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Parent-level risk factors for children's obsessive beliefs, interpretation biases, and obsessive-compulsive symptoms: A cross-sectional examination

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ABSTRACT

There is conflicting research on the association between parents' and children's obsessive-compulsive (OC) features (obsessive beliefs, interpretation biases, and OC symptoms) and how other parent-level risk factors (e.g., depression) influence the emergence of OC features in youth. To bridge this gap, we adopted a multi-method and multi-informant approach, including both child- and parent-report measures, as well as in vivo behavioral tasks, to evaluate how parent-level factors contribute to children's OC features. Twenty-seven parents and 48 children, who reported OC features across a spectrum of severity, completed diagnostic interviews, self-report questionnaires, and attended an experimental session in our laboratory. We first conducted univariate linear regressions to identify the significant parent-level predictors and applied the False Discovery Rate to control for Type 1 error. Next, significant predictors were entered into a multivariate mixed-effects linear regression model that included a random intercept for family unit. Results suggested that the transmission of beliefs, interpretations, and symptoms is not domain-specific; rather, certain parent factors - religiosity, depression, anxiety, stress, and psychological control - seem to operate as general vulnerability factors for children's OC features. Although the cross-sectional design precludes conclusions regarding causation, findings can inform individualized prevention programs that alter the trajectory of at-risk youth.

1. Introduction

Pediatric obsessive compulsive disorder (OCD) is an impairing psychiatric condition that dramatically impacts children's academic, social, and familial life (Piacentini & Bergman, 2000). Although OCD, as a diagnostic entity, only affects 1–2% of children (Heyman et al., 2001), obsessive-compulsive symptoms (OCS) occur across a continuum, in that cognitions and symptoms differ quantitatively in severity, but not qualitatively in nature (e.g., Abramowitz et al., 2014). The high prevalence of functionally interfering OCS (13–28%; e.g., Fullana et al., 2010) represents a major public health concern and critical target for research. Notably, identifying malleable risk factors that contribute to the development of OCS can inform individualized prevention programs that alter the trajectory of at-risk youth, and alleviate the substantial individual and societal burden (Society for Prevention Research, 2004).

1.1. Cognitive conceptualization of OCS

In evaluating the developmental vulnerabilities for OCS, it is crucial to include demonstrated etiological and maintenance factors, such as obsessive beliefs and interpretation biases (e.g., Abramowitz, Khandker, Nelson, Deacon, & Rygwall, 2006; Berman, Wheaton, & Abramowitz, 2013). Indeed, Rachman (1997, 1998) proposed that dysfunctional obsessive beliefs represent a cognitive risk factor for OCS. These obsessive beliefs include: (a) overestimation of responsibility and threat (RT), (b) importance of, and need to control, thoughts (ICT), and the (c) need for perfectionism and certainty (PC; Obsessive Compulsive Cognitions Working Group [OCCWG], 2003, 2005). These pan-situational beliefs give rise to the misinterpretation of benign intrusive thoughts. In other words, maladaptive interpretations are an intermediary factor in the maintenance of OCS. For example, a child who holds obsessive beliefs about the importance of her thoughts (e.g., an ominous thought means that something bad is going to happen) may have an intrusive image of her mother dying in a car accident. If she

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interprets this thought to be significant, she will erroneously conclude that this accident is more likely to happen. This misappraisal then activates anxiety and contributes to the passing intrusion becoming a clinically significant obsession (i.e., intrusive thought that is unwanted and seemingly uncontrollable), which can be responded to with ritualistic behaviors intended to neutralize the heightened anxiety or reduce the likelihood of a feared outcome occurring (American Psychiatric Association, 2013). Taken together, (a) obsessive beliefs, (b) maladaptive interpretations, and (c) OCS are the tenets of Rachman's (1997, 1998) cognitive model and will heretofore be termed "OC features" when all three levels are referenced.

Despite ample research on the cognitive model of OCS in adults (e.g., Taylor et al., 2006; Wheaton, Abramowitz, Berman, Riemann, & Hale, 2010), there is limited research examining these processes in children (e.g., Farrell, Waters, & Zimmer-Gembeck, 2012; Reynolds & Reeves, 2008). Importantly, the model does extend to youth, although age-specific considerations are important (e.g., Farrell & Barrett, 2006). The validity of this model across the lifespan affords researchers the opportunity to examine how parent-level beliefs, interpretations, and OCS influence children's OC features. Research evaluating the generational transmission of OC features is conflicted and has led researchers to examine how other parent-level risk factors (e.g., depressive symptoms) may explain the development of children's OC features. Using learning theory as a framework (for a review, see Rapee, Schniering, & Hudson, 2009), we will now outline the literature on the relationship between parents' and children's OC features and how other parent-level risk factors relate to children's obsessive beliefs, interpretation biases and OCS severity.

1.2. Learning theory

Learning theories regarding the development of anxiety disorders (e.g., Chorpita & Barlow, 1998; Field, 2006; Rachman, 1977) posit that parents with anxiety model fearful responses to potential threat (e.g., flammable items). By observing parents' *behavior* (e.g., mother returning home to ensure the stove is off), children may learn that such stimuli are dangerous and develop generalized beliefs that the world is unsafe (i.e., vicarious learning). Children may also learn to fear stimuli through direct *verbal instruction* (e.g., telling a child that germs from dogs are dangerous; e.g., Field, 2006). This theoretical framework aligns with longitudinal research demonstrating that parents transmit cognitive risk factors by modeling negative thinking styles, which become incorporated into children's belief systems and elevate their vulnerability for affective disorders (Alloy et al., 2004). Experimental research testing these theories in the development of OCD is extremely scarce.

1.3. Association between parents' and children's OC features

Supporting the acquisition of fear-based thinking via generational transmission (Rapee et al., 2009), past research has demonstrated a positive association between parents' and children's *obsessive beliefs* (Farrell et al., 2012; Pietrefesa, Schofield, Whiteside, Sochting, & Coles, 2010; Sanchez, Kendall, & Comer, 2016). Pietrafesa et al. (2010) found that belief transmission is domain-specific (e.g., positive relationship between maternal and children's RT beliefs), whereas Farrell et al. (2012) indicated that maternal obsessive beliefs operate as a broad vulnerability for children's obsessional thinking and are not domain-specific. Additional research is needed to discern whether parental obsessive beliefs operate as a specific or broad vulnerability factor.

Very little research has examined how *maladaptive interpretations* regarding the dangerousness of intrusive thoughts develop in youth and the parallels between parents' and children's appraisals. Some research demonstrates that children with fear-based disorders interpret ambiguous situations similar to their mothers (e.g., Creswell, Schniering, & Rapee, 2005), while others have not replicated this pattern (Farrell, Hourigan, Waters, & Harrington, 2015; Micco & Ehrenreich, 2008). Given that past studies examined the interpretation of ambiguous scenarios, and not the misappraisal of unwanted thoughts (i.e., OC-specific interpretation bias), research must be extended to understand this pathway.

In terms of OCS, although recent genetic studies demonstrate its high heritability (e.g., Hettema, Neale, & Kendler, 2001; van Grootheest, Cath, Beekman, & Boomsma, 2007), with contamination symptoms possessing the strongest familial pattern (Alvarenga et al., 2015), little to no research has evaluated how parents' OCS influence all *three levels* of children's OC features. Farrell, Hourigan, and Waters (2013) demonstrated that parental RT and ICT beliefs possessed positive associations with children's OCS severity; however, a systematic examination of generational associations across all three levels of the cognitive model has not yet been done.

1.4. Other parent-level risk factors

Given that parents' OC features are not consistent predictors of children's outcomes nor do they explain a majority of the variance in children's OC features (e.g., Farrell et al., 2012), it is likely that other theoretically-grounded parent factors (internalizing psychopathology, religiosity, and psychological control) confer risk for children's OC features. First, past research demonstrates that *parental depression, stress, and anxiety* are risk factors for the development of childhood fear-based disorders (including OCD). In fact, in their meta-analysis, Micco et al. (2009) indicated that offspring of anxious parents were 8.69 times more likely to have OCD than children of parents without a psychiatric diagnosis. Additionally, parents with elevated anxiety and depression symptoms engage in greater accommodation of children's OCS (e.g., buying soap for a child who engages in washing rituals), which is a well-documented maintenance factor in childhood OCD (e.g., Wu et al., 2016). This research highlights the influence of parental psychopathology on children's OCS, but no research has evaluated how parental anxiety, depression, and stress influence children's obsessive beliefs or interpretation biases.

Second, *parental religiosity* may influence children's interpretation of "taboo" thoughts (e.g., "what if I'm gay"; Salkovskis, Shafran, Rachman, & Freeston, 1999) and the need to engage in compensatory behaviors (e.g., prayer; Berman, Stark, Ramsey, Cooperman, & Abramowitz, 2014). Although there is limited research on how parent religiosity impacts children's OC features, previous studies indicate a positive association between one's own religiosity and obsessive beliefs, as well as obsessional symptoms (Abramowitz, Deacon, Woods, & Tolin, 2004; Berman, Abramowitz, Pardue, & Wheaton, 2010; Siev & Cohen, 2007). Accordingly, the strength of parents' religiosity is a putative risk factor for children's OC features.

Finally, research suggests that *parental psychological control* (i.e., attempts to control children's internal experiences) is positively associated with children's anxiety symptoms (e.g., Rapee et al., 2009), perfectionism (e.g., Kawamura, Frost, & Harmatz, 2002), ICT beliefs (Berman, Wheaton et al., 2013), and OCS (e.g., Aycicegi, Harris, & Dinn, 2002). Given that many previous investigations asked college students to retrospectively rate their parents, research that assesses children's current perception of their parents' psychological control is needed to eliminate retrospective reporting biases (e.g., Kazdin, 2002).

1.5. Current study

The current study is the first to examine how parents' OC features and other relevant risk-factors are associated with children's obsessive beliefs, interpretation biases, and OCS (i.e., all three levels of the cognitive model). We adopted a multi-method and multi-informant approach, including both child- and parent-report measures, as well as in vivo behavioral tasks. Importantly, identifying the modifiable parent-level factors associated with OC features in youth can inform future

research aimed at developing prevention efforts for children at-risk.

As previously mentioned, many correlational and experimental studies demonstrate that OC features occur across a continuum (e.g., Berman, Abramowitz, Wheaton, Pardue, & Fabricant, 2011; Frost & Steketee, 2002; OCCWG, 2003, 2005) and adopting a dimensional framework provides richer insight into the factors that contribute to their development (Abramowitz et al., 2014). Thus, the present study examines OC features in children and adults who report a range of severity. To mitigate the risk associated with range restriction in a community sample, we over-sampled participants with OCD (Abramowitz et al., 2014).

Given the scarcity of research on the relationship between parents' and children's OC features at all three levels, our hypotheses were exploratory. Our primary aim was to examine the following parent-level risk factors as predictors of children's OC features: (a) obsessive beliefs, (b) interpretation biases, (c) OCS severity, (d) severity of co-occurring internalizing symptoms (i.e., depression, anxiety, and stress), (e) strength of religiosity, and (f) psychological control. We anticipated that parental risk factors would be positively correlated with child outcomes; however, given the conflicted findings regarding domain-specific transmission and that no previous studies have examined this triad simultaneously, we did not have *a priori* hypotheses as to which factors would emerge as the most potent predictors. Lastly, given past research demonstrating that children's age moderates the transmission of maternal cognitive biases (Farrell et al., 2012), we included this child-level risk factor in study analyses.

2. Methods

2.1. Participants

Twenty-seven parents (primarily mothers) and all of their eligible children between the ages of 8–18 (N = 48; equal gender distribution) completed diagnostic interviews, self-report questionnaires, and attended an experimental session in our laboratory. Demographic and diagnostic characteristics are presented in Tables 1 and 2. Although most families were single-child households (44.4%), many parents opted to include two (40.7%), three (7.4%) and four (7.4%) of their eligible children ($M_{children}$ = 1.78; $SD_{children}$ = .89). As reported in Table 1, the predominant number of parents and children self-identified as Caucasian. Additionally, most parents obtained at least a college degree, were married, and identified with Christianity.

Although most parents did not carry any psychiatric diagnoses, the primary parent met criteria for an average of .65 diagnoses (SD = 1.23). The most common parent condition was OCD (see Table 2). No parents met diagnostic criteria for any substance use disorder and, based upon parent report, all depressive episodes had remitted. Children, on average, met diagnostic criteria for an average of 1.06 (SD = 1.77) psychiatric disorders. A current diagnosis of OCD was also the most common, with a minority reporting other internalizing (e.g., social anxiety disorder) and externalizing disorders (e.g., ADHD). Except for OCD, the rates of parent and childhood psychiatric conditions approximated, or were less than, those reported in nationwide community samples (Kessler et al., 2012; Kessler, Chiu, Demler, & Walters, 2005).

2.2. Procedure

First, parents called our clinic to participate in a study about how "thinking styles are passed on from parents to children." A clinical research coordinator (CRC) completed a phone screen to assess whether the primary parent and their biological children (ages 8–18) spoke fluent English and were able to provide informed consent (inclusion criteria). Multiple children from the same family could participate and we did not use diagnostic criteria or cut-off scores on self-report questionnaires to determine eligibility. Additionally, the following exclusion criteria were assessed in parents and children: (1) acute psychosis or active suicidality; (2) serious neurological disorder or impairment (e.g. brain damage, blindness), an intellectual disability, or autism; (3) whether child(ren) was/were adopted; and, (4) psychotropic medications were not stable (i.e., at current dose for less than two months).

Following the phone screen, families were sent an informed consent form, which was reviewed over the phone and verbal consent was obtained. The primary parent was then administered a diagnostic assessment about him or herself and eligible children. Following the interview, the primary parent and child(ren) were emailed self-report questionnaires. Lastly, the parent and eligible children visited our clinic. The Principal Investigator obtained written consent from the

Table 1
Parent and child demographic characteristics.

	Primary Parent (N = 27)	Children (N = 48)
Age	M = 45.07; SD = 7.91	M = 12.35; SD = 2.98
Gender		
Female	22 (81.5%)	24 (50%)
Male	5 (18.5%)	24 (50%)
Race		
Caucasian	22 (81.5%)	37 (77.1%)
African-American	3 (11.1%)	4 (8.3%)
Asian	1 (3.7%)	3 (6.3%)
American Indian/Alaska Native	0	1 (2.1%)
More than one race	1 (3.7%)	3 (6.3%)
Highest Education Attained		
High School/GED	4 (14.8%)	–
Associates or 2-year College	3 (11.1%)	–
Partial College (courses towards degree)	1 (3.7%)	–
College Degree (4-year college)	9 (33.3%)	–
Masters Degree	7 (25.9%)	–
Professional Degree (MD, PhD, JD)	3 (11.1%)	–
Marital Status		
Single	4 (14.8%)	–
Married	19 (70.4%)	–
Living with partner (not married)	1 (3.7%)	–
Separated or Divorced	3 (11.1%)	–
Religious Affiliation		
Christian	19 (70.37%)	–
Jewish	1 (3.7%)	–
Islam	1 (3.7%)	–
Spiritual	1 (3.7%)	–
Atheist	5 (18.5%)	–

Table 2
Parent and child current psychiatric diagnoses.

Psychiatric Diagnoses	Primary Parent (N = 27) N (%)	Children (N = 48) N (%)
Obsessive Compulsive Disorder	3 (11.5%)	6 (12.8%)
Generalized Anxiety Disorder	1 (3.8%)	5 (10.6%)
Social Anxiety Disorder	0	4 (8.5%)
Panic Disorder	2 (7.7%)	1 (2.1%)
Agoraphobia	1 (3.8%)	0
Child-Specific Modules		
Separation Anxiety Disorder	–	2 (4.3%)
Specific Phobia	–	3 (6.5%)
Motor Tic Disorder	–	1 (2.1%)
Transient Tic Disorder	–	1 (2.1%)
ADHD – Combined Type	–	2 (4.3%)
ADHD - Inattentive Type	–	1 (2.1%)
Oppositional Defiant Disorder	–	2 (4.3%)

Note. (1) The child version of the MINI assesses for psychiatric disorders that are not included in the adult version; (2) Table 2 includes all diagnoses for which parents and children met criteria. If a diagnosis is not listed, then no participant met diagnostic criteria.

parent and assent from eligible children. Subsequently, children completed an in vivo thought induction. At the completion of the visit, families were debriefed and compensated via gift cards ($50 for diagnostic interviews + $25 for each person who attended the clinic visit). Our hospital IRB approved all study measures and procedures.

2.3. Measures

2.3.1. Diagnostic assessment

The primary parent was administered the *Mini International Neuropsychiatric Interview Version 5.0* (2005; MINI 5.0) and reported on him or herself. The primary parent was also administered the *Mini International Neuropsychiatric Interview for Children and Adolescents Version 6.0* (2010) and reported on each eligible child. The MINI is a valid and reliable structured clinical assessment that can be administered by a lay interviewer and assesses DSM-IV mood, anxiety, attentional, and behavioral disorders (Sheehan et al., 1997, 2010). Interviews were conducted by a licensed clinical psychologist (NCB), as well as CRCs who underwent extensive reliability training. Following training, all CRC-conducted diagnostic interviews were audio-taped, reviewed by NCB in weekly supervision, and final diagnostic decisions were made by consensus following supervision and reviewing of the audio file (if needed).

2.3.2. Demographics

The primary parent reported his or her sex, age, racial identity, marital status, and education history. He or she also identified the family's primary religious affiliation and rated each parent's degree of involvement in childcare (0 = "Not at all involved" to 3 = "Extremely involved"). A paired-samples *t*-test verified that the primary parent was more involved in childcare (M = 2.26, SD = .86), than the co-parent (M = 1.42, SD = 1.14; $t(25) = 3.10$, $p = .004$). Children self-reported their sex, age, and racial identity.

2.3.3. Parent-level risk factors

To assess psychiatric symptom severity, the primary parent completed the *Depression, Anxiety, and Stress Scale – 21* (DASS-21; Lovibond & Lovibond, 1995) and the *Dimensional Obsessive-Compulsive Scale* (DOCS; Abramowitz et al., 2010). The DASS-21 is a valid and reliable measure of depression, anxiety, and stress in adults (Henry & Crawford, 2005). Respondents indicate the degree to which they experience symptoms ("I felt that I had nothing to look forward to") over the past week on a 4-point Likert scale (0 = "Did not apply to me at all" to 3 = "Applied to me very much, or most of the time"). The DOCS is a psychometrically valid 20-item questionnaire assessing the severity of four OCD symptom dimensions (contamination, responsibility for harm, unacceptable thoughts, and symmetry/ordering) over the past month. For each dimension, respondents rate: (a) time occupied by obsessions and rituals, (b) avoidance behavior, (c) associated distress, (d) functional interference, and (e) difficulty resisting the obsessions and compulsions, on a scale from 0 to 4.

To assess OC cognitive factors, parents completed the *Obsessional Beliefs Questionnaire* (OBQ-44; OCCWG, 2003, 2005) and the *Interpretation of Intrusions Inventory* (III-31; OCCWG, 2003, 2005). The OBQ-44 is a 44-item measure with three factor analytically derived subscales (responsibility and threat estimation [RT], perfectionism and certainty [PC], and the importance and control of thoughts [ICT]) and possesses adequate reliability and validity (OCCWG, 2005). Each item is rated on a Likert scale from 1 ("Disagree very much") to 7 ("Agree very much"). The III-31 is a psychometrically valid semi-idiographic questionnaire that asks respondents to identify their most upsetting or frequent intrusion (OCCWG, 2003, 2005). Participants then rate the strength of their appraisal ("I must regain control of this thought") when an intrusion, like the one specified, occurs from 0 ("I did not believe this idea at all") to 100 ("I was completed convinced this idea was true"). Total III-31 scores range from 0 to 3100.

The primary parent also completed the *Santa Clara Religious Faith Scale* (SCRFS; Plante & Boccaccini, 1997), which is a 10-item scale that provides a reliable and valid measure of one's strength of religiosity (e.g., "I look to my faith as providing meaning and purpose in my life"). Each item is rated on a Likert scale from 1 ("Strongly disagree") to 4 ("Strongly agree"). Children reported on their primary parent's degree of psychological control using the *Parental Psychological Control – Youth Self-Report* (PPC-YSR; Barber, 1996). This eight-item measure assesses the primary parent's invalidation of feelings, restriction of verbal expression, personal attack, and love withdrawal (e.g., "[My primary parent] would like to be able to tell me how to feel or think about things all the time"). Children rated each item on a Likert scale from 0 ("Not like him/her") to 3 ("A lot like him/her"). Psychometric analyses demonstrate adequate internal consistency for all 4 parent-child gender dyads (e.g., mother-daughter; father-son) and the measure converges with observational coding of psychological control (Barber, 1996).

2.3.4. Child OC features

Children completed the 44-item *Obsessional Beliefs Questionnaire-Child Version* (OBQ-CV), which possesses satisfactory psychometric properties (Coles et al., 2010). Although the OBQ-CV possesses the same three subscales (RT, PC, and ICT) as the adult version, the Likert scale differs. Children rate each item (e.g., "If I'm not super careful, I will have a bad accident or cause a bad accident") from 1 ("Disagree very much") to 5 ("Agree very much"). To assess OCS, children completed the psychometrically valid Obsessive Compulsive Inventory – Child Version (OCI-CV; Foa et al., 2010). The 21-items (e.g., "I get upset if my stuff is not in the right order") are rated on 3-point scale (0 = "Never" to 2 = "Always") and yields six subscales (checking/doubting, obsessing, washing, hoarding, ordering, neutralizing), as well as a total score.

To measure *children's interpretation biases*, we conducted an in vivo thought induction, which is a safe method for studying obsessional phenomena within the laboratory (Berman et al., 2011; Berman, Calkins, et al., 2013). First, children completed a one-minute neutral discussion with the experimenter about what they ate. Children then rated their degree of anxiety from 0 ("Not at all anxious") to 100 ("Extremely anxious"). Next, children identified a beloved relative and wrote that person's name on an index card in black ink. Children were then presented with a template for a developmentally-appropriate intrusion: "I will physically hurt {beloved relative} even though I don't want to" and were asked to insert their relative's name into the intrusion. Participants were asked to think about this event occurring for 30 s and then to read the intrusion aloud. Children subsequently rated: (1) degree of anxiety (on the same 0 – 100 scale), (2) likelihood of the event occurring because he or she thought about it (0 = "Not at all likely" to 100 = "Extremely likely"), and (3) the moral wrongness of thinking about this event occurring (0 = "Not at all morally wrong" to 100 = "Extremely morally wrong"). Children's likelihood and moral wrongness ratings operated as two separate interpretation bias indices (Berman et al., 2011) and their rating of anxiety operated as the manipulation check.

2.4. Data analytic plan

First, frequencies, means, and standard deviations were calculated. Subsequent analyses examined associations between parent risk factors and children's: (a) obsessive beliefs, (b) maladaptive interpretations, and (c) OCS severity. Given the number of repeated tests necessary to evaluate our research question, we used the total score for both parent (DOCS) and children's (OCI-CV) OCS severity and excluded OC subtypes in further analyses.

We conducted preliminary zero-order correlations to examine the inter-relationships among parent risk factors and children's OC features. Given that zero-order correlations assume that observations are independent of one another, but children were nested within families, this

analytical approach could not be used to evaluate the relationship between parent risk factors and children's OC features. Paralleling the work of Clark, Cornelius, Wood, and Vanyukov (2004), all following analyses controlled for the nested data structure by conducting univariate and multivariate mixed-effect linear regression models with a random intercept for family unit. Our univariate models tested whether each parent risk factor influenced the aforementioned outcome variables. To control for type I error, we applied the False Discovery Rate (FDR) to interpret univariate analyses (Benjamini & Hochberg, 1995).

Accounting for past research demonstrating the influence of children's age on obsessive beliefs and symptoms (Coles et al., 2010; Farrell et al., 2012), this demographic variable was included as a univariate predictor. Given that the effect of children's age on outcome variables was based upon an *a priori* hypothesis, the FDR adjustment was not applied to this predictor. Significant univariate predictors ($p < .05$ after FDR adjustment for all parent risk factors and $p < .05$ without FDR adjustment for child's age) were subsequently entered as predictors in a multivariate model. Lastly, we estimated the variance explained (R^2) by each multivariate mixed-effects model by first subtracting the sum of the variance components of the intercept-only model from the variance components (i.e., family variance plus residual variance) from the full model. This value was then divided by the sum of the variance components of the intercept-only model, while holding the variance of the family term equal to that estimated in the full model.

3. Results

3.1. Descriptive statistics

Table 3 reports descriptive statistics for the parent risk factors and children's OC features. On average, the severity of parents' psychiatric symptoms (depression, anxiety, stress, and OC), obsessive beliefs, and maladaptive interpretations were consistent with those reported by community samples (Abramowitz et al., 2010; Lovibond & Lovibond, 1995; OCCWG, 2005). The strength of parents' religiosity was moderate and consistent with reports by university students and civic group members (Plante & Boccaccini, 1997). Children's obsessive beliefs approximated reports by children who have a diagnosis of OCD (Coles et al., 2010). For the in vivo ratings, children's likelihood estimates paralleled those reported by undergraduates who were asked to think about a loved one being in a car accident (Berman et al., 2011); whereas children's ratings of moral wrongness were substantially higher than college students (Berman et al., 2011). Moreover, supporting the validity of this paradigm, a paired samples *t*-test demonstrated that participants' subjective anxiety rating increased significantly from the neutral discussion to the in vivo thought induction ($t(44) = -2.06$, $p < .05$). Lastly, the severity of children's OCS was less than children who met diagnostic criteria for OCD (Foa et al., 2010).

3.2. Zero-order correlations among parent risk factors and child OC features

Many parent risk factors were positively associated with one another (see Table 4). Expectedly, all subscales of the DASS-21 were positively and significantly related; however, only the anxiety and stress subscale possessed a meaningful relationship with the DOCS total score (*r*'s range from .33 to .68). The subscales of the OBQ-44 possessed moderate to strong positive relationships with one another (*r*'s range from .53 to .78) and the importance/control subscale of the OBQ-44 was significantly associated with parents' OCS severity. Parents who appraised their intrusions as threatening (III-31 total score) also reported greater obsessive beliefs (all subscales; *r*'s range from .33 to .51), more severe OCS, and elevated anxiety and stress symptoms (*r*'s range from .41 to .47). Parents' psychological control and religiosity both possessed a significant and positive relationship with parents' OCS severity (*r*'s range from .31 to .42) and neither was related to OBQ-44 subscales or the III-31 total score (all *p*'s > .05).

Table 3
Descriptive statistics for parent-level risk factors and child OC features.

Parent Risk Factors	*M (SD)*	Range
DASS-21 Depression	1.37 (2.18)	0–9
DASS-21 Anxiety	.66 (1.33)	0–6
DASS-21 Stress	2.48 (2.43)	0–9
OBQ-44 RT	37.78 (15.91)	16–68
OBQ-44 PC	40.03 (17.33)	16–77
OBQ-44 ICT	23.63 (12.43)	12–55
SCRFS Total	25.11 (9.23)	10–40
DOCS-C	.70 (1.10)	0–4
DOCS-R	1.18 (1.88)	0–6
DOCS-T	1.11 (1.84)	0–7
DOCS-S	1.44 (2.33)	0–7
DOCS Total	4.44 (5.62)	0–20
III-31 Total	390.48 (407.97)	10–1544
PPC Total	10.98 (3.10)	8–23
Child OC Features		
OBQ-CV-RT	40.58 (12.62)	16–71
OBQ-CV-PC	38.00 (12.91)	16–71
OBQ-CV-ICT	23.37 (7.68)	12–40
In Vivo Likelihood	11.83 (19.16)	0–50
In Vivo Moral Wrongness	51.40 (35.30)	0–100
OCI-CV-Checking[a]	.36 (.41)	0–1.80
OCI-CV-Obsessing[a]	.52 (.45)	0–1.50
OCI-CV-Washing[a]	.17 (.31)	0–1.33
OCI-CV Hoarding[a]	.55 (.53)	0–2.00
OCI-CV-Ordering[a]	.51 (.44)	0–1.67
OCI-CV Neutralizing[a]	.17 (.27)	0–1.00
OCI-CV-Total	7.75 (5.94)	0–21

Abbreviations: DASS-21 = Depression, Anxiety, and Stress Scale; OBQ-44 = Obsessional Beliefs Questionnaire; RT = Responsibility/Threat subscale; PC = Perfectionism/Certainty subscale; ICT = Importance/Control of Thoughts subscale; SCRFS = Santa Clara Religious Faith Scale; DOCS = Dimensional Obsessive Compulsive Scale; DOCS – C = Contamination subscale; DOCS – R = Responsibility for Harm subscale; DOCS-T = Unacceptable Thoughts subscale; DOCS-S = Symmetry/Order subscale; III-31 = Interpretation of Intrusions Inventory; PPC = Parent Psychological Control; OBQ-CV = Obsessional Beliefs Questionnaire Child Version (subscales are identical to the OBQ-44); OCI-CV = Obsessive Compulsive Inventory Child Version.

[a] OCI-CV subscale descriptives reflect average item scores.

Paralleling parent data, all child obsessive belief subscales (OBQ-CV) possessed moderate to strong positive associations with one another (*r*'s range from .45 to .72). Moreover, children who reported elevated RT and PC beliefs also endorsed greater OCS severity (OCI-CV total score). Lastly, children's in vivo ratings of likelihood and moral wrongness were not significantly related to each other.

3.3. Prediction of obsessive beliefs

The univariate associations between parent risk factors and children's obsessive beliefs are presented on the left in Table 5 and the multivariate statistical model that includes significant parent risk factors following FDR adjustment are presented on the right of Table 5. Of note, univariate and multivariate models included a random intercept for family unit. In the prediction of children's RT beliefs, parents' depression and stress severity, as well as degree of parental psychological control remained statistically significant following adjustment. In the multivariate model, parents' depression and psychological control emerged as unique predictors and accounted for 37.14% of variance in RT beliefs.

In the prediction of children's PC beliefs, children's age, as well as parents' stress and psychological control emerged as significant in univariate analyses following adjustment. In the multivariate model, parents' stress and age emerged as unique predictors of children's PC beliefs, with psychological control trending towards significance ($p = .06$). The final model accounted for 27.01% of variance in PC beliefs. Children's ICT beliefs were only predicted by parents' strength

Table 4
Zero-order correlations among parent-level risk factors and children's OC features.

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Parent Risk Factor															
1. DASS-21 Depression	**.55**[c]	**.44**[c]	.22	**.31**[a]	.06	− .08	.11	.17	.07	**.40**[b]	**.29**[a]	− .16	**.30**[a]	− .26	**.38**[b]
2. DASS-21 Anxiety	–	**.57**[c]	.18	.26	.22	− .24	**.33**[a]	**.41**[b]	.19	.23	.23	− .14	**.40**[b]	− .05	.26
3. DASS-21 Stress	–	–	.08	.16	**.31**[a]	.17	**.68**[c]	**.47**[c]	**.39**[b]	**.46**[c]	**.37**[b]	.12	.14	− **.35**[a]	**.29**[a]
4. OBQ-44 RT	–	–	–	**.78**[c]	**.53**[c]	− .17	.26	**.50**[c]	− .14	− .06	− .05	− .23	**.55**[c]	− .13	.006
5. OBQ-44-PC	–	–	–	–	**.65**[c]	− .07	.28	**.51**[c]	− .05	.07	.05	− .05	**.37**[b]	− .12	.08
6. OBQ-44-ICT	–	–	–	–	–	.07	**.29**[a]	**.33**[a]	− .06	.09	.11	.12	**.31**[a]	− .10	.04
7. SCRFS Total	–	–	–	–	–	–	**.42**[b]	.24	.20	.20	− .09	**.36**[b]	− .09	− .22	− .08
8. DOCS Total	–	–	–	–	–	–	–	**.74**[c]	**.31**[a]	.29	.12	.20	.15	− **.32**[a]	.01
9. III-31 Total	–	–	–	–	–	–	–	–	.08	.08	− .09	− .04	**.51**[c]	− **.35**[a]	.02
10. PPC Total	–	–	–	–	–	–	–	–	–	**.51**[c]	**.36**[b]	**.29**[a]	− .13	− .02	**.49**[c]
Child OC Features															
11. OBQ-CV-RT	–	–	–	–	–	–	–	–	–	–	**.72**[c]	**.67**[c]	.15	− .13	**.54**[c]
12. OBQ-CV-PC	–	–	–	–	–	–	–	–	–	–	–	**.45**[c]	− .04	.14	**.50**[c]
13. OBQ-CV-ICT	–	–	–	–	–	–	–	–	–	–	–	–	− .09	.08	.20
14. In Vivo Likelihood	–	–	–	–	–	–	–	–	–	–	–	–	–	.03	.21
15. In Vivo Moral	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.005
16. OCI-CV Total	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Bold values reflect significance at $p < .05$. Abbreviations: DASS-21 = Depression, Anxiety, and Stress Scale; OBQ-44 = Obsessional Beliefs Questionnaire; RT = Responsibility/Threat subscale; PC = Perfectionism/Certainty subscale; ICT = Importance/Control of Thoughts subscale; SCRFS = Santa Clara Religious Faith Scale; DOCS = Dimensional Obsessive Compulsive Scale; III-31 = Interpretation of Intrusions Inventory; PPC = Parent Psychological Control; OBQ-CV = Obsessional Beliefs Questionnaire Child Version (subscales are identical to the OBQ-44); OCI-CV = Obsessive Compulsive Inventory Child Version.

[a] $p < .05$.

[b] $p < .01$.

[c] $p < .001$.

of religiosity following adjustment. Given the singular predictor, no multivariate analysis was conducted. The final model accounted for 10.70% of variance in ICT beliefs. VIFs were less than two in all models, demonstrating that multicollinearity was not an issue. Parents' OBQ-44, III-31 and DOCS scores did not emerge as significant predictors of any child obsessive belief subscales following adjustment.

3.4. Prediction of interpretation biases and OCS severity

As seen in Table 6, parents' anxiety severity, responsibility/threat beliefs (OBQ-44 RT), and misappraisal of intrusions (III-31 total score) emerged as significant predictors of children's in vivo likelihood ratings following adjustment. In the multivariate model, parents' anxiety and RT beliefs emerged as significant predictors. Together, these parent risk factors accounted for 43.51% of variance in children's in vivo likelihood estimates. In the prediction of children's moral wrongness ratings, univariate analyses indicated that neither child age nor any other parental risk factor were significant. Given the absence of significant predictors, these univariate models are not included in Table 6. Lastly, in the prediction of children's OCS severity, parents' depression severity and psychological control emerged as significant in univariate analyses following adjustment. When compared against one another, both factors remained significant in the multivariate model. These two predictors accounted for 31.44% of variance in children's OCS severity. Akin to the models predicting obsessive beliefs, VIFs were less than two for each model, indicating that multicollinearity was not a concern.

4. Discussion

The current study evaluated associations between parents' and children's obsessive beliefs, interpretation biases, and OCS and the degree to which theoretically relevant parenting factors (e.g., depression symptoms) influence youth's OC features. Most notably, results suggest that associations between parents' and children's beliefs, interpretations, and symptoms are not domain-specific; rather, certain parent factors, such as psychological control, seem to operate as general vulnerability factors for children's OC features. Importantly, our significant multivariate models explained up to 43.5% of the variance in children's OC features, which is comparable to recent heritability estimates of OCD (see Pauls, 2010 for a review). Taken together, our findings demonstrate the relevance of parent risk factors for children's OC features, and the potential benefit of targeting these modifiable characteristics in both prevention and treatment efforts. To interpret our pattern of results, we will separately discuss the observed relationship between each parenting factor and children's OC features through the lens of learning theory.

4.1. Parental psychopathology

Findings from this multi-modal and multi–informant study mirror past research demonstrating that parental psychological factors operate as robust risk factors for psychopathology in youth (e.g., Goodman et al., 2011; Weissman et al., 2006). Accordingly, parental depression, anxiety, and stress influenced all three levels (i.e., beliefs, interpretations, and symptoms) of children's OC features. More specifically, parents' elevated *depression* symptoms were associated with more severe RT beliefs and OCS in children; parents' heightened *stress* levels were associated with greater PC beliefs in youth; and parents' RT beliefs and *anxiety* symptoms positively predicted children's maladaptive interpretation biases.

In line with past research, parental depression may impart its effect upon children's OC features through maladaptive parenting practices, such as modeling ineffective coping and limited use of praise or positive attention (Compas et al., 2010; McKee et al., 2014). For example, by responding to neutral stimuli in an avoidant manner (e.g., refusing to answer the phone), parents model maladaptive cognitive and behavioral responses, which serve as a template for children's future action (e.g., compulsive avoidance; Bandura, 1977; Chorpita & Barlow, 1998; Field, 2006;). Parents may then inadvertently reinforce children's emerging pathology by attending more to their maladaptive coping responses (i.e., differential attention; Sajwaj & Dillon, 1977). Likewise, increased parental stress, characterized by limited attention and depleted cognitive and emotional resources, may overwhelm the demands of parenting (Abidin, 1990) and interfere in modeling adaptive coping skills. Moreover, parents with higher stress levels may inconsistently respond to youth's daily demands (Abidin, 1990), yielding heightened

Table 5
Univariate and multivariate models predicting children's obsessive beliefs.

Study Variables	Univariate model					Multivariate Model			
	B	SE	*t*	Unadjusted *p*	FDR Adjusted *p*	*B*	SE	*t*	*p*
OBQ-RT									
Child Age	− .02	.61	− .03	.98	–				
DASS-21 Depression	2.18	.82	2.66	.01	.03	1.57	.70	2.24	.03
DASS-21 Anxiety	2.02	1.69	1.20	.24	.48				
DASS-21 Stress	2.41	.73	3.28	.004	.02	.91	.74	1.23	.22
OBQ-44 RT	.03	.13	.25	.80	.80				
OBQ-44-PC	.12	.13	.98	.34	.48				
OBQ-44-ICT	.14	.18	.76	.46	.57				
SCRFS Total	.22	.22	1.01	.33	.48				
DOCS Total	.66	.36	1.79	.09	.22				
III-31 Total	.002	.005	.44	.66	.73				
PPC Total	1.96	.52	3.81	> .001	> .001	1.72	.51	3.34	.002
OBQ-PC									
Child Age	1.45	.59	2.44	.01	–	1.56	.54	2.90	.006
DASS-21 Depression	1.63	.86	1.89	.07	.23				
DASS-21 Anxiety	2.10	1.67	1.26	.21	.52				
DASS-21 Stress	2.00	.79	2.53	.01	.05	1.57	.74	2.14	.04
OBQ-44 RT	.01	.133	.08	.93	.93				
OBQ-44-PC	.08	.12	.68	.50	.65				
OBQ-44-ICT	.15	.18	.84	.40	.65				
SCRFS Total	− .14	.22	− .64	.52	.65				
DOCS Total	.33	.38	.87	.39	.65				
III-31 Total	− .002	.005	− .51	.61	.67				
PPC Total	1.41	.57	2.47	.01	.05	1.08	.56	1.92	.06
OBQ-ICT									
Child Age	− .43	.37	− 1.15	.25	–				
DASS-21 Depression	− .54	.50	− 1.07	.30	.55				
DASS-21 Anxiety	− .98	.99	− .98	.33	.55				
DASS-21 Stress	.35	.49	.71	.48	.6				
OBQ-44 RT	− .11	.07	− 1.62	.11	.36				
OBQ-44-PC	− .009	.07	− .13	.90	.90				
OBQ-44-ICT	.09	.11	.80	.43	.60				
SCRFS Total	.27	.11	2.78	.001	.01	.27	.11	2.78	.001
DOCS Total	.27	.21	1.32	.20	.50				
III-31 Total	− .009	.003	− .27	.79	.88				
PPC Total	.71	.35	2.05	.05	.25				

Abbreviations: DASS-21 = Depression, Anxiety, and Stress Scale; OBQ-44 = Obsessional Beliefs Questionnaire; RT = Responsibility/Threat subscale; PC = Perfectionism/Certainty subscale; ICT = Importance/Control of Thoughts subscale; SCRFS = Santa Clara Religious Faith Scale; DOCS = Dimensional Obsessive Compulsive Scale; III-31 = Interpretation of Intrusions Inventory; PPC = Parent Psychological Control; OBQ-CV = Obsessional Beliefs Questionnaire Child Version (subscales are identical to the OBQ-44).

uncertainty in their children. As a result of children's uncertainty regarding their parents' responses, offspring may develop a heightened sense of responsibility (e.g., "It is up to me to make sure things go OK") and threat perception (e.g., "If I can't handle this on my own, something bad will happen"). In fact, research has demonstrated the positive relationship between parents' stress level and children's development of maladaptive coping strategies (e.g., Podolski & Nigg, 2001).

Through a similar developmental pathway, parents may model their obsessive beliefs and anxiety symptoms through verbal and behavioral cues, yielding interpretation biases in children. Notably, both of these parent predictors are characterized by exaggerated threat perception (Lovibond & Lovibond, 1995; OCCWG, 2005). Therefore, it is not surprising that a child who observes her parent interpret neutral situations catastrophically will adopt this cognitive profile (Alloy et al., 2004). Moreover, through learning generalization (Gluck, Mercado, & Myers, 2014), children may extend this interpretive bias to internal stimuli. Specifically, when a child is confronted with an innocuous intrusive thought, he may perceive the feared outcome to be dangerous and feel greater responsibility over its occurrence.

4.2. Religiosity

Parent religiosity positively predicted children's ICT beliefs, paralleling previous research in adults (Berman et al., 2010; Berman, Wheaton, Abramowitz, 2013). This extends past work by demonstrating that religiosity not only influences parents' own obsessive beliefs (Berman et al., 2014; Salkovskis et al., 1999), but also their children's. In line with learning theory, this transmission may occur verbally through parent-child dialogues regarding "impure" thoughts. For instance, if a child discloses an intrusive thought to his mother (e.g., "I have thoughts about being gay that don't make sense") that conflicts with her religious beliefs, she may respond with alarm or punishment, leading to the development of a belief that "impure" thoughts are wrong and should be controlled. Additionally, this mechanism of transmission may occur through behavioral modeling. For example, if a child observes her father say something blasphemous (e.g., Lord's name in vain) and then witnesses him compensate (e.g., overt religious ritual), she may learn that "taboo" thoughts are significant and should be avoided (or neutralized) at all costs. The association between parents' religiosity and children's obsessive thinking may be moderated by the family's religious affiliation (as would be expected given past research; Berman, Wheaton, et al., 2013; Siev & Cohen, 2007); however, we were not sufficiently powered to conduct such analyses.

4.3. Child age

Results indicated that age was positively associated with the severity of children's PC beliefs. Although this age effect is unlikely to exert its influence in isolation, it is possible that the increased academic and future-oriented demands placed upon older children precipitated

Table 6
Univariate and multivariate models predicting interpretation biases and OC symptoms.

Study Variables	Univariate model					Multivariate Model			
	B	SE	*t*	Unadjusted *p*	FDR Adjusted *p*	*B*	SE	*t*	*p*
In Vivo Likelihood									
Child Age	− .40	.99	− .41	.68	–				
DASS-21 Depression	2.43	1.17	2.08	.04	.08				
DASS-21 Anxiety	6.56	2.31	2.83	.009	.03	4.50	2.01	2.23	.03
DASS-21 Stress	1.42	1.32	1.08	.29	.36				
OBQ-44 RT	.67	.15	4.66	> .001	> .001	.49	.16	3.02	.004
OBQ-44-PC	.39	.17	2.33	.05	.08				
OBQ-44-ICT	.55	.25	2.16	.04	.08				
SCRFS Total	− .14	.32	− .44	.67	.67				
DOCS Total	.77	.57	1.34	.20	.28				
III-31 Total	.03	.007	3.84	.001	.005	.008	.007	1.02	.31
PPC Total	− .75	.92	− .82	.42	.47				
OCI-CV Total									
Child Age	.39	.31	1.29	.21	–				
DASS-21 Depression	.94	.35	2.70	.01	.05	.82	.31	2.63	.01
DASS-21 Anxiety	1.30	.73	1.77	.08	.20				
DASS-21 Stress	.70	.36	1.95	.06	.20				
OBQ-44 RT	.002	.06	.04	.97	.97				
OBQ-44-PC	.03	.06	.52	.61	.97				
OBQ-44-ICT	.02	.09	.27	.79	.97				
SCRFS Total	− .004	.09	− .05	.96	.97				
DOCS Total	.01	.16	.09	.92	.97				
III-31 Total	.0003	.002	.14	.89	.97				
PPC Total	1.01	.27	3.69	.001	.01	.92	.26	3.59	.001

Abbreviations: DASS-21 = Depression, Anxiety, and Stress Scale; OBQ-44 = Obsessional Beliefs Questionnaire; RT = Responsibility/Threat subscale; PC = Perfectionism/Certainty subscale; ICT = Importance/Control of Thoughts subscale; SCRFS = Santa Clara Religious Faith Scale; DOCS = Dimensional Obsessive Compulsive Scale; III-31 = Interpretation of Intrusions Inventory; PPC = Parent Psychological Control; OCI-CV = Obsessive Compulsive Inventory Child Version.

their difficulties tolerating uncertainty (Barahmand, 2008). This finding conflicts with past research. Coles and colleagues (2010) reported that older (ages 13–18) and younger (ages 8–12) children's obsessive beliefs did not significantly differ, whereas Farrell and colleagues (2012) found that maternal cognitive biases positively predicted OCS in young children (ages 7–11) and negatively predicted OCS for adolescents (ages 12–17). The discrepancy among past and current findings may be attributable to different age cut-offs for child vs. adolescent groups and dichotomizing age. Dichotomizing continuous variables reduces power (e.g., MacCallum, Zhang, Preacher, & Rucker, 2002), and therefore considering age as a continuous variable, as done in the current study, may increase the likelihood of detecting a true effect.

4.4. Psychological control

Psychological control emerged as a strong predictor of multiple child obsessive belief domains and OCS severity. Parents' attempts to manage children's internal phenomena may lead youth to believe that uncomfortable psychological experiences are outside of their control, thus yielding maladaptive beliefs ("I can't cope with distress") that are foundational to internalizing conditions (e.g., Chorpita & Barlow, 1998). More specific to OCD, when parents excessively control children's internal experiences ("don't think that thought"), children may learn to interpret triggers (e.g., intrusive thoughts) to be inherently dangerous and assume they are incapable of managing distress independently (e.g., Haugh, Miceli, & DeLorme, 2017). Given that parents cannot be omnipresent, children's deficit in autonomous regulation may facilitate reliance upon short-term solutions (e.g., rituals) to reduce emotional distress.

Aligning with recent evidence that maternal psychological control is positively associated with child-reported depression (Frazer & Fite, 2016; Rakow et al., 2009) and anxiety (El-Sheikh, Hinnant, Kelly, & Erath, 2010), results suggest that this parenting strategy may be a general risk factor for child psychopathology. Therefore, targeting this modifiable construct may provide a parsimonious approach to reducing (or preventing) children's OC features, as well as co-occurring anxiety and depression. In fact, reducing parental guilt induction – a form of psychological control – decreased children's maladaptive cognitive processes and internalizing symptoms in a sample of at-risk youth (i.e., parent with depression; McKee et al., 2014).

4.5. Other parent-level effects

In our sample, parent obsessive beliefs, interpretation biases, and OCS were not significantly associated with children's obsessive beliefs or OCS, contributing to the mixed literature. Some studies suggest a direct association of parental OC features to children (e.g., Pietrafesa et al., 2010); whereas others suggest that transmission is more nuanced, with maternal anxiety broadly impacting parenting and, consequently, child psychopathology (e.g., Farrell et al., 2012). In fact, in our sample, parents' depression emerged as a more meaningful predictor of children's OC features, compared to parents' obsessive beliefs, interpretation biases, or OCS.

None of the parent risk factors predicted children's moral biases. Although the lack of predictors may be attributable to measurement invariance (i.e., nomothetic self-report measures predicting idiographic performance on a behavioral index), this pattern of findings does align with the literature. Berman and colleagues (2013) demonstrated that the moral bias possesses unique developmental predictors, when compared to other OC interpretation biases. Moreover, the moral bias has been shown to be more strongly associated with depressive, rather than obsessional, processes (Abramowitz, Whiteside, Lynam, & Kalsy, 2003; Rassin, Merckelbach, Muris, & Schmidt, 2001), therefore, measuring risk factors for depression (e.g., Kane & Garber, 2004) may identify the developmental precursors to an inflated sense of moral wrongness.

4.6. Limitations and future directions

Findings should be considered in the context of several limitations. First, participants spanned the spectrum of severity and we only relied upon the primary parent's report, which limits generalizability. Although obsessional processes occur across a continuum, parents with

more severe OCS may overtly model maladaptive behaviors within the home (e.g., demanding that children shower when they come home) yielding more pervasive transmission. Second, despite controlling for heritability by only recruiting biological children, our study did not measure psychiatric genetic indices. Indeed, recent animal research indicates that parental fear responses can be transmitted to offspring via epigenetics (Dias & Ressler, 2014), underscoring how environmental information can be encoded at the genetic level. Moreover, children may be genetically predisposed to develop cognitive biases, which aligns with past research demonstrating that unaffected family members of a proband with OCD possess similar neuropsychological deficits (e.g., executive functioning) when compared to the general population (i.e., cognitive endophenotype; Viswanath, Reddy, Kumar, Kandavel, & Chandrashekar, 2012). Accordingly, omitting neuropsychological and biological measures impeded a comprehensive examination of the pathogenesis of OC phenomena in youth.

Third, the cross-sectional design precludes conclusions regarding causation. In fact, the causal pathway may be reversed. Children's obsessive beliefs or OCS may trigger a stress response in parents (e.g., Raposa, Hammen, & Brennan, 2011), which behaviorally manifests as psychological control. Given past developmental psychopathology research, it is likely that these effects are reciprocal (Rapee et al., 2009). Fourth, our analytic approach – univariate screen, application of FDR, hierarchical linear regression – prohibited several relevant predictors from reaching significance in the multivariate models. This conservative approach, along with our small sample size, also prevented an evaluation of interaction effects, which would more clearly elucidate the mechanisms by which effects occur (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001).

In light of these limitations, future research should recruit a larger sample, powered to detect mediators and moderators, integrate measures of psychiatric genetics, and prospectively follow children longitudinally (e.g., Alloy et al., 2004). Moreover, researchers should develop prevention programs (e.g., Timpano, Abramowitz, Mahaffey, Mitchell, & Schmidt, 2011) that target the parent-level risk factors that predict children's obsessive beliefs (e.g., depression and psychological control). Given previous research demonstrating that obsessive beliefs prospectively predict the emergence of OCS (e.g., Abramowitz et al., 2006), these prevention programs, if efficacious, could inhibit the emergence of OCS in youth.

In conclusion, the current study highlights several modifiable parent characteristics that are positively associated with children's obsessive beliefs, interpretation biases, and OCS. Aligning with past research (e.g., Compas et al., 2009), parental depression, stress, and psychological control continue to represent salient targets for family prevention efforts. Findings can inform the development of evidence-based prevention programs that target specific and measurable risk factors in order to alter the developmental trajectory of at-risk youth.

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Conflict of interest

All authors declare that they have no conflict of interest.

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