

The link between mother and child's obsessive-compulsive symptoms: A test of simple and serial mediation models in a healthy community sample

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ABSTRACT

This study intends to build on current literature regarding the parental correlates of obsessive-compulsive (OC) symptoms among school-age children by addressing a gap related to the possible relations of parental OC symptoms, parenting stress and dysfunctional caregiving behaviors with the child's OC symptoms. The cross-sectional design involved 113 children (61 female; M age = 11.04 years, SD = 1.00) and their mothers (M age = 41.58 years, SD = 4.60), recruited through schools located in urban areas. Child-reported measures included OC symptoms and perceived mothers' caregiving behavior, while mother-reported measures included OC symptoms and parenting stress.

Simple and serial mediation models tested using the SPSS macro PROCESS (Hayes, 2013), supported the relation of the mother's OC symptoms with those of the child, through the simple indirect effect of parenting stress, rather than dysfunctional caregiving. Sequential effects from parenting stress on hostility/aggression and on indifference/neglect, linking indirectly the mother and child's OC symptoms, were also supported.

These findings add new information to our understanding of the parental correlates of OC symptoms in the child and have important clinical implications for the treatment of pediatric OCD, suggesting the potential to target not only children, but also their mothers.

1. Introduction

According to the fifth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5; APA), obsessive-compulsive disorder (OCD) is a typically chronic disorder characterized by the presence of intrusive and disturbing thoughts (obsessions) and repetitive behaviors an individual feels driven to perform (compulsions), which cause distress, are time-consuming, or interfere with age-appropriate functioning (American Psychiatric Association, 2013). Large community estimates over recent decades have estimated the prevalence of OCD among children to be somewhere close to 3% (James, Farrell & Zimmer-Gembeck, 2017). Pediatric OCD is a heterogeneous condition: symptoms may include obsessions regarding contamination, aggressive thoughts, hoarding, somatic, religious, superstitious and sexual beliefs, as well as compulsive washing, checking, repeating, counting, ordering, hoarding, magical thinking or rituals involving

other people. Moreover, comorbidity is very high and along with suffering from other disorders, children diagnosed with OCD might be at greater risk of coercive-disruptive behaviors, social isolation and peer victimization (James, Farrell, & Zimmer-Gembeck, 2017; Lebowitz, Storch, MacLeod Leckman, 2014; Storch et al., 2006). Empirical findings also highlight a mixed prognosis for the long-term outcomes of OCD with onset in childhood and adolescence, with some youths becoming subclinical over time, whereas others have to struggle with a persistent disorder in the long term (James et al., 2017). Taken together, these findings suggest the need for practitioners to possess a deep understanding of the aetiological and maintenance factors of this disorder as well have access to evidence-based treatment protocols targeting children with OCD.

Evidence from multiple disciplines supports the idea that pediatric OCD is a multi-factorial condition, characterized by the co-occurrence of hereditary, biological, and environmental mechanisms. As such,

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findings fit the major assumptions of the developmental psychopathology perspective (Cicchetti & Cohen, 1995), which implies that psychopathology is the result of a complex and dynamic interplay of multiple factors acting in a developing organism (Drabick & Kendall, 2010).

Evidence supporting genetic vulnerability, as indicated by family aggregation of OCD, is quite consistent (e.g., Mataix-Cols et al., 2013; Taylor, 2013). Neurochemical mechanisms have also been suggested to play a role, such as dysfunctions in brain serotonergic systems and the glutamatergic system (Goodman, Grice, Lapidus, & Coffey, 2014), together with neuro-anatomical and neurophysiological mechanisms, recently highlighted with neuro-imaging procedures (for an extensive review see Basile, Sautoni, & Mancini, 2016).

Unfortunately, less consensus exists on the environmental factors that might serve as aetiological and/or maintenance conditions of pediatric OCD, working either in conjunction with one another or as modulators of certain genotypes (Brander, Perez-Vigil, Larsson, & Mataix-Cols, 2016; Murphy & Flessner, 2015 for reviews). Many aspects of adverse family functioning have been targeted as possible vulnerability factors for OCD (Barcaccia, Tenore, & Mancini, 2015): retrospective findings collected on adults and late adolescents, both healthy and those diagnosed with OCD, seem to suggest that perceived overprotecting, authoritarian and rejecting parental styles, as well as attachment anxiety, are associated with increased risk of OCD (Brander et al., 2016; Timpano, Keough, Mahaffey, Schmidt, & Abramowitz, 2010; Yarbro, Mahaffey, Abramowitz, & Kashdan, 2013). More recent findings show that in the context of treatment, when compared to patients with other diagnoses, OCD patients reported significantly more childhood memories characterized by parental blame/reproach and guilt inducing contents (Basile et al., 2018). Nevertheless, not all retrospective designs confirm the relationship of recollected family functioning and parental rearing styles with OC symptoms in adulthood (Mancini, D'Olimpio, Prunetti, Didonna & Del Genio, 2000; Sawyer, Williams, Chasson, Davis, & Chapman, 2015).

When it comes to concurrent designs, evidence appears to be more consistent; moreover, since it has now been accepted and recognized by the fifth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5; APA, 2013) that the difference between clinical and sub-clinical OC symptoms is in quantity/intensity and not in quality (Mancini, 2019), many investigations have been conducted on sub-clinical OC symptoms among large community samples, as well as on small clinical samples, leading to quite robust evidence. An early review (Waters & Barrett, 2000) concluded that family risk factors specific to pediatric OCD were still theoretical, given the very little evidence which was at that point available; 15 years later an updated review (Murphy & Flessner, 2015) indeed concluded that there was sufficient empirical evidence supporting a strong association between pediatric OCD and many aspects of family and parents functioning, such as parental mental health, family dynamics and emotional climate in the family.

Of particular interest for the present study is the fine-grained evidence of the current state of the art of literature, drawn from indirect and observational measures on children and adolescents from both healthy and clinical samples, showing that dysfunctional parenting, including overprotection and controlling, authoritarian and negative behavior might lead to an offspring's OC symptoms by sensitizing children to inflated responsibility, obsessional beliefs related to responsibility and threat estimation, as well as responsibility attitudes (Aycicegi, Harris, & Dinn, 2002; Farrell, Hourigan, & Waters, 2013; Haciomeroglu & Karanci, 2013; Hofer et al., 2018; Jacobi, Calamari, & Woodard, 2006; Murphy & Flessner, 2015).

Notwithstanding the relevance of this evidence, the correlates of such dysfunctional parenting have not yet been highlighted. We suggest that one possible candidate could be parental OC symptoms: indeed, both above mentioned reviews identify parental mental health, such as depression, anxiety and psychoticism, as a possible risk factor for an

offspring's OCD. While Waters and Barrett's (2000) review does conclude that subclinical obsessive-compulsive traits are commonly observed in parents of children with OCD and parents are slightly more at risk of receiving a diagnosis of OCD, with fathers almost three times as likely as mothers, none of the studies analyzed in Murphy and Flessner's review (2015) focused on OC symptoms among the parental mental health conditions which might predispose offspring to OCD. Only one study has attempted to show that parental OC symptoms might predict the same symptoms in adolescents, through parents' obsessive beliefs related to responsibility, but it failed to support the mediation according to Baron and Kenny's (1986) criteria.

A second issue to be explored as a possible correlate of dysfunctional parenting in the onset of a child's OC symptoms is parenting stress: like parents' OC symptoms, parenting stress has also received scant research attention in relation to an offspring's OC symptoms. Parenting stress has been conceptualized as a negative psychological response to the obligations of being a parent (Bornstein, 2002) and is universally recognized as a risk factor for the quality of caregiving and child development (Deater-Deckard & Panneton, 2017): meta-analytic findings document a significant negative association of parenting stress with sensitive caregiving (Booth, Macdonald, & Youssef, 2018) and a positive association with child behavior problems (Barroso, Mendez, Graziano, & Bagner, 2017). The evidence linking parenting stress to caregiving behaviors relevant in the maintenance of OC symptoms among children, such as negative, rejecting, punitive, controlling and authoritative symptoms, is certainly also of interest to the present study (Han & Lee, 2018; Putnik et al., 2008; for a review, see; Crnic & Ross, 2017).

Notwithstanding this evidence, parenting stress has received little research attention in the investigation of the environmental factors involved in pediatric OCD: to the best of our knowledge, only one study showed that the parents of children affected by trichotillomania, which is a OCD related disorder according to the DSM V Ed., reported higher parenting stress compared to healthy controls (Keuthen, Fama, Altenburger, Allen, & Raff, 2013), suggesting that parenting stress might be one family risk condition implicated in the disorder's onset or maintenance, or might hamper the process and outcome of treatment. Nevertheless, no study has jointly investigated the role of parenting stress and dysfunctional behaviors in increasing their offspring's risk of OC symptoms. Furthermore, the possible relation between parental OC symptoms and parental stress remains largely unexplored, with the only exception being the work of Doron, Derby, and Szepeswol (2017): studying a community sample of parents these scholars found that parenting stress was significantly related to their OC symptoms. Nevertheless, whether parental OC symptoms and parenting stress are related to children and adolescents' OC symptoms is, thus far, an unexplored issue.

To sum up, neither parents' OC symptoms nor stress have received sufficient research attention as possible correlates of children's OC symptoms. Building on the findings reviewed above, the study firstly aims to test whether these two parental features are related to children's OC symptoms: based on the findings reviewed above suggesting that both might be parental correlates of children's OC, we expect such relations to be confirmed.

The second objective aims to contribute to the understanding of how a parent's OC symptoms might be linked to the same kinds of symptom in the child: possible mediators are both parenting stress and dysfunctional behaviors and a set of simple and serial mediation models will be tested. More specifically, we will test whether parenting stress or dysfunctional parenting alone mediate the relation between a parent's and child's OC symptoms; in such cases, it is hypothesized that parenting stress and dysfunctional parenting might be independently related to OC symptoms in children.

Alternatively, or additionally, sequential effects might also be suggested, according to which the parent's OC symptoms are related to parenting stress, which might be linked to dysfunctional parenting

behaviors, resulting in OC symptoms in the child. Given the findings reviewed above, we expect both simple and sequential pathways from parents' to children's OC symptoms to be confirmed, particularly those pathways involving dysfunctional parenting dimensions that might sensitize children to experience inflated responsibility and guilt (Barcaccia et al., 2015; Basile et al., 2018; Mancini & Gangemi, 2004), which have been suggested as being vulnerability conditions for children's OC symptoms.

2. Method

2.1. Participants

The sample used in the present study included 113 mother-child dyads: these were derived from a larger sample of 143 parent-child dyads, including 24 fathers and 119 mothers. Given the small sample size of fathers, these dyads were dropped. Since the study relied on parent reports, mothers were required to have achieved at least a high school diploma, in order to guarantee a good enough understanding of the questionnaires. For this reason, 6 dyads were dropped because the mothers reported having completed only elementary school education. Recruitment was carried out in three schools (one elementary and two high schools) located in an urban area of the South of Italy. The schools were selected based on their central position in the urban area and therefore their ability to access a representative community sample of Southern Italian urban area children and adolescents. As regards participating children, 55% ($N = 61$) were female, and their age ranged between 9 and 14 years old ($M = 11.04$, $SD = 1.00$). All children were Italian and according to school files, none were diagnosed with psychological delays/disorders. The mean age of the mothers involved was 41.58 years ($SD = 4.60$; $range = 28-54$) and they had an average of 11.35 years of education ($SD = 3.43$; $range 8-18$). The families involved were not paid for their participation and were treated in accordance with the ethical standards outlined by the American Psychological Association and the Italian Association of Academic Psychologists (AIP, www.aipass.org).

2.2. Procedure and measures

The study's purpose was explained to the participating schools principals and teachers, who provided their informed consent. Parents were informed about the research purposes through a letter and their written informed consent was obtained prior to data collection. If parents consented, they were asked to complete the battery (i.e., three questionnaires, one for sociodemographic data and one for self-reported obsessive-compulsive symptoms and parenting stress): in such cases, either the mother or the father was asked to complete the questionnaires, based on their own free choice. If they did not consent, they were to return non-completed questionnaires to school. Before completing the questionnaires, parents were asked to specify whether they were fathers or mothers. Only one of the two parents was requested to complete the questionnaires, as only one battery of questionnaires was provided. 83% of parents completing the measures were mothers ($N = 119$) and 17% fathers ($N = 24$). Because of the limited number of participating fathers, these data were dropped.

Child-rated data collection was completed in a single session at school. Research assistants arranged a visit to classes, providing students whose parents agreed to participate with a package containing the battery of self-report questionnaires. They were given general information about the study's aims and were given reassurance regarding the confidentiality of the data collected. To protect confidentiality, participants were instructed to choose an identifying code by combining the first three letters of their names and surnames, and then to fill in the self-reports at their leisure, taking all the time they needed. Teachers were not present in the classroom, in order to make sure that children did not experience their research participation as a school task.

Children also were assured that their participation was voluntary and that they could decline to participate at any time. None of the children whose parents agreed to participate refused to complete the questionnaires or asked to stop.

3. Measures

3.1. Mothers-reported measures

Mothers completed the Parenting Stress Index – Short Form (PSI-SF; Abidin, 1995; Guarino, Di Blasio, D'Alessio, Camisasca, & Serantoni, 2008 for the Italian version). This is a self-report screening tool which helps providers and families identify the sources and different types of stress that come with parenting. Parents report their level of agreement with 36 items on a four-point scale and scores are then averaged to obtain a Total Stress Score which is an indicator of the overall level of stress a person feels in their role as a parent. This global measure was used in the analyses.

To assess obsessive compulsive symptoms, mothers completed the Obsessive Compulsive Inventory- Revised version (OCI-R; Foa et al., 2002), which contains 18 items and six subscales (washing, checking, ordering, obsessing, hoarding, and mental neutralizing). Adults report their level of distress associated with each OCD symptom in the past month on a five-point scale, ranging from 0 (not at all) to 4 (very much); scores are then summed to obtain a total score of OC symptoms. This revision is the short version of the original version made up of 42 items (OCI; Foa, Kozak, Salkovskis, Coles, & Amir, 1998) and it is intended to avoid the redundancy between the measures of frequency and distress of each symptom. The Italian version of the OCI-R was validated on both a community and a clinical sample and has shown to have robust psychometric properties (Marchetti, Chiri, Ghisi, & Sica, 2010; Sica et al., 2009).

3.2. Children's reported measures

The Self-Administered Psychiatric Scales for Children and Adolescents (Cianchetti & Sannio Fancello, 2001; Franzoni et al., 2009) is an Italian standardized battery of self-report scales for the assessment of a wide range of psychiatric symptoms according to the DSM diagnostic criteria. The entire battery includes a total of six scales (each with sub-scales), which can be used together or separately, all provided with satisfactory psychometric properties (reliability by internal consistency and test-retest; convergent, discriminant and content validity; see manual for more details). The scales assess the following psychiatric areas: anxiety, depression, obsessive-compulsive symptoms, somatic and hypochondriac symptoms, psychogenic eating disorders and phobias. Administration can be either individual or collective (for example, screening in schools). Each scale includes two or three versions, each tailored for a specific age range and all items are rated on a three-point scale (true, partly true and false).

For the purposes of the present study, only the Obsessive-Compulsive scale was administered. We administered the age appropriate version: children aged up to 10 completed the 20-item version, which was tailored to suit children of 8–10 years old; the older ones completed the 38-item version, tailored for children and adolescents aged between 11 and 18. Children report their level of agreement with each item on a three-point scale (0–2) and scores are then summed to obtain a Total OC symptom score. Since the versions for different ages included a different number of items, in order to treat the sample as a whole, the scores of obsessive-compulsive symptoms were standardized within each group.

Children reported on perceived maternal behavior by completing the short version of the Parental Acceptance-Rejection/Control Questionnaire - Short Form - Mother's version (PARQ/Control- SF; Rohner & Khaleque, 2005; Comunian, 2012). This is a self-report questionnaire consisting of 29 items, on which children report their

Table 1
Descriptive statistics (means, standard deviations and Cronbach's alphas) of the questionnaires.

	Mean (SD, range)	Cronbach's α
Children's Self-report Obsessive Compulsive symptoms 9–10 years old (SAFA OC)	17.11 (7.18; 1–34)	.79
Children's Self-report Obsessive Compulsive symptoms 10–14 years old (SAFA-OC)	27.64 (13.76; 3–65)	.91
Mother's self-reported obsessive compulsive symptoms (OCI-R)	15.49 (12.01; 0–58)	.90
Mothers' perceived parenting stress (PSI-SF)	64.87(17.04; 36–102)	.91
Mothers' Warmth/Affection (PARQ-C)	28.80 (3.24; 15–32)	.73
Mothers' Hostility/Aggression (PARQ-C)	8.75 (2.89; 6–23)	.65
Mothers' Indifference/Neglect (PARQ-C)	8.60 (2.95; 6–19)	.71
Mothers' Undifferentiated Rejection (PARQ-C)	5.14 (1.84; 4–13)	.58
Mothers' Control (PARQ-C)	14.42 (2.98; 7–20)	.62

level of agreement with each item on a four-point scale (1–4), which provides information about the way in which the child perceives each parent's behavior. The short version questionnaire is derived from the union of the PARQ scale and of the Parental Control Scale (PCS) which provide information about parental control. Therefore, PARQ/Control makes it possible both to obtain information about the four subscales assessed by the PARQ (Warmth/Affection, Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection) and to evaluate the control exerted by parents along a continuum from permissiveness to restrictiveness (Control scale). The instrument is grounded in a solid theoretical framework (PARTheory, Rohner & Khaleque, 2005) and both the original and the Italian version have displayed good psychometric properties (Comunian, 2012). For the purpose of the present study, children filled in both the mothers' and the fathers' version, although only the mothers' data were used in the analyses due to the lack of fathers' participation.

None of the measures had missing data; descriptive statistics and Cronbach's Alfa for reliability are reported in Table 1. As shown in the Table, the alfa value for the Undifferentiated Rejection scale was 0.58; nevertheless, based on Taber's review (2016), according to which such a value can be considered satisfactory, we decided to retain the scale as it is.

4. Results

4.1. Preliminary analyses

All analyses were conducted with the IMB SPSS package 24th Ed. Firstly, we tested whether the children's and mothers' ages and years of education were related to the variables of interest. A set of Pearson's correlations were run. Results are reported in Table 2 and show that sociodemographic variables (mothers' age and years of education, child's age) were associated with some of the study variables. Gender differences were investigated on both mother and child reported measures; no significant differences between boys and girls were found, $-1.825 < t(111) < 0.386$, all *n.s.*

Table 2
Correlations among the study variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. C age										
2. M age	.18									
3. M education	-.17	.00								
4. C Obsessive Compulsive symptoms	-.07	-.02	.06							
5. M Obsessive Compulsive symptoms	-.03	.02	-.10	.28**						
6. M Stress	-.08	-.23*	-.01	.33***	.38***					
7. M Warmth/Affection	.03	.18	-.09	-.18	-.10	-.24*				
8. M Hostility/Aggression	-.07	-.13	.17*	.27**	-.01	.30***	-.37***			
9. M Indifference/Neglect	-.15	-.24*	.00	.28**	.01	.24*	-.50***	.66***		
10. M Undifferentiated Rejection	-.13	-.05	.05	.15	.03	.19*	-.40***	.67***	.64***	
11. M Control	-.21*	-.08	.24*	.26**	.07	.15	-.21*	.34***	.19*	.20*

Note. N is 113, there are no missing values. C = children. M = mothers. Correlations are based on standardized scores.
*p < .05. **p < .01. ***p < .001.

Based on these findings, main analyses were conducted controlling for children's age and mothers' age and years of education.

4.2. Main analyses

We firstly ran Pearson's correlations among the study variables. Results are reported in Table 2: of interest for the test of our first aim, we found that a child's OC symptoms were significantly related to both the mother's total OC symptoms and to parenting stress. Such correlations remained stable when the effects of children's age and mothers' age and years of education was partialized out (0.29, *p* < .01 and .33, *p* < .001, respectively).

As regards the test of the second aim, mediation models were tested through SPSS macro PROCESS (Hayes, 2013), implementing model #6. According to the conceptual model, depicted in Fig. 1, the IV (mothers' OC symptoms) is modeled as affecting the DV (children's OC symptoms) through four pathways: one pathway is indirect ($a_1 - b_1$) and runs from the IV to DV only through M1 (parenting stress), while a second indirect path ($a_2 - b_2$) runs only through M2 (each PARQ-C parenting behavior): thus, in such cases, simple mediation models were tested according to which OC symptoms lead mothers to experience more parenting stress or to display more dysfunctional (and less warmth/affection) parenting behaviors, which increase the children's risk of displaying OC symptoms themselves. A third indirect influence passes through both M1 and M2 sequentially, with M1 affecting M2 ($a_1 - d - b_2$): more specifically, we tested whether maternal OC symptoms cause parenting stress to increase, which leads mothers to display more dysfunctional parenting behavior, or less warmth/affection (M2), concluding with the onset of children's OC symptoms (DV). The remaining effect of the IV is direct (*c'*), from the IV to the DV, without passing through either M1 or M2. Model # 6 was run for each PARQ-C dimension.

Results are reported in Table 3 and support a simple mediation through parenting stress, for all models except for that involving maternal hostility/aggression, such as M2. Therefore, the data support the suggested model according to which mothers' OC symptoms are linked to children's OC symptoms through the mediation of parenting stress.

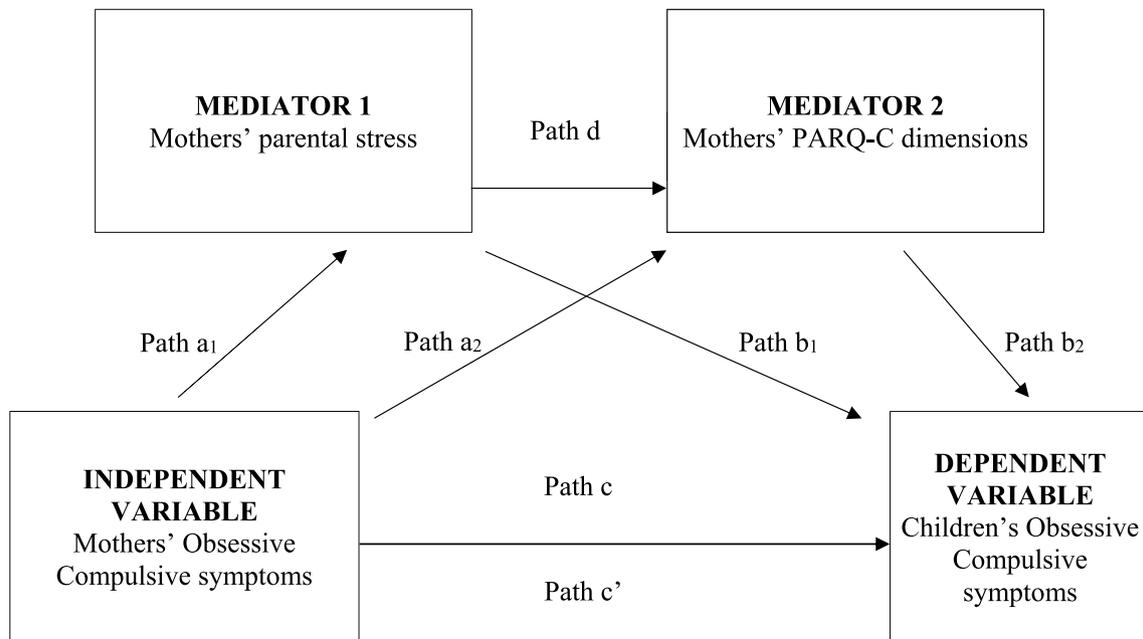


Fig. 1. Conceptual model of the single and serial mediation linking mothers' OC symptoms to children's ones, through the sequential effects of mothers' parenting stress and dysfunctional caregiving behaviors.
 Note. Path c is the total effect of the IV on the DV. Path c' is the direct effect of the IV of the outcome with the mediators in the regression, that is, after controlling for the indirect effects (Baron & Kenny, 1986; Hayes, 2013). Child's age, mothers' age and years of education were treated as covariates in the model.

Conversely, results do not confirm the simple mediation models predicting an indirect pathway from mothers' to children's symptoms through dysfunctional caregiving behaviors. Only two PARQ-C maternal dimensions result as being significantly involved in the prediction of children's OC symptoms, these are mothers' hostility/aggression and indifference/neglect: for both dimensions the indirect effects through M1 and M2 were significant, supporting a sequential double mediation, according to which mothers' OC symptoms are linked to parenting stress which leads mothers to increased hostility/aggression and indifference/neglect in interaction with their children; such caregiving behaviors in turn are related to the children's display of OC

symptoms. Only in the two double sequential models did the direct effects from mothers' to children's OC symptoms remain significant after controlling for the suggested indirect effects, meaning that the suggested indirect effects leave unexplained a significant amount of the effect of the IV on the outcome.

5. Discussion

This empirical contribution aimed to build on the current state of the art on the parental correlates of OC symptoms among school-age children by addressing a gap related to the possible relations of parental

Table 3

Path coefficients of the simple and sequential mediation models predicting child's OC symptoms (DV) from the mothers' OC symptoms (IV), through mothers' parenting stress (M1) and each of the PARQ-C dimensions (M2).

	Warmth/Affection	Hostility/Aggression	Indifference/Neglect	Undifferentiated Rejection	Control
	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)
<i>a</i> ₁	.333*** (.075)	.333*** (.075)	.333*** (.075)	.333*** (.075)	.333*** (.075)
<i>b</i> ₁	.281* (.116)	.227 [†] (.117)	.244* (.113)	.283* (.116)	.275* (.113)
<i>a</i> ₂	-.033 (.098)	-.109 (.095)	-.069 (.096)	-.049 (.099)	.036 (.094)
<i>b</i> ₂	-.110 (.094)	.210* (.096)	.250** (.093)	.092 (.093)	.223* (.098)
<i>d</i>	-.218 (.116)	.369** (.113)	.244* (.115)	.232 [†] (.118)	.132 (.111)
<i>c</i>	.286** (.091)	.286** (.091)	.286** (.091)	.286** (.091)	.286* (.091)
<i>c</i> '	.181 [†] (.096)	.207* (.095)	.202* (.094)	.189 [†] (.097)	.176 (.095)
I.E. M1	.093 (.045)	.076 (.043)	.081 (.044)	.094 (.045)	.092 (.044)
C.I.	[.021 - .204]	[.004 - .176]	[.007 - .185]	[.022 - .202]	[.020 - .200]
I.E. M2	.018 (.024)	-.023 (.024)	-.017 (.027)	-.004 (.015)	.008 (.025)
C.I.	[-.015 - .084]	[-.086 - .011]	[-.091 - .033]	[-.058 - .012]	[-.033 - .071]
I.E. M1-M2	.008 (.009)	.026 (.015)	.020 (.012)	.007 (.009)	.010 (.011)
C.I.	[-.006 - .035]	[.004-.070]	[.005 - .057]	[-.003 - .038]	[-.003 - .049]

[†]p < .06. *p < .05. **p < .01. ***p < .001.

Note. Paths *a*₁ and *b*₁ are the effect of the IV on each of the two mediators (M1 and M2); path *a*₂ and *b*₂ are the effects of each mediator (M1 and M2) on the DV. Path *c* is the total effect of the IV on the DV, that is the sum of the two and indirect effects. Path *d* is the effect from M1 to M2. Path *c*' is the direct effect of the IV of the outcome with the mediator/s in the regression, that is, after controlling for the indirect effect. In order to prove a simple mediation, paths *a*, *b* and *c* must be significant; moreover, path *d* must be significant in order to prove a serial mediation, with sequential effects through M1 and M2. Non-significant *b* values for path *c*' indicate a full mediation (Baron & Kenny, 1986; Hayes, 2013). Child's age, mothers' age and years of education were treated as covariates in all models.

I.E. is the indirect effect, that is the effect of the IV on the DV mediated by each mediator (either M1 or M2). C. I. are lower-level bootstrap confidence interval (95%) and upper-level bootstrap confidence interval (95%). Confidence intervals not containing zero, mean that *b* values are statistically different from zero.

OC symptoms, parenting stress and dysfunctional caregiving behaviors with children's OC symptoms. We firstly suggested that parents' OC symptoms and parenting stress might be good candidates to investigate. Due to the lack of participation by fathers, such relations could be tested only on mothers; findings show that both maternal dimensions were associated with children's OC symptoms. Building on these results, we then tested two sets of mediation models to verify whether OC symptoms might be associated with mothers' stress in looking after the child, or dysfunctional caregiving behaviors, in terms of decreased warmth/affection and increased hostility/aggression, indifference/neglect, rejection and control, which in turn might relate to the child's OC symptoms. Alternatively, we suggested serial double mediation models according to which maternal OC symptoms might explain the variance of children's OC symptoms by means of the sequential effects of parenting stress affecting dysfunctional caregiving behaviors.

As regards the simple mediation models, none of those suggesting an indirect pathway from mothers' to children's symptoms through dysfunctional caregiving behaviors alone was confirmed; the indirect pathway through parenting stress alone was confirmed. This finding suggests OC symptoms might not necessarily lead mothers to behave in a dysfunctional way, unless their symptoms are associated with their parenting stress. We suggest that mothers experiencing obsessive-compulsive symptoms, although in a sub-clinical way, might be highly at risk of increased parenting stress given the core belief domains of OCD: among the others, these include inflated responsibility, over-estimation of threat, intolerance of uncertainty and perfectionism (OCCWG, 1997), which filter the meanings of daily experiences. In the context of caregiving duties, which require parents to allocate to the child's needs a great amount of attentive, cognitive and emotional resources, while at the same time dealing with other contextual demands, such kinds of beliefs can easily put mothers at risk of experiencing feelings of exaggerated responsibility, guilt and inability to deal appropriately with the multiple obligations of being a parent.

Crnic and Ross' (2017) have appropriately distinguished between parenting stress and stressed parents. A stressed parent may result from many conditions outside the family or caregiving context, such as work or financial concerns. Parenting stress, on the other hand, involves stressors that are specifically related to the context of caregiving, parent-child relationships, and the broader parenting role (Nomaguchi & Milkie, 2017). This distinction is of particular interest in relation to our findings since our models suggest that OC symptoms might be related to the mothers' negative appraisal of intrusive thoughts related to caregiving experiences with a bias towards inflated responsibility, perfectionism and need to control such intrusive thoughts; as a consequence, they might perceive themselves as being unable to carry out their duties as caregivers effectively. Certainly, such speculation requires an empirical test, although it appears to be coherent with the cognitive model of OCD, according to which OC symptoms arise from obsessive beliefs and negative appraisals of intrusive thoughts (Abramowitz, Nelson, Rygwall & Khandker, 2007).

The link between parenting stress and parental psychopathology and psychological distress, also in the absence of a clear diagnosis, is conceptually robust and has been empirically well supported, although most research attention has been directed to links with parental depression and anxiety (Crnic & Ross for a review 2017). To the best of our knowledge, only one study has reported on the relation between parenting stress and parents' OC symptoms (Doron et al., 2017) and only one on the relation between parenting stress and children's OC symptoms (Keuthen et al., 2013). None however have focused on the joint impact of mothers' OC symptoms and parenting stress on children's OC symptoms. Thus, what our findings suggest is that parental OC symptoms might be a risk factor because, by increasing parenting stress, they might predispose children to the same kind of symptoms; certainly, this suggestion paves the way for follow-up work.

The sequential models involving dysfunctional caregiving behaviors shed some light on how parenting stress might lead mothers to put their

children at risk of OC symptoms. Specifically, two maternal dimensions seem to be at work and are significantly predicted by parenting stress: maternal hostility/aggression and indifference/neglect. These kinds of maternal behaviors might elicit in children a hypervigilance towards threat, which could interfere with the acquisition of coping skills, mastery and a sense of control. They might also imply criticism, disproportionate blame, reproach and high expressed emotion: these are all caregiving behaviors which are consistently suggested to pave the way for the vulnerability conditions of OCD, such as inflated responsibility, fear of guilt and a self-image of being a person constantly responsible for mistakes, deeply wrong and deserving to be punished and blamed (Barcaccia et al., 2015; Basile et al., 2018; Mancini & Gangemi, 2004; Tenore & Basile, 2019). Mothers experiencing OC symptoms might attribute dysfunctional meanings to caregiving contexts implying biases towards inflated responsibility and guilt, which can easily expose them to parenting stress. As a consequence, they might become hostile/aggressive and over-demanding towards their children in terms of responsibility, paving the way for their children's successive vulnerability to OC symptoms themselves. Alternatively, these mothers might become indifferent and neglectful, forcing children to inappropriately manage their own personal needs and eventually those of other siblings or family members. Such neglecting experiences might predispose children to developing a vulnerability to OCD, by increasing their sense of responsibility and the risk of experiencing feelings of incompetence, sense of failure and guilt when such responsibilities are not fulfilled (Barcaccia et al., 2015).

It is well known that parenting stress interferes with positive caregiving behaviors, such as positive affect, sensitivity and involvement, while it increases intrusiveness and negative behaviors (Booth et al., 2018; Crnic & Ross, 2017). What our findings add to the picture is that such relations might be involved in the onset of children's OC symptoms and specifically in how mothers' OC symptoms might put their children at risk of developing the same symptoms.

Among the maternal dimensions for which no model was supported, unexpectedly, control was seen as playing a minor role. Coherently with other findings (Aycicegi et al., 2002; Farrell et al., 2013; Haciomeroglu & Karanci, 2013; Hofer et al., 2018; Jacobi et al., 2006; Murphy & Flessner, 2015), it is indeed related to children's OC symptoms, but it does not mediate the impact of maternal OC symptoms on children's symptoms. Thus, our findings suggest that OC symptoms do not lead mothers to become more controlling with their children, differently from what has been previously suggested (e.g., Barcaccia et al., 2015).

Future investigations are needed to understand if other parental dimensions associated with OC symptoms and parenting stress might be involved in the onset of OC symptoms in children: indeed, both double sequential models resulted in significant direct effects from mothers to children's OC symptoms, after controlling for the indirect effects, meaning that these indirect effects leave a significant amount of the effect of mothers' OC symptoms on children's symptoms unexplained.

Limitations of the study also need to be addressed: firstly, the associations between parents' and children's OC symptoms, both direct and mediated by parenting stress and dysfunctional caregiving behaviors, suffer from the use of a cross-sectional design with concurrent measures; as such, we are unable to state whether this shared variance between mothers' and children's OC symptoms depends on genetic or environmental conditions; we are also unable to draw clear conclusions on the direction of the influences, as we are unable to exclude the alternative explanation which could fit our data; we might suggest, alternatively, that children's OC symptoms exacerbate their mothers' symptoms. Therefore, the investigation of parents' determinants might benefit in the future from implementing a longitudinal design, which is the golden standard for reliably testing predictions over time. As regards the second limitation, our findings must be treated with caution as they are derived from a healthy community sample, rather than a clinical one; a deeper understanding of the relations between parents' OC symptoms, stress and dysfunctional caregiving behaviors requires

the investigation of such dimensions among children diagnosed with OCD.

Thirdly, our study is unable to contribute to the understanding of how mothers' and fathers' OC symptoms, parenting stress and parenting style differentially relate to the offspring's OC symptoms: there is some evidence suggesting that fathers might play a more relevant role, compared to mothers, in the onset of children's OC symptoms (e.g., Waters & Barrett, 2000) and this has been shown to be true also among a non-clinical Italian sample like ours (e.g., Sica et al., 2013). In line with this evidence, we attempted to collect both maternal and paternal measures, by asking one parent per family to complete the questionnaires. This choice was made so that parents would not be overloaded with excessive demands and to make it possible to collect independent measures, as we had the chance to test our aims with measures collected on mothers and fathers belonging to different families. However, participation by fathers was very low. Growing evidence suggests that both mothers and fathers influence the development of offspring and different pathways, both environmental and genetic, have been suggested (Baun & Champagne, 2014). The same claim has been suggested to understand mothers' and fathers' influences on the onset of offspring's OC symptoms (Waters & Barrett, 2000). Thus, future studies should address this issue and try to disentangle differential effects of each parent.

Lastly, we should underline that we only collected OC symptoms among mothers and children, leaving uncontrolled the potentially confounding effect of other clinical manifestations, such as anxiety and depression, which are expected to be in comorbidity with OC symptoms (e.g., APA, 2013; Brander et al., 2016; Farrell et al., 2013).

Notwithstanding these limitations, our findings add new information to the understanding of the maternal correlates of children's OC symptoms and provide empirical support for the recent speculations within the cognitive framework regarding the family origin of vulnerability to OC symptoms (Barcaccia et al., 2015). Moreover, these findings might have important clinical implications for the treatment of pediatric OCD because they suggest the potential to target not only children, but also the family context as a whole. Thus far, the family has been involved in OCD treatment, especially to interrupt dysfunctional accommodation mechanisms which contribute to reinforce and maintain both adults' and children's OC symptoms (Lebowitz & Shimshoni, 2018; Salianni, Cosentino, Barcaccia, & Mancini, 2019; Storch et al., 2007). Our findings suggest that treatment of pediatric OCD should also involve psychological support for parents in order to reduce their parenting stress, which might depend on a dysfunctional appraisal of caregiving duties, as well as parent training in order to reduce dysfunctional caregiving behaviors and increase positive parenting.

Ethical approval

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

Informed consent

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

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Declaration of competing interest

The authors declare that they have no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jocrd.2020.100510>.

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