

## **The Influence of Situation-Specific Control Beliefs on Obsessive-Compulsive Phenomena**

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### **Abstract**

*This study investigated whether situation-specific control beliefs would influence obsessive compulsive (OC) related phenomena using a set of hypothetical, potential contamination scenarios. As expected, higher situation-specific desire for control and lower sense of control predicted higher threat appraisals. The interaction between desire for control and sense of control predicted distress. Neither desire for control nor sense of control predicted propensity to act. However, greater distress predicted a greater propensity to act in relation to the contamination scenario. This study confirms the relevance of control beliefs to obsessive compulsive disorder (OCD) and adds to the current research by demonstrating that situation-specific control beliefs contribute to dysfunctional threat beliefs and distress. The results also indicate that distress may mediate the relationship between control beliefs and OC behaviours. It is suggested that individuals with OCD may benefit from cognitive therapy which directly targets problematic control beliefs.*

**Keywords:** Obsessive-Compulsive Disorder, Contamination, Desire for control, Sense of control, Threat

### **1. Introduction**

Obsessive-compulsive disorder (OCD) is a psychological disorder in which individuals suffer from obsessions and/or compulsions (American Psychiatric Association [APA], 2013). OCD is associated with reduced quality of life in several domains, including work, school, household duties, social relationships and emotional wellbeing (Eisen et al., 2006) and has a lifetime prevalence of approximately 2.3% (Ruscio, Stein, Chiu, & Kessler, 2010). According to cognitive models of OCD, dysfunctional beliefs, such as inflated estimations of threat or personal responsibility, are thought to contribute to the experience of obsessive-compulsive phenomena (Abramowitz, Khandker, Nelson, Deacon, & Rygwall, 2006; Clark, 2004; Taylor, 2002).

Control beliefs, both sense of control and desire for control, have also been suggested to play a role in OCD (eg. Moulding & Kyrios, 2006). An individual's sense of control is their belief that they can produce a desired outcome or prevent an undesired one (Skinner, 1996). Sense of control is of central importance to some cognitive models of anxiety and mood disorders (Moulding & Kyrios, 2006, 2007). For example, anxiety and avoidance may result from low self-efficacy to cope with a potential threat (Bandura, 1997), or a sense of uncontrollability over such threat (Barlow, 2000). An individual's desire for control is their innate motivation or need to control events in their life (Burger, 1992). Desire for control is typically positively correlated with sense of control and negatively correlated with anxiety (Burger, 1992).

In correlational analyses of the relationships between desire for control, sense of control, OC symptoms and the dysfunctional beliefs measured by the Obsessional Beliefs Questionnaire (OBQ; Obsessive Compulsive Cognitions Working Group, 2005) in undergraduate samples, higher desire for control together with lower sense of control predicted greater dysfunctional beliefs and OC symptoms (Moulding & Kyrios, 2007; Moulding, Kyrios, Doron, & Nedeljkovic, 2009). Other research has also suggested a link between control beliefs and OC-related phenomena.

Moulding, Kyrios, and Doron (2007) used a hypothetical checking scenario, in which undergraduate students imagined themselves in a situation in which a household tap may have been left dripping while they were out. Both higher desire for control and lower sense of control predicted distress and the propensity to act to confront the situation. However, as participants' control beliefs were not manipulated, no causal inferences could be made about the influence of control beliefs on OC-related distress or behaviour. Further, negative affect was not controlled, so participants' distress or propensity to act may have been influenced by anxiety or depression.

In an earlier experimental study employing undergraduates, Mancini, D'Olimpio and Cieri (2004) manipulated perception of responsibility for the outcome of a checking task and self-efficacy to deliver that outcome. A high responsibility/low self-efficacy group demonstrated more checking and hesitating behaviours than either high responsibility or control groups, suggesting that the self-efficacy aspect of sense of control may contribute to checking behaviours. In contrast, in a study of cleaning behaviours in undergraduates, Gelfand and Radomsky (2013) found that self-efficacy in respect of a computer keyboard cleaning task did not predict cleaning times, but greater perceived controllability of the cleanliness of the keyboard did predict longer cleaning times.

Despite the evidence that desire for control and sense of control are relevant to OCD, the specific role played by these control beliefs is unclear. Dysfunctional beliefs may influence desire for control. Logan, Baron, Keeley, Law, and Stein (1991) suggest that the level of threat perceived by an individual in a situation will influence their desire for control over the situation. Similarly, Moulding, Kyrios, and Doron (2007) suggest that the fear of guilt about not acting responsibly enough may increase a person's desire for control over a situation. There is some evidence to support these suggestions. In the dripping tap study conducted by Moulding et al. (2007) and replicated in OCD and anxiety-disordered patients by Moulding, Doron, Kyrios, and Nedeljkovic (2008), a 2 (threat) x 2 (responsibility) design was used to examine the effect of participants' perceptions of threat and their responsibility for harm on their desire and sense of control beliefs. Desire for control was found to be higher in both the high responsibility and high threat conditions, in both undergraduate and clinical groups. Sense of control was found to be higher only in the high responsibility condition for the undergraduate group and, although significant, the size of the effect on sense of control was small. Sense of control was otherwise unaffected by the responsibility or threat manipulations (Moulding et al., 2007; Moulding et al., 2008).

This is more consistent with Bandura's view that rather than threat being a fixed property of a situation, an individual's perception of threat is largely determined by their self-efficacy in relation to the situation (Bandura, 1989, 1997). According to this view, sense of control influences threat appraisal, rather than vice versa. However, there appear to be no experimental studies investigating whether sense of control or self-efficacy influence OC-related dysfunctional beliefs, such as inflated threat or responsibility. It has also been theorised that desire for control may underlie dysfunctional beliefs such as inflated responsibility or threat, since, like desire for control, these beliefs are typically associated with the taking of action, such as avoiding harm to self or others or avoiding threatening situations (Moulding, Kyrios, Doron, & Nedeljkovic, 2009). However, in regression models predicting dysfunctional beliefs and OC symptoms, when sense of control was excluded as a predictor, desire for control did not predict beliefs or symptoms (Moulding & Kyrios, 2007), so it is unclear whether desire for control underlies or contributes to dysfunctional beliefs.

In relation to OC symptoms, a higher desire for control together with a lower sense of control may motivate the taking of action to regain a greater sense of control (Moulding, Kyrios, Doron, & Nedeljkovic, 2009). Studies on superstition support this argument. As superstitious behaviour allows individuals to manage uncertainty or stress, by taking an active role in a situation (Campbell, 1996), superstitious behaviour is more likely when people's sense of control is low (Moulding & Kyrios, 2006). Findings reported by Zebb and Moore (2003) show that when the effects of superstition were controlled for, lower sense of control was related to greater OC symptoms (Zebb & Moore, 2003). The need to regain a greater sense of control may also underlie the phenomenon of illusory control, in which an individual's subjective sense of control is greater than the objectively available control (Moulding & Kyrios, 2006). Reuven-Magril, Dar, and Liberman (2008) found that when participants used keyboard presses to try to control the presentation time of visual stimuli which were, in reality, uncontrollable, participants with OCD had a greater illusion of control than those without OCD and showed more rigid key-pressing patterns in response to aversive stimuli.

In OCD research to date, control beliefs have typically been measured at the trait level, with scales that are relatively general in nature.

Even domain-specific scales, such as the Anxiety Control Questionnaire (Rapee, Craske, Brown, & Barlow, 1996) used by Moulding, Kyrios, Doron, and Nedeljkovic (2009), measure a disposition towards an aspect of life, rather than a belief about a specific situation. However, more specific scales are preferable for establishing empirical relationships between control beliefs and other variables (Logan et al., 1991; Skinner, 1996). Accordingly, measuring desire for control and sense of control in a specific situation that may induce anxiety in someone with OCD may be of greater predictive utility in relation to OC-related phenomena than measuring their trait control beliefs. Despite this, very few studies have experimentally manipulated desire for control and sense of control to examine their influence on OC phenomena (Gelfand & Radomsky, 2013). There is also little research on the relationship between control beliefs and OC contamination/washing symptoms, despite this being one of the most common symptom groups in OCD (Eisen, Yip, Mancebo, Pinto, & Rasmussen, 2010).

The aim of this study is to experimentally manipulate participants' desire for control and sense of control in respect of a hypothetical contamination scenario, so as to examine the effect of situation-specific control beliefs on participants' responsibility appraisals, threat appraisals, distress and propensity to act in relation to the potential contamination. Based on evidence that individuals with high trait desire for control proactively manage their environments (Burger, 1992), it was hypothesised that higher situation-specific desire for control would predict higher responsibility and threat appraisals in the hypothetical contamination scenarios. In addition, as self-efficacy is argued to influence threat appraisals (Bandura, 1989, 1997), it was hypothesised that lower situation-specific sense of control would predict higher threat appraisals. Finally, as higher desire for control and lower sense of control are related to OC symptoms (Moulding & Kyrios, 2007; Moulding et al., 2009) and predict distress and the propensity to act in relation to a checking scenario (Moulding, Kyrios, & Doron, 2007), it was hypothesised that higher situation-specific desire for control and lower situation-specific sense of control would be significant predictors of greater distress and a greater propensity to act in the contamination scenarios.

## **2. Method**

### **2.1 Ethical Considerations**

The study was approved by the University of Sydney Human Research Ethics Committee.

### **2.2 Participants**

Participants were 140 first year undergraduate Psychology students enrolled at an Australian university. Participants ranged in age from 17 to 61 years ( $M = 19.84$ ,  $SD = 4.85$ ) and 77.1% were female. All participants earned a small amount of course credit for participation.

### **2.3 Design**

A 2 (desire for control) x 2 (sense of control) repeated measures design was used. All participants completed the Contamination Scenarios Questionnaire (CSQ; adapted from the Obsessive-Compulsive Vignette Inventory developed by Moulding, Kyrios, & Doron, 2007). Items in the CSQ relate to four hypothetical, potential contamination scenarios, which sought to vary desire for control (higher/lower) and sense of control (higher/lower). The order of appearance of the four scenarios in the CSQ (the CSQ condition) was counterbalanced and participants were randomly assigned to receive one of the 4 CSQ conditions.

### **2.4 Materials**

#### **2.4.1 Padua Inventory – Washington State University Revision (PI-R; Burns, Keortge, Formea, & Sternberger, 1996)**

The PI-R is a 39-item self-report measure of the degree of disturbance caused by obsessional thoughts and compulsive behaviours associated with OCD. These symptoms are measured by five subscales: (a) obsessional thoughts of harm to self/others, (b) obsessional impulses to harm self/others, (c) contamination obsessions/washing compulsions, (d) checking compulsions and (e) dressing/grooming rituals. Responses are measured on a 5-point scale from 0 (Not at all) to 4 (Very much). Scores range from 0 to 156 and higher scores indicate greater disturbance. The subscales have shown internal consistency (Cronbach's alpha) of, respectively, .77, .82, .85, .88 and .78, and the scale discriminates obsessions from worry, in undergraduates (Burns et al., 1996).

### 2.4.2 Depression Anxiety Stress Scales – 21 (DASS; Lovibond & Lovibond, 1995)

The 21-item DASS is a self-report measure containing three scales which measure the severity and frequency of depression, anxiety and stress symptomology over the past week. Each scale has seven items. Responses are rated on a 4-point scale from 0 (“Did not apply to me at all”) to 3 (“Applied to me very much, or most of the time”), with higher scores indicating greater symptomology. The DASS has shown good convergent and discriminant validity when assessed against other measures of anxiety and depression and high internal consistency in clinical and non-clinical groups, with Cronbach alphas ranging from .88-.94 (depression), .82-.87 (anxiety) and .90-.91 (stress) (Antony, Bieling, Cox, Enns, & Swinson, 1998; Henry & Crawford, 2005).

### 2.4.3 Contamination Scenarios Questionnaire (Moulding, Kyrios, & Doron, 2007)

The CSQ is a modified version of the Obsessive-Compulsive Vignette Inventory (OCVI) designed by Moulding et al. (2007). The OCVI was modified by replacing the dripping tap/checking scenario with a potential contamination scenario developed by the current authors. The CSQ contains four hypothetical scenarios, in which the participant needs to use a public toilet. The four scenarios seek to vary participants’ desire for control (higher/lower) and sense of control (higher/lower). For each scenario, participants are asked to consider possible negative outcomes that could occur in the situation and to answer 4 items assessing desire for control (eg. “To what extent do you want to have control over the outcomes of this situation?”), 3 items assessing sense of control (eg. “To what extent do you feel you have control over the outcomes of this situation?”) and 2 items each for the threat perceived in the situation, beliefs about responsibility for possible negative outcomes and distress in respect of the situation. Eight items assess participants’ propensity to act in respect of the situation, including by seeking assurance or taking some preventive action. Finally, 1 question assesses relevance of the scenarios to the participant’s life. Responses are rated on a 9-point scale from 1 (“Not at all”) to 9 (“Extremely”).

## 2.5 Procedure

Participants were tested in small groups, in single sessions lasting a maximum of 50 minutes. After providing written consent to participate, participants were given the CSQ and asked to read the first scenario carefully and then to imagine themselves in that situation “as if it was actually happening to you” and then to answer the questions relating to that scenario. Participants were instructed to repeat that process for the three remaining scenarios, in the order in which they appeared in the CSQ. After completing the CSQ, participants completed the PI-R and DASS. Upon completion of the study, participants were debriefed.

## 3. Results

### 3.1 Preliminary Analyses

All statistical analyses were performed using SPSS version 22.0, with an alpha level of .05. Data screening indicated no obvious errors and a low level of missing data, which was dealt with by listwise deletion (Howell, 2008). OC symptom scores in the sample ranged from non-clinical (scores between 0-49) to clinical (scores over 50) levels, as specified by Cicolini and Rees (2003). Table 1 shows mean OC symptoms in this study within the range of other undergraduate samples and compared to an OCD sample.

**Table 1: OC Symptom Means (Standard Deviations) in Undergraduate and OCD Samples**

| Scale              | Undergraduate |                          |                     | OCD                 |
|--------------------|---------------|--------------------------|---------------------|---------------------|
|                    | Current study | Moulding & Kyrios (2007) | Inozu et al. (2012) | Burns et al. (1996) |
| PI-R Total         | 32.56 (21.91) | 25.36 (22.35)            | 45.04 (21.75)       | 54.93 (16.72)       |
| PI-R Contamination | 11.07 (8.85)  | 7.99 (7.35)              | 18.48 (9.39)        | 13.87 (7.96)        |

*Note.* Inozu et al. = Inozu, Yorulmaz, & Terzi (2012); Burns et al. = Burns, Keortge, Formea, & Sternberger (1996); PI-R Contamination = PI-R contamination obsessions and washing compulsions subscale.

#### 3.1.1 Scenario Relevance

Participants’ appraisals of the relevance of the CSQ scenarios to their life correlated moderately with OC symptoms,  $r = .30$ ,  $p = .001$ , suggesting the scenarios were relevant for the study of OC-related issues.

Table 3: Summary of hierarchical linear regression analyses for desire for control and sense of control predicting CSQ threat and distress appraisals and propensity to act

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| Measures | Threat (N = 135) |                 |              |        | Distress (N = 135) |                 |              |        | Propensity to act (N = 132) |                 |              |       |
|----------|------------------|-----------------|--------------|--------|--------------------|-----------------|--------------|--------|-----------------------------|-----------------|--------------|-------|
|          | R <sup>2</sup>   | ΔR <sup>2</sup> | FΔ           | β      | R <sup>2</sup>     | ΔR <sup>2</sup> | FΔ           | β      | R <sup>2</sup>              | ΔR <sup>2</sup> | FΔ           | β     |
| Step 1   | .09              | .09             | 13.86**<br>* |        | .11                | .11             | 15.80**<br>* |        | .06                         | .06             | 7.57**       |       |
| Anxiety  |                  |                 |              | .31*** |                    |                 |              | .33*** |                             |                 |              | .24** |
| Step 2   | .17              | .08             | 12.79**<br>* |        | .50                | .39             | 50.98**<br>* |        | .21                         | .15             | 11.84**<br>* |       |
| Anxiety  |                  |                 |              | .23**  |                    |                 |              | .14*   |                             |                 |              | .10   |
| Resp     |                  |                 |              | .30*** |                    |                 |              | -.07   |                             |                 |              | -     |
| Threat   |                  |                 |              | -      |                    |                 |              | .68*** |                             |                 |              | .12   |
| Distress |                  |                 |              | -      |                    |                 |              | -      |                             |                 |              | .32** |
| Step 3   | .27              | .10             | 9.23***      |        | .58                | .08             | 13.11**<br>* |        | .22                         | .02             | 1.34         |       |
| Anxiety  |                  |                 |              | .09    |                    |                 |              | .09    |                             |                 |              | .08   |
| Resp     |                  |                 |              | .25**  |                    |                 |              | -.13*  |                             |                 |              | -     |
| Threat   |                  |                 |              | -      |                    |                 |              | .59*** |                             |                 |              | .12   |
| Distress |                  |                 |              | -      |                    |                 |              | -      |                             |                 |              | .25*  |
| DC       |                  |                 |              | .29**  |                    |                 |              | .34*** |                             |                 |              | .15   |
| SC       |                  |                 |              | -.29** |                    |                 |              | -.08   |                             |                 |              | -.01  |
| Step 4   | .27              | .00             | 0.02         |        | .60                | .02             | 6.50*        |        | .22                         | .00             | 0.55         |       |
| Anxiety  |                  |                 |              | -      |                    |                 |              | .07    |                             |                 |              | -     |
| Resp     |                  |                 |              | -      |                    |                 |              | -.12   |                             |                 |              | -     |
| Threat   |                  |                 |              | -      |                    |                 |              | .59*** |                             |                 |              | -     |
| DC       |                  |                 |              | -      |                    |                 |              | .33*** |                             |                 |              | -     |
| SC       |                  |                 |              | -      |                    |                 |              | -.08   |                             |                 |              | -     |
| DCxSC    |                  |                 |              | -      |                    |                 |              | -.15*  |                             |                 |              | -     |

Note. Anxiety = DASS Anxiety subscale; Resp = CSQ responsibility appraisals; DC = mean-centred desire for control, measured by the DC Scale; SC = mean-centred sense of control, measured by the ACQ; DCxSC = interaction between mean-centred DC and SC. Standardised regression coefficients for Step 4 are not presented for the regressions predicting threat and propensity to act as the DCxSC interaction was not significant. \*p<.05. \*\*p<.01. \*\*\*p<.001.

### 3.1.2 Manipulation Check

To check whether the sense of control and desire for control manipulations were successful, paired samples t-tests were conducted to test for differences in control beliefs between the higher and lower sense of control scenarios and the higher and lower desire for control scenarios. Sense of control appraisals were significantly higher in the higher ( $M = 20.66, SD = 3.76$ ) than the lower ( $M = 16.28, SD = 4.33$ ) sense of control scenarios,  $t(139) = 12.59, p < .001, d = 1.06, 95\% CI [3.69, 5.06]$ , indicating that the sense of control manipulation was successful. Desire for control appraisals in the higher ( $M = 27.14, SD = 6.34$ ) and lower ( $M = 27.12, SD = 6.33$ ) desire for control scenarios did not differ,  $t(138) = 0.08, p = .934$ . The failure of the desire for control manipulation does not affect the validity of the regression analyses, but inferences about causality cannot be made in relation to situation-specific desire for control as a predictor.

### 3.1.3 CSQ Condition

The order in which the hypothetical scenarios appeared in the CSQ (CSQ condition) was counterbalanced. To check whether CSQ condition had any unintended effects on participants' control appraisals, responsibility or threat appraisals, distress or propensity to act, CSQ condition was included as a between-subjects factor in a series of one-way ANOVAs, with desire for control, sense of control, responsibility, threat and distress appraisals, and propensity to act, as dependent variables. The ANOVAs for threat appraisals,  $F(3, 136) = 3.82, p = .012, \eta^2_p = .08$ , and distress,  $F(3, 136) = 4.34, p = .006, \eta^2_p = .09$ , were significant.

Post-hoc Tukey HSD comparisons indicated that participants who received CSQ condition 3 (which presented the scenarios in the order higher sense of control (SC)/lower desire for control (DC); lower SC/lower DC; higher SC/higher DC; lower SC/higher DC) had higher threat ( $M = 37.27$ ,  $SD = 15.70$ ) and distress ( $M = 45.16$ ,  $SD = 11.74$ ) appraisals than those who received CSQ condition 1 (lower SC/higher DC; higher SC/higher DC; higher SC/lower DC; lower SC/lower DC) (threat,  $M = 26.58$ ,  $SD = 10.46$ ; distress,  $M = 34.45$ ,  $SD = 13.92$ ),  $p = .002$  for threat and  $p = .003$  for distress. There were no other significant differences in situation-specific variables by CSQ condition, all  $ps > .05$ . As CSQ condition correlated with threat,  $r = .22$ ,  $p = .009$ , and with distress,  $r = .22$ ,  $p = .010$ , the regression analyses predicting threat and distress were first conducted with dummy variables representing CSQ condition included as covariates, to check the influence of CSQ condition on the regressions. The inclusion of CSQ condition did not materially affect the results of the analyses, so to simplify the models, the results presented for threat and distress regressions do not include CSQ condition as a covariate.

### 3.2 Situation-Specific Control Beliefs as Predictors of OC Phenomena

The internal consistencies for the CSQ variables, and the correlations between CSQ variables and depression and anxiety, are reported in Table 2. All scales had good to excellent internal consistency, except Responsibility, which was poor and therefore excluded from further analysis.

**Table 2: CSQ Internal Consistencies and Zero-Order Correlations between CSQ Appraisals of Control, Threat, Responsibility, Distress, Propensity to Act, and Anxiety and Depression**

| Measure       | 1      | 2      | 3      | 4     | 5      | 6    | 7      | 8 |
|---------------|--------|--------|--------|-------|--------|------|--------|---|
| 1. DC         | -      |        |        |       |        |      |        |   |
| 2. SC         | .25**  | -      |        |       |        |      |        |   |
| 3. Threat     | .32*** | -.26** | -      |       |        |      |        |   |
| 4. Resp       | .31*** | .04    | .36*** | -     |        |      |        |   |
| 5. Distress   | .48*** | -.17*  | .69*** | .20*  | -      |      |        |   |
| 6. Action     | .32*** | -.11   | .37*** | .15   | .43*** | -    |        |   |
| 7. Depression | .05    | -.27** | .10    | .20*  | .12    | .14  | -      |   |
| 8. Anxiety    | .21*   | -.28** | .29**  | .27** | .31*** | .22* | .60*** | - |
| $\alpha$      | .96    | .84    | .92    | .55   | .88    | .92  | -      | - |

*Note.* Depression = DASS-Depression scale; Anxiety = DASS-Anxiety scale; DC = CSQ desire for control appraisals; SC = CSQ sense of control appraisals; Threat = CSQ threat appraisals; Resp = CSQ responsibility appraisals; Distress = CSQ distress appraisals; Action = CSQ propensity to act scores.

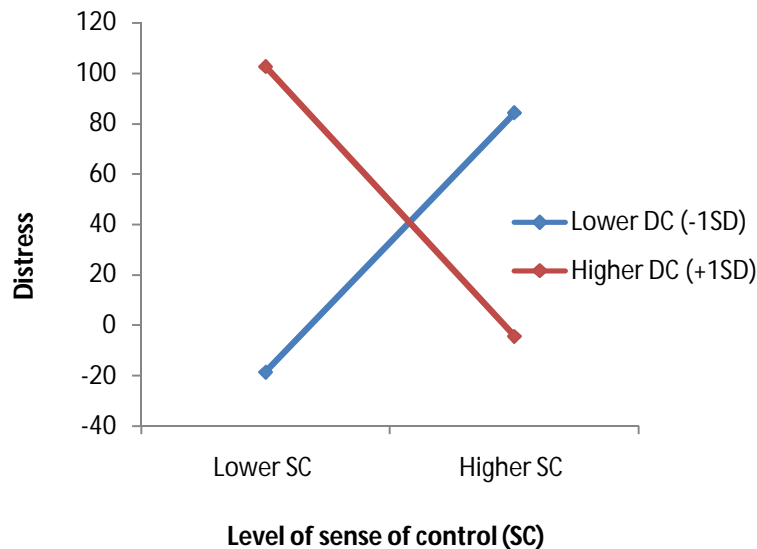
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Three separate hierarchical linear regression analyses were conducted to examine whether situation-specific desire for control, sense of control or their interaction predicted threat appraisals, distress and propensity to act. These regressions are summarised in Table 3.

As can be seen in Table 2, threat appraisals correlated significantly with anxiety, responsibility, desire for control and sense of control. Anxiety was entered as a background variable at step 1, followed by responsibility, then desire for control and sense of control, and their mean-centred interaction. Threat was also significantly correlated with distress and propensity to act. However, neither distress nor propensity to act were included in the regression model, since current cognitive models of OCD conceptualise distress and OC-related behaviours as being outcomes of dysfunctional beliefs and obsessions, rather than as contributors to dysfunctional beliefs. Over and above responsibility, greater desire for control and lower sense of control accounted for equal increases in threat appraisals.

Distress was significantly correlated with anxiety, responsibility, threat, sense of control and desire for control (see Table 2). Anxiety, responsibility and threat were therefore entered as background variables, followed by desire for control and sense of control, then their interaction. The model explained 60% of the variance in distress appraisals,  $F(6, 128) = 32.33$ ,  $p < .001$ . Higher levels of both threat and desire for control significantly predicted higher distress.

While sense of control was not a significant individual predictor of distress, there was a significant interaction between desire for control and sense of control, indicating that desire for control predicts distress differently at different levels of sense of control. This interaction is shown in Figure 1, using centred data for all variables, at high (mean + 1SD) and low (mean - 1SD) levels of sense of control and desire for control. At higher levels of desire for control, distress is greater when sense of control is lower. However, at lower levels of desire for control, distress is higher when sense of control is higher. To further understand the interaction, a simple slopes analysis was conducted by regressing distress on desire for control separately for high and low sense of control, using Holmbeck's (2002) method. The slopes for lower,  $\beta = .404$ ,  $t(123) = 5.70$ ,  $p < .001$ , and higher,  $\beta = .270$ ,  $t(123) = 3.67$ ,  $p < .001$ , desire for control were significant, indicating that the relationship between desire for control and distress is significant across levels of sense of control.



**Figure 1: Relationship between Distress and Desire for Control (DC), by Sense of Control**

Propensity to act was significantly correlated with anxiety, threat, distress and desire for control appraisals (see Table 2). Unexpectedly, propensity to act and sense of control were not significantly correlated. In the regression for propensity to act, anxiety was entered at step 1, then threat and distress appraisals at step 2. At step 3, although sense of control was not correlated with propensity to act, it was entered together with desire for control so that their interaction could be tested. In this model, which explained 22% of the variance,  $F(6, 125) = 5.96$ ,  $p < .001$ , distress was the only significant individual predictor of unique variance in propensity to act. Contrary to hypothesis, neither desire for control nor sense of control explained significant variance in propensity to act.

#### 4. Discussion

This study examined whether situation-specific control beliefs influence appraisals of threat, responsibility, distress and propensity to act, in respect of a set of hypothetical contamination scenarios. As hypothesised, higher threat appraisals were predicted by both higher situation-specific desire for control and lower situation-specific sense of control. While no previous studies have investigated whether situation-specific sense of control predicts threat in an OCD-relevant context, this finding parallels the relationship found between trait sense of control and responsibility and threat beliefs by Moulding and Kyrios (2007). It is also consistent with Bandura's formulation of an individual's perception of threat in a situation as being determined by the relationship between the individual's self-efficacy beliefs and their environment, rather than being a fixed property of the situation (Bandura, 1997). Although trait desire for control has previously been found not to predict responsibility or threat beliefs (Moulding & Kyrios, 2007), the present finding that situation-specific desire for control predicts threat may reflect the greater predictive utility of a situation-specific measure of control compared to a trait measure (Logan, Baron, Keeley, Law, & Stein, 1991).

We also hypothesised that higher situation-specific desire for control and lower situation-specific sense of control would predict greater distress, and a greater propensity to act, in relation to the contamination scenarios. The hypothesis in relation to distress was partly supported, with higher desire for control predicting more distress.

Sense of control did not itself predict distress, but interacted with desire for control. For participants with higher desire for control, distress increased when sense of control was lowered. The pattern was reversed for participants with lower desire for control, as their distress increased when sense of control was heightened. These results suggest that, amongst individuals with a higher desire to control an OCD-relevant situation, lowering their sense of control over that situation will contribute to greater distress. This is consistent with evidence that greater distress is experienced in the context of dental treatment and childbirth when this same discrepancy in control beliefs occurs (Baron & Logan, 1993; Baron, Cusumano, Evans, Hodne, & Logan, 2004). Further, it complements the finding that experimentally increasing the sense of control in individuals with higher desire for control decreases their distress (Law, Logan, & Baron, 1994), and suggests that the discrepancy between higher desire for control and lower sense of control plays a causal role in contributing to distress (Baron & Logan, 1993).

One previous study considered the relationship between control beliefs and distress in an OCD-relevant situation. Unlike the present study, Moulding, Kyrios, and Doron (2007) found both higher desire for control and lower sense of control predicted more distress in respect of a hypothetical checking scenario. However, lower sense of control predicted more distress when participants felt low responsibility for any potential negative outcomes, but not when they felt high responsibility. This suggests that sense of control and responsibility interact in relation to distress, which may have obscured any relationship between sense of control and distress in the current study, where responsibility was not varied.

The hypothesis that desire for control and sense of control would predict propensity to act was not supported. The sole predictor of higher propensity to act was higher distress. Previous studies have found that both desire for control and sense of control, or closely related constructs, predict OC-related checking behaviours (Mancini, D'Olimpio, & Cieri, 2004; Moulding, Kyrios, & Doron, 2007), cleaning behaviours (Gelfand & Radomsky, 2013) and OC symptoms (Moulding & Kyrios, 2007; Moulding, Kyrios, Doron, & Nedeljkovic, 2009). However, although some of these studies controlled for background negative affect, none included participants' situational level of distress as a predictor. Taken together, the findings of those studies in relation to OC-related behaviours, and of this study in relation to distress and propensity to act, suggest that control beliefs may influence OC-related behaviours through their influence on distress.

This study contributes to the existing body of research on the relationships between control beliefs and OC-phenomena by providing preliminary evidence of the influence of situation-specific control beliefs. In particular, we have shown that situation-specific sense of control influences threat appraisals in an OCD-relevant situation. Additionally, we have shown that lowering sense of control in people with higher desire for control increases their distress and that this situational distress predicts propensity to act in an OCD-relevant situation. These findings complement earlier findings (Gelfand & Radomsky, 2013; Mancini, D'Olimpio, & Cieri, 2004; Moulding, Kyrios, & Doron, 2007) that control beliefs predict and influence OC-related behaviours, by suggesting for the first time that control beliefs predict OC-related behaviours indirectly through distress.

This interpretation of the present findings is consistent with current cognitive models of OCD, which posit that individuals with OCD engage in compulsive behaviours to reduce the distress associated with obsessions. These findings also support earlier phenomenological characterisations of OCD as fundamentally control-related (Moulding & Kyrios, 2006), which suggests that despite the variation in symptoms, OCD is a unitary condition (McKay et al., 2004).

The results of this study have clinical implications. Cognitive therapies such as Danger Ideation Reduction Therapy (DIRT) that target excessive threat appraisals for OCD washers have been shown to be effective in reducing OC symptomology (Krochmalik, Jones, Menzies, & Kirkby, 2004). Since the current study found that control beliefs influence both threat appraisals and distress, it is suggested that directly targeting control cognitions may reduce both threat and distress. However, as compulsive behaviours are an attempt to reduce the discrepancy between desired and perceived control by increasing perceived control (Reuven-Magril, Dar, & Liberman, 2008), cognitive therapy that assists individuals to lessen their need for control may be preferable (Moulding & Kyrios, 2006). This might be achieved by decreasing an individual's belief in the need to control a feared event or strengthening their belief in their ability to cope with it (Shapiro & Astin, 1998), or assisting individuals to accept their thoughts and feelings through mindfulness-based therapy (Hanstede, Gidron, & Nykliček, 2008).



There are a number of limitations to the current study. First, since the desire for control manipulation was not successful, no causal inferences can be made about the relationship found between desire for control and threat, or about the role of desire for control in contributing to distress independently of lowered sense of control. The intended manipulation of participants' desire for control may have been overridden by the sense of control manipulation, or the desire for control manipulation may not have been strong enough. Earlier studies that have examined desire for control as an independent variable have formed higher versus lower desire groups using median splits of trait desire for control (Keinan, 2002; McLaren & Crowe, 2003). No earlier studies have directly manipulated desire for control. It is possible that existing levels of trait desire for control are not easily manipulated, particularly in a hypothetical context. Second, no hypotheses in relation to situation-specific responsibility appraisals were able to be tested due to the poor internal consistency of the CSQ responsibility scale. Additionally, this study focused on the contamination/washing subtype of OCD, therefore the findings may not generalise to other subtypes, such as the symmetry, unacceptable thoughts or hoarding subtypes, that are not so closely associated with responsibility and threat beliefs. Finally, this study employed a non-clinical sample. It is possible that different relationships between control beliefs, dysfunctional threat and responsibility beliefs, distress and OC-related behaviours may be found in a clinical sample. Future research overcoming these limitations is required.

## 5. References

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