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Manipulating beliefs about losing control causes checking behaviour

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ABSTRACT

Cognitive theories of obsessive-compulsive disorder (OCD) posit that maladaptive beliefs lead to the development of symptoms. However, psychometric studies have provided mixed evidence regarding whether beliefs about control over thoughts predict OCD symptoms above and beyond other obsessive beliefs. Clinical reports have documented concerns among those diagnosed with OCD regarding a potential loss of control over their thoughts *and behaviour*, indicating that broadening the scope of beliefs about control by integrating aspects of *losing control* may better explain their role in OCD. In this study, 133 undergraduate participants underwent a bogus EEG session and received (positive or negative) false feedback about the possibility that they may lose control over their thoughts and behaviour, and completed a task asking them to control the pace of pictures. As hypothesized, participants in the high (versus low) beliefs about losing control condition checked significantly more often which keys they should use to control the pictures, $t(106.95) = 2.28$, $p = .02$, $d = .44$, demonstrating that manipulating beliefs about control can impact checking behaviour when a potential loss of control is emphasized. Also, checking behaviour predicted a lower desire for control, such that compulsions may be seen as opportunities to re-establish disrupted control cognitions.

1. Introduction

Obsessive-compulsive disorder (OCD) is characterized by intrusive thoughts, images, or impulses (i.e., obsessions) and repetitive behaviour, mental acts, or rituals (i.e., compulsions), such as repeated washing and checking (American Psychiatric Association, 2013). OCD affects approximately 2.5% of the population (Angst, 1994; Karno, Golding, Sorenson, & Burnam, 1988) and has been listed as one of the top ten causes of disability worldwide (World Health Organization, 1999). Because changes in beliefs during cognitive-behaviour therapy (CBT) for OCD have been shown to be responsible for symptom reduction (e.g., Adams, Riemann, Wetterneck, & Cisler, 2012; Alcolado & Radomsky, 2016; O'Connor et al., 2005; Solem, Håland, Vogel, Hansen, & Wells, 2009; Wilhelm, Berman, Keshaviah, Schwartz, & Steketee, 2015; Woody, Whittal, & McLean, 2011), investigating the belief domains underlying the aetiology and maintenance of obsessions and compulsions has become increasingly important (e.g., Alcolado & Radomsky, 2011; Lind & Boschen, 2009; Obsessive Compulsive Cognitions Working Group, 1997, 2001, 2003, 2005). The aim of the current study was to broaden the conceptualization of beliefs about the need to control one's thoughts by expanding the focus to include beliefs about the possibility of losing control over one's thoughts and behaviour. Specifically, the causal relationship between beliefs about *losing control* and checking behaviour was assessed experimentally, as a way to further understand the role of dysfunctional beliefs in OCD symptomatology and, accordingly, to improve the efficacy of existing evidence-based psychological treatments.

Current cognitive theories of OCD posit that misinterpreting intrusive thoughts as overly significant leads individuals to engage in compulsive behaviour to prevent negative outcomes (e.g., Rachman, 1997, 1998, 2002; Salkovskis, 1985, 1999). Critically, specific maladaptive beliefs are thought to be responsible for these misappraisals of normal intrusive thoughts (Clark et al., 2014; Moulding et al., 2014; OCCWG, 1997, 2001, 2003, 2005; Radomsky et al., 2014). Early evidence for cognitive theory comes from experiments with manipulations of responsibility beliefs, showing that higher perceived responsibility causes increased discomfort, urges to check, and actual checking behaviour (e.g., Arntz, Voncken, & Goosen, 2007; Ladouceur, Rhéaume, & Aublet, 1997; Lopatka & Rachman, 1995; Shafran, 1997). Since then, several belief domains have been identified that play a role in the development and maintenance of OCD. These include three empirically-derived groups of beliefs related to OCD: beliefs about responsibility and threat overestimation, perfectionism and intolerance for uncertainty, and beliefs about the importance of and control over thoughts (OCCWG, 2005). Later, Alcolado and Radomsky (2011) provided support for the integration of negative beliefs about memory in cognitive models of OCD. Using a laboratory-based experimental

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paradigm, they showed that negative (versus positive) beliefs about memory confidence lead to increased urges to check. Similarly, Hermans et al. (2008) demonstrated the importance of other metacognitive beliefs in predicting repetitive checking, such as confidence in one's attention and perception.

OCD has also been theoretically conceptualized through notions of control (e.g., Carr, 1974; Clark & Purdon, 1993; McFall & Wollersheim, 1979; Reuven-Magril, Dar, & Liberman, 2008), and several authors have suggested that control cognitions are critical in OCD (e.g., Moulding & Kyrios, 2006; Moulding, Kyrios, Doron, & Nedeljkovic, 2009). For instance, Moulding and Kyrios (2007) have shown that one's *desire for control* (i.e., motivation to control a given outcome or situation; Burger & Cooper, 1979; Deci & Ryan, 2000; Harter, 1978; Skinner, 1995; White, 1959) and one's *sense of control* (i.e., perceived level of control over a given outcome or situation; Skinner, 1996) were tightly linked with obsessive-compulsive symptoms. In a community sample, they found that tendencies toward a higher desire for control and a lower sense of control were associated with greater obsessive-compulsive symptoms, and this was then replicated in a clinical sample of individuals diagnosed with OCD (Moulding, Doron, Kyrios, & Nedeljkovic, 2008). Thus, it has been posited that a "control mismatch"—when one's perceived level of control does not match the desired level of control—could be partly responsible for OCD symptoms (Gelfand & Radomsky, 2013; Moulding & Kyrios, 2007; Moulding et al., 2008), such that a desire to re-establish one's sense of control over anxiety-provoking events could motivate compulsions (Radomsky & Rachman, 2004; Reuven-Magril et al., 2008).

As mentioned above, cognitive theories and empirical investigations have instead placed great emphasis on *beliefs about control over thoughts* (e.g., OCCWG, 1997, 2001, 2003, 2005; Purdon & Clark, 2002; Tolin, Woods, & Abramowitz, 2003) or, in other words, the belief that full control over intrusive thoughts is important, desirable, and possible (OCCWG, 1997; Purdon & Clark, 2002; Salkovskis, 1985). However, correlational research has provided mixed evidence regarding whether this belief domain predicts specific OCD symptoms above and beyond other obsessive beliefs (e.g., Myers, Fisher, & Wells, 2008; Myers & Wells, 2005; OCCWG, 2003, 2005; Solem et al., 2009; Steketee, Frost, & Cohen, 1998; Wheaton, Abramowitz, Berman, Riemann, & Hale, 2010). Still, both anecdotal and clinical reports (e.g., Carr, 1974; Clark & Purdon, 1993; McFall & Wollersheim, 1979; Reuven-Magril et al., 2008) have consistently documented concerns among those diagnosed with OCD regarding a potential loss of control over their thoughts and behaviour (e.g., "Losing control over one's thoughts will eventually lead to loss of control over my behaviour"; Clark & Purdon, 1993, p. 165). Likewise, Clark and Purdon have suggested that "perceived control over upsetting intrusions is best predicted by the belief that the thought might be acted upon…" (OCCWG, 1997, p. 672), capturing the idea that believing in a potential loss of control over one's thoughts and/or behaviour might be directly related to a persistent need to control intrusions. This is also in line with the large body of research on the negative effects of thought control strategies in OCD, which can essentially be construed as behavioural manifestations of beliefs about control over thoughts (Clark & Purdon, 1993). For example, Wells and Davies (1994) and, later, Freeston and Ladouceur (1997) found that individuals with OCD engage in a number of though control strategies (e.g., distraction, punishment, reappraisal), perhaps to prevent acting upon or losing control over their intrusive thoughts (Clark & Purdon, 1993; Rachman & Hodgson, 1980; Rachman, 1997, 1998). Ironically, studies have shown that deliberate thought suppression can increase the frequency of intrusions in both nonclinical (e.g., Salkovskis & Campbell, 1994; Trinder & Salkovskis, 1994; Wegner, Schneider, Carter, & White, 1987) and clinical (e.g., Tolin, Abramowitz, Przeworski, & Foa, 2002) samples. In this way, thought suppression may potentially reinforce the impression that one is losing control over their thoughts.

The goal of the current study was to explore this broader cognitive domain of beliefs about control by integrating the possibility of *losing control* over one's thoughts and/or behaviour, as this might better explain the development and maintenance of OCD symptoms. This is a broader, expanded view of control-related beliefs as compared to beliefs about control over thoughts (alone), and may have important implications for capturing the full range of beliefs and symptoms relevant to those struggling with OCD. This proposition was examined via an experimental manipulation of the expanded belief domain and its impact on checking behaviour. Indeed, along with repeated washing, checking is the most commonly reported compulsion in OCD (Ball, Baer, & Otto, 1996; Rachman & Hodgson, 1980), and was posited to reduce the anxiety individuals holding beliefs about losing control may experience by temporarily increasing their perceptions of control. In this experiment, beliefs about losing control were manipulated in a sample of undergraduate students in the context of a bogus electroencephalography (EEG) session. More precisely, following the EEG session, participants were given positive or negative feedback about the possibility that they may lose control over their thoughts and behaviour. This manipulation was used to assess whether these beliefs would influence checking behaviour during a subsequent laboratory-based computer task asking participants to control the pace of pictures (adapted from Reuven-Magril et al., 2008).

It was hypothesized that participants provided with negative feedback about their performance during the EEG session (i.e., greater beliefs about losing control) would check more often which keys they should be using to control the pace of the pictures during the computer task, as compared to participants provided with positive feedback (i.e., lower beliefs about losing control). Experimental support for this relationship would potentially justify a broader understanding of beliefs about control by including aspects of losing control and would suggest useful treatment targets to improve the efficacy of CBT. It was further hypothesized that participants with greater beliefs about losing control would report a lower sense of control and a higher desire for control over the computer task's pictures (i.e., a more pronounced and maladaptive control mismatch toward the pictures), as compared to participants with lower beliefs about losing control.

2. Method

2.1. Participants

Participants were 136 undergraduate students recruited from Concordia University. They all received course credit for participating. The only inclusion criteria were the ability to understand, read, and communicate in English. Three participants' data were omitted: one did not finish the protocol, one did not understand the instructions during the EEG session, and one did not understand the instructions of the computer task. The final sample consisted of 133 participants, with 67 in the high beliefs about losing control (HLC) condition and 66 in the low beliefs about losing control (LLC) condition. Participants' mean age was 23.26 (SD = 5.23; range = 18–45) years and 91.7% of the sample was female. There were no significant differences between the two conditions in age, $t(131) = -.02$, $p = .98$, sex, $\chi^2(1) = .84$, $p = .36$, ethnicity, $\chi^2(5) = 8.27$, $p = .14$, or educational attainment, $\chi^2(7) = 6.35$, $p = .50$.

To ensure there were no significant differences between the two conditions with regard to relevant psychopathology symptoms and aspects of losing control, the Vancouver Obsessional Compulsive Inventory (VOCI; Thordarson et al., 2004), Obsessive Beliefs Questionnaire (OBQ-44; OCCWG, 2005), Depression Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995), and an adapted version of Reid and Ware (1974) Internal-External Questionnaire—Self-Control Subscale (IEQ-SC; Tiggemann & Raven, 1998) were administered (see Measures below and Table 1 for means and standard deviations). No significant differences between conditions were found as evidenced by VOCI scores, $t(131) = -.72$, $p = .47$, the checking subscale of the