 22 validated for the Spanish preschool population, and the Spanish preschool version presents adequate psychometric
50
51 23 properties (Ezpeleta, de la Osa, Granero, Domènech, & Reich, 2011). The DICA-PPYC was answered by one
52
53 24 (mother or father) or by both parents together, completing a single interview. In this situation they reach an
54
55 25 agreement on the answer that best represents the opinion about the child's behavior. The average administration time
56
57 26 is approximately 50 minutes. We used data collected from the DICA-PPYC at child ages 3, 4 and 5. At each follow-
58
59 27 up, the number of ODD symptoms was used as a measure of ODD level. Additionally, the following diagnoses

1 Parental psychopathology, temperament and ODD

2
3
4 1 comorbid with ODD were defined as covariates in the analysis: Attention-deficit/hyperactivity disorder, conduct
5
6 2 disorder, depression, separation anxiety, general anxiety, specific phobias and social phobia.

7
8
9 3 As regards the respondents, at child age 3, 367 (66.7%) mothers, 41 (7.5%) fathers and 142 (25.8%) both
10
11 4 parents together, completed an interview. At child age 4, 378 (70.0%) mothers, 42 (7.8%) fathers and 120 (22.2%)
12
13 5 both parents together answered the DICA-PPYC. At child age 5, 370 (74.6%) mothers, 36 (7.3%) fathers and 90
14
15 6 (18.1%) both parents together answered the interview.

16
17
18 7 *Adult Self-Report (ASR)* (Achenbach & Rescorla, 2003): The ASR evaluates emotional and behavioral
19
20 8 problems in adults between the ages of 18 and 59. It features 126 items that inquire about the respondent's own
21
22 9 behavior over the past six months, plus some items related to interpersonal relationships, work and educational
23
24 10 matters. The internalizing problems scale combines anxious/depressed, withdrawn/depressed and somatic
25
26 11 complaints syndrome scores and the externalizing problems scale combines rule-breaking behaviors, aggressive
27
28 12 behavior and intrusive syndrome scores. The measurement scale is ordinal, with 3 response options: 0 (not true), 1
29
30 13 (somewhat or sometimes true) and 2 (very true or often true). Mothers and fathers answered this questionnaire when
31
32 14 the children were 3 years old, and for the purpose of this study, symptomatology levels of the anxiety, depression
33
34 15 and aggressiveness (measured through anxious-depressed and aggressive behavior scales) were used for both
35
36 16 mothers and fathers. The scales demonstrated high internal consistency in the sample: Maternal anxious-depressed,
37
38 17 $\alpha = 0.81$; paternal anxious-depressed, $\alpha = 0.79$; maternal aggressive behavior, $\alpha = 0.80$ and paternal aggressive
39
40 18 behavior, $\alpha = 0.81$.

41
42
43 19 *Children's Behavior Questionnaire (CBQ)* (Rothbart et al., 2001): The CBQ is a parent-reported
44
45 20 questionnaire that evaluates the temperament of children between the ages of 3 and 7. It has a 7 option Likert
46
47 21 response format, ranging from 1 ("extremely untrue of your child") to 7 ("extremely true of your child"), plus a
48
49 22 response choice of "not applicable" when parents have not observed this situation. The items measure 15 dimensions
50
51 23 of child temperament, structured in 3 second-order scales: surgency, negative affect and effortful control. The
52
53 24 surgency scale includes the dimensions of activity level, high intensity pleasure, impulsivity and approach/positive
54
55 25 anticipation. The negative affect scale includes the dimensions of anger/frustration, discomfort, soothability/falling
56
57 26 reactivity, sadness, and shyness. The effortful control scale includes attentional focusing, inhibitory control, low
58
59 27 intensity pleasure, perceptual sensitivity, and smiling or laughter. This study used the Spanish version, which has

Parental psychopathology, temperament and ODD

1 been proven to provide reliable and valid scores to evaluate temperament in preschool children (de la Osa, Granero,
2 Penelo, Domènech, & Ezpeleta, 2013). There was high internal consistency in the study sample, with values at
3 baseline equal to $\alpha = 0.74$ for surgency, $\alpha = 0.71$ for negative affect and $\alpha = 0.79$ for effortful control. The responses
4 of parents at child ages 3, 4 and 5 were included in the analysis.

Data Analyses

5
6 We used the statistical software SPSS20 for Windows to perform data analysis. Since the data were
7 collected using a double-phase screening design, all analyses were weighted in such a way that each subject was
8 assigned an amount equal to the inverse probability of selection in the second phase of sampling. This weighted
9 variable made it possible to generalize the results to the general population of origin. Independent variables included
10 temperament scales (surgency, negative affect and effortful control), parental psychopathology (levels of symptoms
11 in aggressive behavior and anxious-depressed scales), and the interaction of each temperament scale with parental
12 aggressive behavior and parental anxiety or depression. The level of symptoms of the parents was defined with T
13 scores. T score= 50 for normal clinical thresholds, T score= 65 for subclinical and T score= 70 for clinical.

14 The dependent variable was the ODD level, defined as the total number of symptoms of ODD in the
15 diagnostic interview. Diagnoses in the DICA-PPYC were generated through computerized algorithms entered in
16 EnDat, according to the DSM-IV-TR criteria. This helped to obtain both the diagnosis and the number of established
17 symptoms of ODD, with which we dimensionally worked in this study.

18 Given the association between the variables analyzed in this work (ODD symptoms and levels of parental
19 psychopathology) with children's sex (especially at an early age) and the presence of other psychological disorders,
20 to avoid bias in the results, the statistical analyses have been adjusted according to gender and the presence of other
21 comorbid disorders. This is because ODD prevalence is similar in boys and girls at an early age (Ezpeleta, de la
22 Osa, Granero, & Trepate, 2014), but different in older children (Munkvold, Lundervold, & Manger, 2011) and ODD
23 can be comorbid with other disorders (Lavigne et al., 2009).

24 The data were analyzed using negative binomial regression modeling, an alternative to Poisson regression
25 to count data whose distribution exhibits over-dispersion. The modeling was performed in three blocks: First, the
26 control or adjustment variables were introduced. Second, we introduced temperament scores as measured by the

1 Parental psychopathology, temperament and ODD

2
3
4 1 CBQ and levels of parental psychopathology as measured by the ASR. Third, we included the interaction parameters
5
6 2 of each scale of the CBQ with each scale of the ASR. To assess the relevance of all interaction parameters for each
7
8 3 individual model, the following procedure was employed: a) when the chunk-test produced a value of $p > .10$, step 3
9
10 4 was omitted, and the main effects from step 2 were analyzed; b) when the test for combined interactions produced a
11
12 5 value of $p \leq .10$, indicating the presence of significant interactions, the interactions were analyzed individually to
13
14 6 determine which were significant, and only those that had a significant effect were retained in the model and tested.

15
16
17 7 Since the objective of this work is to screen for any possible interaction term, rather than testing for a
18
19 8 hypothesized specific interaction, the *p-value* to value interaction terms has been fixed at $p < 0.10$ to avoid low
20
21 9 statistical power and sensitivity (Kleinbaum, Kupper, Muller, & Nizam, 2013). By simultaneously entering
22
23 10 information from the paternal and maternal reports into the ASR, regression models could be obtained that indicated
24
25 11 the specific contribution of each parent.

26
27
28 12 The data were analyzed using both cross-sectional and longitudinal analyses. The cross-sectional analysis
29
30 13 obtained independent results for paternal and maternal levels of psychopathology at child age 3, as well as CBQ
31
32 14 temperament scores and ODD symptoms at ages 3, 4 and 5. In the longitudinal analysis, predictor variables included
33
34 15 child CBQ scores at age 3, as well as the interaction between child temperament and parental levels of
35
36 16 psychopathology at that same age; the dependent variable was defined as the number of ODD symptoms at child age
37
38 17 5.

39 40 41 18 **Results**

42
43
44 19 Table 2 includes the descriptive (mean and standard deviation) for the CBQ and ASR scales. Table 3
45
46 20 contains the bivariate correlation matrix for all the measures used. Due to the large sample size, and therefore the
47
48 21 high statistical power, many correlations with low effect size were statistically significant, so coefficients with
49
50 22 moderate to good effect size were marked.

51
52 23 --- Insert Tables 2-3 ---

53
54
55 24 The first block of Table 4 contains the negative binomial regression valuing the association between CBQ
56
57 25 and ASR scores (defined as independent variables in the model) and the number of ODD symptoms (dependent
58
59 26 variable). The chunk test valuing the set of interaction terms achieved non-significant results ($p = .842$), so all the

1 Parental psychopathology, temperament and ODD

2
3
4 1 moderation effects between ASR and CBQ were excluded from the model and main effects were estimated and
5
6 2 interpreted. The absence of relevant interaction parameters indicates that parents' psychopathology levels (anxious-
7
8 3 depressed and aggressive behavior) do not moderate the potential association between child temperament and ODD
9
10 4 levels. At child age 3, high ODD severity levels were related to high scores on the temperamental dimension of
11
12 5 negative affect and low scores on the dimension of effortful control. Additionally, the ODD level was higher for
13
14 6 children whose mothers had higher aggressive behavior scores and whose fathers had higher anxious-depressed
15
16 7 levels.

17
18
19 8 --- Insert Table 4 ---

20
21
22 9 The second block in Table 4 corresponds to the association between the CBQ scores (measured at child age
23
24 10 4), the ASR scores with the criterion number of ODD symptoms at child age 4. At this age, the block with the
25
26 11 interaction parameters also obtained non-significant results ($p=.859$), and it was excluded from the final model. At
27
28 12 this age, the highest levels of ODD were registered for children with high negative affect and low effortful control.
29
30 13 Regarding parental psychopathology, only maternal aggressive behavior was related to higher levels of ODD
31
32 14 symptoms at child age 4.

33
34
35 15 The third block of Table 4 contains the regression for the predictor CBQ scores at child age 5, ASR scores
36
37 16 and the criterion number of ODD symptoms at child age 5. Since a value of $p=0.79$ was obtained in the chunk test
38
39 17 for the block of interaction parameters, specific interaction terms were explored to determine which ones achieved
40
41 18 significant results to be retained in the final model. A statistically significant result was achieved for the term
42
43 19 effortful control by fathers' anxious-depressed level ($p=.003$) so simple effects were estimated and interpreted for
44
45 20 the effortful control scale across three paternal anxious-depressed levels (values $T=50$, $T=65$ and $T=70$,
46
47 21 corresponding to normal clinical thresholds, subclinical and clinical). The final results showed that at child age 5,
48
49 22 higher levels of ODD symptoms were detected in children with high scores on the negative affect scale and low
50
51 23 scores on the scale relating to effortful control. Additionally, the effect of effortful control on ODD severity
52
53 24 increased as paternal T-scores in anxious-depressed levels increased (as a consequence of the interaction).

54
55
56 25 The lower block of Table 4 shows the results of the longitudinal analysis, which assessed the association
57
58 26 between child temperament scores at age 3, parental psychopathology levels (also recorded at child age 3), and ODD
59
60 27 levels at child age 5. Again, there was a significant interaction between the effortful control scale of temperament

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

1 Parental psychopathology, temperament and ODD

2
3
4 1 and paternal ASR anxious-depressed scores ($p=0.040$). The final model showed that at child age 5, ODD levels were
5
6 2 higher for children who at the start of preschool had scored higher on negative affect and lower on effortful control
7
8 3 (and this effect of temperament on ODD increased according to paternal anxious-depressed levels).

10 4 **Discussion**

11
12
13
14 5 The results indicate that during the preschool period, the temperamental traits of negative affect and
15
16 6 effortful control are cross-sectionally associated with higher levels of symptoms of ODD in children. Furthermore,
17
18 7 this relationship is moderated by levels of paternal depression and anxiety toward the end of the preschool period (at
19
20 8 child age 5). The level of the temperamental traits of negative affect and effortful control at age 3 were statistical
21
22 9 predictors of ODD levels at age 5, and the levels of paternal anxiety and depression moderated the strength of the
23
24 10 relationship. On the other hand, cross-sectional models indicated that maternal psychopathology (specifically,
25
26 11 symptoms of depression, anxiety and aggression) does not moderate the relationship between child temperament and
27
28 12 ODD level.

29
30
31 13 The current study suggests that levels of negative affect and low effortful control directly influence the
32
33 14 development of oppositional defiant disorder in preschoolers, a result that concurs with previous findings from
34
35 15 several authors (Burke et al., 2010; Dougherty et al., 2011; Eisenberg et al., 2009; Lavigne et al., 2012; Martel et al.,
36
37 16 2012; Stringaris et al., 2010; Valiente et al., 2003). Additionally, we arrived at a number of more nuanced
38
39 17 conclusions regarding the influence of parental symptomatology of anxiety, depression and aggressive behavior on
40
41 18 children's ODD symptoms. First, we found that between child ages 3 and 5 there is a differential effect of parental
42
43 19 aggressive and anxious-depressed behavior on children's ODD levels. Specifically, maternal high aggressive
44
45 20 behavior influences the child's ODD level, a result that is consistent with several studies linking maternal negativity
46
47 21 and anger with behavioral problems in children (Chen et al., 2014; Goelman et al., 2014). Our results also coincide
48
49 22 with those reported by authors such as Breaux et al. (2013), Davé et al. (2008), Kashdan et al. (2004), Meadows,
50
51 23 McLanahan, & Brooks-Gunn (2007) and Weitzman et al. (2011), who have argued that children of parents with
52
53 24 depression and anxiety may be more likely to have behavioral problems and develop oppositional defiant disorder.

54
55
56 25 Our findings regarding the specific moderating role of parental psychopathology in the relationship
57
58 26 between child temperament and ODD levels is of particular importance, as it differentially highlights the role of
59
60 27 each parent. Specifically, only paternal symptoms of depression and anxiety moderated the relationship between
61
62
63
64
65

1 Parental psychopathology, temperament and ODD

2
3
4 1 child temperament and ODD symptoms, whereas none of the maternal symptoms examined (aggression, depression
5
6 2 and anxiety) served a moderating role. In light of empirical evidence regarding the impact of maternal
7
8 3 psychopathology on self-regulation and behavior problems in children (Chen et al., 2014; Crawford et al., 2011;
9
10 4 Gartstein et al., 2013; Goelman et al., 2014), we expected maternal psychopathology to be a significant moderator of
11
12 5 the relationship between child temperament and ODD levels. Nevertheless, in our study, only paternal symptoms of
13
14 6 depression and anxiety interacted with the specific temperamental dimension of low effortful control.

15
16
17 7 These results are in accordance with the findings of several authors, who argue that paternal
18
19 8 psychopathology may have a more serious impact on a child's psychological functioning than maternal
20
21 9 psychopathology (Cimino, Cerniglia, & Paciello, 2014; Lovejoy et al., 2000). One explanation for this phenomenon
22
23 10 focuses on the different roles that fathers and mothers play when their children are in preschool. For instance,
24
25 11 research suggests that mothers spend more time with their children than fathers do during infancy, and much of this
26
27 12 time is spent establishing limits. In comparison, fathers spend more time playing with their children, and as a result
28
29 13 experience fewer difficulties and conflicts with the children than mothers (Driscoll & Pianta, 2011; Weaver, Shaw,
30
31 14 Crossan, Dishion, & Wilson, 2014). Particularly toward the end of the preschool period, paternal involvement in
32
33 15 child development intensifies, as fathers become closer to their children, engaging with them and behaving like a
34
35 16 playmate (John, Halliburton, & Humphrey, 2012).

36
37
38 17 The presence of an involved father can have a major positive impact on a young child. In fact, there is
39
40 18 evidence that this relationship is critical to a child's development, promoting higher self-esteem and self-regulation
41
42 19 (John et al., 2012; Sarkadi, Kristiansson, Oberklaid, & Bremberg, 2008). By contrast, children with little paternal
43
44 20 support would have more difficulty regulating their negative emotions (Hurrell, Hudson, & Schniering, 2015). In
45
46 21 this vein, fathers with symptoms of psychopathology tend to show a reduced response level to their children, which
47
48 22 can be a risk factor for the occurrence of maladaptive behaviors (Elgar, Mills, McGrath, Waschbusch, &
49
50 23 Brownridge, 2007). Depressed fathers in particular present a reduced ability to regulate the emotions of their
51
52 24 children, which could affect the development of child temperament (Lovejoy et al., 2000). In this regard, depressed
53
54 25 fathers would display more negative behaviors towards their children and reductions in monitoring, and this overly-
55
56 26 permissive behavior would have an impact on child behavioral problems (Childs et al., 2014; Jewell, Krohn, Scott,
57
58 27 Carlton, & Meinz, 2008). It is likely that a permissive father would be unable to properly control his child's behavior

1 Parental psychopathology, temperament and ODD

2
3
4 1 or prevent possible maladaptive behaviors (Braza et al., 2013). In theory, effortful control should increase during the
5
6 2 preschool years (Liang, Zhang, Deng, Song, & Zheng, 2013); at the same time, there is evidence that having a father
7
8 3 who is overly permissive and who demonstrates little acceptance or paternal engagement is a risk factor for poor
9
10 4 self-regulation and effortful control (Braza et al., 2013; Liang et al., 2013).

11
12
13 5 The main limitations of the present study lie in the fact that a relatively low number of fathers provided
14
15 6 complete responses to the Adult Self-Report compared to the number of mothers, and that all the data analyzed and
16
17 7 interpreted was reported only by parents. Moreover, the study possesses a number of strengths: the availability of
18
19 8 separate reports for psychopathology measures from fathers and mothers, performing longitudinal tests in a large
20
21 9 and representative sample of preschoolers, measuring child psychopathology through diagnostic interview and the
22
23 10 statistical control of all the analyses of other comorbid disorders with symptoms that differ from ODD symptoms
24
25 11 (that is, the empirical association obtained between temperament, parental symptomatology and ODD levels can be
26
27 12 specifically attributed to this diagnostic condition). These contributions in the methodological area involve an
28
29 13 improvement compared to previous researches carried out in small-sized sample and with data reported only by
30
31 14 mothers.

32
33 15 The results of this study have important implications for the prevention and treatment of ODD symptoms.
34
35 16 While much remains to be learned about the early risk factors for oppositional defiant disorder, the present study
36
37 17 suggests that evaluating early temperamental traits in children may be an important first step, since the presence of
38
39 18 high levels of negative affect and low levels of effortful control may be an early indicator of children at risk for
40
41 19 developing ODD levels. Of particular importance is the fact that low effortful control is related to temperamental
42
43 20 symptoms of ODD, as it raises the possibility of early intervention for ODD symptoms through the teaching of
44
45 21 effortful control skills, as indicated by Lavigne et al. (2012).

46
47 22 Furthermore, it is important to address the moderating role of paternal symptoms of depression and anxiety,
48
49 23 as few studies have focused on the influence of fathers in early child development. According to our findings, a
50
51 24 child with low effortful control may be more or less likely to present ODD symptoms depending on whether his
52
53 25 father suffers from mild, moderate or severe anxiety or depression. Evidently, this could have a number of
54
55 26 consequences at the individual level (for children and for fathers) and at the family level. In terms of clinical
56
57 27 evaluation, it is essential that clinicians integrate the family members of preschoolers who display behavioral or
58
59 28 temperamental problems, inquiring in detail into present and past parental mental health. According to our results, it

1 Parental psychopathology, temperament and ODD
2
3

4 1 is very important to know about the father's mental health especially, focusing on the symptoms of depression and
5
6 2 anxiety.
7

8
9 3 At the environmental level, it is important to consider that a child with a difficult temperament and
10
11 4 symptoms of ODD may have an impact on the emotional state of the father. Evidence suggests that raising a child
12
13 5 with ODD levels is a major challenge for mothers and fathers (Burke, Pardini, & Loeber, 2008), but the fathers,
14
15 6 particularly those who are involved in parenting, will face disciplinary obstacles when their children engage in
16
17 7 difficult behaviors (Aviram, Atzaba-poria, Pike, Meiri, & Yerushalmi, 2015). Furthermore, there exists evidence
18
19 8 that child behavioral problems may actually affect negative parental emotionality and behavior to a greater extent
20
21 9 than parenting attitudes affect children (Childs et al., 2014; Larsson, Viding, Rijdsdijk, & Plomin, 2008; Pardini, Fite,
22
23 10 & Burke, 2008). Future studies will need to consider this child-to-father relationship, as it implies the possibility of a
24
25 11 reciprocal effect of negative behavior and emotionality on mental health for children and fathers.
26

27
28 12 Finally, it is likely that fathers with higher levels of symptoms of depression and anxiety are probably more
29
30 13 focused on their own difficulties and may be less available for their children. In terms of clinical intervention, then,
31
32 14 fathers should be encouraged to address and treat their own symptomatology first, thus enhancing the mental health
33
34 15 of the whole family unit.
35

36
37 16 **Funding sources:** Funding for this study was provided by the Spanish Ministry of Economy and
38
39 17 Competitiveness [PSI2012-32695] and [PSI2015-63965-R], Secretaria d'Universitats i Recerca, Departament
40
41 18 d'Economia i Coneixement de la Generalitat de Catalunya [2014 SGR 312], and CONICYT, Ministry of Education,
42
43 19 Government of Chile. These funding sources had no role in the study design, collection, analysis or interpretation of
44
45 20 the data, nor in writing the manuscript or deciding to submit the paper for publication. The terms of this arrangement
46
47 21 have been reviewed and approved by the Autonomous University of Barcelona in accordance with its policy on
48
49 22 research.
50

51 23 **Acknowledgements:** We would like to thank the participating families and schools.
52
53 24
54
55
56 25
57
58 26
59
60
61
62
63
64
65

1 Parental psychopathology, temperament and ODD
 2
 3

4 **1 References**

- 5
 6 2 Achenbach, T. y Rescorla, L. (2003). *Manual for the ASEBA adult forms & profiles*. Burlington: University of
 7
 8 3 Vermont, Research Center for Children, Youth, and Families.
 9
 10
 11 4 American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (4th ed., Text*
 12
 13 5 *revised)*. Washington, DC, US.
 14
 15
 16 6 American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorder: DSM-5*.
 17
 18 7 Washington, Londres : American Psychiatric Association.
 19
 20
 21 8 Aviram, I., Atzaba-Poria, N., Pike, A., Meiri, G., & Yerushalmi, B. (2015). Mealtime Dynamics in Child Feeding
 22
 23 9 Disorder : The Role of Child Temperament , Parental Sense of Competence , and Paternal Involvement, *40*(1),
 24
 25 10 45–54.
 26
 27
 28 11 Bernard, S. N., Whitson, M., & Kaufman, J. (2015). The Moderating Effect of Positive Father Engagement and
 29
 30 12 Accessibility on a School-Based System of Care Intervention for Mental Health Outcomes of Children.
 31
 32 13 *Journal of Child and Family Studies*, *24*(10), 2923–2933. doi:10.1007/s10826-014-0096-0
 33
 34
 35 14 Braza, P., Carreras, R., Muñoz, J. M., Braza, F., Azurmendi, A., Pascual-Sagastizábal, E., Cardas, J. & Sánchez-
 36
 37 15 Martín, J. R. (2013). Negative Maternal and Paternal Parenting Styles as Predictors of Children’s Behavioral
 38
 39 16 Problems: Moderating Effects of the Child’s Sex. *Journal of Child and Family Studies*, 1–10.
 40
 41 17 doi:10.1007/s10826-013-9893-0
 42
 43
 44 18 Breaux, R. P., Harvey, E. A., & Lugo-Candelas, C. I. (2013). The Role of Parent Psychopathology in the
 45
 46 19 Development of Preschool Children with Behavior Problems. *Journal of Clinical Child & Adolescent*
 47
 48 20 *Psychology*, *43*(5), 777–790. doi:10.1080/15374416.2013.836451
 49
 50
 51 21 Brown, G. L., McBride, B. A., Bost, K. K., & Shin, N. (2011). Parental involvement, child temperament, and
 52
 53 22 parents’ work hours: Differential relations for mothers and fathers. *Journal of Applied Developmental*
 54
 55 23 *Psychology*, *32*(6), 313–322. doi:10.1016/j.appdev.2011.08.004
 56
 57
 58 24 Burke, J. D., Hipwell, A. E., & Loeber, R. (2010). Dimensions of Oppositional Defiant Disorder as Predictors of
 59
 60 25 Depression and Conduct Disorder in Preadolescent Girls. *Journal of the American Academy of Child &*
 61
 62
 63
 64
 65

Parental psychopathology, temperament and ODD

- 1
2
3
4 1 *Adolescent Psychiatry*, 49(5), 484–492. doi:10.1016/j.jaac.2010.01.016
5
6
7 2 Burke, J. D., Pardini, D. A., & Loeber, R. (2008). Reciprocal Relationships between Parenting Behavior and
8
9 3 Disruptive Psychopathology from Childhood through Adolescence. *Journal of Abnormal Child Psychology*,
10
11 4 36(5), 679–692. doi:10.1007/s10802-008-9219-7
12
13
14 5 Burke, J. D., Rowe, R., & Boylan, K. (2014). Functional Outcomes of Child and Adolescent Oppositional Defiant
15
16 6 Disorder Symptoms in Young Adult Men. *Journal of Child Psychology and Psychiatry*, 53(3), 264–272.
17
18 7 doi:doi:10.1111/jcpp.12150
19
20 8 Burke, J. D., Waldman, I., & Lahey, B. B. (2010). Predictive validity of childhood oppositional defiant disorder and
21
22 9 conduct disorder: implications for the DSM-V. *Journal of Abnormal Psychology*, 119, 739–751.
23
24 10 doi:10.1037/a0019708
25
26
27 11 Burnette, M. L., Oshri, A., Lax, R., Richards, D., & Ragbeer, S. N. (2012). Pathways from harsh parenting to
28
29 12 adolescent antisocial behavior: a multidomain test of gender moderation. *Development and Psychopathology*,
30
31 13 24(3), 857–70. doi:10.1017/S0954579412000417
32
33
34 14 Buss, A. H., & Plomin, R. (1975). *A temperament theory of personality development*. New York: Wiley. (Wiley.).
35
36 15 New York.
37
38
39 16 Chen, N., Deater-Deckard, K., & Bell, M. A. (2014). The Role of Temperament by Family Environment Interactions
40
41 17 in Child Maladjustment. *Journal of Abnormal Child Psychology*, 42, 1251–1262. doi:10.1007/s10802-014-
42
43 18 9872-y
44
45
46 19 Childs, A. W., Fite, P. J., Moore, T. M., Lochman, J. E., & Pardini, D. A. (2014). Bidirectional associations between
47
48 20 parenting behavior and child callous-unemotional traits: does parental depression moderate this link? *Journal*
49
50 21 *of Abnormal Child Psychology*, 42(7), 1141–51. doi:10.1007/s10802-014-9856-y
51
52
53 22 Cimino, S., Cerniglia, L., & Paciello, M. (2014). Mothers with Depression, Anxiety or Eating Disorders: Outcomes
54
55 23 on Their Children and the Role of Paternal Psychological Profiles. *Child Psychiatry & Human Development*,
56
57 24 228–236. doi:10.1007/s10578-014-0462-6
58
59 25 Crawford, N. A, Schrock, M., & Woodruff-Borden, J. (2011). Child internalizing symptoms: contributions of child
60
61
62
63
64
65

1 Parental psychopathology, temperament and ODD

- 2
3
4 1 temperament, maternal negative affect, and family functioning. *Child Psychiatry and Human Development*,
5
6 2 42(1), 53–64. doi:10.1007/s10578-010-0202-5
7
8
9 3 Davé, S., Sherr, L., Senior, R., & Nazareth, I. (2008). Associations between paternal depression and behaviour
10
11 4 problems in children of 4-6 years. *European Child and Adolescent Psychiatry*, 17, 306–315.
12
13 5 doi:10.1007/s00787-007-0672-6
14
15
16 6 Davies, P. T., Sturge-Apple, M. L., Cicchetti, D., Manning, L. G., & Vonhold, S. E. (2012). Pathways and processes
17
18 7 of risk in associations among maternal antisocial personality symptoms, interparental aggression, and
19
20 8 preschooler's psychopathology. *Development and Psychopathology*, 24(3), 807–32.
21
22 9 doi:10.1017/S0954579412000387
23
24
25 10 De la Osa, N., Granero, R., Penelo, E., Domènech, J. M., & Ezpeleta, L. (2013). The Short and Very Short Forms of
26
27 11 the Children's Behavior Questionnaire in a Community Sample of Preschoolers. *Assessment*, 21(4), 463–476.
28
29 12 doi:10.1177/1073191113508809
30
31
32 13 Derryberry, D., & Rothbart, M. K. (1997). Reactive and effortful processes in the organization of temperament.
33
34 14 *Development and Psychopathology*, 9(04), 633–652. doi:10.1017/S0954579497001375
35
36
37 15 Dougherty, L. R., Bufferd, S. J., Carlson, G. A., Dyson, M., Olino, T. M., Durbin, C. E., & Klein, D. N. (2011).
38
39 16 Preschoolers' observed temperament and psychiatric disorders assessed with a parent diagnostic interview.
40
41 17 *Journal of Clinical Child and Adolescent Psychology*, 40(2), 295–306. doi:10.1080/15374416.2011.546046
42
43
44 18 Driscoll, K., & Pianta, R. C. (2011). Mothers' and fathers' perceptions of conflict and childhood. *Journal of Early*
45
46 19 *Childhood and Infant Psychology*, 7, 1–24.
47
48
49 20 Eisenberg, N., Valiente, C., Spinrad, T. L., Cumberland, A., Liew, J., Reiser, M., Zhou, Q. & Losoya, S. H. (2009).
50
51 21 Longitudinal relations of children's effortful control, impulsivity, and negative emotionality to their
52
53 22 externalizing, internalizing, and co-occurring behavior problems. *Developmental Psychology*, 45(4), 988–
54
55 23 1008. doi:10.1037/a0016213
56
57
58 24 Elgar, F. J., Mills, R. S. L., McGrath, P. J., Waschbusch, D. A., & Brownridge, D. A. (2007). Maternal and paternal
59
60 25 depressive symptoms and child maladjustment: The mediating role of parental behavior. *Journal of Abnormal*
61
62
63
64
65

Parental psychopathology, temperament and ODD

- 1
2
3
4 1 *Child Psychology*, 35, 943–955. doi:10.1007/s10802-007-9145-0
- 5
6
7 2 Ezpeleta, L., de la Osa, N., & Doménech, J. M. (2014). Prevalence of DSM-IV disorders, comorbidity and
8
9 3 impairment in 3-year-old Spanish preschoolers. *Social Psychiatry and Psychiatric Epidemiology*, 49(1), 145–
10
11 4 55. doi:10.1007/s00127-013-0683-1
- 12
13
14 5 Ezpeleta, L., de la Osa, N., Granero, R., Doménech, J. M., & Reich, W. (2011). The Diagnostic Interview of
15
16 6 Children and Adolescents for Parents of Preschool and Young Children: psychometric properties in the
17
18 7 general population. *Psychiatry Research*, 190(1), 137–44. doi:10.1016/j.psychres.2011.04.034
- 19
20
21 8 Ezpeleta, L., de la Osa, N., Granero, R., & Trepát, E. (2014). Functional impairment associated with symptoms of
22
23 9 oppositional defiant disorder in preschool and early school boys and girls from the general population, 30,
24
25 10 395–402.
- 26
27
28 11 Flouri, E., Midouhas, E., & Narayanan, M. K. (2015). The Relationship Between Father Involvement and Child
29
30 12 Problem Behaviour in Intact Families: A 7-Year Cross-Lagged Study. *Journal of Abnormal Child Psychology*.
31
32 13 doi:10.1007/s10802-015-0077-9
- 33
34 14 Gardner, F., Hutchings, J., Bywater, T., & Whitaker, C. (2010). Who Benefits and How Does It Work? Moderators
35
36 15 and Mediators of Outcome in an Effectiveness Trial of a Parenting Intervention. *Journal of Clinical Child &*
37
38 16 *Adolescent Psychology*, 39(4), 568–580. doi:10.1080/15374416.2010.486315
- 39
40
41 17 Gartstein, M. A., Bridgett, D. J., Young, B. N., Panksepp, J., & Power, T. (2013). Origins of Effortful Control:
42
43 18 Infant and Parent Contributions. *Infancy*, 18(2), 149–183. doi:10.1111/j.1532-7078.2012.00119.x
- 44
45
46 19 Goelman, H., Zdaniuk, B., Boyce, W. T., Armstrong, J. M., & Essex, M. J. (2014). Maternal mental health, child
47
48 20 care quality, and children's behavior. *Journal of Applied Developmental Psychology*, 35(4), 347–356.
49
50 21 doi:10.1016/j.appdev.2014.05.003
- 51
52
53 22 Goldsmith, H. H., & Campos, J. J. (1982). Toward a theory of infant temperament. In R. N. Emde and R. J.
54
55 23 *Harmond (Eds.), The development of attachment and affiliative systems*. New York: Plenum.
- 56
57 24 Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A Research Note. *Journal of Child Psychology*
58
59 25 *and Psychiatry*, 38(5), 581–586. doi:10.1111/j.1469-7610.1997.tb01545.x
- 60
61
62
63
64
65

1 Parental psychopathology, temperament and ODD

- 2
3
4 1 Goodman, S. H., Rouse, M. H., Connell, A. M., Broth, M. R., Hall, C. M., & Heyward, D. (2011). Maternal
5
6 2 Depression and Child Psychopathology: A Meta-Analytic Review. *Clinical Child and Family Psychology*
7
8 3 *Review, 14*, 1–27. doi:10.1007/s10567-010-0080-1
9
10 4 Hurrell, K. E., Hudson, J. L., & Schniering, C. A. (2015). Parental reactions to children's negative emotions:
11
12 5 Relationships with emotion regulation in children with an anxiety disorder. *Journal of Anxiety Disorders, 29*,
13
14 6 72–82. doi:10.1016/j.janxdis.2014.10.008
15
16
17 7 Jaffee, S. R., Moffitt, T. E., Caspi, A., & Taylor, A. (2003). Life with (or without) father: the benefits of living with
18
19 8 two biological parents depend on the father's antisocial behavior. *Child Development, 74*(1), 109–126.
20
21 9 doi:10.1037/a0014588
22
23
24 10 Jewell, J. D., Krohn, E. J., Scott, V. G., Carlton, M., & Meinz, E. (2008). The Differential Impact of Mothers' and
25
26 11 Fathers' Discipline on Preschool Children's Home and Classroom Behavior. *North American Journal of*
27
28 12 *Psychology, 10*(1), 173–188.
29
30
31 13 John, A., Halliburton, A., & Humphrey, J. (2012). Child–mother and child–father play interaction patterns with
32
33 14 preschoolers. *Early Child Development and Care*, (December 2014), 1–15.
34
35 15 doi:10.1080/03004430.2012.711595
36
37
38 16 Kashdan, T. B., Jacob, R. G., Pelham, W. E., Lang, A. R., Hoza, B., Blumenthal, J. D., & Gnagy, E. M. (2004).
39
40 17 Depression and anxiety in parents of children with ADHD and varying levels of oppositional defiant
41
42 18 behaviors: modeling relationships with family functioning. *Journal of Clinical Child and Adolescent*
43
44 19 *Psychology, 33*(1), 169–181. doi:10.1207/S15374424JCCP3301_16
45
46
47 20 Kleinbaum, D. G., Kupper, L. L., Muller, K. E., & Nizam, A. (2013). *Applied Regression Analysis and Other*
48
49 21 *Multivariable Methods*. Pacific Grove: Duxbury Applied Press.
50
51
52 22 Larsson, H., Viding, E., Rijdsdijk, F. V., & Plomin, R. (2008). Relationships between parental negativity and
53
54 23 childhood antisocial behavior over time: a bidirectional effects model in a longitudinal genetically informative
55
56 24 design. *Journal of Abnormal Child Psychology, 36*(5), 633–45. doi:10.1007/s10802-007-9151-2
57
58
59 25 Lavigne, J. V., Gouze, K. R., Hopkins, J., Bryant, F. B., & LeBailly, S. A. (2012). A multi-domain model of risk
60
61
62
63
64
65

1 Parental psychopathology, temperament and ODD

- 2
3
4 1 factors for ODD symptoms in a community sample of 4-year-olds. *Journal of Abnormal Child Psychology*,
5
6 2 40(5), 741–57. doi:10.1007/s10802-011-9603-6
7
8
9 3 Lavigne, J. V., Lebailly, S. A., Hopkins, J., Gouze, K. R., & Binns, H. J. (2009). The prevalence of ADHD, ODD,
10
11 4 depression, and anxiety in a community sample of 4-year-olds. *Journal of Clinical Child and Adolescent*
12
13 5 *Psychology : The Official Journal for the Society of Clinical Child and Adolescent Psychology, American*
14
15 6 *Psychological Association, Division 53, 38(3)*, 315–328. doi:10.1080/15374410902851382
16
17
18 7 Liang, Z., Zhang, G., Deng, H., Song, Y., & Zheng, W. (2013). A multilevel analysis of the developmental
19
20 8 trajectory of preschoolers' effortful control and prediction by parental parenting style. [A multilevel analysis
21
22 9 of the developmental trajectory of preschoolers' effortful control and prediction by parental paren. *Acta*
23
24 10 *Psychologica Sinica, 45(5)*, 556–567. doi:10.3724/SP.J.1041.2013.00556
25
26
27 11 Lonigan, C. J., & Phillips, B. M. (2001). Temperamental influences on the development of anxiety disorders. (M.
28
29 12 W. V. M. R. Dadds, Ed.) *The Developmental Psychopathology of Anxiety*. New York, NY, US: Oxford
30
31 13 University Press.
32
33
34 14 Lovejoy, M. C., Graczyk, P. A., O'Hare, E., & Neuman, G. (2000). Maternal depression and parenting behavior: A
35
36 15 meta-analytic review. *Clinical Psychology Review, 20(5)*, 561–592. doi:10.1016/S0272-7358(98)00100-7
37
38
39 16 Martel, M. M., Gremillion, M. L., & Roberts, B. (2012). Temperament and Common Disruptive Behavior Problems
40
41 17 in Preschool. *Personality and Individual Differences, 53(7)*, 874–879. doi:10.1016/j.paid.2012.07.011
42
43
44 18 Meadows, S. O., McLanahan, S. S., & Brooks-Gunn, J. (2007). Parental depression and anxiety and early childhood
45
46 19 behavior problems across family types. *Journal of Marriage and Family, 69(5)*, 1162–1177.
47
48 20 doi:10.1111/j.1741-3737.2007.00439.x
49
50
51 21 Melegari, M. G., Nanni, V., Lucidi, F., Russo, P. M., Donfrancesco, R., & Cloninger, C. R. (2015). Temperamental
52
53 22 and character profiles of preschool children with ODD, ADHD, and anxiety disorders. *Comprehensive*
54
55 23 *Psychiatry*. doi:10.1016/j.comppsy.2015.01.001
56
57
58 24 Munkvold, L. H., Lundervold, A. J., & Manger, T. (2011). Oppositional defiant disorder-gender differences in co-
59
60 25 occurring symptoms of mental health problems in a general population of children. *Journal of Abnormal Child*
61
62
63
64
65

Parental psychopathology, temperament and ODD

- 1
2
3
4 1 *Psychology*, 39(4), 577–87. doi:10.1007/s10802-011-9486-6
- 5
6
7 2 Nicholson, J. S., Deboeck, P., Farris, J. R., Boker, S. M., & Borkowski, J. G. (2011). Maternal Depressive
8
9 3 Symptomatology and Child Behavior: Transactional Relationship with Simultaneous Bidirectional Coupling.
10
11 4 *Developmental Psychology*, 47(5), 1312–1323. doi:10.1037/a0023912
- 12
13
14 5 Nigg, J. T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*,
15
16 6 47(3-4), 395–422. doi:10.1111/j.1469-7610.2006.01612.x
- 17
18
19 7 Pardini, D. A., Fite, P. J., & Burke, J. D. (2008). Bidirectional associations between parenting practices and conduct
20
21 8 problems in boys from childhood to adolescence: the moderating effect of age and African-American
22
23 9 ethnicity. *Journal of Abnormal Child Psychology*, 36(5), 647–62. doi:10.1007/s10802-007-9162-z
- 24
25 10 Reeb, B. T., Conger, K. J., & Wu, E. Y. (2010). Paternal Depressive Symptoms and Adolescent Functioning: The
26
27 11 Moderating Effect of Gender and Father Hostility. *Fathering*, 8(1), 131–142. doi:10.3149/fth.0801.131
- 28
29
30 12 Reich, W. & Ezpeleta, L. (2009). *Diagnostic interview for children and adolescents - version for parents of*
31
32 13 *preschoolers (3-7 years)* (Unpublishe.). St. Louis, MO, USA.
- 33
34
35 14 Rothbart, M. K. (2007). Temperament, Development, and Personality. *Current Directions in Psychological Science*,
36
37 15 16(4), 207–212. doi:doi: 10.1111/j.1467-8721.2007.00505.x
- 38
39
40 16 Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven
41
42 17 years: the Children’s Behavior Questionnaire. *Child Development*, 72(5), 1394–1408. doi:10.1111/1467-
43
44 18 8624.00355
- 45
46
47 19 Rothbart, M. K., & Bates, J. E. (2006). *Temperament*. (N. Eisenberg, W. Damon, & R. M. Lerner, Eds.)*Handbook of*
48
49 20 *child psychology: Vol. 3, Social, emotional, and personality development (6th ed.)*. Hoboken, NJ, US: John
50
51 21 Wiley & Sons Inc.
- 52
53 22 Rothbart, M. K., & Posner, M. I. (2006). Temperament, attention, and developmental psychopathology. (D. C. D. J.
54
55 23 Cohen, Ed.)*Developmental Psychopathology, Vol 2: Developmental Neuroscience (2nd Ed.)*. Hoboken, NJ,
56
57 24 US: John Wiley & Sons Inc.
- 58
59
60 25 Sarkadi, A., Kristiansson, R., Oberklaid, F., & Bremberg, S. (2008). Fathers’ involvement and children's
- 61
62
63
64
65

1 Parental psychopathology, temperament and ODD

- 2
3
4 1 developmental outcomes: a systematic review of longitudinal studies. *Acta Paediatrica*, 97(2), 153–158.
5
6 2 doi:10.1111/j.1651-2227.2007.00572.x
7
8
9 3 Stringaris, A., & Goodman, R. (2009). Mood lability and psychopathology in youth. *Psychological Medicine*, 39,
10
11 4 1237–1245. doi:10.1017/S0033291708004662
12
13
14 5 Stringaris, A., Maughan, B., & Goodman, R. (2010). What's in a disruptive disorder? Temperamental antecedents of
15
16 6 oppositional defiant disorder: findings from the Avon longitudinal study. *Journal of the American Academy of*
17
18 7 *Child and Adolescent Psychiatry*, 49(5), 474–483. doi:10.1016/j.jaac.2010.01.021
19
20
21 8 Thomas, A., & Chess, S. (1977). *Temperament and development*. (N. Y. N. Y. U. Press., Ed.). New York.
22
23
24 9 Trepát, E., Granero, R., & Ezpeleta, L. (2014). Parenting practices as mediating variables between parents'
25
26 10 psychopathology and oppositional defiant disorder in preschoolers. *Psicothema*, 26(4), 497–504.
27
28 11 doi:10.7334/psicothema2014.102
29
30
31 12 Valiente, C., Smith, C. L., Fabes, R. A., Guthrie, I. K., & Murphy, B. C. (2003). The Relations of Effortful Control
32
33 13 and Reactive Control to Children's Externalizing Problems: A Longitudinal Assessment. *Journal of*
34
35 14 *Personality*, 71(6), 1171–1196.
36
37
38 15 Weaver, C. M., Shaw, D. S., Crossan, J. L., Dishion, T. J., & Wilson, M. N. (2014). Parent-Child Conflict and Early
39
40 16 Childhood Adjustment in Two-Parent Low-Income Families: Parallel Developmental Processes. *Child*
41
42 17 *Psychiatry and Human Development*, 1–14. doi:10.1007/s10578-014-0455-5
43
44
45 18 Weitzman, M., Rosenthal, D. G., & Liu, Y.-H. (2011). Paternal Depressive Symptoms and Child Behavioral or
46
47 19 Emotional Problems in the United States. *Pediatrics*, 128, 1126–1134. doi:10.1542/peds.2010-3034
48
49
50
51 20 Yoo, Y. S., Adamsons, K. L., Robinson, J. L., & Sabatelli, R. M. (2013). Longitudinal Influence of Paternal Distress
52
53 21 on Children's Representations of Fathers, Family Cohesion, and Family Conflict. *Journal of Child and Family*
54
55 22 *Studies*, 24(3), 591–607. doi:10.1007/s10826-013-9870-7
56
57
58 23 Zeman, J., Cassano, M., Perry-Parrish, C., & Stegall, S. (2006). Emotion Regulation in Children and Adolescents.
59
60 24 *Journal of Developmental and Behavioral Pediatrics*, 27(2), 155–168. doi:10.1097/00004703-200604000-
61
62 25 00014
63
64
65

Parental psychopathology, temperament and ODD

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

1

Parental psychopathology, temperament and ODD

1 Table 1. Characteristics of the initial sample of participants and the sample of children who were part of the analysis at baseline.

Sociodemographic		Total	Analysis	DSM-IV Disorders	Total		Analysis			
At baseline (3 years)		<i>n</i> =622	<i>n</i> =550	(weighted % at ages 3-4-5)	<i>n</i> =622		<i>n</i> =550			
Age (years)	Mean (SD)	3.76 (0.32)	3.77 (0.34)	Disruptive disorders	10.03	8.93	9.72	9.28	7.93	9.59
Sex; <i>n</i> (%)	Female	312 (50.2)	285 (51.8)	ADHD	3.70	5.10	4.33	3.50	4.73	4.16
Socioeconomic status	High	205 (33.0)	184 (33.5)	Oppositional defiant	6.91	5.14	6.55	6.34	4.21	6.47
	Mean-high	195 (31.4)	184 (33.5)	Conduct disorder	1.36	0.20	0.53	1.08	0.00	0.23
	Mean	88 (14.1)	74 (13.5)	Depressive disorders	3.10	0.60	0.32	2.93	0.00	0.00
Ethnicity	Medio-low	99 (15.9)	82 (14.9)	Anxiety disorders	8.33	6.70	9.81	7.71	5.72	9.24
	Low	35 (5.6)	26 (4.7)	Separation anxiety	2.15	1.41	1.27	1.86	0.89	1.04
	White	554 (89.1)	499 (90.7)	Generalized anxiety	0.10	0.10	0.53	0.11	0.11	0.58
	Hispanic	40 (6.4)	31 (5.6)	Specific phobia	5.33	5.60	8.96	4.67	4.73	8.31
	Other	28 (4.5)	20 (3.7)	Social phobia	1.94	2.10	3.58	1.96	2.19	3.57

2 SD: standard deviation.

3

4

1 Table 2. Descriptives for the CBQ and ASR scales in the sample: means and standard deviations (SD).

	Age 3; <i>n</i> =550		Age 4; <i>n</i> =540		Age 5; <i>n</i> =496	
	Mean	SD	Mean	SD	Mean	SD
CBQ-surgency	4.34	0.80	4.21	0.82	4.23	0.83
CBQ-negative	3.78	0.75	3.64	0.72	3.68	0.77
CBQ-effortful	5.26	0.63	5.33	0.60	5.33	0.57
ASR-anx-depressed (mother)	6.32	4.24	---	---	---	---
<i>Clinical range (T-score<70)</i>	5.6%					
ASR-aggressive behavior (mother)	4.08	3.49	---	---	---	---
<i>Clinical range (T-score<70)</i>	4.5%					
ASR-anx-depressed (father)	5.16	3.90	---	---	---	---
<i>Clinical range (T-score<70)</i>	5.1%					
ASR-aggressive behavior (father)	3.55	3.46	---	---	---	---
<i>Clinical range (T-score<70)</i>	5.5%					

2 --- Not assessed.

3

1 Table 3. Correlation matrix for the variables of the study.

	Age 3; <i>n</i> =550								Age 4; <i>n</i> =540								Age 5; <i>n</i> =496							
	2	3	4	5	6	7	8		2	3	4	5	6	7	8		2	3	4	5	6	7	8	
1 CBQ-surgency	-.16*	-.25*	-.02	.01	.04	.04	.10*	-.09*	-.26*	.04	.06	.07	.09*	.08	-.09*	-.20*	.07	.07	.07	.08	.02			
2 CBQ-negative		-.06	.15*	.10*	.07	.04	.26*		-.09*	.15*	.14*	.00	-.02	.32*†		-.11*	.12*	.08	.04	.08	.30*†			
3 CBQ-effortful			-.06	-.15*	.01	-.02	-.18*			-.06	-.13*	-.01	-.05	-.23*			-.07	-.09*	-.04	-.17*	-.14			
4 ASR-anx.-dep. (mother)				.58*†	.23*	.20*	.16*				.59*†	.23*	.21*	.13*				.57*†	.23*	.20*	.08			
5 ASR-aggress. (mother)					.23*	.20*	.19*					.23*	.20*	.22*					.22*	.16*	.12*			
6 ASR-anx.-dep. (father)						.64*†	.15*						.64*†	.11*						.65*†	.15*			
7 ASR-aggress. (father)							.07							.10*							.10*			
8 # of ODD-symptoms							---							---							---			

2 *Significant correlation. †High effect size for the correlation ($|r| \geq 0.30$).

3

4

- 1 Table 4. Association between child temperament, paternal psychopathology and their interaction in ODD levels:
- 2 father + mother joint analysis.

	B	SE	95% CI for B		χ^2	<i>p</i>
<i>Transversal 3 years-old</i>						
CBQ-surgency	0.012	0.006	-0.001	0.024	3.237	.072
CBQ-negative	0.032	0.006	0.020	0.044	27.328	<.001
CBQ-effortful	-0.018	0.007	-0.031	-0.005	7.306	.007
ASR-anx-depressed (mother)	0.004	0.017	-0.031	0.038	0.042	.837
ASR-aggressive behavior (mother)	0.047	0.021	0.005	0.088	4.825	.028
ASR-anx-depressed (father)	0.043	0.020	0.003	0.082	4.475	.034
ASR-aggressive behavior (father)	-0.025	0.023	-0.069	0.019	1.255	.263
<i>Chunk test for interactions</i>					7.23	.842
<i>Transversal 4 years-old</i>						
CBQ-surgency	0.007	0.007	-0.007	0.021	1.029	.310
CBQ-negative	0.047	0.007	0.033	0.061	44.629	<.001
CBQ-effortful	-0.027	0.007	-0.041	-0.012	13.411	<.001
ASR-anx-depressed (mother)	-0.019	0.020	-0.058	0.021	0.879	.348
ASR-aggressive behavior (mother)	0.075	0.023	0.030	0.120	10.579	.001
ASR-anx-depressed (father)	0.017	0.022	-0.027	0.060	0.563	.453
ASR-aggressive behavior (father)	0.016	0.024	-0.031	0.064	0.451	.502
<i>Chunk test for interactions</i>					6.97	.859
<i>Transversal 5 years-old</i>						
CBQ-surgency	0.005	0.007	-0.008	0.019	0.595	.440
CBQ-negative	0.048	0.007	0.033	0.062	40.839	<.001
CBQ-eff.; anx-dep:-father T=50	-0.268	0.087	-0.438	-0.098	9.528	.002
CBQ-eff.; anx-dep:-father T=65	-0.355	0.116	-0.582	-0.128	9.399	.002
CBQ-eff.; anx-dep:-father T=70	-0.384	0.126	-0.630	-0.138	9.368	.002
ASR-anx-depressed (mother)	-0.017	0.020	-0.056	0.021	0.781	.377
ASR-aggressive behavior (mother)	0.033	0.023	-0.013	0.079	1.952	.162
ASR-anx-depressed (father)	0.324	0.098	0.132	0.515	10.985	.001
ASR-aggressive behavior (father)	-0.004	0.026	-0.056	0.047	0.028	.867
<i>Inter.: CBQ-eff×Anx-Dep (father)</i>					8.97	.003
<i>Chunk test for interactions</i>					19.43	.079
<i>Longitudinal model</i>						
CBQ-surgency	0.006	0.007	-0.008	0.019	0.686	.407
CBQ-negative	0.033	0.007	0.019	0.046	21.325	<.001
CBQ-eff.; anx- dep:-father T=50	-0.182	0.092	-0.363	-0.001	3.897	.048
CBQ-eff.; anx- dep:-father T=65	-0.245	0.123	-0.485	-0.004	3.957	.046
CBQ-eff.; anx- dep:-father T=70	-0.287	0.143	-0.567	-0.006	4.008	.045
ASR-anx-depressed (mother)	-0.015	0.019	-0.053	0.022	0.657	.418
ASR-aggressive behavior (mother)	0.023	0.023	-0.022	0.068	1.009	.315
ASR-anx-depressed (father)	0.235	0.103	0.033	0.438	5.174	.023
ASR-aggressive behavior (father)	0.008	0.025	-0.041	0.057	0.092	.762
<i>Inter.: CBQ-eff×Anx-Dep.(father)</i>					4.20	.040
<i>Chunk test for interactions</i>					13.11	.041