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The Link between Mother's and Child's Obsessive-Compulsive Symptoms: test of
Simple and Serial Mediation Models in a Healthy Community Sample

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Abstract

The study meant to build on the current state of art of the literature on the parental determinants of OC symptoms among school-age children, by addressing a gap related to the possible relations between maternal OC symptoms, parenting stress and dysfunctional caregiving behaviors in the onset of children's OC symptoms. The cross – sectional design involved 113 children (61 female; M age=11.04 years, SD=1.00, range = 9-14) and their mothers (M age=41.58, SD=4.60, range = 28-54; M years of education=11.35, SD=3.43, range = 8-18), 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 with SPSS macro PROCESS (Hayes, 2013), supported an effect of mothers' OC symptoms on children's ones, though a simple indirect effect of parenting stress, but not dysfunctional caregiving. Sequential effects from parenting stress to hostility/aggression and to indifference/neglect dysfunctional, linking indirectly mothers' and children's OC symptoms were also supported.

These findings add new pieces of information to the understanding of the parental determinants of children's OC symptoms and have important clinical implications for the treatment of pediatric OCD, suggesting the potential of targeting not only children, but also their parents.

Keywords: Obsessive compulsive disorder, school-age children, parenting stress, PARQ-C, mother-child dyads

The Link between Mother's and Child's Obsessive-Compulsive Symptoms: test of Simple and Serial Mediation Models in a Heathy Community Sample

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 that the person feels driven to perform (compulsions) or both, that 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 comprise 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 besides suffering from other disorders, children diagnosed with OCD might be at greater risk, compared to healthy controls, for coercive-disruptive behaviors, social isolation and peer victimization (James et al., 2017; Lebowitz, Storch, MacLeod & Leckman, 2014; Storch et al., 2006). Also, empirical findings highlight mixed prognosis for the long-term outcomes of OCD with onset in childhood and adolescence, with some youth becoming subclinical over time, whereas others having to struggle with a persistent disorder on the long term (James et al., 2017). All together, these findings posit the urge for practitioners to have a deep understanding of aetiological and maintenance factors of this disorder as well as to have available evidence-based treatment protocols targeting children with OCD.

Evidence from multiple disciplines supports the idea about pediatric OCD being a multi-factorial condition, characterized by the co-occurrence of hereditary, biological, and environmental mechanisms. As such, findings fit the major assumptions of the developmental

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

Evidence supporting the 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 glutamatergic system (Goodman, Grice, Lapidus & Coffey 2014), together with neuro-anatomical and neurophysiological ones, recently highlighted with neuro-imaging procedures (for an extensive review see Basile, Sattioni & Mancini, 2016).

Unfortunately, less consensus exists on the environmental factors that might serve as aetiological and/or maintenance conditions of paediatric 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). Environmental factors have been the focus of interest especially of cognitive-behavioral models, according to which the development and maintenance of obsessions, related distress and the urge to neutralize them through compulsive behaviors, originate from maladaptive appraisal processes which lie on assumptions learnt within dysfunctional relationships with significant others and adverse family context. Such cognitive assumptions, which are related for example to inflated responsibility, overestimation of threat, perfectionism, intolerance of uncertainty, over-importance of thoughts and need to control (Julien, O'Connor, Aardema & Todorov, 2006), might have had an adaptive function earlier in life, but can trigger the development of OCD in the presence of critical events (Salkovskis et al., 2000). A further elaboration of the cognitive conceptualization, well supported by clinical and experimental evidence (for a review, see Mancini & Gangemi, 2004), posits that the central feature of OCD is the fear of guilt regarding one's potential to act irresponsibly and not in accordance with one's personal moral standards (Barcaccia, Tenore & Mancini, 2015; Mancini & Gangemi, 2004).

Such cognitive and emotional patterns have been related to many aspects of adverse family functioning, targeted as possible vulnerability factors for OCD (Barcaccia et al.,

2015): retrospective findings collected on adults and late adolescents, both healthy and with a diagnosis of OCD seem to suggest that perceived overprotecting, authoritarian and rejecting parental styles, as well as attachment anxiety, are associated with increased risk for OCD (Brander et al., 2016; Yarbrow, Mahaffey, Abramowitz & Kashdan, 2013; Timpano, Keough, Mahaffey, Schmidt & Abramowitz, 2010). More recent findings show that in the context of treatment, OCD patients, compared to patients with other diagnoses, 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 relation 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, because it is now 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, 2016), many investigations have been conducted on sub-clinical OC symptoms among large community samples, besides small clinical samples, leading to quite robust evidence. Despite the conclusion of an early review (Waters & Barrett, 2000), according to which family risk factors specific to pediatric OCD were still theoretical at that time, given the very little evidence thus far available, about 15 years later an updated review (Murphy & Flessner, 2015) concluded indeed that there was sufficient empirical evidence supporting a strong association between pediatric OCD and many aspect of family and parents' functioning, such as parental mental health, family dynamics and family emotional climate.

Of particular interest for the present study is the fine-grained evidence of the current state of art of the 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 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 precursors of such dysfunctional parenting have not been highlighted yet. We suggest that one possible candidate could be parental OC symptoms: both reviews mentioned above, in fact, do identify parental mental health, such as depression, anxiety and psychoticism, as a possible risk factor for offspring's OCD. While Waters and Barrett's (2000) review does conclude about subclinical obsessive-compulsive traits being commonly observed in parents of children with OCD and parents being slightly more at risk of receiving a diagnosis of OCD, with fathers almost three times as likely than mothers, unfortunately none of the studies analyzed in Murphy and Flessner's review (2015) focused on OC symptoms among the parental mental health conditions predisposing to OCD among the offspring. Only one study has attempted to show that parental OC symptoms might predict adolescents' ones, through parents' obsessional beliefs related to responsibility, but it failed to support the mediation according to Baron & Kenny's (1986) criteria.

A second good candidate to be explored as a possible precursor of dysfunctional parenting or as a co-occurring mechanism in the onset of children's OC symptoms is parenting stress: as for parents' OC symptoms, also parenting stress has received scant research attention in the investigation of the parental determinants of offspring's OC symptoms. Parenting stress has been conceptualized as a negative psychological response to the obligations of being a parent (Bornstein, 2002) and it 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) whereas a positive one with child behavior problems (Barroso, Mendez, Graziano & Bagner, 2017). Of interest to the present study, is 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 ones (Han & Lee, 2018; Putnik et al., 2008; for a review, see Crnic & Ross, 2017).

Notwithstanding this evidence, parenting stress has received scant research attention in the investigation of the environmental factors involved in pediatric OCD: to the best of our knowledge, only one study showed that 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 onset or maintenance, or might hamper the process and outcome of treatment. Nevertheless, no study has investigated jointly the role of parenting stress and dysfunctional behaviors in increasing their offspring's risk to develop OC symptoms. Also, the possible relation between parental OC symptoms and parental stress is thus far unexplored, with the only exception of Doron, Derby and Szepsenwol (2017): these scholars found among a community sample of parents that parenting stress was significantly related to their OC symptoms. Nevertheless, whether parental OC symptoms is related to parenting stress in the etiology and maintenance of 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 in the understanding of the aetiological and/or maintenance conditions of children's OC symptoms. Building on the findings reviewed above, the study aims firstly at testing whether these two maternal features are related with children's OC symptoms: based on the findings reviewed above suggesting that both might be precursors of children's OC, we expect such relations to be confirmed.

The second aim focuses on understanding by which means mothers' OC symptoms might predispose children to develop the same kind of symptoms: possible mediators will be 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 mothers' and children's OC

symptoms; in such cases, it is hypothesized that parenting stress and dysfunctional parenting might contribute independently one from the other to children's onset of OC symptoms.

Alternatively, or additionally, sequential effects can also be suggested, according to which mothers' OC symptoms predict parenting stress, which might increase dysfunctional parenting behaviors, resulting in the prediction of children's OC symptoms. Given the findings reviewed above, we expect both simple and sequential pathways from mothers' 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 to be vulnerability conditions for children's OC symptoms.

Method

Participants

The total sample included 113 mother-child dyads, recruited in three schools located in an urban area of the South of Italy. As to the 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 teachers reports and school files, none were diagnosed with psychological delays/disorders. The mothers' mean age was 41.58 years ($SD = 4.60$; $range = 28-54$) and they had on average 11.35 years of education ($SD = 3.43$; $range 8-18$). Our sample had features similar to those (i.e., health community school-age children), to help ensure that our findings would build on the extant empirical base (e.g., Brander et al., 2016; Murphy & Flessner, 2015). Families were not compensated 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).

Procedure and Measures

The study's purpose was explained to schools' principals and teachers, who provided their informed consent. Mothers were informed about the research purposes through a letter and their written informed consent was obtained prior to data collection. Mother-rated data collection was completed at the time mothers provided their consent to participate. If mothers consented, they were asked to complete the battery. If not, they could return them in blank to the school. Participation rate was high with only about 10% of families declining to participate. Child-rated data collection was completed in a single session at school. Research assistants arranged a visit in the 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 aim and were reassured about 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, to minimize children experiencing 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.

Measures

Mothers-reported measures

Mothers completed the Parenting Stress Index – Short Form (PSI-SF; Abidin, 1999; Guarino, Di Blasio, D'Alessio, Camisasca & Serantoni, 2008 for the Italian version). This is a self-report screening tool that 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 is feeling in their role as a parent. This global measure was used in the analyses.

To assess the incidence of 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 agreement with each item describing a OC symptom, based on the frequency they experienced that symptom on a five-point scale (0-5) and scores are then summed to obtain a total score of OC symptoms. This revision is the short version of the original version composed by 42 items (OCI; Foa, Kozak, Salkovskis, Coles, & Amir, 1998). The Italian version of the OCID-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).

Children's reported measures

The Self-Administrated 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, false and partly true).

For the purposes of the present study, only the Obsessive-Compulsive Subscale was administered. We administered the age appropriate version: children with age up to 10 completed the 20-item version, tailored for children of 8 to 10 years old; the older ones instead completed the 38-item version, tailored for children and adolescent with age 11 to 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 the 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 level of agreement with each item on a four-point scale (1-4), that provide information about the way in which the child perceives the mother'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 the parental control. Therefore, PARQ/Control allows both to obtain information about the four subscales assessed by the PARQ (Warmth/Affection, Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection) and allows 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 shown to have good psychometric properties (Comunian, 2012). For the purpose of the present study, scores for all five scales were used.

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, alfa value for the Undifferentiated Rejection scale was .58; nevertheless, based on Taber's review (2016), according to which such value can be considered satisfactory, we decided to retain the scale as it is.

Results

Preliminary analyses

All analyses were conducted with the IBM SPSS package 24° Ed. Firstly, we tested whether children's age and mother's age 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, $-1.825 < t(111) < .386$, all *n.s.*

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

Main Analyses

We firstly ran Pearson's correlations among the study variables. Results are reported in Table 2: of interest for the test of the first aim, we found that children's OC symptoms was significantly related to both mother's total OC symptoms and parenting stress. Such correlations remained stable when the effects of children's age and mothers' age and years of education was partialized out ($.29, p < .01$ and $.33, p < .001$, respectively).

As to 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 Figure 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 children's risk to display 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 causes 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 but that involving maternal hostility/aggression as M2. Therefore, the data support the suggested model according to which mothers' OC symptoms increase parenting stress which in turn increases children's risk to display OC symptoms themselves. Only two PARQ-C maternal dimensions result to be significantly involved in the prediction of children's OC symptoms, that is 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 increases parenting stress which leads mothers to increase hostility/aggression and indifference/neglect in interaction with their children; such caregiving behaviors in turn resulted in increased risk for children to display OC symptoms. Only in the two double sequential models, 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.

Discussion

This empirical contribution meant to build on the current state of art of the literature on the parental determinants of OC symptoms among school-age children, by addressing a gap related to the possible relations between maternal OC symptoms, parenting stress and dysfunctional caregiving behaviors in the onset of children's OC symptoms. By focusing specifically on mothers which have been consistently identified as primary caregiver in South Italian families (e.g., Cassibba, Coppola, Sette, Curci & Costantini, 2017), we firstly suggested that mothers' OC symptoms and parenting stress could be good candidates to investigate. 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 expose mothers either to experience stress in caregiving the child, or to display increased dysfunctional caregiving behaviors, in terms of decreased warmth/affection and increased hostility/aggression, indifference/neglect, rejection and

control, which in turn might put the child at risk to develop OC symptoms. Alternatively, we suggested serial double mediation models according to which maternal OC symptoms might increase child's risk for OC symptoms by the means of sequential effects of parenting stress affecting dysfunctional caregiving behaviors.

As to the simple mediation models, none of those suggesting an indirect pathway from mothers' to children's symptoms through dysfunctional caregiving behaviors alone was confirmed; indeed the indirect pathway through parenting stress alone was confirmed. This finding suggests that OC symptoms do not necessarily lead mothers to behave in a dysfunctional way, unless their symptoms increase their parenting stress. We suggest that mothers experiencing obsessive-compulsive symptoms, although in a sub-clinical way, might be highly at risk to increased parenting stress given the core beliefs domains of OCD: among the others, these include inflated responsibility, overestimation 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 kind of beliefs can easily put mothers at risk to experience feelings of exaggerated responsibility, guilt and inability to deal appropriately with the multiple obligations of being a parent. Sub-clinical OC symptoms might also lead mothers to compulsive behaviors that are difficult to resist carrying out, and which might involve domains of washing, checking, ordering and hoarding (APA, 2013; Sica et al., 2009). Such behaviors are time consuming and psychologically absorbing and might interfere with mothers' social functioning and emotional availability, which also might lead to increased levels of parenting stress.

Crnic and Ross' (2017) have appropriately distinguished between parenting stress and stressed parents: while stressed parent may result from many conditions outside the family or caregiving context, such as occupation or financial concerns, parenting stress, instead, 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 because what our models suggest is that OC symptoms might interfere with the meanings mothers attribute to the caregiving experiences with a bias towards inflated responsibility and guilt; as a consequence, they might perceive themselves as being unable to carry out effectively their duties as caregivers.

The link between parenting stress and parental psychopathology and psychological distress, also in the absence of a clear diagnosis, is conceptually robust and it 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), but none on the joint impact of mothers' OC symptoms and parenting stress on children's OC symptoms. Thus, what our findings add to the existing state of art of the literature is that parental OC symptoms might be a risk factor because, by increasing parenting stress, they predispose children to the same kind of symptoms.

The sequential models involving dysfunctional caregiving behaviors shed some light on how parenting stress might lead mothers to put their children at risk to develop OC symptoms. Specifically, two maternal dimensions seem to be at work and are significantly predicted by parenting stress: maternal hostility/aggression and indifference/neglect. This kind of maternal behaviors elicit in children a hypervigilance towards threat, which could interfere with the acquisition of coping skills, mastery and a sense of control. Also, they might imply criticism, disproportionate blame, reproach and high expressed emotion: these are all caregiving behaviors consistently suggested to pave the way to 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; Tenore, 2016; Mancini & Gangemi, 2004). 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 to their children's vulnerability to OC symptoms themselves. Alternatively, these mothers might become indifferent and neglectful, forcing children to inappropriately manage on their own their personal needs and eventually those of other siblings or family members. Such kind of neglecting experiences might predispose children to vulnerability conditions to OCD, such as excessive sense of responsibility and the risk to experience feeling 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 & Gross, 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 at risk their children to develop the same symptoms.

Among the maternal dimensions for which no model was supported, unexpectedly, control was playing a minor role: in fact, it is related to children's OC symptoms, coherently with other findings (Aycicegi et al., 2002; Farrell, 2013; Haciomeroglu & Karancy, 2013; Hofer et al., 2018; Jacobi, Calamari & Woodard, 2006; Murphy & Flessner, 2015), but it does not mediate the impact of maternal OC symptoms on children's ones. Thus, our findings suggest that OC symptoms do not lead mothers to become more controlling with their children, differently from what has been 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 children's onset of OC symptoms: both double sequential models, in fact, resulted in significant direct effects from mothers to children's OC symptoms, after controlling for the indirect effects, meaning that these indirect effects leave unexplained a significant amount of the effect of mothers' OC symptoms on children's ones.

Limitations of the study 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 concurrent study design; as such, we are unable to state whether this shared variance between mothers' and children's OC symptoms depends on genetic or environmental conditions; also we cannot draw clear conclusions on the direction of the influences, as we are unable to exclude the alternative explanation which could fit our data, that is that children's OC symptoms might exacerbate their mothers' ones. Therefore, the investigation of parents' determinants might benefit in the future from implementing a longitudinal design, which is the golden standard for testing reliably predictions over time. As to the second limitation, findings must be treated with caution as they derive from a healthy community sample, instead of a clinical one; a deeper understanding of the relations between parents' OC symptoms, stress and dysfunctional caregiving behaviors requires the investigations of such dimensions among children diagnosed with OCD.

Notwithstanding these limitations, our findings add new pieces of information to the understanding of the parental determinants of children's OC symptoms and provide empirical support to the recent speculations within the cognitive framework regarding the family origin of the 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 of targeting not only the children, but also the family context. Thus far, 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; Saliari, Cosentino, Barcaccia & Mancini, 2016; Storch et al., 2007). Our findings suggest that the treatment of pediatric OCD should also involve psychological support to parents in order to reduce their parenting stress, which might depend on dysfunctional beliefs related to caregiving duties, as well as parent training in order to reduce dysfunctional caregiving behaviors and increase positive parenting.

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