When more is less: Doubt, repetition, memory, metamemory, and compulsive checking in OCD

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ABSTRACT

Memory and metamemory phenomena associated with obsessive-compulsive disorder (OCD) have received much attention in literature dedicated to a better understanding of the doubt and repetition associated with obsessions and compulsions. Following previous work on repeated checking among nonclinical participants, we asked participants to repeatedly turn on, turn off and check a real kitchen stove ($n = 30$ compulsive checkers diagnosed with OCD and $n = 30$ non-clinical undergraduates), or a real kitchen faucet ($n = 30$ non-clinical undergraduates) in a standardized, ritualized manner, in two connected experiments. Results indicated that following repeated relevant checking, both clinical and nonclinical participants reported significantly reduced memory confidence, vividness and detail; those who completed repeated irrelevant checking did not. The effects of repeated checking on memory accuracy were also explored. Results are discussed in terms of cognitive-behavioural formulations of OCD and in terms of the effects of repetition on memory and metamemory in association with checking behaviour.

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Even the most effective treatments for obsessive-compulsive disorder (OCD) leave a substantial proportion of patients unwell (see Ponniah, Magiati, & Hollon, 2013 for a review). Early psychological approaches to understanding OCD stipulated that obsessions and compulsions result from an inflated sense of responsibility (Salkovskis, 1985). Lopatka and Rachman (1995) showed that experimentally manipulated levels of perceived responsibility caused changes in estimates of probability and seriousness of harm in a clinical sample. However, an approach based solely on responsibility lacks specificity in that certain manifestations of OCD may be more connected with responsibility than others (Lopatka & Rachman, 1995). Several additional cognitive constructs have since been implicated as important to OCD (e.g., Obsessive Compulsive Cognitions Working Group [OCCWG], 1997, 2005). A controlled trial of cognitive and behavioural treatments for combined subtypes of OCD had promising, although perhaps somewhat tepid results (McLean et al., 2001), suggesting differing targets of therapy are needed depending on idiosyncratic aspects of the case in question. Since a number of studies have found that checking compulsions were the most common in OCD (Henderson & Pollard, 1988; Rachman & Hodgson, 1980; Ruscio, Stein, Chiu, & Kessler, 2010), a refinement of these early cognitive-behavioural efforts to account specifically for compulsive checking is warranted.

Experimental research on doubt and uncertainty in checking-related OCD has been extremely valuable within the contexts of both physical and mental compulsive checking (e.g., Radomsky & Alcolado, 2010; Radomsky, Rachman, & Hammond, 2001; Tolin, Abramowitz, & Brigidi, 2001; van den Hout & Kindt, 2003a), frequently mischaracterized as resulting from memory deficits (Radomsky & Rachman, 1999, 2004). Nonetheless, a comprehensive model of compulsive checking in OCD was developed and set out a number of hypotheses associated with the onset and maintenance of checking behaviour in OCD (Rachman, 2002). This model is essentially comprised of two main features: three cognitive 'multipliers' (including perceptions of responsibility, probability of harm, and seriousness of harm) and a self-perpetuating checking/doubting mechanism.

The second main feature of the model, the "self-perpetuating mechanism", was the focus of the current investigations. It was proposed that checking behaviour itself produces conditions that promote doubt/uncertainty, and that these perpetuate checking behaviour. Preliminary support for this mechanism came from a series of studies by van den Hout and Kindt (2003a, 2003b, 2004) in which non-clinical participants who repeatedly checked a computerized (virtual) gas stove (relevant checking) had less

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confidence in their memory for stove checking than a group who checked virtual light bulbs (irrelevant checking) before a final check of the stove. No differences in memory accuracy were found (van den Hout & Kindt, 2003a, 2003b). The authors suggested that as repeated checking continues, encoding shifts from primarily perceptual and detailed processing to semantic processing, i.e., a shift from 'remembering' the last checking episode to 'knowing' that it occurred (Tulving, 1985). This mechanism is consistent with the general notion that perceptual processing is inhibited during repetition (Johnston & Hawley, 1994), and with evidence demonstrating that the detailed quality of perceptual aspects of memory are those that typically allow one to differentiate between actual and imagined events (e.g., Johnson, Foley, Suengas, & Raye, 1988). These experiments, together with recent studies of manipulations of memory confidence on inducing urges to check (Alcolado & Radomsky, 2011; Cuttler, Sirois-Delisle, Alcolado, Radomsky, & Taylor, 2013), and of uncertainty on inducing checking behaviour (Toffolo, van den Hout, Hooge, Engelhard, & Cath, 2013) provided support for the presence of the self-perpetuating mechanism. Virtual checking that occurred in the absence of real threat, however, left open the question of whether these metacognitive declines associated with repeated checking behaviour were affected by the presence of real perceived threat.

In order to investigate the impact of real perceived threats on the effects of repeated checking, Radomsky, Gilchrist, and Dussault (2006) replicated the work of van den Hout and Kindt by asking participants to repeatedly check a *real* (rather than virtual) electric stove and/or a real kitchen sink and found, similarly, that repeated checking of potentially threatening objects promoted significantly reduced memory confidence, vividness and detail. Coles, Radomsky, and Horng (2006) approached the question of *how much* checking is necessary to produce impaired metamemory. They found that significant reductions in aspects of metamemory became evident after 5 but before 10 checks were completed, although trend analyses revealed that such effects were detectable after two checks. Both of these studies provided important information about aspects of metacognitive consequences of repeated checking and both raised questions about memory accuracy.

Although it has been shown that memory accuracy is enhanced for threatening information in compulsive checking (Radomsky et al., 2001), it is somewhat unclear how this finding might relate to *repeated* checking. The original investigations of virtual checking (van den Hout & Kindt, 2003a, 2003b, 2004) did not find reductions in memory accuracy. In contrast, two experiments testing these mechanisms in the context of real possible threat (e.g., checking a functioning stove) did reveal very small reductions in memory accuracy (Coles et al., 2006; Radomsky et al., 2006). Further, one study showed that declines in memory accuracy following repeated checking were attenuated through a broader attentional focus strategy (Ashbaugh & Radomsky, 2007). Thus, it remains to be demonstrated whether or not reductions in memory accuracy occur as a result of repeated checking of potentially threatening objects, and this was an additional aim of the current investigations.

Additional questions remain about how individuals diagnosed with OCD would respond to a laboratory-based repeated checking task. One investigation using a sample of individuals with OCD found that they had even greater metamemory decreases than students; however the experimenters did not specifically test a sample of individuals who compulsively check (Boschen & Vuksanovic, 2007). An evaluation of the mechanisms reported above in a clinical population is warranted — ideally one comprised of individuals for whom compulsive checking is a primary symptom. It is possible, given likely differences in perceived responsibility between actions associated with threatening objects at

home and those in a laboratory, that clinical participants may not experience reductions in metamemory variables in the laboratory. However, given the robust nature of metamemory declines reported to date, it would be surprising that clinical OCD participants, particularly those engaged in checking compulsions, would not report substantial declines in memory confidence, vividness and detail following repeated checking. One might expect that baseline levels of confidence, vividness and detail of memory in clinical participants would be low, given that low memory confidence is a feature of compulsive checking (Rachman & Hodgson, 1980; Radomsky et al., 2001; Tolin et al., 2001).

For the current investigations of the memorial and meta-memorial consequences of repeated checking, it was hypothesized that memory confidence, vividness and detail would be significantly reduced following repeated (relevant) checking compared to irrelevant checking. We also predicted that clinical participants would have lower metamemory ratings at baseline than nonclinical controls, but that these would also decline following repeated checking behaviour. Given findings of small reductions in memory accuracy for the last item(s) checked under ecologically valid conditions, it was also hypothesized that participants would show small but significant reductions in memory accuracy following repeated checking. It was also proposed that there would be a significant relationship between memory confidence and memory accuracy following repeated checking in both clinical and nonclinical participants.

Experiment 1

In Experiment 1, individuals diagnosed with OCD with primary checking compulsions and non-clinical undergraduates completed a repeated checking task in a functional laboratory kitchen. Meta-memory and memory accuracy measures for stove checks were assessed pre- and post-repeated checking. For half of the participants in each group, the repeated checking was conducted using the stove (relevant checking condition). For the other half, the repeated checking was conducted using the sink (irrelevant checking condition).

Method

Participants

The non-clinical group was comprised of thirty undergraduates (53.3% female) from Concordia University. We selected older participants (by contacting those in the top quartile in age from a list of interested individuals) in an attempt to age match non-clinical participants to clinical participants (see below). Participants were offered a ballot entry into a cash draw as compensation for their time. On average, non-clinical participants were 33.5 ($SD = 9.64$) years old and ranged in age from 19 to 59 years. Scores on self-report measures of depression, anxiety, and OCD were all within the non-clinical range and are displayed in Table 1.

The clinical group was comprised of thirty participants (46.7% female) who met the DSM-IV-TR (APA, 2000) diagnostic criteria for

Table 1
Participant characteristics.

Group	Non-clinical M (SD)	Clinical M (SD)
BAI Total	7.53 (8.86)	20.03 (10.56)
BDI II Total	7.87 (7.53)	18.73 (11.07)
VOCI Total Score	23.87 (28.95)	92.03 (34.82)
VOCI Checking Subscale	2.73 (5.07)	18.37 (5.24)

Note. Mean ratings were all significantly higher among clinical participants (all $ps < .001$).