

An Experimental Investigation of Responsibility and Reassurance: Relationships with Compulsive Checking

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Abstract

Inflated perceptions of responsibility are hypothesized to contribute to compulsive checking. Reassurance seeking, proposed to be a form of checking, may exacerbate checking behaviour in the long run. A sample of non-clinical participants ($N = 100$) performed a complex manual classification task under 1 of 4 experimental conditions: high responsibility-high reassurance, high responsibility-low reassurance, low responsibility-high reassurance, or low responsibility-low reassurance, and provided ratings of anxiety, urges to check, urges to seek reassurance, and confidence both before and after experimental manipulations were employed. Higher levels of perceived responsibility were associated with the maintenance of compulsive urges and doubt. Results are discussed in terms of cognitive and behavioural models of obsessive-compulsive disorder, and in terms of directions for future research. *Key words:* Obsessive-compulsive disorder, OCD, Responsibility, Reassurance, Checking, Neutralization.

Obsessive-compulsive disorder (OCD) is characterized by recurrent obsessions and/or compulsions that are time-consuming (lasting at least one hour per day) and which cause marked distress or significant impairment in functioning (American Psychiatric Association, 2000). Cognitive conceptualizations of OCD (e.g., Rachman, 1976, 1993; Salkovskis, 1985, 1999) emphasize the fundamental role of perceived responsibility in promoting obsessional phenomena. Responsibility, in this context, refers to “the belief that one possesses pivotal power to provoke or prevent subjectively crucial negative outcomes” (Salkovskis, Rachman, Ladouceur, & Freeston, 1992). The centrality of this construct was first highlighted in Salkovskis’s (1985) cognitive theory of obsessions, which states that a primary distinction between non-clinical and clinical (i.e., OCD) populations is the manner in which they interpret and appraise intrusive phenomena. This theory helped to explain two critical findings from early research on OCD-related cognitions: (i) ‘normal’ individuals routinely experience intrusions whose content resembles that of clinical obsessions (Rachman & De Silva, 1978; Salkovskis & Harrison, 1984), and (ii) unlike OCD sufferers, non-clinical populations can easily dismiss cognitive intrusions as senseless and trivial events (Salkovskis & Harrison, 1984). Salkovskis (1985, 1999) suggested that obsessionals frequently (mis)interpret their intrusive thoughts, images, and impulses as indicating that danger is imminent, and that they feel personally responsible for preventing any potential harm that might occur as a result of this threat. It was also hypothesized that OCD sufferers’ negative interpretations of their intrusions would lead to discomfort which, in turn, would increase their subsequent urges to engage in various forms of anxiety-neutralizing behaviour (e.g., checking, reassurance seeking, washing, thought suppression, distraction, mental ritualization, etc.). Thus, an inflated sense of perceived responsibility has been hypothesized to increase both the occurrence of obsessions and the use of counter-productive neutralization strategies (Salkovskis et al., 2000).

Several authors (e.g., Ladouceur et al., 1995; Lopatka & Rachman, 1995; Rachman, 1976, 2002; Rachman & Hodgson, 1980; Rhéaume, Ladouceur, Freeston, & Letarte, 1995) have suggested that an exaggerated sense of responsibility for preventing harm may be particularly relevant to individuals with checking compulsions. For example, an individual pre-occupied with images of their children trapped in a fire might repeatedly check the stove, gas taps, etc., to ensure that they have been properly shut off. However, a number of other factors, including exaggerated perceptions of threat and impaired meta-memory, may also contribute to doubting and checking activities (Rachman, 2002).

Rachman's (2002) recent model of compulsive checking provides an outline of the mechanisms purported to be involved in the onset and maintenance of this behaviour. According to this model, repeated checking is precipitated by increases in anxiety/discomfort and urges to check, which result from the presence of three "cognitive multipliers", namely, perceived responsibility for harm, perceived probability of harm and perceived seriousness of harm. Rachman notes that compulsive checking is usually intended to prevent future harm from occurring as a result of a perceived threat. However, perceived threats are often hypothetical, vague, and never-ending (e.g., "the failure to check properly might lead to harm coming to a family member"), thus individuals plagued with harm-related obsessions are often compelled to continue checking repeatedly, in order to temporarily alleviate their feelings of anxiety. In addition, because compulsive checking can prevent the disconfirmation of negative beliefs (e.g., "If I do not check, disaster is certain to occur"), it serves to maintain these beliefs, thereby increasing the likelihood of further compulsions and safety behaviours. Rachman's theory also stipulates that a "self-perpetuating mechanism" acts to maintain compulsive checking once it has begun. The act of repeated checking itself is purported to paradoxically increase one's sense of personal responsibility for harm, as well as one's estimation of threat, while also impairing meta-memory (Coles, Radomsky, & Horng, in press; Hout & Kindt, 2004; Radomsky, Gilchrist, & Dussault, in press). Thus, an exaggerated sense of responsibility for preventing harm (in conjunction with a bias towards increased perceptions of threat) is thought to play a critical role in both the onset and maintenance of compulsive checking behaviour.

Research examining the relationships between perceived responsibility and compulsive checking has generally supported this theory. For instance, Lopatka & Rachman (1995) asked a group of clinical checkers to perform an anxiety-provoking exposure task in their own homes under conditions of high and low responsibility, and a "no manipulation" control condition. Lower perceived responsibility was associated with significant reductions in participants' subjective anxiety/discomfort, urges to check, and perceived likelihood and severity of harm (i.e., threat estimation), while higher perceived responsibility *did not* lead to a significant increase in any of these variables, relative to the control condition. In a related study, Ladouceur et al. (1995) had non-clinical students perform a manual classification task (e.g., sorting pills) under conditions of high and low responsibility/threat. Higher levels of perceived responsibility/threat were associated with significantly greater checking behaviour and hesitations. However, similar to Lopatka and Rachman's (1995) findings, participants in the high responsibility group did not demonstrate significantly higher levels of doubt or urges to check, relative to participants in the low responsibility group. More recently, Shafran (1997) manipulated responsibility indirectly in a sample of OCD patients, by varying whether the experimenter was present (low responsibility condition), or absent (high responsibility condition), during an idiographically designed exposure task. Participants reported significantly higher levels of perceived threat, discomfort, and urges to neutralize in the high responsibility condition, relative to the low responsibility condition.

Thus, the majority of empirical and anecdotal evidence suggests that an inflated sense of responsibility for preventing harm contributes to doubting and checking behaviour. Yet, the precise manner in which responsibility affects these variables remains unclear, as the effects of manipulating responsibility were not entirely uniform across these studies. Whereas Ladouceur et al. (1995) found that increases in perceived responsibility were associated with increased checking behaviour, Lopatka and Rachman (1995) found that decreases, but not increases in perceived responsibility significantly affected anxiety and compulsive urges. In addition, because Shafran's (1997) study did not include a 'baseline' condition, it is not clear whether the significant group differences found in this experiment reflect an increase in OCD-related cognitions in the high responsibility group, a decrease in these cognitions in the low responsibility group, or a combination of both. Thus, one objective of the current study is to clarify these issues, by investigating both the nature and direction of responsibility and threat manipulations in a non-clinical group of participants.

Another focus of the current investigation was to examine the effects of repeated reassurance on various factors purported to exacerbate checking and related behaviours. Repeated requests for reassurance are common in OCD, particularly among individuals with checking compulsions (Rachman, 2002; Rachman & Hodgson, 1980; Salkovskis, 1985, 1999). This behaviour has been conceptualized as a form of checking “by proxy” (Rachman, 2002), in which the individual seeks to disperse responsibility for harm to others (Salkovskis, 1985, 1999). In fact, Rachman (2002) proposes that excessive reassurance-seeking, compulsive checking, and other forms of OCD-related neutralization behaviour can all be construed as anxiety-reduction techniques aimed at exerting influence over negative outcomes (i.e., reducing “threat”), and reducing one’s perceived responsibility for such outcomes. However, similar to effects observed in compulsive checking, the hypothesized reductions in anxiety and perceived responsibility that follow repeated reassurance are thought to be temporary (Hout & Kindt, 2004; Rachman, 2002; Rachman & Hodgson, 1980). Thus, both the functions and the long-term consequences of reassurance seeking and compulsive checking in OCD are purported to be similar.

Prior research has demonstrated a number of long-term detrimental effects associated with excessive reassurance seeking in the context of other emotional disorders, such as health anxiety (or hypochondriasis) (Hadjistavropoulos, Craig, & Hadjistavropoulos, 1998; Salkovskis & Warwick, 1986) and depression (Joiner & Schmidt, 1998; Joiner, Alfano, & Metalsky, 1992). Among individuals with health anxiety, requests for reassurance tend to focus on health status (e.g., “Do I have a disease?”, “Is this spot cancerous?”), whereas depressed individuals tend to seek reassurance regarding issues related to self-worth (e.g., “Do you really care about me?”). In these contexts, excessive reassurance seeking has been shown to contribute to interpersonal difficulties (e.g., causing others to become frustrated with repeated demands for reassurance; Joiner et al., 1992), unnecessary health costs (e.g., due to increased and unnecessary medical consultation in the case of health anxiety; Salkovskis & Warwick, 1986), and the long-term exacerbation of compulsive behaviour (e.g., increased demands for additional reassurance; Hadjistavropoulos et al., 1998; Salkovskis & Warwick, 1986). Furthermore, the manner in which other individuals respond to repeated requests for reassurance seems to be an important factor in determining the long-term consequences of this behaviour. Repeated provisions of reassurance can be counter-productive, leading to subsequent and further increases in reassurance seeking (Hallam, 1974; Salkovskis & Warwick, 1986; Tolin, 2001). Given that a common underlying purpose for soliciting reassurance in each of the above-described circumstances may be to achieve rapid (albeit temporary) reductions in anxiety, it is reasonable to hypothesize that excessive reassurance seeking in OCD may have long-term consequences that resemble those described above. Therefore, an investigation of this behaviour, particularly in the context of compulsive checking, is warranted.

Accordingly, the present investigation was designed to address the following questions: (i) Do manipulations of perceived responsibility and threat during a complex and potentially threatening task affect participants’ subjective ratings of anxiety, compulsive urges (to check and to seek reassurance), performance-related doubt (e.g., confidence in outcome), and/or memory accuracy (e.g., their ability to recall recently-performed actions), and (ii) Are the above-listed phenomena affected by repeated provisions of reassurance?

To examine these issues, the current study used a protocol similar to that employed by Ladouceur et al. (1995). In their study, non-clinical participants were asked to perform a manual classification task (i.e., sorting pharmaceutical capsules into a row of small containers according to their colour) under conditions of either high or low responsibility. In the high responsibility condition, participants were told that the results of their individual performance would have important implications for the health and safety of inhabitants of a developing country. In contrast, participants in the low responsibility condition were told that the purpose of the experiment was to examine colour perception, and that the sorting trials they were asked to complete were only “practice” before the real experiment began. The current study

also included a reassurance manipulation, in order to determine whether reassurance might interact with perceived responsibility to exacerbate OCD-related cognitions and distress.

Hypotheses

It was hypothesized that participants assigned to high responsibility conditions would demonstrate subsequent increases in: i) subjective anxiety, ii) urges to check, and iii) urges to seek additional reassurance, relative to participants in low responsibility conditions. It was also hypothesized that increases in perceived responsibility would act to decrease participants' confidence in their performance accuracy. In addition, it was hypothesized that providing repeated reassurance to participants regarding their performance during the experimental task would amplify the effects of increased responsibility, relative to conditions in which no reassurance was offered. Finally, memory accuracy (i.e., participants' ability to recall specific details of the sorting procedure) was not expected to be influenced by manipulations of either responsibility or reassurance.

Method

Participants

One hundred twenty-four volunteer undergraduate students participated in this study. In order to preserve the credibility of the experiment, Psychology majors were not recruited for participation. Participants' mean age was 22.57 (SD = 4.80, range = 17-43) years, and 73.0% of participants were female. Participants were compensated for their time with course credit, or entry in a draw for a cash prize. Participant characteristics are displayed in Table 1.

Table 1

Participants' Scores on the VOCI, OBQ-44, BAI, and BDI-II

Measure	<i>M</i>	<i>SD</i>	Min.	Max.	Max. possible
VOCI ^a					
Total	43.10	36.24	0.00	153.00	220.00
HResp-HRsre	37.04	30.90	0.00	104.00	220.00
HResp-LRsre	53.74	42.42	0.00	117.00	220.00
LResp-HRsre	33.04	29.52	0.00	112.00	220.00
LResp-LRsre	49.11	39.04	1.00	153.00	220.00
OBQ-44 ^a					

Total	141.96	44.80	56.00	250.00	308.00
HResp-HRsre	137.62	49.00	56.00	250.00	308.00
HResp-LRsre	147.56	44.50	78.00	237.00	308.00
LResp-HRsre	139.02	42.72	57.00	243.00	308.00
LResp-LRsre	143.88	45.04	67.00	244.00	308.00
BAI					
Total	11.92	9.98	0.00	42.00	63.00
HResp-HRsre	9.25	7.60	0.00	28.00	63.00
HResp-LRsre	15.39	11.09	0.00	38.00	63.00
LResp-HRsre	9.42	8.98	0.00	42.00	63.00
LResp-LRsre	13.74	10.95	0.00	37.00	63.00

Table 1 (continued)

Participants' Scores on the VOCI, OBQ-44, BAI, and BDI-II

Measure	<i>M</i>	<i>SD</i>	Min.	Max.	Max. possible
BDI-II					
Total	12.33	9.84	0.00	45.00	63.00
HResp-HRsre	10.71	7.25	0.00	32.00	63.00
HResp-LRsre	13.35	11.23	0.00	34.00	63.00
LResp-HRsre	11.73	10.08	1.00	45.00	63.00
LResp-LRsre	13.48	10.62	1.00	43.00	63.00

Note. Total = total sample ($n = 100$), HResp-HRsre = high responsibility – high reassurance condition ($n=24$), HResp-LRsre = high responsibility – low reassurance condition ($n=23$), LResp-HRsre = low responsibility – high reassurance condition ($n=26$), LResp-LRsre = low responsibility – high reassurance condition ($n=27$).

^a participants' mean scale scores were substituted for missing values.

Measures

Vancouver Obsessional Compulsive Inventory

The Vancouver Obsessional Compulsive Inventory (VOCI; Thordarson et al., 2004) is a 55-item self-report measure designed to assess a broad range of OCD symptoms.

A factor analysis revealed 6 easily interpretable factors, which comprise the VOCI's 6 component subscales: checking, contamination, obsessions, hoarding, "just right", and indecisiveness. The VOCI possesses good inter-item reliability in student, community, OCD, and clinical control populations (Cronbach's $\alpha = .96, .90, .94,$ and $.98$ respectively). Test-retest reliability for the VOCI total score is high in clinical populations (Pearson's $r = .96, p < 0.001$) (Thordarson et al., 2004), as well as in student samples (Pearson's $r = .91, p < 0.001$) (Parrish, Ouimet, Ashbaugh, Radomsky, & O'Connor, 2004).

Obsessional Beliefs Questionnaire – 44

The Obsessional Beliefs Questionnaire – 44 (OBQ; Obsessive-Compulsive Cognitions Working Group [OCCWG], 2005) is a 44-item scale that measures the presence and strength of various beliefs that are common among OCD sufferers.

A recent analysis conducted on a previous 87-item version of the OBQ revealed three empirically derived factors that correspond to cognitive constructs hypothesized to be highly relevant to OCD: 1) responsibility and threat estimation, 2) perfectionism and intolerance for uncertainty, and 3) importance and control of thoughts (OCCWG, 2005). As a result of this analysis, the shorter, 44-item version of the OBQ was created. This abbreviated version possesses excellent internal consistency among OCD patients (Cronbach's $\alpha = .95$), and evidence supports the criterion validity of this measure (OCCWG, 2005).

Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI; Beck & Steer, 1990) is a 21-item self-report measure designed to assess the severity of primarily somatic anxiety symptoms experienced by respondents during the previous week. The BAI has been shown to be highly reliable and valid (Beck & Steer, 1990).

Beck Depression Inventory-II

The Beck Depression Inventory-II (BDI; Beck, Steer, & Brown, 1996) is a 21-item self-report measure that assesses the severity of depressive symptoms experienced by respondents over the course of the previous two weeks. The BDI has been shown to be a highly reliable and valid assessment tool (Beck, Steer, & Brown, 1996).

Anxiety (Subjective units of distress scale [SUDS])

Participants were asked to rate their subjective anxiety on a 0-100 scale, where 0 was anchored by "not-at-all anxious", and 100 was anchored by "extremely anxious."

Urge to check

Participants were asked to rate their urge to check their performance on a 0-100 scale, where 0 was anchored by "no urge whatsoever", and 100 was anchored by "extreme urge to check".

Urge to seek reassurance

Participants were asked to rate their urge to receive additional reassurance on a 0-100 scale, where 0 was anchored by “no urge whatsoever”, and 100 was anchored by “extreme urge to be reassured.”

Confidence in outcome

Participants were asked to rate how confident they were that they had sorted the pills accurately on a 0-100 scale, where 0 was anchored by “not-at-all confident”, and 100 was anchored by “completely confident.”

Memory accuracy

To assess memory accuracy, participants completed a multiple-choice memory test (see Appendix), which measured their ability to remember the pill combinations they had been asked to place in each bottle during the sorting task.

Procedure

The study employed a 2 (time) x 2 (responsibility condition) x 2 (reassurance condition) mixed design, in which both perceived responsibility and the provision of reassurance were experimentally manipulated. Thus, four conditions (high responsibility-high reassurance [HResp-HRsre], high responsibility-low reassurance [HResp-LRsre], low responsibility-high reassurance [LResp-HRsre], and low responsibility-low reassurance [LResp-LRsre]) across two assessment points comprised the experimental design.

After providing informed consent, participants were seated in a small testing room where the experimenter provided initial verbal instructions and a detailed standardized demonstration of the pill-sorting task that they would be asked to perform. Participants were presented with an assortment of ten different pill types (including various shapes, colours and sizes) in two large ceramic bowls, and were subsequently asked to perform a series of sorting trials during the experiment. Each trial involved sorting the pills into a row of seven opaque pharmaceutical bottles, one pill at a time, using seven pre-determined four-pill combinations. Participants were instructed not to look into the bottles while sorting.

Participants were not initially informed of the purpose of the sorting task; however, they were instructed to sort the pills as quickly and accurately as possible. Participants were asked to wear a pair of latex gloves while sorting the pills, and were informed that the experimenter would record the time taken to complete each trial.

Following each of the first three trials, participants received identical feedback regarding the accuracy of their performance. After the first trial, all participants were told that they had made a mistake while sorting the pills (regardless of their actual performance). This potentially false feedback was meant to increase participants' uncertainty about their ability to perform the sorting task correctly and quickly, and is consistent with the procedure employed by Hout & Kindt (2003a, 2003b) in their investigations of repeated checking. However, to ensure that participants believed that they were also capable of performing the task correctly, they were assured that they had sorted the pills correctly following the second trial (again, regardless of their actual performance). Participants were not given feedback following their third trial. Instead, they were led to a different room, where they were asked to provide the subjective ratings outlined above (i.e., anxiety, urges to check, urges to seek reassurance, confidence in outcome), as well as to complete the test of memory accuracy.

Responsibility manipulation

In the high responsibility condition, participants were told that our laboratory had been asked by a charitable organization to determine whether pills of various shapes, sizes and colours could be sorted quickly and accurately by hand. Participants were also told that the results of their individual performance would be important for developing a safe and efficient means of sorting and distributing vitamins and medications in a third-world country. To maximize credibility and increase participants' perceived responsibility and threat in this condition, the experimenter wore a lab coat throughout the experiment, and a poster from a charitable organization was displayed on the wall of the testing room. Conversely, participants in the low responsibility condition were told that the present study had been designed to investigate colour and shape perception, and that our laboratory was interested in determining how quickly and accurately people were able to sort pills according to their colour and shape. The experimenter did not wear a lab coat in this condition, nor were any additional props (e.g., posters) included. All participants (regardless of responsibility condition) were told that we were also interested in determining how task repetition would affect their mood.

Reassurance manipulation

Following the responsibility manipulation, each participant performed two more sorting trials (trials #4 and #5). In between these trials, a brief series of task-irrelevant questionnaires was administered to participants in an adjacent room. Members of the low reassurance groups did not receive any feedback regarding their performance following the fourth and fifth trials, while members of the "high-reassurance" groups were provided with three standardized bouts of reassurance following the fourth trial. These reassurances involved three discrete statements of positive performance-related feedback: (i) "That's great, I've checked every pill in each bottle, and you've sorted them exactly right. Let me reassure you that your performance was satisfactory. However, to be sure, we use a standardized procedure for checking your performance, so I am now going to take this tray of pills to our data entry person for her to check", (ii) "Our data entry person has just checked your last trial and also found that you sorted the pills exactly right. She will now enter your last trial into our database which will provide another means of checking your performance", and (iii) "Our computer database has also verified that you sorted the pills correctly on your last trial". These reassurance provisions were spread out over a 15-minute time period, during which the above-mentioned questionnaires were completed. Participants did not receive any performance-related feedback following the fifth trial, regardless of reassurance condition.

After completing the fifth trial, participants were asked to provide a second set of subjective ratings (i.e., anxiety, urge to check, urge to seek reassurance, confidence in outcome). They were also asked to complete the multiple-choice memory accuracy test once more. In addition, as a manipulation check, participants were asked to rate (scale 0 – 100) the level of perceived responsibility/threat that they associated with the experimental task.

Results

Analyses were conducted excluding cases with incomplete data ($n = 24$). As a result, the overall sample size was reduced from 124 to 100 participants (HResp-HRsre group: $n = 24$, HResp-LRsre group: $n = 23$, LResp-HRsre group: $n = 26$, LResp-LRsre group: $n = 27$).

Participant characteristics

Participants in the four experimental groups did not differ with respect to age, $F(3,96) = 1.75$, *n.s.*, nor did they differ in terms of their mean total scores on the BDI, $F(3,96) = .45$, *n.s.*, the BAI, $F(3,96) = 2.44$, *n.s.*, the VOCI, $F(3,96) = 1.85$, *n.s.*, or the OBQ, $F(3,96) = .24$, *n.s.* (see Table 1 for descriptive statistics).

Sex comparisons

A chi-squared analysis revealed that sex was not equally distributed across the experimental groups ($\chi^2 [3, N = 100] = 8.37, p = .04$). There were fewer males in the “high responsibility” groups than in the “low responsibility” groups (19.1% vs. 34.0%, respectively), and fewer males in the HResp-HRsr group compared to the other three groups (4.2% vs. 34.8%, 34.6%, and 33.3% respectively). However, independent samples t-tests revealed that males and females did not differ with respect to the number of error-free sorting trials they performed, $t(98) = 1.65, n.s.$ ($M = 2.59[SD = 1.37]$ vs. $3.10[SD = 1.34]$ error-free trials for males and females, respectively). Furthermore, there were no significant differences between males and females on pre-manipulation ratings of anxiety, $t(98) = .35, n.s.$, urges to check, $t(98) = .34, n.s.$, urges to seek reassurance, $t(98) = -.45, n.s.$, or confidence in outcome, $t(98) = -.63, n.s.$ Likewise, there were no significant sex differences on post-manipulation ratings of anxiety, $t(98) = .48, p = n.s.$, urges to check, $t(98) = -.30, n.s.$, urges to seek reassurance, $t(98) = .15, n.s.$, or confidence in outcome, $t(98) = -.53, n.s.$ Males and females also did not differ in terms of their memory accuracy prior to, $t(98) = -.27, n.s.$, or following, $t(98) = .01, n.s.$, the experimental manipulations.

Manipulation check

Following the last pill-sorting trial, participants rated (on a scale from 0–100) the extent to which they felt their performance would affect the well-being of others. Participants in the high responsibility groups reported a significantly greater amount of perceived responsibility/threat associated with the experimental task than participants in the low responsibility groups, $F(1,96) = 12.47, p < 0.01$ ($M = 46.68[SD = 27.32]$ vs. $27.81[SD = 26.50]$, respectively), indicating that the responsibility manipulation was effective.

Main dependent variables

A repeated-measures ANOVA was conducted, in which time and scale were treated as within-participants factors, while responsibility and reassurance conditions served as between-participants factors. Significant main effects of time, $F(1,288) = 6.90, p = .01$ (Cohen's $d = .31$) and scale, $F(3,288) = 57.53, p < .001$ (Cohen's $d = .89$) were found, indicating that participants' ratings differed according to the scale being measured and the time of measurement. In addition, results revealed a significant 3-way (time x scale x responsibility condition) interaction, $F(3,288) = 3.23, p = .02$ (Cohen's $d = .21$), indicating that participants' ratings for each of the above-mentioned scales were differentially influenced by manipulations of perceived responsibility across time. In contrast, the interaction between time, scale, and reassurance condition was not statistically significant, $F(3,288) = .60, n.s.$, nor was the 4-way interaction between time, scale, responsibility condition, and reassurance condition, $F(3,288) = 1.13, n.s.$

To determine which scales were affected by the interaction between time of measurement and responsibility condition, four separate 2 x 2 x 2 repeated measures ANOVAs were conducted (one for each scale) using the pooled error term from the original analysis (see Howell, 1987). Subsequent to these analyses, the simple effects of time were examined at both levels of responsibility for each scale, and pairwise comparisons were conducted to clarify significant results.

Table 2

Participants' Subjective Ratings (scale 0-100) at Time1 and Time2.

Group	Time 1	Time 2
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Rating	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)
High responsibility (<i>n</i> =47)				
Anxiety	33.83	25.45	28.57	24.75
Urge to check	42.23	32.32	41.00	34.54
Urge to seek reassurance	40.26	32.40	39.62	33.65
Confidence	72.13	23.10	71.21	29.45
Low responsibility (<i>n</i> =53)				
Anxiety	35.68	26.53	30.09	25.23
Urge to check	50.34	33.51	38.77	34.49
Urge to seek reassurance	49.25	32.19	39.40	32.23
Confidence	69.32	28.33	77.17	24.64

Anxiety

The interaction between time and responsibility condition was not significant with respect to participants' anxiety ratings, $F(1,288) = .01, n.s.$ Furthermore, simple effects tests revealed that participants' anxiety ratings did not differ significantly from time 1 to time 2 in either the high responsibility groups, $F(1,288) = 2.11, n.s.$, or the low responsibility groups, $F(1,288) = 2.69, n.s.$

Urges to check

The interaction between time and responsibility condition was statistically significant for participants' "urge to check" ratings, $F(1,288) = 4.27, p = .04$, (Cohen's $d = .24$). Participants in the low responsibility conditions demonstrated a decrease in urges to check from time 1 to time 2, $F(1, 288) = 11.52, p < .001$ (Cohen's $d = .40$), whereas participants in the high responsibility conditions did not demonstrate this decrease in urges to check, $F(1,288) = .12, n.s.$

Urges to seek reassurance

An examination of participants' "urge to seek reassurance" ratings revealed a marginally significant trend for the interaction between time and responsibility condition, $F(1,288) = 3.40, p = .07$ (Cohen's $d = .22$). Under conditions of low responsibility, participants' urges to seek reassurance decreased from time 1 to time 2, $F(1, 288) = 8.36, p < .01$ (Cohen's $d = .34$), while participants in the high responsibility conditions did not demonstrate this decrease, $F(1,288) = .03, n.s.$

Confidence in outcome

A trend was found for the interaction between time and responsibility condition when examining participants' ratings of confidence in outcome, $F(1,288) = 3.22, p = .07$ (Cohen's $d = .21$). Participants in the low responsibility conditions demonstrated a significant increase in confidence from time 1 to time 2, $F(1,288) = 5.30, p = .02$, whereas participants in the high responsibility conditions did not demonstrate this increase in confidence, $F(1,288) = .06, n.s.$

It was important to assess whether these findings might have resulted from greater performance accuracy among participants in the low responsibility conditions. To determine whether participants in each responsibility condition differed in terms of their actual performance, an independent samples t-test was performed, in which the number of incorrectly performed trials served as the dependent variable. The responsibility groups did not differ with respect to the number of trials performed incorrectly, $t(98) = -.569, n.s.$ ($M = 1.96[SD = 1.40]$ vs. $2.11[SD = 1.34]$ for high vs. low responsibility groups, respectively).

Memory accuracy

A separate $2 \times 2 \times 2$ repeated measures ANOVA was performed to assess whether participants' memory accuracy differed by time of measurement or experimental condition. The effects of time, $F(1,96) = .75, n.s.$, responsibility condition, $F(1,96) = .69, n.s.$, and reassurance condition $F(1,96) = .06, n.s.$, were not statistically significant. Similarly, the responsibility by reassurance condition interaction, $F(1,96) = 1.16, n.s.$, the time by responsibility condition interaction, $F(1,96) = .08, n.s.$, and the time by reassurance condition interaction $F(1,96) = .16, n.s.$, were not significant. In contrast, a significant 3-way interaction was found between time, responsibility condition and reassurance condition, $F(1,96) = 4.18, p = .04$ (Cohen's $d = .42$). However, simple effects tests revealed that participants' memory accuracy did not differ significantly as a function of time in the high responsibility conditions, $F(1,46) = .18, n.s.$, the low responsibility conditions, $F(1,52) = .74, n.s.$, the high reassurance conditions, $F(1,49) = .07, n.s.$, or the low reassurance conditions, $F(1,49) = 1.07, n.s.$ Notwithstanding this result, pairwise comparisons revealed a trend towards increased memory accuracy in the LResp-LRsre group from time 1 to time 2, $F(1,96) = 3.50, p = .06$, whereas none of the other experimental groups demonstrated a significant change in memory accuracy following the experimental manipulations.

Trial completion time

To assess whether the experimental manipulations of reassurance and responsibility affected the amount of time participants spent performing the final sorting trial, a two-way ANOVA was conducted. The amount of time spent sorting on the final trial did not differ significantly between responsibility conditions, $F(1,96) = .02, n.s.$, or reassurance conditions, $F(1,96) = .02, n.s.$ Also, the responsibility condition by reassurance condition interaction was not statistically significant, $F(1,96) = .19, n.s.$

Discussion

The results of the current study provided mixed support for our hypotheses. As predicted, manipulations of perceived responsibility/threat had a significant impact upon participants' urges to check, their urges to seek reassurance, and their confidence in outcome. Specifically, participants in the low responsibility conditions reported significant decreases in their urges to check and to seek reassurance, as well as an increase in confidence, following the responsibility manipulation that was employed in this study. In contrast, these effects were not apparent among participants assigned to the high responsibility conditions. Thus, higher levels of perceived responsibility/threat were associated with the maintenance of compulsive urges and performance-related doubt following the completion of a complex experimental task. Also, as predicted, neither manipulations of responsibility/threat, nor manipulations of reassurance affected memory accuracy. These findings are generally consistent with previous research in this domain (e.g., Ladouceur et al., 1995; Lopatka & Rachman, 1995; Shafan,

1997), and they provide additional support for leading cognitive-behavioural models of OCD which emphasize the importance of perceived responsibility and threat perception in maintaining obsessional thinking (e.g., Rachman, 1976, 2002; Rachman & Hodgson, 1980; Salkovskis, 1985, 1999).

Notwithstanding these results, manipulations of perceived responsibility/threat did not affect participants' reported levels of anxiety, despite the fact that participants in the low responsibility group displayed a post-manipulation decrease in compulsive urges. Contrary to predictions set forth by anxiety-reduction theories of compulsive behaviour (e.g., see Rachman, de Silva, & Roper, 1976; Rachman & Hodgson, 1980; Salkovskis, 1999), these results seem to suggest that reductions in compulsive urges might occur independently of reductions in anxiety. However, because participants were asked to indicate their *general* level of anxiety following the two experimental trials, rather than their *specific* (i.e., performance-related) anxiety, it is possible that some participants may have interpreted this question in a more global fashion, and rated their anxiety accordingly. Therefore, these findings must be interpreted with caution. Future investigations would benefit from the inclusion of several, perhaps differently focused, measures of anxiety, in addition to other potentially distressing emotions (e.g., worry, guilt, etc.).

In this study, decreases in perceived responsibility led to greater change in participants' ratings of compulsive urges and confidence than did increases in responsibility. Participants reported moderately high levels of doubt (i.e., low confidence) and compulsive urges prior to the experimental manipulation, which subsequently decreased in the low responsibility conditions only. Consistent with results reported by Lopatka & Rachman (1995), and Ladouceur et al. (1995), increases in perceived responsibility did not lead to significant increases in compulsive urges or to a significant decrease in confidence. This suggests that it may be common for individuals to experience relatively high levels of performance-related doubt and compulsive urges when performing a complex and unfamiliar task. However, whereas non-clinical populations would be expected to demonstrate a decrease in compulsive urges and doubt as they gain familiarity with the task, individuals with an inflated sense of responsibility may be hindered from processing information that would decrease their (mis)appraisals of threat, thus maintaining high levels of performance-related doubt, and consequent urges to check. Further investigation is warranted to test this hypothesis.

Hypotheses regarding the effects of repeated reassurance on anxiety, compulsive urges, and confidence in outcome were not supported by the current investigation. However, a number of issues related to the experimental protocol may have compromised our ability to test a valid analogue of real-life reassurance-seeking behaviour, thereby limiting our results.

Firstly, efforts to standardize the provision of reassurance in the present experiment might have reduced the credibility of this feedback. All participants were given identical feedback following their first two sorting trials, regardless of their actual performance. Consequently, a number of participants received false reassurance during these initial trials (e.g., some were told they had sorted the pills correctly when they had in fact made a mistake and vice versa). While very few participants exhibited any signs of disbelief as a result of this potentially false information, our use of deception may have raised suspicion in a number of participants, thereby reducing the impact of subsequent reassurance. Moreover, as a result of standardization, reassurance provisions may have been perceived as somewhat artificial, stereotypic and excessive. Thus, the internal validity of our reassurance manipulation may have been compromised by the standardization of this procedure.

Second, the performance-related feedback provided to participants in our study might not have fully resembled the "type" of feedback typically received by individuals who persistently seek reassurance from others. The feedback given to participants in this study was detailed, precise, and unambiguous (e.g., "Good. I've checked every pill in every bottle, and you've sorted them exactly correctly"). Conversely, individuals who repeatedly request reassurance from others are probably more

likely to receive ambiguous and imprecise feedback (e.g., “Yes dear, I’m sure it’s OK”), as a result of frustration over repeated requests. Such ambiguity is likely to increase uncertainty, thereby perpetuating one’s urges to seek further reassurance. Therefore, future investigations of reassurance-seeking behaviour might attempt to incorporate ambiguity in experimental reassurance provisions to increase the ecological validity of this manipulation.

Finally, our efforts to develop an analogue to reassurance seeking in OCD may have been compromised by the fact that participants did not actively seek reassurance in the present study. Given that a number of previous studies (e.g., Coles, Radomsky, & Hornig, in press; Hout & Kindt, 2003a, 2003b, 2004; Radomsky et al., in press) used forced task repetition as an analogue for real-life checking, it was theorized that providing unsolicited reassurance would act as a valid analogue for real-life responses to excessive reassurance seeking. However, repeatedly providing unsolicited reassurance may differ substantially from repeatedly granting *active* requests for reassurance. In fact, many of the cognitive-behavioural processes purported to exacerbate reassurance-seeking behaviour in OCD may remain relatively inactive until, or unless, the individual feels compelled to actively solicit reassurance. For example, it is presumed that obsessional beliefs are common among individuals who actively seek reassurance (e.g., “I have to do everything I can to prevent disaster, or something bad will surely happen”), and that repeatedly granting an individual’s requests for reassurance prevents them from disconfirming these beliefs. However, such processes might not occur among individuals receiving unsolicited feedback, as they may have never endorsed such beliefs in the first place. Furthermore, individuals who actively solicit reassurance are hypothesized to experience short-term benefits (e.g., temporary reductions in anxiety and compulsive urges) as a result of this feedback, thereby activating a vicious cycle of compulsive behaviour that is maintained by negative reinforcement. In this manner, requests for reassurance which are followed by temporary decreases in anxiety/discomfort would be expected to lead to subsequent increases in reassurance-seeking behaviour. However, it is reasonable to suspect that this self-perpetuating mechanism might not become activated in individuals who do not solicit reassurance. Indeed, in the absence of clear evidence of urge-related distress, it is difficult to ascertain whether or not participants experienced any of the maladaptive cognitive processes that are hypothesized to contribute to increased checking and reassurance seeking behaviour.

There were a number of other limitations in this study. First, it was not entirely clear whether our responsibility manipulation affected participants’ sense of responsibility for preventing harm, or their predictions of risk (i.e., threat). While our responsibility manipulation was designed to incorporate both components of Salkovskis et al.’s (1992) definition of responsibility (i.e., participants’ “pivotal role” in preventing harm, and the “crucial” nature of the task), it is possible that participants’ perceptions of threat were more influenced by our manipulation than their perceptions of personal influence over outcome. Also, the experimenter was present while participants completed the pill sorting task, which may have led participants to feel less responsible for potential negative outcomes due to responsibility sharing or displacement (Rachman, 1976; Shafran, 1997). Furthermore, because we collected participants’ responsibility ratings only after the experimental manipulation was introduced, we could not assess whether post-manipulation group differences in responsibility occurred as a result of increases in perceived responsibility in the high responsibility condition, decreases in perceived responsibility in the low responsibility condition, or a combination of both (relative to baseline). Lastly, the failure to include a clinical group in this study might limit the generalizability of our results.

Future investigations aimed at examining the relationships between responsibility and checking behaviour might attempt to determine whether individuals with checking compulsions demonstrate an impaired ability to process information that is inconsistent with their responsibility perceptions. Also, future studies might attempt to manipulate perceived responsibility more explicitly (e.g., using a ‘responsibility contract’) within a high-threat paradigm, in order to tease apart the effects of threat and responsibility on individuals’ cognitions and behaviour.

Lastly, to increase our understanding of the mechanisms involved in excessive reassurance seeking, further efforts must be made to develop valid methods of examining this potentially distressing behaviour through empirical means. A preliminary step in this process might involve building on knowledge gained from the current investigation to design methods of enquiry in which methodological problems from the current study are addressed. This will likely include the development of an experimental protocol in which participants are able to actively solicit reassurance under different conditions of perceived responsibility/threat.

Once researchers establish reliable and effective methods of studying reassurance-seeking behaviour, they can begin to make significant progress in examining issues that are relevant to this behaviour. For example, future investigations might evaluate the apparent inability/unwillingness of some individuals diagnosed with OCD to inhibit their compulsive urges to seek reassurance, as well as to determine whether a link exists between certain belief domains (e.g., intolerance of uncertainty, worry) and excessive reassurance seeking. It is expected that such investigations will provide a great deal of insight for researchers and clinicians who are interested in being better able to understand (and treat) this potentially distressing and complex compulsive behaviour.

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Appendix

Please circle the best answer for each of the following. Do not spend too much time on any one item; if unsure of an answer, simply put your best guess.



A



B



C



D



E



F



G

1. In which bottles did pill # 1 go?:

- a) A, D, and E
 b) B, and G

c) A, B, and D

2. In which bottles did pill # 2 go?:

- a) C, F, and G
- b) C, D, and F
- c) B, F, and G

3. In which bottles did pill # 3 go?:

- a) A, D, E, and G
- b) A, E, and G
- c) B, C, D, and E

4. In which bottles did pill # 4 go?:

- a) A, D, and F
- b) A, C, and G
- c) B, C, and F

5. In which bottles did pill # 5 go?:

- a) A, and E
- b) B, and F
- d) B, and E

**** please continue with questions on next page**

Please circle the best answer for each of the following. Do not spend too much time on any one item; if unsure of an answer, simply put your best guess.



A



B



C



D



E



F



G

6. In which bottles did pill # 6 go?:

- a) A, B, and G
- b) B, D, and F
- c) B, F, and G

7. In which bottles did pill # 7 go?:

- a) D, E, and G
- b) B, D, and E
- c) B, D, and G

8. In which bottles did pill # 8 go?:
a) B, E, and G
b) C, and E
c) B and F
9. In which bottles did pill # 9 go?:
a) B, C, and E
b) A, D, and G
c) B, D, and F
10. In which bottles did pill # 10 go?:
a) C, and F
b) E, and F
c) C, E, and F

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