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Do you believe in magical thinking? Examining magical thinking as a mediator between obsessive-compulsive belief domains and symptoms

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Abstract

Background: Despite substantial research attention on obsessive beliefs, more research is needed to understand how these beliefs serve as aetiological or maintaining factors for obsessive-compulsive (OC) symptoms. Magical thinking may allow individuals to gain a sense of control when experiencing intrusive thoughts and corresponding obsessive beliefs, potentially accounting for why OC belief domains are often related to OC symptoms.
Aims: This study examines magical thinking as a mediating variable in the relationship between OC belief domains and symptoms.
Method: Undergraduate students ($n = 284$) reported their obsessive beliefs, magical thinking, and OC symptoms.
Results: As expected, there were significant indirect effects for the belief domain of inflated responsibility and over-estimation of threat on OC symptoms via magical thinking. There was also an indirect effect for the belief domain of importance and control of thoughts on OC symptoms via magical thinking. Unexpectedly, there was no indirect effect involving the belief domain of perfectionism and intolerance of uncertainty.
Conclusions: Magical thinking may be one mechanism through which certain OC beliefs lead to OC symptoms. It may be that magical thinking serves as a coping mechanism in response to elevated beliefs. Future studies should extend these findings across time and clinical samples.

Keywords: coping mechanisms; magical thinking; obsessive beliefs; obsessive-compulsive symptoms

Introduction

Cognitive theories of obsessive-compulsive disorder (OCD) posit that intrusive thoughts are experienced by most healthy individuals without significant distress or impairment, and suggest that it is the dysfunctional interpretation of such thoughts that results in obsessive-compulsive (OC) symptoms (Rachman, 1997; Salkovskis, 1999). The three most prominent belief domains that have been linked to OC symptoms include: responsibility and threat over-estimation (responsibility/threat), or the belief that one has the ability to cause or prevent negative outcomes that are perceived to be severe and probable; perfectionism and intolerance of uncertainty (perfectionism/certainty), or the belief that perfection is achievable and necessary and that uncertainty is threatening and unsafe; and importance and control of thoughts (importance/control of thoughts), or the belief that mental events are morally, psychologically and behaviourally important and that control of thoughts should be achieved [Obsessive

Compulsive Cognitions Working Group (OCCWG), 1997, 2005]. Each belief domain has been found to predict specific OC symptoms, including sexual and religious obsessions, washing, checking, doubting and ordering (among others), although these links have been inconsistently supported (Brakoulias *et al.*, 2014; Cordeiro *et al.*, 2015; Myers *et al.*, 2008; Siev *et al.*, 2011; Wheaton *et al.*, 2010). While these belief domains are theorized to influence the interpretations and subsequent emotional consequences of intrusive thoughts (OCCWG, 1997), additional mediating factors are probably involved, given the inconsistency of the relationships (Mantz and Abbott, 2017).

One intriguing link between belief domains and OC symptoms may be magical thinking, which refers to beliefs about one's thoughts and behaviours being 'linked in a way that cannot be rationally explained by physical laws or culturally acceptable explanations' (Bocci and Gordon, 2007). While magical thinking may include religious or spiritual beliefs, it encapsulates a broad spectrum of beliefs, including beliefs in clairvoyance, luck, evil spirits' influential power, energy transfer, and other paranormal phenomena (Eckblad and Chapman, 1983). Thus, magical thinking is a broader construct than thought–action fusion, which refers to thoughts influencing the likelihood of events (e.g. thinking about a loved one dying in a plane crash increases the likelihood of it happening) or having a moral equivalence to actions (e.g. thinking about physically harming someone is no different from actually assaulting them; Amir *et al.*, 2001; Shafran *et al.*, 1996). OC beliefs may lead to higher levels of magical thinking due to magical thinking's likely function as a coping mechanism for handling uncontrollable situations (Moulding and Kyrios, 2006). Specifically, OC beliefs may spur greater perceptions of uncontrollability surrounding an intrusive thought, which then may be partially coped with using magical thinking. In turn, magical thinking may drive specific OCD-relevant responses (e.g. compulsions; Einstein and Menzies, 2004). For instance, belief in spirits may justify responding to threatening thoughts by engaging in neutralizing behaviours such as repeating a mantra believed to recruit the help of a particular spirit. Magical thinking may help explain why individuals with elevated obsessive beliefs have higher levels of OC symptoms across several key belief domains. In terms of responsibility/threat, studies have found a link with superstitious thinking, a closely tied construct to magical thinking (Frost *et al.*, 1993; Sica *et al.*, 2002). Similarly, responsibility/threat has been found to relate to paranormal beliefs (Yorulmaz *et al.*, 2011). Furthermore, it is plausible that people who over-estimate threats may be especially prone to engage in magical thinking because of its perceived ability to help cope with threats. Based on these ideas, we expected magical thinking to mediate the relationship between responsibility/threat and OC symptoms. For the other belief domains, there is also evidence to suggest that magical thinking may mediate the relationship between perfectionism/certainty and OC symptoms. Perfectionism/certainty has also been linked to paranormal beliefs (Yorulmaz *et al.*, 2011). Putting more stock into exerting control via magical thinking may minimize the impact of an uncertain, imperfect world. Thus, it is no surprise that increased magical thinking is linked to a number of uncertainty-filled activities, including gambling (Joukhador *et al.*, 2004), investing (Carlson *et al.*, 2009), and sporting events (Burger and Lynn, 2005). Lastly, in terms of the importance/control of thoughts belief domain, there seemed to be competing evidence for importance/control of thoughts and magical thinking as mediators of the other's relation to OC symptoms. For example, if one believes that one can use their thoughts to avoid bad luck (i.e. magical thinking), it may only impact OC symptoms according to their beliefs that thoughts may be responsible for determining the outcome of an event (importance/control of thoughts). However, believing that one's thoughts are important and must be controlled (importance/control of thoughts) may only result in OC symptoms to the extent that they believe their thoughts can be used to control outcomes (magical thinking). As a result, we made no predictions about that relationship and considered this test exploratory.

Method

Participants and procedure

Participants were undergraduates ($n = 284$; 62.3% female; mean age = 19.12 years; $SD = 1.07$; 76.4% White) at a large Midwestern university in the United States who participated for course credit as part of a larger study. All measures were approved by the institutional review board, and were administered in-person on a computer using Qualtrics software (Qualtrics, Provo, UT, USA; see Qualtrics, 2019).

Measures

Obsessional Beliefs Questionnaire-44 (OBQ-44; OCCWG, 2005)

The OBQ-44 measures three obsessive belief domains: responsibility/threat, perfectionism/ certainty, and importance/control of thoughts (OCCWG, 2005). Example items include 'When I see any opportunity to do so, I must act to prevent bad things from happening' (responsibility/threat), 'If I'm not absolutely sure of something, I'm bound to make a mistake' (perfectionism/certainty), and 'For me, having bad urges is as bad as actually carrying them out' (importance/control of thoughts). The OBQ-44 has been shown to have strong internal consistency, good criterion-related validity and convergent validity, and less evidence of discriminant validity (OCCWG, 2005). Cronbach's alpha values in the current study were .95 for the total scale, and for the subscales were .89 (responsibility/threat), .92 (perfectionism/ certainty) and .88 (importance/control of thoughts).

Illusory Beliefs Inventory (IBI; Kingdon et al., 2012)

The IBI was used to measure magical thinking (Kingdon *et al.*, 2012). In addition to providing a total score, the IBI consists of three subscales: Magical Beliefs, Spirituality, and Internal State and Thought Action Fusion. When calculating a total, we excluded the 'Internal State and Thought Action Fusion' subscale from our analyses to avoid redundancy between magical thinking and the belief domain already captured by the importance/control of thoughts subscale from the OBQ-44. This left the subscales of Magical Beliefs and Spirituality that we used to examine the construct of magical thinking. We found the same pattern of results when including the 'Internal State and Thought Action Fusion' subscale. There was an indirect effect of responsibility/threat and importance/control of thoughts on OC symptoms via magical thinking and no indirect effect for perfectionism/certainty. The remaining 19 items were used as a measure of magical thinking. Example items include 'Most things that happen to us are the result of fate' (Magical Beliefs) and 'There is an invisible force guiding us all' (Spirituality). The IBI has strong test–retest reliability and convergent validity, and acceptable levels of internal consistency (Kingdon *et al.*, 2012; Shihata *et al.*, 2014). Cronbach's alpha for the current study was .84.

Obsessive-Compulsive Inventory-Revised (OCI-R; Foa et al., 2002)

The OCI-R is an 18-item measure of six common categories of OC symptoms (Foa *et al.*, 2002). Example items include 'I check things more often than necessary' and 'I sometimes have to wash or clean myself simply because I feel contaminated'. The OCI-R has strong internal consistency, good test–retest reliability and convergent validity, and mixed evidence for discriminant validity that depends upon the relevant problem area (Abramowitz and Deacon, 2006; Foa *et al.*, 2002). Cronbach's alpha for the current study was .89.

Table 1. Means, standard deviations, and bivariate correlations

	Mean	SD	1	2	3	4
1. RT	57.13	15.56				
2. PC	61.07	17.48	.67**			
3. ICT	33.37	11.71	.65**	.56**		
4. IBI	67.10	13.64	.29**	.13*	.27**	
5. OCI-R	17.39	11.28	.55**	.42**	.42**	.36**

RT, responsibility/over-estimation of threat; PC, perfectionism/intolerance of uncertainty; ICT, importance/control of thoughts; IBI, Illusory Beliefs Inventory; OCI-R, Obsessive-Compulsive Inventory-Revised; *$p < .05$; **$p < .01$.

Analytic plan

For analyses, we conducted a series of mediation models using Model 4 of Hayes' PROCESS Macro (Hayes, 2017). To test our hypotheses, we examined the size and significance of the estimated indirect effect of OC beliefs on OC symptoms through magical thinking (i.e. an OC belief domain predicts magical thinking, which in turn predicts OC symptoms). Thus, our primary analysis tested three different mediation models, one for each belief domain. As a check on the directionality of the results, we conducted additional mediation analyses that switched the order of OC beliefs and magical thinking. In other words, these models examined the estimated indirect effect of magical thinking on OC symptoms through OC beliefs (i.e. magical thinking predicts the OC belief domains, which in turn predicts OC symptoms). We ran four models that tested both directions with the OC beliefs entered simultaneously. We ran three models with each obsessive belief domain entered as the independent variable, magical thinking as the mediating variable, OC symptoms as the outcome variable, and the other two beliefs entered as covariates. Finally, we ran a model with all three beliefs entered simultaneously as mediators of the relationship between magical thinking and OC symptoms. Each analysis was run with 10,000 bootstraps and with 95% confidence intervals. All variables were standardized.

Results

Table 1 displays the correlations among OC beliefs, magical thinking, and OC symptoms, as well as the means and standard deviations.

The indirect effects of OC belief domains on OC symptoms via magical thinking

Responsibility and threat over-estimation

We first examined the indirect effect of responsibility/threat on OC symptoms through magical thinking. As seen in Fig. 1, greater responsibility/threat predicted greater magical thinking [$\beta = .20$, $SE = .06$, CI (.09, .32), $p < .001$], and greater magical thinking predicted greater OC symptoms [$\beta = .18$, $SE = .05$, CI (.08, .28), $p < .001$]. Critically, as expected, there was a significant indirect effect of responsibility/over-estimation on OC symptoms through magical thinking [indirect effect = .04, CI (.01, .07), $P_M = .07$].

Perfectionism and intolerance of uncertainty

Unlike responsibility/threat, perfectionism/certainty did not predict magical thinking [$\beta = .06$, $SE = .06$, CI (−.06, .18), $p = .30$; see Fig. 2]. As before, greater magical thinking predicted greater OC symptoms [$\beta = .26$, $SE = .05$, CI (.16, .36), $p < .001$]. Contrary to our hypothesis, there was no indirect effect of perfectionism/certainty on OC symptoms through magical thinking [indirect effect = .02, CI (−.02, .06), $P_M = .04$].
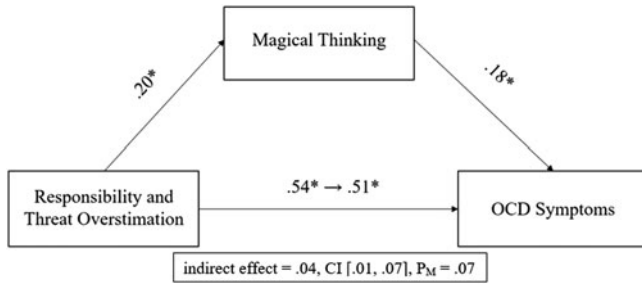
Figure 1. Magical thinking as a mediator of the relationship between responsibility and threat over-estimation and OC symptoms. Values represent standardized beta values. *$p < .001$.
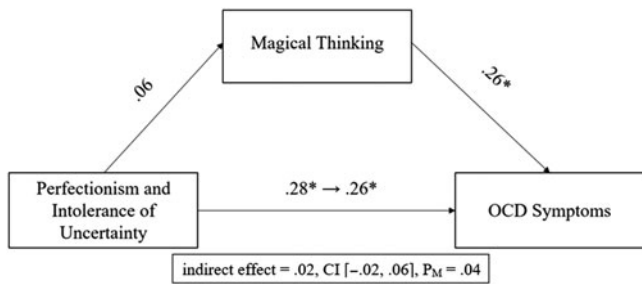

Figure 2. Magical thinking as a mediator of the relationship between perfectionism and intolerance of uncertainty and OC symptoms. Values represent standardized beta values. *$p < .001$.
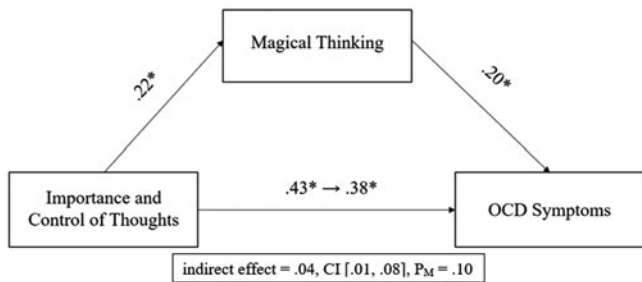

Figure 3. Magical thinking as a mediator of the relationship between importance and control of thoughts and OC symptoms. Values represent standardized beta values. *$p < .001$.

Importance and control of thoughts

As seen in Fig. 3, greater importance/control of thoughts predicted greater magical thinking [$\beta = .22$, $SE = .06$, CI (.10, .34), $p < .001$], and greater magical thinking predicted greater OC symptoms [$\beta = .20$, $SE = .05$, CI (.10, .31), $p < .001$]. For this domain which did not have a hypothesis, there was an indirect effect of importance/control of thoughts on OC symptoms through magical thinking [indirect effect = .04, CI (.01, .08), $P_M = .10$]. Thus, across the three beliefs domains we found indirect effects of responsibility/threat and importance/control of thoughts through magical thinking, but not perfectionism/certainty.

Finally, as a check on the directionality of the original models, we examined the three reversed models testing the indirect effects of magical thinking on OC symptoms via the three obsessive belief domains. We found significant indirect effects for the models examining responsibility/ threat [indirect effect = .10, CI (.04, .16), $P_M = .36$], and importance/control of thoughts [indirect effect = .08, CI (.03, .14), $P_M = .28$], as mediators, but not for perfectionism/certainty [indirect effect = .02, CI (−.03, .08), $P_M = .09$]. Thus, for both of the belief domains that had demonstrated indirect effects with magical thinking as a mediator, the same was true when

obsessive beliefs were the mediators. For the four simultaneous models, the results paralleled those listed above with the exception being that there was no indirect effect of importance/control of thoughts in the relationship between magical thinking and OC symptoms.

Discussion

In the present study, we evaluated whether magical thinking indirectly linked obsessive belief domains (responsibility/threat, perfectionism/certainty, and importance/control of thoughts) and OC symptoms, finding partial support for our hypotheses. There were indirect effects flowing through magical thinking for both responsibility/threat and importance/control of thoughts beliefs, supporting the idea that magical thinking may partially explain previous inconsistency in the relationship between OC beliefs and OC symptoms. These findings give credence to proposals that magical thinking may be used by individuals to maintain control (Moulding and Kyrios, 2006), given that individuals with higher responsibility/threat and importance/control of thoughts are prone to feeling less control (Moulding and Kyrios, 2007). Magical thinking did not mediate the relationship between perfectionism/certainty and OC symptoms and in fact was unrelated to perfectionism/certainty, which is somewhat surprising given past links between these constructs (Keinan, 1994; Yorulmaz *et al.*, 2011). Nevertheless, this finding is congruent with other work not finding a link between perfectionism and superstition (Sica *et al.*, 2002) in which the authors speculated that the OBQ may not fully capture the pathological side of perfectionism. For example, magical thinking may only be tied to perfectionism when perfectionism revolves around negative outcomes (Terry-Short *et al.*, 1995). In these cases, magical thinking would emerge due to a perceived function of preventing such outcomes. Belief in a higher power or in luck may be deemed advantageous when one feels limited capability to change their environment (Rothbaum *et al.*, 1982). Another possibility is that the link between perfectionism/certainty and magical thinking may not be linear. For example, Keinan (1994) found that uncertainty interacted with stress to predict even higher levels of magical thinking. Perhaps, environmental stressors play a pivotal role in predicting magical thinking. Future work should examine whether other risk factors explain the relationship between perfectionism/certainty and OC symptoms, and if any of the risk factors work in conjunction with magical thinking to heighten symptoms.

As part of our analyses, we also checked whether OC belief domains mediated the relationship between magical thinking and OC symptoms. While the current study aligned with past research by finding magical thinking to be a significant predictor of OC symptoms (Einstein and Menzies, 2004; Kingdon *et al.*, 2012), we found that magical thinking only accounted for a small portion of the association between both responsibility/threat and importance/control of thoughts, and OC symptoms. In contrast, the proportion of the total effect accounted for by responsibility/threat in the reversed model (i.e. 30%) was more substantial. Furthermore, all three of the OC belief domains we tested were robust predictors of OC symptoms, which is consistent with some past research and theory but is not always found (Freeston, Rhéaume, & Ladouceur, 1996; OCCWG, 2005; Salkovskis, 1985). Although causality cannot be determined due to the cross-sectional design, the direct and indirect effects we found largely support cognitive theories of OCD which emphasize the role of beliefs in leading to OC symptoms. It may be the case that believing that thoughts can subvert harm (i.e. magical thinking) leads to an inflated sense of responsibility, which in turn leads to neutralizing behaviour. In addition to the current mediation analyses, it will be important for future work to elucidate the extent to which OC beliefs are necessary for magical thinking to predict OC symptoms (i.e. do OC beliefs moderate the relationship between magical thinking and OC symptoms?), and to examine how their attenuation impacts the association between magical thinking and OC symptoms. Furthermore, more complicated models that include additional variables (e.g. stress, perceived

ability to cope) may increase our understanding of these relationships. For example, those who over-estimate threats may be especially prone to engage in magical thinking due to the elevated distress they may feel when over-estimating threats. Distress is commonly experienced when one's perceived ability to cope with a threat is diminished (Bandura, 1988; Wiedenfeld *et al.*, 1990) and magical thinking is a typical response to loss of control (Case *et al.*, 2004). Past research on Israelis under the threat of missile attacks during the Gulf War (i.e. a stressful and uncertain situation) found that they endorsed higher levels of magical thinking, particularly when their reported ability to tolerate the uncertainty was low (Keinan, 1994). Thus, magical thinking may be more likely used as a coping mechanism under stressful and uncertain situations, when an alternative coping mechanism is not seen as being viable (Rothbaum *et al.*, 1982).

While the cross-sectional design prohibits us from inferring causation for either directional model, it is interesting to consider these relationships for future, temporal tests. A bidirectional relationship may exist, in which increases in responsibility/threat lead to increases in magical thinking, and vice versa, with both magical thinking and responsibility/threat in turn leading to increases in OC symptoms. It also remains possible that OC beliefs, magical thinking and OC symptoms operate in a cyclical pattern. The non-occurrence of a feared outcome after OC symptom behaviours like neutralizing and/or checking may serve to reinforce the importance of controlling one's thoughts and magical thinking. Thus, future work should examine how these variables influence each other temporally. Additionally, the idiosyncratic nature of OC beliefs and symptomatology may be better captured by intra-individual approaches.

In addition to the cross-sectional design, other limitations deserve mentioning. First, we measured obsessive beliefs using the OBQ-44, which collapses six beliefs into three domains (OCCWG, 2005). As other work has suggested that some of these beliefs should be measured separately (e.g. Moulding *et al.*, 2011), it is possible that our results would have changed if we had tested our hypotheses with each individual belief. Second, we used an undergraduate sample that was fairly homogenous in terms of age and race. Future research should look to enhance the generalizability of these results by examining these variables in more racially and age diverse samples, as well as in different cultures and clinical samples.

Conclusion

The current study examined the relationship between OC belief domains, magical thinking, and OC symptoms. Limitations notwithstanding, this study found that the relationships between some OC belief domains and symptoms partially flow through magical thinking. If magical thinking is indeed as pernicious to the effectiveness of psychosocial interventions as has been suggested, then clarifying the directionality between magical thinking and different OC belief domains will be helpful in informing interventions (Einstein and Menzies, 2008; Freeston *et al.*, 1996).

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