Shame and Metacognitive Beliefs in Obsessions and Compulsions

School of Psychology, University of Adelaide

September 26, 2022

Word Count: 9,383

This thesis is submitted in partial fulfilment of the Honours degree of Bachelor of Psychology (Advanced) (Honours)

Table of Contents

List of Figures

List of Tables

Abstract

The metacognitive model of obsessive-compulsive disorder (OCD) proposes that metacognitive beliefs guide negative appraisals of intrusive thoughts, causing heightened emotions, and leading to compulsions being performed to regulate emotions. Previous research has observed a positive association between OCD symptoms and shame, and it has been suggested that some individuals may perform compulsive behaviours to regulate shame. At present there are no studies investigating the relationship between shame and specific metacognitive beliefs described by the metacognitive model of OCD. This analogue study employed a cross-sectional design using a sample of 229 university students who completed online questionnaires measuring OCD symptoms, shame, and metacognitive beliefs. Scores on these measures were used to explore several mediation models describing relationships predicted by the metacognitive model of OCD. The hypotheses tested in this study were mostly confirmed. Metacognitive beliefs known to be associated with OCD symptoms were found to be significantly and positively correlated with shame. In simple mediation models, shame was found to have a significant indirect effect on the relationship between metacognitive beliefs and OCD symptoms. In serial mediation models, specific metacognitive beliefs and shame were found to have a small but significant sequential indirect effect on the relationship between obsessions and compulsions. The findings of this study provide some cross-sectional support for the metacognitive model of OCD, but they also suggest that shame plays a role in the relationship between obsessions and compulsions that is independent of metacognitive beliefs.

Keywords: shame, metacognitive beliefs, obsessions, compulsions

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

Contribution Statement

In producing this thesis, my supervisors and I collaborated to generate research questions of interest and to design appropriate methodology. I conducted the literature search and completed the ethics application. My supervisors and I collaborated to select appropriate measures to test the research questions in the study, and I designed the Qualtrics survey and was responsible for all data collection. I performed all data analysis in the study with the guidance of my supervisors and I wrote all sections of this thesis.

Shame and Metacognitive Beliefs in Obsessions and Compulsions

Intrusive or obsessive thoughts are experienced to some degree by most individuals (Rachman & de Silva, 1978) and can trigger a range of emotional responses including anxiety, revulsion, and shame (Wells et al., 2017). For people diagnosed with obsessive-compulsive disorder (OCD) intrusions can be frequent and intense, and they are often accompanied by compulsive behaviours performed to regulate emotional distress. Cognitive psychological theories propose that beliefs about the importance of thoughts, or metacognitive beliefs, are involved in guiding appraisals of obsessive thoughts (Wells, 1997). Differences in metacognitive beliefs may help explain why obsessive thoughts are dismissed relatively easily by some people, and why obsessive thoughts elicit stronger emotional responses and provoke compulsive behaviours in other people. Research has consistently observed a positive association between shame and OCD, and preliminary research suggests that some individuals may perform compulsive behaviours to regulate shame arising from obsessive thoughts (Valentiner & Smith, 2009; Visvalingam, 2022). Further research exploring the relationship between shame and metacognitive beliefs in obsessions and compulsions is warranted; exploration of the processes underlying the relationships between these variables could further theoretical knowledge and help improve therapeutic strategies. In this study, mediation models will be used to investigate relationships involving shame and metacognitive beliefs that are described by the metacognitive model of OCD (Wells, 1997, 2011, Wells et al., 2017).

Obsessions and Compulsions

Obsessive thoughts and compulsive behaviours are defining characteristics of OCD (American Psychiatric Association, 2022). Obsessions are persistent, unwanted, intrusive thoughts, urges, or images that cause distress and may be followed by behavioural or mental

action to suppress or neutralise them. Compulsions are excessive and repetitive mental acts or behaviours performed in response to obsessions, and with the aim of reducing distress arising from them. To meet the diagnostic criteria for OCD the experience of obsessions and compulsions must consume enough time and be severe enough to cause clinically significant impairment and distress (American Psychiatric Association, 2022). OCD is associated with significant functional impairment in many areas of life including personal relationships, work, and education, resulting in diminished quality of life (Eisen, 2006; Huppert, 2009; Sørensen et al., 2004) and with increased risk of suicide (Angelakis et al., 2015). It is also common for people who are diagnosed with OCD to have co-morbid psychopathology, particularly mood and anxiety disorders (Ruscio et al., 2010). Although research suggests that OCD symptoms occur within the general population on a continuum of severity (Abramowitz et al., 2014), less than 2% of people experience symptoms severe enough to be diagnosed with OCD (Fawcett et al., 2020; Ruscio et al., 2010). Men diagnosed with OCD are more likely to have an earlier age of onset than women (Rusio et al., 2010), but a recent meta-analysis suggests that throughout their lifetime women are more likely to be diagnosed with OCD than men (Fawcett et al., 2020). It has also been observed that a slightly higher prevalence of OCD (4-5%) exists among university students (Sulkowski et al., 2011, Yoldascan et al., 2009).

OCD is a heterogenous condition in which two individuals with the same diagnosis may report quite different patterns of obsessions and compulsions (Abramovitch et al., 2021). The content of obsessions may vary widely among individuals who are given a diagnosis of OCD and tends to reflect contemporaneous and culturally relevant concerns; importantly, a feature that distinguishes obsessions from other negative thoughts is that they are experienced as being ego-dystonic, or inconsistent with one’s sense of self (Purdon & Clark, 1999). Common themes have been observed among intrusive thoughts, which include content

relating to contamination, sexual themes, religious themes, immorality, aggression, symmetry, order, and doubt (García-Soriano et al., 2011). Similarly, a range of commonly observed compulsions have been noted such as washing, counting, checking, ordering, and hoarding (Foa et al., 1998). That there are common themes observed in obsessions and compulsions has led researchers to attempt to identify OCD symptom subtypes. Numerous factor analytic studies of the Yale Brown Obsessive Compulsive Scale (YBOCS; Goodman et al., 1989), a diagnostic tool for OCD that is widely considered the gold-standard, have revealed four underlying factors that may reflect clinically useful OCD subtypes: those with symmetry obsessions and ordering compulsions, those with contamination obsessions and washing compulsions, those with religious, sexual, or aggressive obsessions and checking compulsions, and those with hoarding obsessions and compulsions (Cullen et al., 2007; Feinstein et al., 2003, Hasler et al., 2006).

The obsessive thoughts and compulsive behaviours that are cardinal features of OCD are also experienced widely among non-clinical populations, with clinical symptoms differentiated by the frequency, intensity, and extent to which they cause distress and impairment (Abramowitz et al., 2014). Rachman and de Silva (1978) conducted a study in which they found that individuals in a non-clinical sample experienced unwanted intrusive thoughts that are comparable in content and form to clinical obsessions; this finding has been replicated several times (Belloch et al., 2004; García-Soriano et al., 2011; Purdon & Clark, 1993; Salkovskis & Harrison, 1984). Covert and overt neutralising strategies similar to the compulsions present in OCD have also been widely observed in non-clinical populations (Freeston et al., 1995; Ladouceur et al., 2000; Marks & Woods, 2007), and evidence from experimental research indicates that these compulsions serve the same distress-reducing function as clinical level compulsions (Rachman et al., 1996). Because intrusive thoughts similar to obsessions and neutralising behaviours similar to compulsions occur widely in the

general population, it may be helpful to understand cognitive mechanisms underlying OCD with analogue studies in non-clinical populations (Abramowitz., 2014). Analogue studies that examine the frequency and intensity of obsessions and compulsions may help to explain why some individuals experience obsessions and compulsions more frequently and more intensely than others, as well as helping to identify novel treatment targets.

For those people with symptoms severe enough to be diagnosed with OCD the level of distress and impact on quality of life is high, and therefore delivery of effective and compassionate interventions is vital. If left untreated OCD typically follows a chronic and deteriorating course (Pinto et al., 2006) and, prior to modern behavioural and cognitive psychological approaches, was considered a relatively untreatable condition (Abramowitz, 2006). The development of behavioural interventions saw the prognosis for people diagnosed with OCD improve considerably; a prominent behavioural intervention is exposure and response prevention (ERP), which involves the triggering of obsessions while refraining from engaging in compulsions (Abramowitz, 2006). Although ERP has been shown to be effective in reducing symptom severity by 48-59%, this treatment approach requires intensive engagement with stimuli that may be distressing and are typically avoided. Consequently, many people find the experience to be intolerable and are reluctant to complete exposure exercises or drop out of treatment completely (Kozak & Coles, 2005). For some people with OCD, pharmacological interventions such as selective serotonin reuptake inhibitors (SSRIs) are also effective in reducing symptom severity, but medications can also produce unwanted side effects (Del Casale et al., 2019). The most commonly used intervention strategy at present is cognitive behavioural therapy (CBT), sometimes in combination with SSRI medications and often in combination with ERP (Abramowitz et al., 2018). A meta-analysis of studies investigating effectiveness of CBT treatment for OCD found that combined CBT and medication, combined CBT and ERP, and CBT alone all had large effect sizes when

compared to waiting list and controls (Öst et al., 2015). Interestingly, there were no significant differences between CBT alone and when CBT was combined with either medication or ERP. Traditional CBT interventions for treating OCD typically include challenging and modification of dysfunctional cognitive beliefs thought to underlie the distress experienced in response to obsessive thoughts (Clark, 2006). Belief domains that have been identified as being of particular relevance to OCD include cognitive beliefs about perfectionism and responsibility, and metacognitive beliefs about the importance and control of thoughts (OCCWG, 2005).

Metacognitive Beliefs

Metacognition refers to knowledge, experiences, strategies, and beliefs about thinking and was first elaborated on by Flavell (1979). Metacognitive beliefs are a specific class of beliefs concerning the significance, meaning, and power of thoughts (Wells et al., 2017). For example, one might hold positive beliefs about the usefulness of worry for problem solving, or one might hold negative beliefs about the danger or uncontrollability of thoughts. One might believe that it is necessary or desirable to be in control of their thoughts and thought processes, or one might have negative beliefs about the integrity of their memory (Wells & Cartwright-Hatton, 2004). It is also common for people to have beliefs about the power of their thoughts to interact with or influence actions, events, or objects in the real world (Myers et al., 2009). Though these types of beliefs do occur even in the absence of a disorder such as OCD, modern cognitive models of OCD imply that dysfunctional metacognitive beliefs play a prominent role in the development and maintenance of the disorder (Hezel & McNally 2016; Wells, 2011).

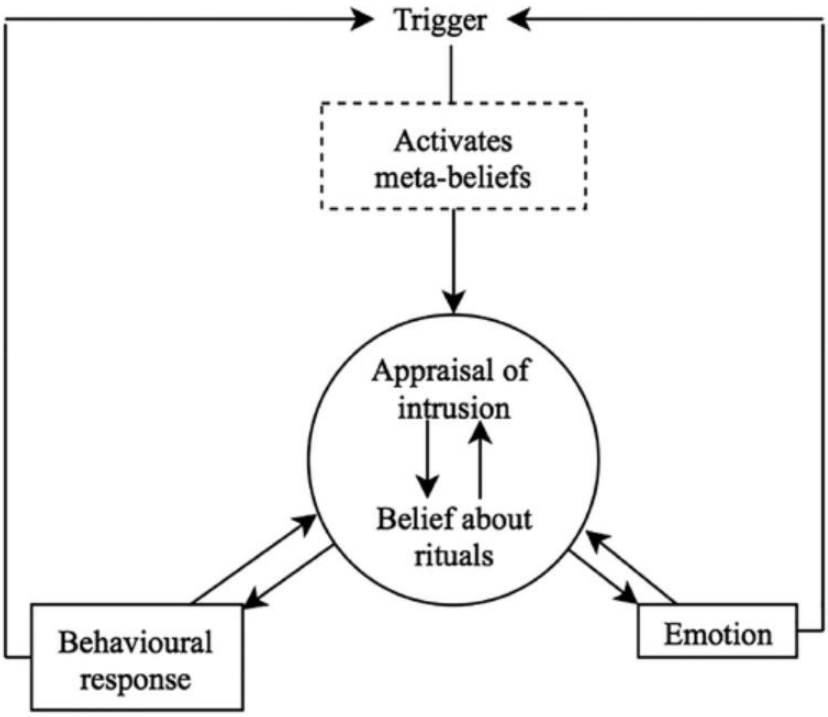
Cognitive models of OCD have been proposed that incorporate a number of theoretical perspectives, and these can be useful in understanding and predicting cognitive

processes that underlie the disorder. Salkovskis (1985) developed a model in which inflated responsibility is emphasised. In Salkovskis' model an individual might interpret intrusive thoughts as indicating potential harm and then perform compulsions to alleviate anxiety arising from a sense of responsibility for harm. Rachman (1997) expanded on Salkovkis' model by incorporating another factor which was described as "catastrophic misinterpretations" of thoughts, proposed to be caused by a phenomenon known as thought-action fusion (TAF), in which one believes that thinking about an action or an event makes it more likely to happen in reality (Rachman, 1993). TAF metacognitive beliefs induce the perception of responsibility for harm because an individual believes the probability of a negative outcome is increased as a function of their thinking about it (Shafran et al., 1996).

Another cognitive model that seeks to explain the development and maintenance of the disorder is the metacognitive model of OCD (Wells, 1997, 2011; Wells et al., 2017). In Wells' information processing model, dysfunctional metacognitive beliefs play a central role whereas other cognitive beliefs associated with OCD (such as inflated responsibility) are considered by-products of the effect metacognitive beliefs have on processing (Meyers et al., 2009). The model assumes that beliefs about the significance, meaning and power of thoughts are triggered when an obsession thought occurs. These beliefs guide appraisals of the intrusion, resulting in a perception of threat and subsequent anxiety and other emotions that both reinforce the perception of threat from intrusions and also drive compulsions, which are performed as a means of escaping threat and coping with distress. Wells and Matthews (1996) first proposed a metacognitive model based on their self-regulatory executive function (S-REF) model in which metacognitive beliefs, appraisals, and attentional control interact to maintain emotional disorders. The model was further expanded on by Wells (1997) and a diagrammatic representation can be seen in Figure 1.

Figure 1

The Metacognitive Model of OCD



Note. From *Cognitive therapy of anxiety disorders: A practice manual and conceptual guide* (p.242), by Wells. A, 1997, Chichester, UK: John Wiley & Sons. Copyright 1997 by John Wiley & Sons.

The metacognitive model of OCD considers thought-fusion beliefs to be especially important in the aetiology of OCD. A metacognitive perspective classifies thought-fusion beliefs as either thought-event fusion, thought-action fusion, or thought-object fusion. Thought-event fusion is the belief that thinking about an event will influence its occurrence or indicate that the event has occurred; thought-action fusion is the belief that thinking about doing something will increase the probability that the person will act even if it is something undesirable, and thought-object fusion is the belief that thinking about an object can influence or cause contamination of the object (Wells, 2017). In the metacognitive model of OCD thought-fusion beliefs have a primary role in guiding the appraisal of an obsessive thought as

potentially harmful or as simply an event in the mind. The relationship between OCD symptoms and thought-fusion beliefs as conceptualised by the metacognitive model has been well established in clinical and non-clinical populations (Grøtte et al., 2015; Gwilliam et al., 2004; McNicol & Wells, 2012; Myers et al., 2009; Solem et al., 2010).

Other metacognitive domains implicated by the metacognitive model include positive beliefs about worry, negative beliefs about the uncontrollability and danger of thoughts, beliefs about the need to control thoughts, beliefs about cognitive competence, and cognitive self-consciousness. Positive associations have consistently been demonstrated between OCD symptom severity and total scores on measures of these metacognitive domains in clinical and non-clinical samples (Irak & Tosun, 2008; Timpano et al., 2014; Wells & Papageorgiou, 1998). Also, changes in total scores on the same metacognitions measure have been shown to be positively and significantly correlated with changes in OCD symptom severity following treatment (Solem et al., 2009). Of these metacognitive domains, there is most evidence for a relationship between OCD symptoms and negative beliefs about the uncontrollability and danger of thoughts (Cho et al., 2012; Grøtte et al., 2016; Sica et al., 2007; Yilmaz et al., 2008), between OCD symptoms and beliefs about the need to control thoughts and the consequences of not doing so (Hermans, et al., 2003; Janeck et al., 2003), and between OCD symptoms and cognitive self-consciousness, which is the tendency to closely monitor one's own thoughts and thought processes (Grøtte et al., 2016; Irak & Tosun, 2008; Janeck et al., 2003; Wells & Papageorgiou, 1998).

Shame

Shame is self-conscious emotion involving negative evaluation of the entire self and is experienced as a sense of being defective, flawed, inferior, powerless, humiliated, or exposed (Lewis 1971; Tangney & Dearing, 2002). Shame affects one's mood and sense of

personal identity (Woien et al., 2003) and can lead to withdrawal, avoidance, and concealing behaviours (Tangney & Dearing, 2002). Guilt is distinct from shame, in that guilt involves negative appraisal of one's behaviour and tends to motivate reparative behaviours, whereas shame involves negative appraisal of one's self and more often leads to withdrawal, avoidance, and concealing behaviours (Tangney & Dearing, 2002). Shame can be differentiated as external, when arising from the perception that others may evaluate one's self negatively, or internal, when arising from global self-judgements (Gilbert, 2003), but typically the experience of shame involves interaction of both internal and external aspects (Matos et al., 2021). A number of measures of shame exist including scales of state-shame, shame-proneness, trait, and dispositional shame (Andrews et al., 2002; Marschall et al., 1994; Tangney et al., 1989). Empirical studies have shown shame to be associated with a wide range of psychopathologies including anxiety, depression, bipolar disorder, and eating disorders (Cândea & Szentagotai, 2013).

Recent reviews describe a growing body of evidence that shame is prominent in OCD (Szentagotai-Tătar et al., 2020; Weingarden & Renshaw, 2015). Elevated levels of state shame have been observed among people diagnosed with OCD when compared to healthy controls (Hezel et al., 2012), and research suggests that individuals with OCD symptoms that are clinically relevant have stronger defectiveness/shame schemas than individuals with OCD symptoms that do not reach a clinical level (Kim et al., 2014). A study comparing healthy controls and people with OCD using functional magnetic resonance imaging (fMRI) found that the OCD group had higher levels of trait shame and increased activity in the limbic, hypothalamic, and temporal areas when exposed to shame related stimuli (Hennig-Fast et al., 2015). Correlational studies using student samples have also demonstrated associations between obsessive compulsive beliefs and shame-proneness (Weingarden & Renshaw, 2014) and shame-proneness and OCD symptom severity (Olatunji et al., 2015). There is also

evidence to suggest that obsessions featuring thoughts of harm and symmetry may be more closely linked to shame (Wetterneck et al., 2014), and that dimensions of shame (characterological, behavioural, and bodily shame) may be differentially related to OCD symptom dimensions (Singh et al., 2016).

Weingarden & Renshaw (2015) published a narrative review of the relationship between shame and OCD and related disorders and proposed a role for shame within cognitive models of OCD such that obsessions may trigger shame and compulsions may be performed to neutralise shame. A study that investigated the role of shame-proneness, TAF, and obsessions in predicting compulsions found that in shame-prone individuals the relationship between obsessions and compulsions was strengthened by TAF metacognitive beliefs (Valentiner & Smith, 2008). Another more recent experimental study found that induced harm and sexual obsessions elicited shame in participants, and shame responses were associated with greater urges to neutralise (Visvalingam et al., 2022). These studies suggest that some individuals may engage in compulsions to neutralise shame; nevertheless, further research is needed to confirm this finding and to explore the theoretical and clinical implications.

The Current Study

Although there is evidence of a relationship between shame and OCD (Szentagotai-Tătar et al., 2020; Weingarden & Renshaw, 2015) and emerging evidence that suggests a relationship between shame, metacognitive beliefs, obsessions, and compulsions (Valentiner & Smith, 2008), further investigation of these relationships is warranted. Understanding the role of shame in relation to cognitive processes underlying the development and maintenance of OCD may help to guide development of theoretical models and aid clinical practice. There are no studies investigating the relationship between shame and the specific metacognitive

beliefs described in Wells' (1997) metacognitive models of OCD. The current study aims to examine the connection between shame and metacognitive beliefs in obsessions and compulsions.

Previous research has identified that specific metacognitive beliefs – thought-fusion beliefs, negative beliefs about the uncontrollability and danger of thoughts, beliefs concerning the need to control thoughts, and cognitive self-consciousness, are consistently associated with OCD symptoms (Wells, 2017). The first hypothesis of the current study is that people who score higher on measures of these specific metacognitive constructs will also score higher on a measure of dispositional shame.

In this study, simple and serial mediation models will be used to investigate the relationships between shame, metacognitive beliefs, obsessions, and compulsions that is described by the metacognitive model of OCD. In Wells' metacognitive model of OCD, obsessive thoughts engage metacognitive beliefs that are causal in the appraisal of threat. The heightened emotions (e.g., anxiety, revulsion, shame) generated by this appraisal drive compulsive behaviours that are performed to reduce the experience of negative affect; this, in turn, increases awareness of intrusions. The current study aims to explore the relationships proposed by the metacognitive model as described in Figure 1. Therefore, the second hypothesis of the current study is that shame will mediate the relationship between metacognitive beliefs and OCD symptoms as in Figure 2. The third hypothesis is that metacognitive beliefs and shame will serially mediate the relationship between obsessions and compulsions as in Figure 3.

Figure 2

Generic Form of a Simple Mediation Model Linking Metacognitive Beliefs to OCD Symptoms Severity Through Dispositional Shame.

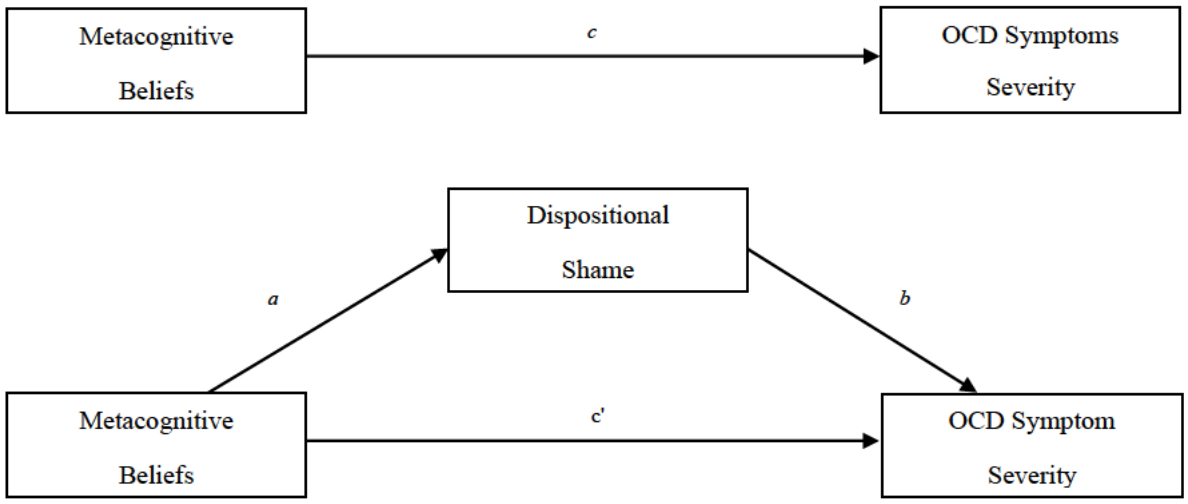
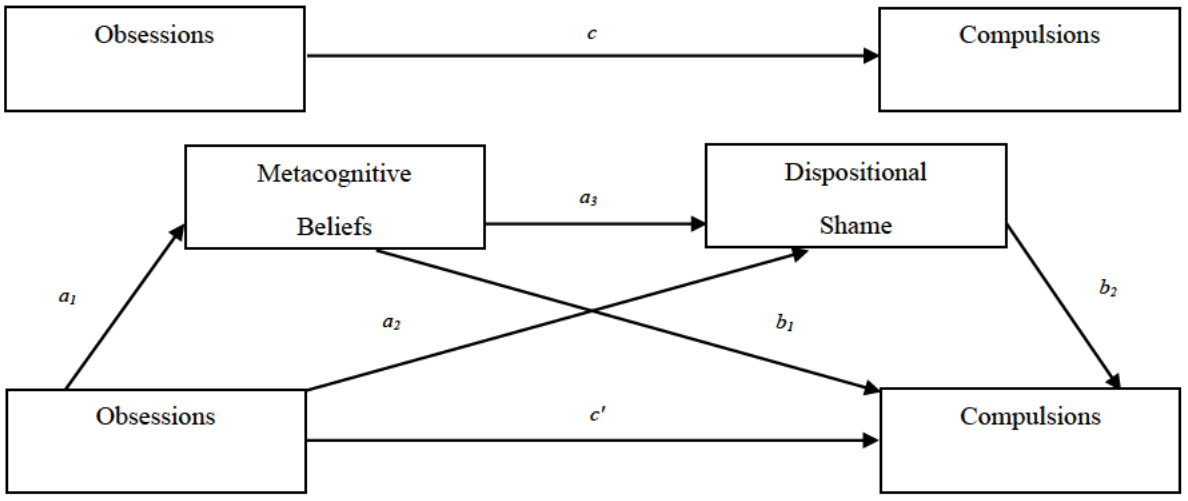


Figure 3

Generic Form of a Serial Mediation Model Linking Obsessions to Compulsions Through Metacognitive Beliefs and Dispositional Shame.



Method

Participants and Procedure

The participants in the current study were all current University of Adelaide (UoA) students. The high prevalence of OCD symptoms in university students noted by previous research (Sulkowski et al., 2011, Yoldascan et al., 2009) justifies the use of a student samples in OCD analogue studies. The majority were enrolled in first-year psychology courses (74%), and the remainder were from the wider student population who either responded to posts on a UoA website or Facebook page advertising the study (20%) or responded to fliers placed on UoA noticeboards featuring a QR code link to the study (6%)**.** There were 263 participants who commenced the survey, and 34 were excluded due to incomplete questionnaire data. The final sample of 229 participants had a mean age of 21.14 (SD = 6.01) and the majority reported identifying as a woman (75%), with a lesser number identifying as a man (23%), as non-binary (1%), or preferring not to say (1%). Most participants reported having completed some university study but not having a degree (74%). Others had completed a bachelor's degree (12%), a post-graduate degree (7%), and some did not give details (7%). Most participants reported speaking English as their first language (83%), with others reporting speaking Vietnamese (3%), Cantonese (2%), Mandarin (2%), Bahngla (1%), Gujarati (1%), Hindi (1%), Tagalog (1%), and smaller numbers of participants speaking Afrikaans, Bahasa Indonesian, Balochi, German, Korean, Nepali, Polish, Punjabi, Russian, Spanish, and Tamil.

The project was approved by the Human Research Ethics Sub-committee of the School of Psychology at the UoA (approval 22/49). Participants were eligible if they were at least 18 years of age and a current student of UoA. The sample was recruited between May and August in 2022 through UoA's Research Participation System (RPS), advertising on the UoA Unified website, advertising on UoA student Facebook pages, and through flyers on

UoA campus noticeboards. Participants in the study completed an online survey that was estimated to take 15 minutes to complete. First-year psychology students completing the survey through the RPS received 0.5 units of course-credit for participation, and all other participants were given the opportunity to enter a draw to win one of two $50 gift certificates. Participants were also given the opportunity to elect to receive a summary of the study results by email. Participants whose scores on a scale for obsessive compulsive symptoms were over a pre-determined clinical threshold (and who had indicated they would like to be contacted for this reason) were emailed by the research team and provided with information and resources to aid help seeking. The collected data were stored on a secure server and de-identified to protect the privacy of participants who provided email addresses.

Measures

In addition to providing demographic information (i.e., age, gender, level of education, and first language), participants completed the following self-report measures of shame, metacognitive beliefs, and OCD symptoms (see Appendix A)

Experience of Shame Scale (ESS; Andrews et al., 2002)

The 25-item self-report ESS was derived from Andrews and Hunter's (1997) interview measure of shame. The ESS assesses the experience of shame over the past year and can be considered a measure of dispositional shame. The instrument is designed to assess areas of characterological shame (shame of personal habits, manner with others, sort of person you are, and personal ability), behavioural shame (shame about doing something wrong, saying something stupid, and failure in competitive situations), and bodily shame (feeling ashamed of your body or parts of it). For each of the eight areas of shame there are three items in the scale that address associated experiences (e.g., 'have you felt ashamed of any of your personal habits?') cognitions (e.g., 'have you worried about what other people

think of any of your personal habits?'), and behaviours (e.g., 'have you ever tried to cover up or conceal any of your personal habits?'). The scale also contains one additional item related to bodily shame which concerns avoidance of mirrors. The measure uses a 4-point scale ranging from 1 (not at all) to 4 (very much) which participants use to rate the degree to which the questions reflect their feelings at any time in the past year. Only the total score (obtained by summing scores on all 25 items) was used. Andrews et al. (2002) found the ESS to have good internal consistency with Cronbach's alpha of .92 and a test-retest reliability coefficient of .83 after an 11-week interval. In the current study, McDonald's omega for the ESS was in the acceptable range at .96.

Metacognitions Questionnaire-30 (MCQ-30; Wells & Cartwright-Hatton, 2004)

The 30-item self-report MCQ-30 was developed as a revised and shortened form of the Metacognitions Questionnaire (Cartwright-Hatton & Wells, 1997) and is designed to measure metacognitive beliefs important in the metacognitive model of psychological disorders. The instrument incorporates five subscales (each containing six items) representing specific domains of metacognitive beliefs, namely: positive beliefs about worry, negative beliefs about the uncontrollability and danger of thoughts, beliefs about the need to control thoughts, beliefs about cognitive competence, and cognitive self-consciousness. Items take the form of short statements (e.g., 'I need to worry in order to remain organised') to which participants indicate how much they agree with the statement on a 4-point scale ranging from 1 (do not agree) to 4 (agree very much). Subscale scores for each of the five metacognitive belief domains can be calculated, as well as a total score obtained by summing scores on all 30 items. Wells & Cartwright-Hatton (2004) found the MCQ-30 to have good internal consistency with Cronbach's alphas of .93 for the total score, alphas ranging from .72 to .93 for the individual subscales, and a test-retest coefficient of .75 for the total score and .59 to .87 for the subscales after a 5-week interval. In the current study, McDonald's omega was

acceptable, being .90 for the MCQ-30 total score and ranging from .74 to .87 for the subscales.

Thought Fusion Instrument (TFI; Wells et al., 2011)

The 14-item self-report TFI was designed to measure a class of metacognitive beliefs, known as thought-fusion beliefs, that are fundamental to the metacognitive model of OCD. The instrument measures thought-fusion beliefs by presenting statements relevant to the three metacognitive belief domains discussed earlier in the introduction: TAF (e.g., 'Having bad thoughts means I will do something bad'), TEF (e.g., 'If I think about an unpleasant event it will make it more likely to happen'), and TOF (e.g., 'My feelings can be transferred into objects'). Participants respond to the statements by rating on an 11-point scale from 0 (I do not believe this at all) to 100 (I am completely convinced this is true). Gwilliam et al. (2001) found the TFI to have good internal consistency with Cronbach's coefficient alpha of .89 and test-retest reliability coefficient of .55 after a 6–10-week interval. In the current study, McDonald's omega for the TFI was acceptable at .89.

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

The 18-item self-report OCI-R was developed as a revised and shortened version of the Obsessive-Compulsive Inventory (OCI; Foa et al., 1998) and is designed to assess symptoms of OCD. The OCI-R was designed specifically to be used as a self-report measure and was therefore used in this study rather than the Y-BOCS (Goodman et al., 1989) which was designed to be administered by trained interviewers. The instrument incorporates six subscales (each containing three items) representing the following OCD symptom categories: washing, checking, neutralising, ordering, hoarding, and obsessing. Items take the form of short statements that reflect experiences associated with OCD (e.g., 'I check things more than necessary') to which participants indicate the degree that the experience has caused them

distress in the past month on a 5-point scale from 0 (not at all) to 4 (extremely). Subscale scores for each of the symptom categories can be calculated, as well as a total score obtained by summing scores on all 18 items. Foa et al., (2002) found the OCI-R to have good internal consistency with Cronbach's coefficient alphas of .90 for the total score, alphas ranging from .83 to .90 for the individual subscales, and a test-retest coefficient of .82 for the total score and .74 to .91 for the subscales after a 2-week interval. In the current study, the obsessing subscale was used as a measure of obsessive thoughts and a composite score was also calculated as the sum of scores on the five subscales that measure compulsions (i.e., washing, checking, neutralising, ordering, and hoarding). In the current study McDonald's omega was acceptable, being .90 for OCI-R total score, .85 for the obsessing subscale, and .88 for the composite compulsions score.

Data Analytic Plan

Sample size calculations were based on effect sizes drawn from relevant literature that suggested medium size correlations between the variables of interest in the study (Cândea & Szentagotai-Tătar, 2018; Hallsworth, 2016; Myers et al., 2009; Valentiner & Smith, 2008). The minimum sample size required to test the hypotheses using simple mediation models was determined to be approximately 60 participants and the minimum sample size required to test serial mediation models was approximately 180 participants. Calculations were performed with Monte Carlo Power Analysis for Indirect Effects, a software tool designed to conduct power analysis for simple and serial mediation models using a method based on Monte Carlo simulations (Schoemann et al., 2017). In this study we have opted to use McDonald's omega coefficient rather than Cronbach's alpha coefficient to assess internal consistency of scales. McDonald's omega is increasingly recommended and is considered to be superior to Cronbach's alpha, mainly because it does not assume equal factor loadings which is thought to be the exception for most scales used in empirical research (Hayes & Coutts, 2020). To test

mediation models the approach recommended by Preacher & Hayes (2004) was employed through the use of the PROCESS macro (version 4.1; Hayes, 2022). The PROCESS macro uses bootstrapping to generate point estimates of indirect effects and confidence intervals (CIs) around them. In this method of analysis, indirect effects are said to occur if the 95% CI for the point estimates do not include zero (Hayes, 2012). This bootstrapping method is recommended over other methods of testing indirect effect because it does not rely on assumptions of normality that can lead to incorrect interpretations of results when using smaller samples (Hayes, 2022). All statistical analyses were performed with IBM SPSS Statistics (version 26).

Results

Preliminary Analysis

Responses from 229 participants with complete questionnaire data were analysed in this study. Data were screened for outliers using the outlier labelling rule, by which the interquartile range was multiplied by a factor of 1.5 then added to or subtracted from to the upper and lower quartile respectively with scores above the upper value and below the lower value considered outliers (Hoaglin & Iglewics, 1987; Tukey, 1977). One outlier was identified, a particularly high score on the OCI-R scale, and this score was winsorized by transforming it to the largest retained value. Visual inspection of histograms and Q-Q plots of variables showed that scores on scales used in the study did not depart greatly from normal distributions. Scatterplots were generated and visual inspection determined that there were linear relationships between variables.

Descriptive Statistics

Descriptive statistics for the scales used in the study are presented in Table 1. Analyses were performed to examine whether scores on variables used in the study differed

according to the demographic characteristics of the participants. There was a weak but significant negative correlation between age and ESS score $r(227) = .15$, $p = < .05$, but age was not significantly correlated with scores on other variables. One-way ANOVA's showed significant gender differences in variable scores, with post-hoc analysis finding women scored significantly higher on all measures except for the need for control subscale of the MCQ-30. The gender differences on scale scores observed here do align with some previous findings (Else-Quest et al., 2012, Fawcett et al., 2020), but this has not been a focus of the current study. One-way ANOVAs showed no significant differences in variable scores between levels of education, and Welch's t-tests showed no significant differences in variable scores between those who speak English as their first language and those who speak a different first language**.**

Table 1

Descriptive statistics for scales

Scale/Subscale	Min.	Max.	*M*	*SD*	95% CI	
					Lower	Upper
ESS	00	75	41.20	18.10	38.92	43.40
OCI-R (Total)	00	58	22.87	12.93	21.19	24.58
OCI-R (Obsessions)	00	12	4.55	3.24	4.16	4.97
OCI-R (Compulsions)	00	54	18.34	10.78	16.94	19.89
TFI	00	100	41.04	23.00	38.13	44.01
MCQ-30 (Total)	02	76	39.72	14.14	37.90	41.62
MCQ-30 (Confidence)	00	18	5.90	4.26	5.33	6.46
MCQ-30 (Positive Beliefs)	00	17	6.43	4.27	5.86	7.00
MCQ-30 (Self-consciousness)	00	18	10.79	3.97	10.28	11.34
MCQ-30 (Negative Beliefs)	00	18	9.70	4.75	9.08	10.30
MCQ-30 (Need For Control)	00	17	6.90	3.75	6.42	7.37

Note. CI's for Means based on 1000 bootstrap samples. *N* for each scale = 229.

Correlations

Pearson correlations were used to test the strength of association between variables, and results of this analysis can be seen in Table 2. The first hypothesis in this study was that specific metacognitive beliefs associated with OCD (thought-fusion beliefs, negative beliefs about the uncontrollability and danger of thoughts, beliefs concerning the need for control of thoughts, and cognitive self-consciousness) would be positively and significantly correlated with dispositional shame. The hypothesis was confirmed with significant positive correlations between scores on the TFI and the ESS, between scores on the MCQ-30 negative beliefs subscale and the ESS, between scores on the MCQ-30 need for control subscale and the ESS, and between scores on the MCQ-30 cognitive self-consciousness subscale and the ESS. All other measures of metacognitive beliefs were also significantly and positively correlated with dispositional shame. All measures of metacognitive beliefs were significantly and positively correlated with OCD symptom severity and with scores on obsessions and compulsions subscales. Dispositional shame was also significantly and positively associated with OCD symptom severity and with scores on obsessions and compulsions subscales.

Table 2

Correlations Between Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. ESS	-										
2. OCI-R (Total)	.59***	-									
3. OCI-R (Obsessions)	.63***	.76***	-								
4. OCI-R (Compulsions)	.52***	.98***	.61***	-							
5. TFI	.39***	.56***	.48***	.53***	-						
6. MCQ-30 (Total)	.63***	.63***	.63***	.58***	.56***	-					
7. MCQ-30 (Cog. Confidence)	.37***	.32***	.31***	.30***	.39***	.60***	-				
8. MCQ-30 (Positive Beliefs)	.25***	.30***	.20**	.31***	.33***	.62***	.23***	-			
9. MCQ-30 (Cog. Self-consciousness)	.33***	.32***	.37***	.28***	.20**	.62***	.12	.21**	-		
10. MCQ-30 (Danger/Uncontrollability)	.66***	.64***	.68***	.56***	.44***	.77***	.30***	.30***	.42***	-	
11. MCQ-30 (Need for Control)	.49***	.53***	.54***	.48***	.54***	.75***	.37***	.34***	.36***	.50***	-

***p* = < .01 *** *p* = < .001

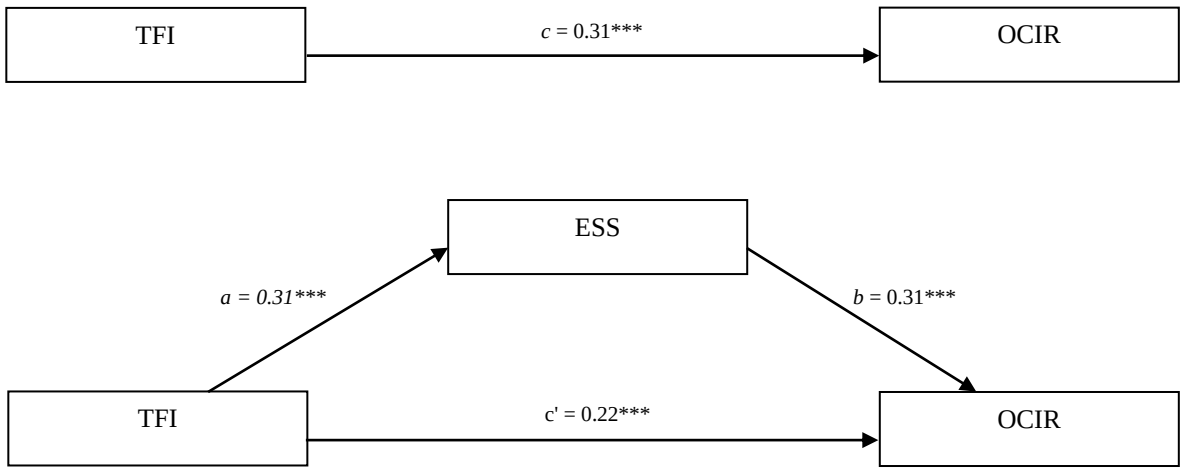
Simple Mediation

The second hypothesis tested in this study was that the relationship between metacognitive beliefs and OCD symptom severity would be mediated by dispositional shame. To test this, two simple mediation analyses were conducted using Model 4 of the PROCESS macro (Hayes, 2022). Details of regression equations for these simple mediation models (and details of regression equations for all other mediation models in this study) can be found in Appendix B. The first simple mediation model of the current study used the TFI as the metacognitive beliefs measure and the second model used the total score of the MCQ-30 as the metacognitive beliefs measure. Both models used OCI-R total score as the OCD symptom severity measure and the ESS as the measure of dispositional shame.

The first model tested for an indirect effect between TFI and OCI-R through ESS. As can be seen in Figure 4, the total effect of TFI on OCI-R (the *c* path) was significant. In the *a* path of the model, scores on the TFI were significantly and positively related to scores on the ESS, and in the *b* path scores on the ESS were significantly and positively related to scores on the OCI-R. Confirming the hypothesis, a 95% confidence interval based on 10,000 bootstrap samples did not include zero indicating a significant indirect effect of TFI on OCI-R through ESS, $ab = 0.10$, SE = 0.02, 95% CI [0.06, 0.13]. However, the direct effect of TFI on OCI-R in the model (the *c*' path) also remained significant. This analysis shows that the proportion of the total effect of TFI on OCI-R operating indirectly through ESS was 32.26%.

Figure 4

Unstandardised Regression Coefficients of a Simple Mediation Model Linking Thought-fusion Beliefs to OCD Symptom Severity Through Dispositional Shame.

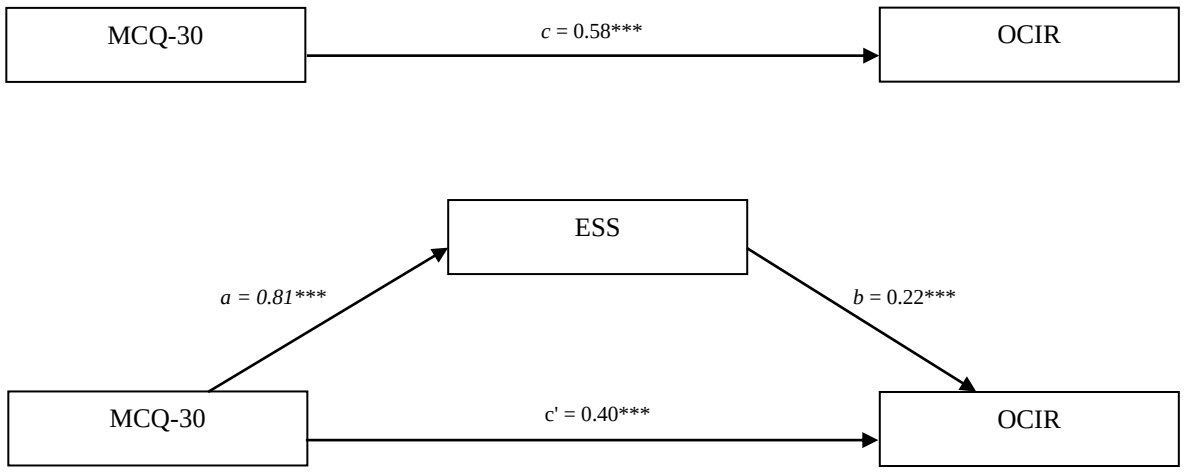


***$p < .001$

The second model tested for an indirect effect between MCQ-30 and OCI-R through ESS. As can be seen in Figure 5, the total effect of MCQ-30 on OCI-R (the *c* path) was significant. In the *a* path of the model, scores on the MCQ-30 were significantly and positively related to scores on the ESS, and in the *b* path scores on the ESS were significantly and positively related to scores on the OCI-R. Confirming the hypothesis, a 95% confidence interval based on 10,000 bootstrap samples did not include zero indicating a significant indirect effect of MCQ-30 on OCI-R through ESS, *ab* = 0.18, SE = 0.04, 95% CI [0.10 – 0.26]. However, the direct effect of MCQ-30 on OCI-R in the model (the *c*' path) also remained significant. This analysis shows that the proportion of the total effect of MCQ-30 on OCI-R operating indirectly through ESS was 31.03%.

Figure 5

Unstandardised Regression Coefficients of a Simple Mediation Model Linking Metacognitions to OCD Symptom Severity Through Dispositional Shame.



***$p < .001$

Serial Mediation

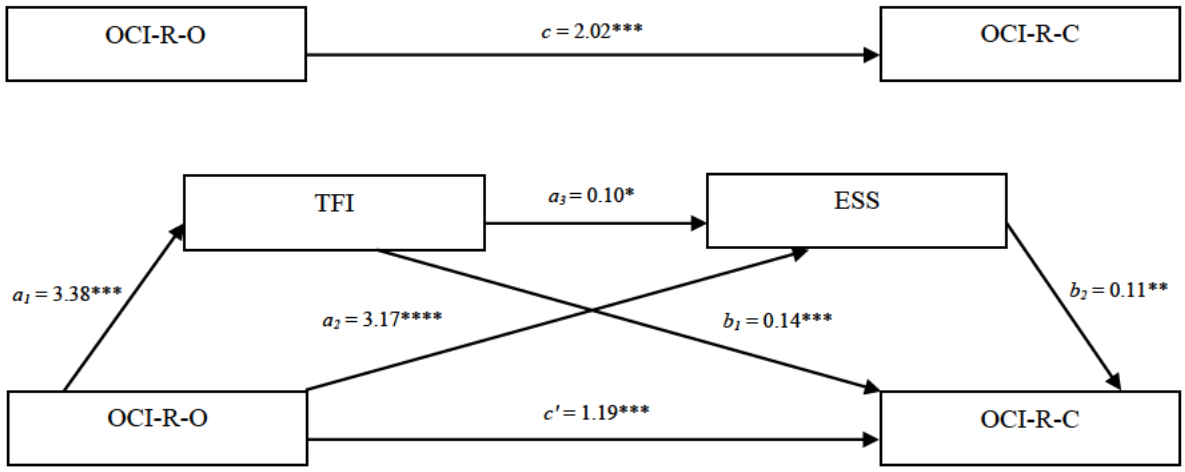
The third hypothesis tested in this study was that the relationship between obsessions and compulsions would be serially mediated through metacognitive beliefs and dispositional shame. To test this, two serial mediation analyses were conducted using Model 6 of the PROCESS macro (Hayes, 2022). The first serial mediation model of the current study used the TFI as the metacognitive beliefs measure and the second model used the total score of the MCQ-30 as the metacognitive beliefs measure. Both models used ESS as the measure of dispositional shame, and both models used the obsessing subscale of the OCI-R (OCI-R-O) as the measure of obsessions and used the composite score summed from the five compulsive behaviour subscales of the OCI-R (OCI-R-C) as the measure of compulsions.

The first model tested for a serial indirect effect between OCI-R-O and OCI-R-C through TFI and ESS. As can be seen in Figure 6, the total effect of OCI-R-O on OCI-R-C (the *c* path) was significant. In the a_1 path of the model, OCI-R-O scores were significantly

and positively related to scores on the TFI, and in the a_2 path OCI-R-O scores were significantly and positively related to scores on the ESS. In the b_1 path of the model, scores on the TFI were significantly and positively related to OCI-R-C scores, and in the b_2 path higher scores on the ESS were significantly and positively related to OCI-R-C scores. In the a_3 path, linking the two mediators in the model, there was a significantly and positive relationship between scores on the TFI and scores on the ESS. Table 3 presents bootstrapped point estimates and standard errors for each indirect effect and their associated 95% CIs and shows that all indirect effect paths were significant. Confirming the hypothesis, a 95% confidence interval based on 10,000 bootstrap samples did not include zero indicating a significant indirect effect of OCI-R-O on OCI-R-C through TFI then ESS (the $a_1a_3b_2$ path). However, the direct effect of OCI-R-O on OCI-R-C in the model (the *c*' path) also remained significant. This analysis shows that the proportion of the total effect of OCI-R-O on OCI-R-C operating indirectly through TFI and serially through ESS was 1.49%.

Figure 6

Unstandardised Regression Coefficients of a Serial Mediation Model Linking Obsessions to Compulsions Through Thought-fusion Beliefs and Dispositional Shame.



*p < .05 **p < .01 ***p < .001

Table 3

Bootstrapped Point Estimates and 95% Confidence Intervals for all Indirect Effects for Serial Mediation Model linking Obsessions to Compulsions Through Thought-fusion Beliefs and Dispositional Shame.

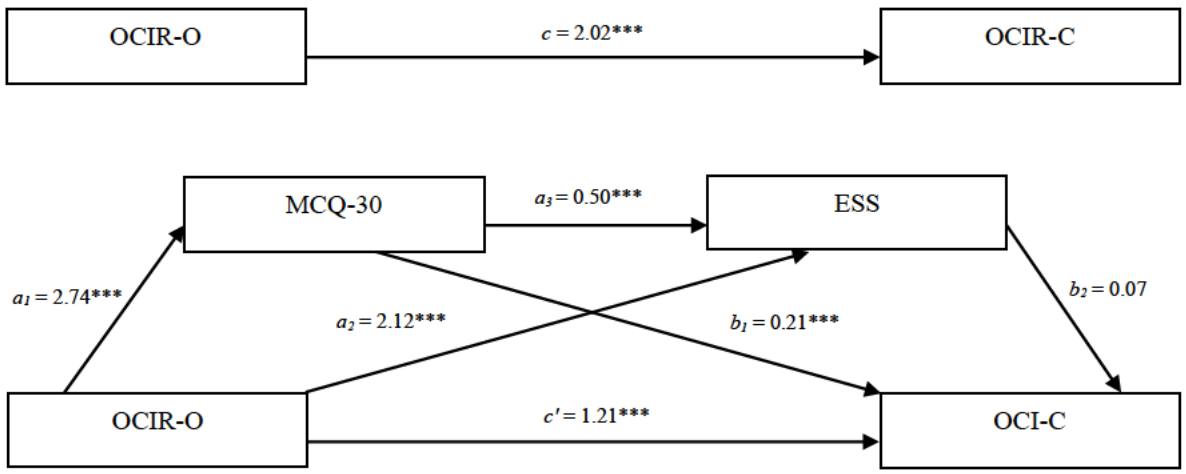
			Bootstrapped 95% CI	
	Point Estimate	SE	Lower	Upper
a_1b_1	0.47	0.12	0.26	0.71
a_2b_2	0.34	0.13	0.08	0.59
$a_1a_3b_2$	0.03	0.02	0.00	0.09
Total indirect effect	0.84	0.19	0.48	1.20

The second model tested for a serial indirect effect between OCI-R-O and OCI-R-C through MCQ-30 and ESS. As can be seen in Figure 7, the total effect of OCI-R-O on OCI-R-C (the *c* path) was significant. In the a_1 path of the model, OCIR-O scores were

significantly and positively related to scores on the MCQ-30, and in the a_2 path OCIR-O scores were significantly and positively related to scores on the ESS. In the b_1 path of the model, scores on the MCQ-30 were significantly and positively related to OCIR-C scores, but in the b_2 path scores on the ESS were not significantly related to OCIR-C scores. In the a_3 path, linking the two mediators in the model, there was a significant and positive relationship between scores on the MCQ-30 and scores on the ESS. The direct effect of OCIR-O on OCIR-C in the model (the *c*' path) was also significant and positive. Table 4 presents bootstrapped point estimates and standard errors for each indirect effect and their associated 95% CIs and shows that the indirect effect of OCIR-O on OCIR-C through MCQ was significant, that the indirect effect of OCIR-O on OCIR-C through ESS and was not significant, and that the indirect effect of OCIR-O on OCIR-C through MCQ30 then ESS was also not significant. Thus, in this model, the hypothesis was not supported.

Figure 7

Unstandardised Regression Coefficients of a Serial Mediation Model Linking Obsessions to Compulsions Through Metacognitions and Dispositional Shame.



***$p < .001$

Table 4

Bootstrapped Point Estimates and 95% Confidence Intervals for all Indirect Effects for Serial Mediation Model linking Obsessions to Compulsions Through Metacognitions and Dispositional Shame.

			Bootstrapped 95% CI	
	Point Estimate	SE	Lower	Upper
a_1b_1	0.58	0.17	0.26	0.92
a_2b_2	0.15	0.10	-0.04	0.34
$a_1a_3b_2$	0.01	0.07	-0.03	0.23
Total indirect effect	0.82	0.19	0.46	1.20

Supplementary analysis

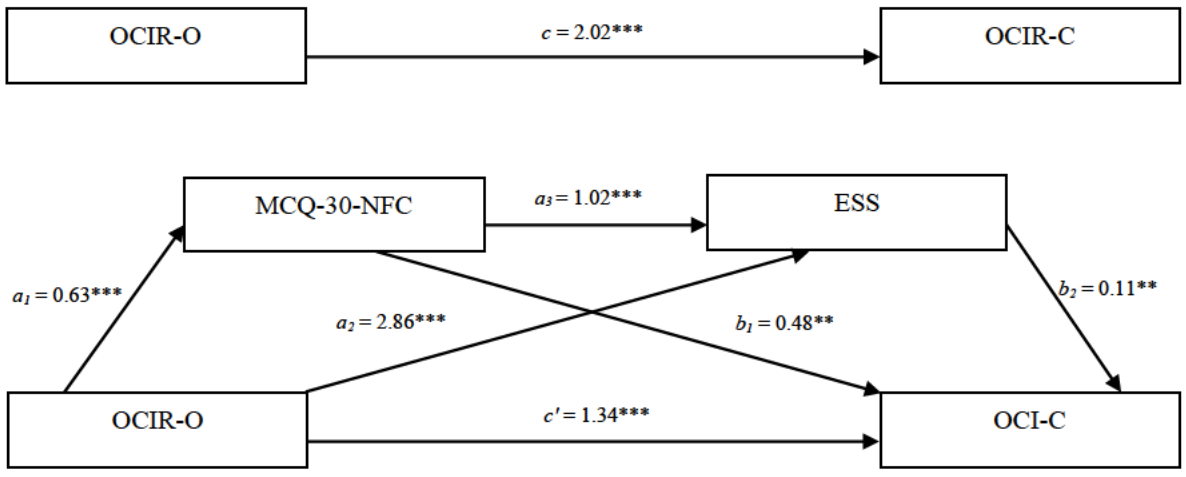
The results of serial mediation analyses above demonstrate a significant serial mediation effect between obsessions and compulsions with thought-fusion beliefs and dispositional shame as the mediators, but no significant effect with the broader measure of metacognitions and dispositional shame as the serial mediators. Thought-fusion beliefs are a specific class of metacognitive beliefs closely related to the 'need for control' subscale of the MCQ-30 (MCQ-30-NFC) which measures beliefs concerning the need to control thoughts and the negative consequences of not doing so. To explore whether there is a specific effect related to this class of metacognitions, a third serial mediation model was investigated testing for a serial indirect effect between OCI-R-O and OCI-R-C through MCQ-30-NFC and ESS.

As can be seen in Figure 8, the total effect of OCI-R-O on OCI-R-C (the *c* path) was significant. In the a_1 path of the model, OCI-R-O scores were significantly and positively related to scores on the MCQ-30-NFC, and in the a_2 path OCI-R-O scores were significantly and positively related to scores on the ESS. In the b_1 path of the model, scores on the MCQ-

30-NFC were significantly and positively related to OCI-R-C scores, and in the b_2 path higher scores on the ESS were significantly and positively related to OCI-R-C scores. In the a_3 path, linking the two mediators in the model, there was a significantly and positive relationship between scores on the MCQ-30-NFC and scores on the ESS. Table 5 presents bootstrapped point estimates and standard errors for each indirect effect and their associated 95% CIs and shows that all indirect effect paths were significant. Confirming the hypothesis, a 95% confidence interval based on 10,000 bootstrap samples did not include zero indicating a significant indirect effect of OCI-R-O on OCI-R-C through MCQ-30-NFC then ESS, $a_1a_3b_2$ = 0.07, SE = 0.04, 95% CI [0.01 – 0.15]. However, the direct effect of OCI-R-O on OCI-R-C in the model (the *c*' path) also remained significant. This analysis shows that the proportion of the total effect of OCI-R-O on OCI-R-C operating indirectly through TFI and serially through ESS was 3.46%.

Figure 8

Unstandardised Regression Coefficients of a Serial Mediation Model Linking Obsessions to Compulsions Through Beliefs Concerning the Need to Control Thoughts and Dispositional Shame.



**$p < 0.01$ ***$p < .001$

Table 5

Bootstrapped Point Estimates and 95% Confidence Intervals for all Indirect Effects for Serial Mediation Model linking Obsessions to Compulsions Through Beliefs Concerning the Need to Control Thoughts and Dispositional Shame.

			Bootstrapped 95% CI	
	Point Estimate	SE	Lower	Upper
a_1b_1	0.30	0.13	0.07	0.57
a_2b_2	0.31	0.13	0.07	0.57
$a_1a_3b_2$	0.07	0.04	0.01	0.15
Total indirect effect	0.68	0.19	0.32	1.05

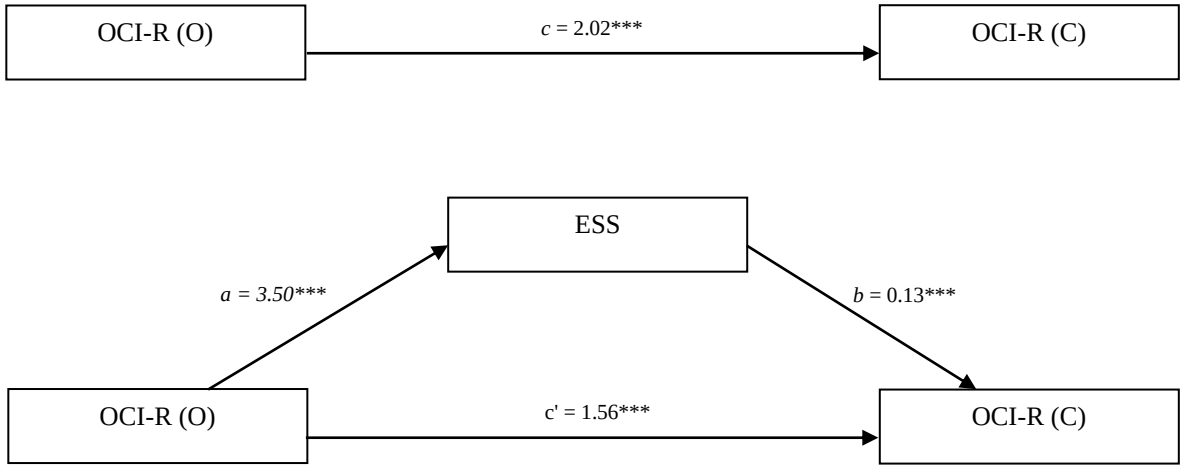
Two of the serial mediation models investigated in this study do show significant mediation effects in the relationship between obsessions and compulsions through a specific class of metacognitive beliefs and dispositional shame, but this effect is small. In order to explore the relationship between dispositional shame, obsessions, and compulsions independently of metacognitive constructs a simple mediation model was investigated testing for an indirect effect between OCI-R-O and OCI-R-C through ESS.

As can be seen in Figure 9, the total effect of OCI-R-O on OCI-R-C (the *c* path) was significant. In the *a* path of the model, scores on the OCI-R-O were significantly and positively related to scores on the ESS, and in the *b* path scores on the ESS were significantly and positively related to scores on the OCI-R-C. Confirming the hypothesis, a 95% confidence interval based on 10,000 bootstrap samples did not include zero indicating a significant indirect effect of OCI-R-O on OCI-R-C through ESS, $ab = 0.47$, SE = 0.15, 95% CI [0.17 – 0.78]. However, the direct effect of OCI-R-O on OCI-R-C in the model (the *c*'

path) also remained significant. This analysis shows that the proportion of the total effect of OCI-R-O on OCI-R-C operating indirectly through ESS was 23.27%.

Figure 9

Unstandardised Regression Coefficients of a Simple Mediation Model Linking Obsessions to Compulsions Through Dispositional Shame.



****p* < .001

Discussion

The aim of this study was to explore relationships between shame and metacognitive beliefs in obsessions, and compulsions. The findings of this study build on previous research showing that both shame and metacognitive beliefs are associated with OCD symptoms, and also contributes new findings of associations between shame and specific metacognitive belief domains. Wells' metacognitive model of OCD posits that specific metacognitive beliefs result in obsessive thoughts being appraised as threatening, causing heightened emotional responses (including shame) which drive the performance of compulsive behaviours (Wells, 1997, 2011, 2017). The current study provides some cross-sectional support for Well's model, but also provides evidence for a relationship between shame and OCD symptoms that is independent of metacognitive beliefs.

Summary of Findings

This study used data collected from a university student sample on self-report measures of OCD symptom severity, shame, and metacognitive beliefs. The mean score on the OCI-R measure of OCD symptom severity was in the moderate range according to empirically derived benchmarks (Abramovitch et al., 2020). Although scores on this measure were higher than expected in a non-clinical population, high scores on the OCI-R among student samples have previously been reported (Hajcak et al., 2004), and a higher prevalence of OCD symptoms has been observed amongst university students when compared to the wider population (Sulkowski et al., 2011; Yoldascan et al., 2009). Scores on the metacognitive belief measures used in this study have previously been shown to be positively associated with OCD symptoms (Myers et al., 2009; Myers and Wells 2005) and the relationship between metacognitive beliefs and OCD is well established. As expected, scores on the TFI measure of thought-fusion beliefs were significantly and positively associated with OCD symptom severity. The total score for the MCQ-30 measure of metacognitions and scores for all MCQ-30 subscales (representing specific domains of metacognitive beliefs) were also significantly and positively associated with OCD symptom severity. The results found here confirm previous findings (Myers et al., 2009; Myers & Wells, 2005) and are consistent with the metacognitive model of OCD. The current study also found that increased dispositional shame was significantly and positively correlated with increased OCD symptom severity, and this confirms previous research in clinical and non-clinical populations (Szentagotai-Tătar et al., 2020; Weingarden & Renshaw, 2015) that suggests shame is prominent in OCD.

The three hypotheses tested in this study were mostly confirmed. The first hypothesis was that specific metacognitive beliefs, previously found to be consistently associated with OCD, would be significantly and positively correlated with dispositional shame; this

hypothesis was confirmed. Thought-fusion beliefs, beliefs about the uncontrollability and danger of thoughts, beliefs concerning the need to control thoughts, and cognitive self-consciousness were all found to be significantly and positively correlated with dispositional shame. It should be noted that, in addition to the significant positive correlations found between shame and metacognitive belief domains with known associations with OCD, scores on the other three subscales of metacognitive beliefs were also significantly and positively correlated with scores on the measure of shame. No previously published research has investigated relationships between shame and metacognitive beliefs, and this finding makes a unique contribution to research on self-conscious emotions.

The second hypothesis tested in this study was that, as suggested by the metacognitive model of OCD, shame would mediate the relationship between metacognitive beliefs and OCD symptoms. The hypothesis was tested in two simple mediation models using either a measure of thought-fusion beliefs or a measure of a broader set of metacognitions as the metacognitive beliefs construct. For both models shame was found to have a significant indirect effect, therefore confirming the hypothesis. This suggests that the self-conscious emotion of shame explains part of the relationship between metacognitive beliefs and OCD symptoms. This finding is in line with the metacognitive model of OCD which posits that dysfunctional metacognitive beliefs result in negative appraisals and heightened emotions, which increase OCD symptoms.

The third hypothesis tested was metacognitive beliefs and shame will serially mediate the relationship between obsessions and compulsions as suggested by the metacognitive model of OCD. Two separate serial mediation models were used to test the hypothesis, using either a measure of thought-fusion beliefs or a measure of a broader set of metacognitions as mediators in the models. In the first model, thought-fusion and shame were found to have a small but significant indirect effect in the relationship between obsessions and compulsions

but, in the second model, the indirect effect through metacognitions and shame was not found to be significant. Therefore, although the hypothesis was confirmed for a specific class of metacognitive beliefs (i.e., thought-fusion), the hypothesis was not confirmed when using the broader measure of metacognitions. Supplementary analysis explored this further in a third serial mediation model using a subscale of the MCQ-30, which measures beliefs about the need to control thoughts and the consequences of not doing so. This was undertaken because, of the factors in the broader metacognitions measure, the need for control factor is reasoned to be the most conceptually related to thought-fusion beliefs. In the third model, need for control and shame were found to have a small but significant indirect effect in the relationship between obsessions and compulsions. Therefore, the hypothesis that metacognitive beliefs and shame will serially mediate the relationship between obsessions and compulsions was confirmed but only for a specific class of metacognitive beliefs that are central to the metacognitive model of OCD.

The indirect effect through metacognitive beliefs and shame on the relationship between obsessions and compulsions found in this study was significant, but it was also very small. A simple mediation model testing the indirect effect of shame alone on the relationship between obsessions and compulsions found a much larger significant effect. This suggests that in the relationship between obsessions and compulsions, though there are significant indirect effects through metacognitive beliefs and shame as predicted by the metacognitive model of OCD, the much larger indirect effect of shame alone is worthy of independent consideration.

Implications

This study found evidence of indirect relationships between OCD symptoms, shame, metacognitive beliefs that have theoretical implications, and that may be of clinical interest.

Thought-fusion beliefs and beliefs concerning the need to control thoughts, in sequence with shame, were found have to have an indirect effect in the relationship between obsessions and compulsions as predicted by the metacognitive model of OCD. However, when considered alone, shame was found to have a greater indirect effect than is explained by metacognitive beliefs.

In Wells' metacognitive model of OCD, the interpretation of intrusions is guided by metacognitive beliefs including thought-fusion beliefs and beliefs concerning the need to control thoughts (Wells, 2017). An individual might hold the thought-fusion belief that having a particular thought is likely to result in real world consequences (e.g., thinking about something I don't want to do will cause me to do it) may perform compulsions in response. The ego-dystonic nature of obsessions increases the stake in controlling thoughts perceived as threats to self-identity (Purdon & Clark, 1999), and failed attempts to control thoughts may be interpreted as a personal weakness. It is reasonable that, for some people, obsessions appraised through thought-fusion beliefs and beliefs concerning the need to control thoughts may result in the experience of shame.

Only one other published study has investigated relationships between shame, metacognitive beliefs, and OCD symptoms (Valentiner & Smith, 2008) and the current study expands upon this by testing specific constructs described in the metacognitive model of OCD. The findings here lend cross-sectional support to the metacognitive model and suggests that, for a small subset of people, obsessive thoughts interpreted through elevated thought-fusion beliefs and beliefs about the need to control thoughts may explain increased levels shame, and increased compulsive behaviours.

Theoretical explanations of the role of shame in the relationship between obsessions and compulsions suggest that shame related to the content of obsessions may drive the

performance of compulsions because of a perceived threat to the self and self-identity (Valentiner & Smith, 2008; Visvalingam, 2022; Weingarden & Renshaw 2015). Although the findings of the current study provide some support for this view, it is important to recognise that shame can also be experienced for other reasons other than in response to obsessions. Some people with OCD experience shame about having a mental illness which can be related to the performance of compulsive behaviours, particularly those that are publicly visible (Kim et al., 2014; Vythilingum & Stein, (2005). The experience of shame can also be a treatment barrier, resulting in avoidance behaviours that can act to maintain feelings of shame (Cândea & Szentagotai, 2013).

In psychological therapy, metacognitive beliefs and shame may be targeted in the treatment of OCD. The results of the current study suggest that, for a small number of individuals, therapeutic targeting of specific thought-fusion beliefs and beliefs concerning the need to control thoughts may indirectly target shame in relation to OCD symptoms. Metacognitive Therapy, a contemporary form of CBT based on Wells' metacognitive model, emphasises helping the client gain awareness of metacognitive processes and to modify their metacognitive beliefs using behavioural experiments and mindfulness exercises. Third-wave CBT approaches such as Acceptance and Commitment Therapy (ACT) also target counterproductive metacognitive strategies utilising the concept of cognitive defusion, which is used to help clients perceive that intrusive thoughts are separate from themselves as a person and focuses on the acceptance of thoughts as events in the mind (Rees & Anderson, 2013). A recent systematic review of interventions to reduce shame (Goffnett et al., 2020) found that CBT incorporating mindfulness interventions and ACT helped participants in accepting emotions and improving emotional regulation. These therapeutic strategies can be used alone or in combination with ERP and may be helpful for people who live with OCD and experience shame.

Limitations

This study was subject to the limitations inherent in a cross-sectional design. Wells' metacognitive model of OCD is an information processing model that posits causal and temporal relationships between obsessions, metacognitions, emotions, and compulsions. The mediation models in the current study test indirect effects between variables similar to those described by Well's model, but it should be recognised that the data used here is generated from a cross-sectional study design and, as such, causal and temporal inferences cannot be drawn from the results. Also, the current study explored relationships between obsessive thoughts, metacognitive beliefs, emotional responses, and compulsive behaviours that are described by the metacognitive model of OCD, but it should be noted that this study did not directly explore appraisals nor beliefs about performance of rituals that are implicated in the model.

Self-report data from a single source can be subject to common methods variance, where some of the covariation observed between constructs is produced by the common method used to measure them (Podsakoff et al., 2012). It is possible that some of the survey respondents many have expressed the tendency to answer questions from unrelated measures with consistently high or low scores, potentially influencing correlations between variables. Another potential limitation related to the self-report survey is a time-frame mismatch between the OCI-R measure, which asks respondents to rate the degree to which they have experienced distress from OCD symptoms over the past month, and the ESS measure, which asks respondents to rate the degree to which they have experienced feelings of shame over the past year. Research suggests that timeframes do influence the way people self-report on both symptoms and emotions, and that this may be related to different cognitive heuristics being employed when responding to surveys with shorter and longer timeframes (Walentynowicz, 2018). It is possible that the differences in reporting periods for these two

measures may, to some extent, constrain their direct comparability especially given the tendency of OCD symptoms to abate or intensify according to stress and life events (Abramowitz, 2006.)

Analogue studies are a valid method of studying OCD symptoms, but it should be acknowledged that the current study used a sample of university students, mainly recruited from first year undergraduate psychology courses, and not a sample of people clinically diagnosed with OCD. Therefore, caution is warranted in generalising the findings of this study to individuals with OCD. It is also possible that some degree of self-selection bias may have occurred; participants may have had a propensity to choose to respond to the survey that is related to the variables being examined in the current study (Olsen, 2008). Although high levels of OCD symptoms have been previously reported in university samples similar to the one used in this study, self-selection bias have influenced the higher-than-expected mean score on the OCI-R measure of OCD symptoms observed here.

When interpreting the results of this study, it is important to be aware of cultural factors than may influence findings. Although most participants reported speaking English as their first language, some of the participants in this study reported speaking a diverse range of languages other than English. The survey included questions about metacognitive beliefs and shame that are subject to cultural variation. Although OCD is found in populations worldwide, it has been observed that symptom expression can be notably different across cultures (Williams et al., 2017). The OCI-R measure of OCD symptoms has been adapted for use in many languages and has been validated in a variety of cultural settings. It has been noted, however, that cultural differences can influence responses on some of the questions in the OCI-R that are related to the meaning and importance of numbers (Ghassemzadeh et al., 2011; Hon et al., 2019).

Future Directions

Future studies should further examine shame and metacognition in relation to OCD using a variety of research methodologies. Studies using mixed methods of data collection, including clinician rated scales such as the Y-BOCS, could be employed to avoid biases inherent in self-report studies. The current study provided cross-sectional evidence suggesting relationships between shame, metacognitive beliefs, obsessions, and compulsions. Experimental studies using appropriate obsession and shame induction procedures may also be designed which are able to investigate causal mechanisms. This study used a convenience sample of university students, most of whom were recruited from first year psychology courses. Future analogue studies could use a larger sized sample from a less heterogenous population and could also include measures to control for depression and anxiety. The relationships investigated in this study may also be expressed differently in a population with more severe OCD symptoms, and future studies are needed using a sample with clinically diagnosed OCD.

Future research should investigate modelling of other emotional responses such as anxiety and revulsion which, along with shame, which are described in the metacognitive model of OCD as drivers of compulsions. Mediation models involving other emotional responses could determine if shame adds incremental validity over and above other emotional responses in explaining OCD symptoms. The relative contribution of metacognitive beliefs compared to other beliefs associated with OCD, such as responsibility or perfectionism, could be examined together in a study using the Obsessional Beliefs Questionnaire (OCCWG, 2005). Future research could also investigate the relationship between shame, metacognitive beliefs, and different types of OCD symptoms such as religious, sexual, or harming obsessions.

Conclusions

The hypotheses investigated in this study were mostly supported. Findings of positive associations between metacognitive beliefs and dispositional shame make a novel new contribution to research on self-conscious emotions. The indirect effects observed in this study provide cross-sectional support for the relationships between shame and specific metacognitive beliefs in obsessions and compulsions that are described by the metacognitive model of OCD, but it was also observed that shame plays a larger role in OCD symptoms that is not explained by metacognitive beliefs. Research investigating the role of shame in OCD advances our conceptual understanding of, and ability to treat, OCD. This study has provided preliminary evidence that thought-fusion beliefs and beliefs concerning the need for control of thoughts may have particular relevance to shame in OCD. For some people, therapeutic targeting of metacognitive beliefs in CBT may assist in treating both shame and OCD symptoms and reduce associated suffering.

References

Abramovitch, A., Abramowitz, J. S., & McKay, D. (2021). The OCI-4: An ultra-brief screening scale for obsessive-compulsive disorder. *Journal of Anxiety Disorders*, 78, Article 102354.

Abramovitch, A., Abramowitz, J. S., Riemann, B. C., & McKay, D. (2020). Severity benchmarks and contemporary clinical norms for the Obsessive-Compulsive Inventory-Revised (OCI-R). *Journal of Obsessive-Compulsive and Related Disorders*, 27, Article 100557.

Abramowitz, J. S. (2006). The psychological treatment of obsessive—compulsive disorder. *The Canadian Journal of Psychiatry*, *51*(7), 407–416.

Abramowitz, J. S., Blakey, S. M., Reuman, L., & Buchholz, J. L. (2018). New directions in the cognitive-behavioral treatment of OCD: Theory, research, and practice. *Behavior Therapy*, *49*(3), 311–322.

Abramowitz, J. S., Fabricant, L. E., Taylor, S., Deacon, B. J., McKay, D., & Storch, E. A. (2014). The relevance of analogue studies for understanding obsessions and compulsions. *Clinical Psychology Review*, *34*(3), 206–217.

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.).

Andrews, B., & Hunter, E. (1997). Shame, early abuse, and course of depression in a clinical sample: A preliminary study. *Cognition & Emotion*, *11*(4), 373–381.

Andrews, B., Qian, M., & Valentine, J. D. (2002). Predicting depressive symptoms with a new measure of shame: The Experience of Shame Scale. *British Journal of Clinical Psychology*, *41*(1), 29–42.

Angelakis, I., Gooding, P., Tarrier, N., & Panagioti, M. (2015). Suicidality in obsessive compulsive disorder (OCD): A systematic review and meta-analysis. *Clinical Psychology Review*, *39*, 1–15.

Belloch, A., Morillo, C., Lucero, M., Cabedo, E., & Carrió, C. (2004). Intrusive thoughts in non-clinical subjects: The role of frequency and unpleasantness on appraisal ratings and control strategies. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, *11*(2), 100–110.

Cândea, D., & Szentagotai, A. (2013). Shame and psychopathology: From research to clinical practice. *Journal of Cognitive and Behavioral Psychotherapies*, *13*(1), 101–113.

Cândea, D. M., & Szentagotai-Tătar, A. (2018). Shame-proneness, guilt-proneness and anxiety symptoms: A meta-analysis. *Journal of Anxiety Disorders*, *58*, 78–106.

Cartwright-Hatton, S., & Wells, A. (1997). Beliefs about worry and intrusions: The Meta-Cognitions Questionnaire and its correlates. *Journal of Anxiety Disorders*, *11*(3), 279–296.

Cho, Y., Jahng, S., & Chai, S. (2012). The factor structure and concurrent validity of the Korean version of the Metacognitions Questionnaire 30 (K-MCQ-30). *Journal of Clinical Psychology*, *68*(3), 349–391.

Clark, D. A. (2006). *Cognitive-behavioral therapy for OCD*. Guilford Press.

Cullen, B., Brown, C. H., Riddle, M. A., Grados, M., Bienvenu, O. J., Hoehn-Saric, R., Shugart, Y. Y., Liang, K. Y., Samuels, J., & Nestadt, G. (2007). Factor analysis of the Yale–Brown Obsessive Compulsive Scale in a family study of obsessive–compulsive disorder. *Depression and Anxiety*, *24*(2), 130–138.

Del Casale, A., Sorice, S., Padovano, A., Simmaco, M., Ferracuti, S., Lamis, D. A., Rapinesi, C., Sani, G., Girardi, P., Kotzalidis, G. D. & Pompili, M. (2019). Psychopharmacological treatment of obsessive-compulsive disorder (OCD). *Current Neuropharmacology*, *17*(8), 710-736.

Eisen, J. L., Mancebo, M. A., Pinto, A., Coles, M. E., Pagano, M. E., Stout, R., & Rasmussen, S. A. (2006). Impact of obsessive-compulsive disorder on quality of life. *Comprehensive Psychiatry*, *47*(4), 270–275.

Else-Quest, N. M., Higgins, A., Allison, C., & Morton, L. C. (2012). Gender differences in self-conscious emotional experience: a meta-analysis. *Psychological Bulletin*, *138*(5), 947–981.

Fawcett, E. J., Power, H., & Fawcett, J. M. (2020). Women are at greater risk of OCD than men: A meta-analytic review of OCD prevalence worldwide. *The Journal of Clinical Psychiatry*, *81*(4), Article 13075.

Feinstein, S. B., Fallon, B. A., Petkova, E., & Liebowitz, M. R. (2003). Item-by-item factor analysis of the Yale-Brown obsessive compulsive scale symptom checklist. *The Journal of Neuropsychiatry and Clinical Neurosciences*, *15*(2), 187–193.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American Psychologist*, *34*(10), 906–911.

Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., & Salkovskis, P. M. (2002). The Obsessive-Compulsive Inventory: Development and validation of a short version. *Psychological Assessment*, *14*(4), 485–496.

Foa, E. B., Kozak, M. J., Salkovskis, P. M., Coles, M. E., & Amir, N. (1998). The validation of a new obsessive–compulsive disorder scale: The Obsessive–Compulsive Inventory. *Psychological Assessment*, *10*(3), 206–214.

Freeston, M. H., Ladouceur, R., Provencher, M., & Blais, F. (1995). Strategies used with intrusive thoughts: Context, appraisal, mood, and efficacy. *Journal of Anxiety Disorders*, *9*(3), 201–215.

García-Soriano, G., Belloch, A., Morillo, C., & Clark, D. A. (2011). Symptom dimensions in obsessive–compulsive disorder: From normal cognitive intrusions to clinical obsessions. *Journal of Anxiety Disorders*, *25*(4), 474–482.

Ghassemzadeh, H., Shams, G., Abedi, J., Karamghadiri, N., Ebrahimkhani, N., & Rajabloo, M. (2011). Psychometric properties of a Persian-language version of the obsessive-compulsive inventory-revised: OCI-R-Persian. *Psychology*, *2*(03), 210–215.

Gilbert, P. (2003). Evolution, social roles, and the differences in shame and guilt. *Social Research: An International Quarterly*, *70*(4), 1205–1230.

Goffnett, J., Liechty, J. M., & Kidder, E. (2020). Interventions to reduce shame: A systematic review. *Journal of Behavioral and Cognitive Therapy*, *30*(2), 141–160.

Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., Heninger, G. R. & Charney, D. S. (1989). The Yale-Brown obsessive compulsive scale: I. Development, use, and reliability. *Archives of General Psychiatry*, *46*(11), 1006–1011.

Grøtte, T., Solem, S., Myers, S. G., Hjemdal, O., Vogel, P. A., Güzey, I. C., Hansen, B., Nordahl, H. M. & Fisher, P. (2016). Metacognitions in obsessive-compulsive

disorder: A psychometric study of the Metacognitions Questionnaire-30. *Journal of Obsessive-Compulsive and Related Disorders, 11*, 82–90.

Grøtte, T., Solem, S., Vogel, P. A., Güzey, I. C., Hansen, B., & Myers, S. G. (2015). Metacognition, responsibility, and perfectionism in obsessive–compulsive disorder. *Cognitive Therapy and Research, 39*(1), 41–50.

Gwilliam, P. D. (2001). *An investigation into the cognitive predictors of obsessive-compulsive symptoms* [Unpublished doctoral dissertation], University of Manchester.

Gwilliam, P., Wells, A., & Cartwright-Hatton, S. (2004). Does meta-cognition or responsibility predict obsessive–compulsive symptoms: A test of the metacognitive model. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice, 11*(2), 137–144.

Hajcak, G., Huppert, J. D., Simons, R. F., & Foa, E. B. (2004). Psychometric properties of the OCI-R in a college sample. *Behaviour Research and Therapy, 42*(1), 115–123.

Hallsworth, D. (2016). *Perfectionism, moral thought-action fusion and shame-proneness as predictors of mental contamination* [Unpublished doctoral dissertation]. University of Surrey.

Hasler, G., Kazuba, D., & Murphy, D. L. (2006). Factor analysis of obsessive–compulsive disorder YBOCS-SC symptoms and association with 5-HTTLPR SERT polymorphism. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics, 141*(4), 403–408.

Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling* [White paper].

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). Guilford publications.

Hayes, A. F., & Coutts, J. J. (2020). Use omega rather than Cronbach's alpha for estimating reliability. But… *Communication Methods and Measures, 14*(1), 1–24.

Hennig-Fast, K., Michl, P., Müller, J., Niedermeier, N., Coates, U., Müller, N., Engel, R. R., Möller, H. J., Reiser, M. & Meindl, T. (2015). Obsessive-compulsive disorder–a question of conscience? An fMRI study of behavioural and neurofunctional correlates of shame and guilt. *Journal of Psychiatric Research, 68,* 354–362.

Hermans, D., Martens, K., De Cort, K., Pieters, G., & Eelen, P. (2003). Reality monitoring and metacognitive beliefs related to cognitive confidence in obsessive–compulsive disorder. *Behaviour Research and Therapy, 41*(4), 383–401.

Hezel, D. M., & McNally, R. J. (2016). A theoretical review of cognitive biases and deficits in obsessive–compulsive disorder. *Biological Psychology, 121*, 221–232.

Hezel, D. M., Riemann, B. C., & McNally, R. J. (2012). Emotional distress and pain tolerance in obsessive-compulsive disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*(4), 981–987.

Hoaglin, D. C., & Iglewicz, B. (1987). Fine-tuning some resistant rules for outlier labeling. *Journal of the American Statistical Association*, *82*(400), 1147–1149.

Hon, K., Siu, B. W., Cheng, C. W., Wong, W. C., & Foa, E. B. (2019). Validation of the Chinese version of obsessive-compulsive inventory-revised. *East Asian Archives of Psychiatry*, *29*(4), 103–111.

Huppert, J. D., Simpson, H. B., Nissenson, K. J., Liebowitz, M. R., & Foa, E. B. (2009). Quality of life and functional impairment in obsessive–compulsive disorder: A

comparison of patients with and without comorbidity, patients in remission, and healthy controls. *Depression and Anxiety*, *26*(1), 39–45.

Irak, M., & Tosun, A. (2008). Exploring the role of metacognition in obsessive–compulsive and anxiety symptoms. *Journal of Anxiety Disorders*, *22*(8), 1316–1325.

Janeck, A. S., Calamari, J. E., Riemann, B. C., & Heffelfinger, S. K. (2003). Too much thinking about thinking?: Metacognitive differences in obsessive–compulsive disorder. *Journal of Anxiety Disorders*, *17*(2), 181–195.

Kim, J. E., Lee, S. W., & Lee, S. J. (2014). Relationship between early maladaptive schemas and symptom dimensions in patients with obsessive-compulsive disorder. *Psychiatry Research*, *215*(1), 134–140.

Ladouceur, R., Freeston, M. H., Rhéaume, J., Dugas, M. J., Gagnon, F., Thibodeau, N., & Fournier, S. (2000). Strategies used with intrusive thoughts: A comparison of OCD patients with anxious and community controls. *Journal of Abnormal Psychology*, *109*(2), 179–187.

Lewis, H. B. (1971). Shame and guilt in neurosis. *Psychoanalytic Review*, *58*(3), 419–438.

Marcks, B. A., & Woods, D. W. (2007). Role of thought-related beliefs and coping strategies in the escalation of intrusive thoughts: An analog to obsessive–compulsive disorder. *Behaviour Research and Therapy*, *45*(11), 2640–2651.

Marschall, D., Sanftner, J., & Tangney, J. P. (1994). *The state shame and guilt scale*. George Mason University.

Matos, M., Galhardo, A., Moura-Ramos, M., Steindl, S. R., Bortolon, C., Hiramatsu, Y.,Baumann, T., Yiu, R. X. Q. & Ferreira, C. (2021). Measuring shame across five

countries: Dimensionality and measurement invariance of the external and internal shame scale. *Current Psychology*, 1–10.

McNicol, K., & Wells, A. (2012). Metacognition and obsessive-compulsive symptoms: The contribution of thought-fusion beliefs and beliefs about rituals. *International Journal of Cognitive Therapy*, *5*(3), 330–340.

Myers, S. G., Fisher, P. L., & Wells, A. (2009). An empirical test of the metacognitive model of obsessive-compulsive symptoms: Fusion beliefs, beliefs about rituals, and stop signals. *Journal of Anxiety Disorders*, *23*(4), 436–442.

Myers, S. G., & Wells, A. (2005). Obsessive-compulsive symptoms: The contribution of metacognitions and responsibility. *Journal of Anxiety Disorders*, *19*(7), 806–817.

Obsessive Compulsive Cognitions Working Group. (2003). Psychometric validation of the obsessive beliefs questionnaire and the interpretation of intrusions inventory: Part I. *Behaviour Research and Therapy*, *41*(8), 863–878.

Obsessive Compulsive Cognitions Working Group. (2005). Psychometric validation of the obsessive belief questionnaire and interpretation of intrusions inventory—Part 2: Factor analyses and testing of a brief version. *Behaviour Research and Therapy*, *43*(11), 1527–1542.

Olatunji, B. O., Cox, R., & Kim, E. H. (2015). Self-disgust mediates the associations between shame and symptoms of bulimia and obsessive-compulsive disorder. *Journal of Social and Clinical Psychology*, *34*(3), 239–258.

Olsen, R. (2008). Self-selection bias. In P. J. Lavrakas (Ed.), *Encyclopedia of survey research methods* (pp. 809–809). Sage Publications.

Öst, L. G., Havnen, A., Hansen, B., & Kvale, G. (2015). Cognitive behavioral treatments of obsessive–compulsive disorder. A systematic review and meta-analysis of studies published 1993–2014. *Clinical Psychology Review*, *40*, 156–169.

Pinto, A., Mancebo, M. C., Eisen, J. L., Pagano, M. E., & Rasmussen, S. A. (2006). The Brown Longitudinal Obsessive Compulsive Study: Clinical features and symptoms of the sample at intake. *Journal of Clinical Psychiatry*, *67*(5), 703-711.

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, *63*(1), 539–569.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717–731.

Purdon, C., & Clark, D. A. (1993). Obsessive intrusive thoughts in nonclinical subjects. Part I. Content and relation with depressive, anxious and obsessional symptoms. *Behaviour Research and Therapy*, *31*(8), 713–720.

Purdon, C., & Clark, D. A. (1999). Metacognition and obsessions. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, *6*(2), 102–110.

Rachman, S. (1993). Obsessions, responsibility and guilt. *Behaviour Research and Therapy*, *31*(2), 149–154.

Rachman. (1997). A cognitive theory of obsessions. *Behaviour Research and Therapy*, *35*(9), 793–802.

Rachman, S., & de Silva, P. (1978). Abnormal and normal obsessions. *Behaviour Research and Therapy*, *16*(4), 233–248.

Rachman, S., Shafran, R., Mitchell, D., Trant, J., & Teachman, B. (1996). How to remain neutral: An experimental analysis of neutralization. *Behaviour Research and Therapy*, *34*(11–12), 889–898.

Rees, C. S., & Anderson, R. A. (2013). A review of metacognition in psychological models of obsessive–compulsive disorder. *Clinical Psychologist*, *17*(1), 1–8.

Ruscio, A. M., Stein, D. J., Chiu, W. T., & Kessler, R. C. (2010). The epidemiology of obsessive-compulsive disorder in the National Comorbidity Survey Replication. *Molecular Psychiatry*, *15*(1), 53–63.

Salkovskis, P. M. (1985). Obsessional-compulsive problems: A cognitive-behavioural analysis. *Behaviour Research and Therapy*, *23*(5), 571–583.

Salkovskis, P. M., & Harrison, J. (1984). Abnormal and normal obsessions—a replication. *Behaviour Research and Therapy*, *22*(5), 549–552.

Schoemann, A. M., Boulton, A. J., & Short, S. D. (2017). Determining power and sample size for simple and complex mediation models. *Social Psychological and Personality Science*, *8*(4), 379–386.

Shafran, R., Thordarson, D. S., & Rachman, S. (1996). Thought-action fusion in obsessive compulsive disorder. *Journal of Anxiety Disorders*, *10*(5), 379–391.

Sica, C., Steketee, G., Ghisi, M., Chiri, L. R., & Franceschini, S. (2007). Metacognitive beliefs and strategies predict worry, obsessive–compulsive symptoms and coping styles: A preliminary prospective study on an Italian non-clinical sample. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, *14*(4), 258–268.

Singh, S., Wetterneck, C. T., Williams, M. T., & Knott, L. E. (2016). The role of shame and symptom severity on quality of life in obsessive-compulsive and related disorders. *Journal of Obsessive-compulsive and Related Disorders, 11,* 49–55.

Solem, S., Håland, Å. T., Vogel, P. A., Hansen, B., & Wells, A. (2009). Change in metacognitions predicts outcome in obsessive–compulsive disorder patients undergoing treatment with exposure and response prevention. *Behaviour Research and Therapy, 47(*4), 301–307.

Solem, S., Myers, S. G., Fisher, P. L., Vogel, P. A., & Wells, A. (2010). An empirical test of the metacognitive model of obsessive-compulsive symptoms: Replication and extension. *Journal of Anxiety Disorders*, *24*(1), 79–86.

Sørensen, C. B., Kirkeby, L., & Thomsen, P. H. (2004). Quality of life with OCD. A self-reported survey among members of the Danish OCD Association. *Nordic Journal of Psychiatry*, *58*(3), 231–236.

Sulkowski, M. L., Mariaskin, A., & Storch, E. A. (2011). Obsessive-compulsive spectrum disorder symptoms in college students. *Journal of American College Health*, *59*(5), 342–348.

Szentágotai-Tătar, A., Nechita, D. M., & Miu, A. C. (2020). Shame in anxiety and obsessive-compulsive disorders. *Current Psychiatry Reports*, *22*(4), 1–9.

Tangney, & Dearing, R. L. (2002). *Shame and Guilt*. Guilford Publications.

Tangney, J. P., Dearing, R. L., Wagner, P. E., & Gramzow, R. (1989). *Test of Self-Conscious Affect–3*. George Mason University.

Timpano, K. R., Rasmussen, J. L., Exner, C., Rief, W., & Wilhelm, S. (2014). The association between metacognitions, the obsessive compulsive symptom dimensions

and hoarding: A focus on specificity. *Journal of Obsessive-Compulsive and Related Disorders, 3*(2), 188–194.

Tukey, J. W. (1977). *Exploratory data analysis*. Addison-Wesley.

Valentiner, D. P., & Smith, S. A. (2008). Believing that intrusive thoughts can be immoral moderates the relationship between obsessions and compulsions for shame-prone individuals. *Cognitive Therapy and Research*, *32*(5), 714–720.

Visvalingam, S., Crone, C., Street, S., Oar, E. L., Gilchrist, P., & Norberg, M. M. (2022). The causes and consequences of shame in obsessive-compulsive disorder. *Behaviour Research and Therapy*, *151*, Article 104064.

Vythilingum, B., & Stein, D. J. (2005). Obsessive-compulsive disorders and dermatologic disease. *Dermatologic Clinics*, *23*(4), 675–680.

Walentynowicz, M., Schneider, S., & Stone, A. A. (2018). The effects of time frames on self-report. *PloS ONE*, *13*(8), Article e0201655.

Weingarden, H., & Renshaw, K. D. (2014). Associations of obsessive compulsive symptoms and beliefs with depression: Testing mediation by shame and guilt. *International Journal of Cognitive Therapy*, *7*(4), 305–319.

Weingarden, H., & Renshaw, K. D. (2015). Shame in the obsessive compulsive related disorders: A conceptual review. *Journal of Affective Disorders*, *171*, 74–84.

Wells, A. (1997). *Cognitive Therapy of Anxiety Disorders: A Practice Manual and Conceptual Guide*. John Wiley & Sons.

Wells, A. (2011). *Metacognitive therapy for anxiety and depression*. Guilford press.

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: Properties of the MCQ-30. *Behaviour Research and Therapy*, *42*(4), 385–396.

Wells, A., & Matthews, G. (1996). Modelling cognition in emotional disorder: The S-REF model. *Behaviour Research and Therapy*, *34*(11-12), 881–888.

Wells, A., Myers, S., Simons, M., & Fisher, P. (2017). Metacognitive model and treatment of OCD. In J. S. Abramowitz, D. McKay & E. A. Storch (Eds.) *The Wiley Handbook of Obsessive Compulsive Disorders*, (pp. 644–662). John Wiley & Sons.

Wells, A., & Papageorgiou, C. (1998). Relationships between worry, obsessive–compulsive symptoms and meta-cognitive beliefs. *Behaviour Research and Therapy*, *36*(9), 899–913.

Wetterneck, C. T., Singh, S., & Hart, J. (2014). Shame proneness in symptom dimensions of obsessive-compulsive disorder. *Bulletin of the Menninger Clinic*, *78*(2), 177–190.

Williams, M. T., Chapman, L. K., Simms, J. V., & Tellawi, G. (2017). Cross-Cultural Phenomenology of Obsessive-Compulsive Disorder. In J. S. Abramowitz, D. McKay & E. A. Storch (Eds.) *The Wiley Handbook of Obsessive Compulsive Disorders*, (pp. 56–74). John Wiley & Sons.

Woien, S. L., Ernst, H. A., Patock-Peckham, J. A., & Nagoshi, C. T. (2003). Validation of the TOSCA to measure shame and guilt. *Personality and Individual Differences*, *35*(2), 313–326.

Yılmaz, A. E., Gençöz, T., & Wells, A. (2008). Psychometric characteristics of the Penn State Worry Questionnaire and Metacognitions Questionnaire-30 and metacognitive predictors of worry and obsessive–compulsive symptoms in a Turkish sample.

Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice, *15*(6), 424–439.

Yoldascan, E., Ozenli, Y., Kutlu, O., Topal, K., & Bozkurt, A. I. (2009). Prevalence of obsessive-compulsive disorder in Turkish university students and assessment of associated factors. *BMC Psychiatry*, *9*(1), 1–8.

Appendix A

Online Self-report Survey

Start of Block: Demographics

What is your age in years?

_____

How do you describe yourself

- ○ Male
- ○ Female
- ○ Non-binary
- ○ Prefer not to say

What is the highest level of education you have completed

- ○ Some University but no degree
- ○ University - Bachelors degree
- ○ Post-graduate degree
- ○ Prefer not to say

What is your first language (language spoken at home)

- ○ English
- ○ Other (please specify) _____

End of Block: Demographics

Start of Block: Questionnaire 1

This questionnaire is concerned with beliefs people have about their thinking. Listed below are a number of beliefs that people have expressed. Please read each item and say how much you generally agree with it by selecting the appropriate response. Please respond to all the items, there are no right or wrong answers.

Worrying helps me to avoid problems in the future.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

My worrying is dangerous for me.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I think a lot about my thoughts.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I could make myself sick with worrying.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I am aware of the way my mind works when I am thinking through a problem.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

If I did not control a worrying thought, and then it happened, it would be my fault.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I need to worry in order to remain organized.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I have little confidence in my memory for words and names.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

My worrying thoughts persist, no matter how I try to stop them.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

Worrying helps me to get things sorted out in my mind.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I cannot ignore my worrying thoughts.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I monitor my thoughts.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I should be in control of my thoughts all of the time.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

My memory can mislead me at times.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

My worrying could make me go mad.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I am constantly aware of my thinking.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I have a poor memory.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I pay close attention to the way my mind works.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

Worrying helps me cope.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

Not being able to control my thoughts is a sign of weakness.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

When I start worrying, I cannot stop.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I will be punished for not controlling certain thoughts.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

Worrying helps me to solve problems.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I have little confidence in my memory for places.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

It is bad to think certain thoughts.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I do not trust my memory.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

If I could not control my thoughts, I would not be able to function.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I need to worry in order to work well.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

I have little confidence in my memory for actions.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

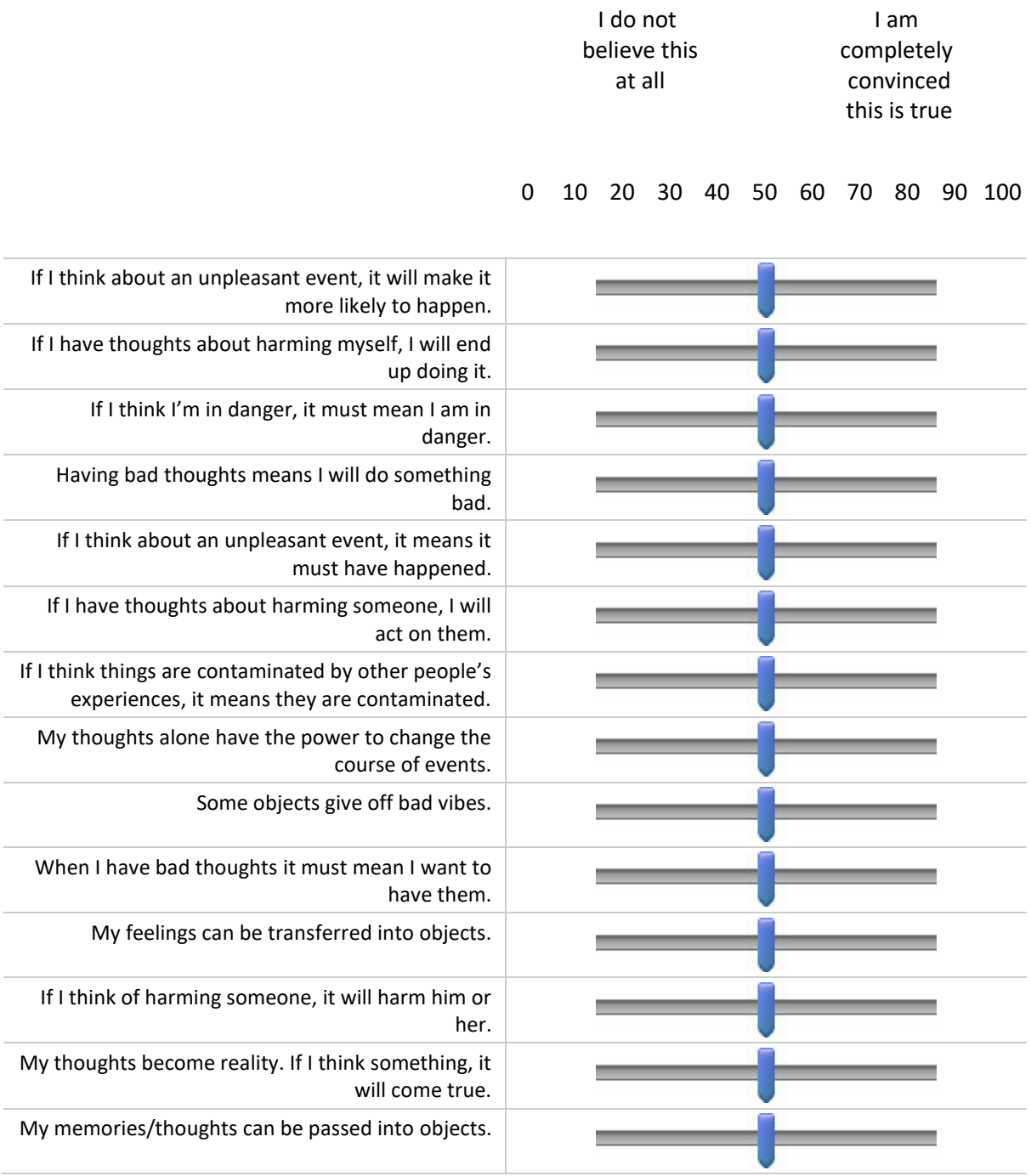
I constantly examine my thoughts.

- ○ Do not agree
- ○ Agree slightly
- ○ Agree moderately
- ○ Agree very much

End of Block: Questionnaire 1

Start of Block: Questionnaire 2

People have different beliefs about the power of their thoughts and experiences. Listed below are a number of these beliefs. Please read each one and indicate how much you believe it by selecting a number on the right-hand scale. There are no right or wrong answers. Do not think too much about each one, indicate how much you generally believe it.



End of Block: Questionnaire 2

Start of Block: Questionnaire 3

The following statements refer to experiences that many people have in their everyday lives. Select the response that best describes HOW MUCH that experience has DISTRESSED or BOTHERED you during the PAST MONTH.

I have saved up so many things that they get in the way.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I check things more often than necessary.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I get upset if objects are not arranged properly.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I feel compelled to count while I am doing things.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I find it difficult to touch an object when I know it has been touched by strangers or certain people.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I find it difficult to control my own thoughts.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I collect things I don't need.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I repeatedly check doors, windows, drawers, etc.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I get upset if others change the way I have arranged things.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I feel I have to repeat certain numbers.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I sometimes have to wash or clean myself simply because I feel contaminated.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I am upset by unpleasant thoughts that come into my mind against my will.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I avoid throwing things away because I am afraid I might need them later.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I repeatedly check gas and water taps and light switches after turning them off.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I need things to be arranged in a particular order.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I feel that there are good and bad numbers.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I wash my hands more often and longer than necessary.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

I frequently get nasty thoughts and have difficulty in getting rid of them.

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ A lot
- ○ Extremely

End of Block: Questionnaire 3

Start of Block: Questionnaire 4

Everybody at times can feel embarrassed, self-conscious or ashamed. These questions are about such feelings if they have occurred at any time in the past year. There are no 'right' or 'wrong' answers. Please select the response which applies to you.

Have you felt ashamed of any of your personal habits?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you worried about what other people think of any of your personal habits?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you tried to cover up or conceal any of your personal habits?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you felt ashamed of your manner with others?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you worried about what other people think of your manner with others?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you avoided people because of your manner?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you felt ashamed of the sort of person you are?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you worried about what other people think of the sort of person you are?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you tried to conceal from others the sort of person you are?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you felt ashamed of your ability to do things?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you worried about what other people think of your ability to do things?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you avoided people because of your inability to do things?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Do you feel ashamed when you do something wrong?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you worried about what other people think of you when you do something wrong?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you tried to cover up or conceal things you felt ashamed of having done?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you felt ashamed when you said something stupid?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you worried about what other people think of you when you said something stupid?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you avoided contact with anyone who knew you said something stupid?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you felt ashamed when you failed in a competitive situation?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you worried about what other people think of you when you failed in a competitive situation?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you avoided people who have seen you fail?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you felt ashamed of your body or any part of it?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you worried about what other people think of your appearance?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you avoided looking at yourself in the mirror?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

Have you wanted to hide or conceal your body or any part of it?

- ○ Not at all
- ○ A little
- ○ Moderately
- ○ Very much

End of Block: Questionnaire 4

Start of Block: Final questions

Responses to this survey are anonymous - any email addresses and/or student numbers provided are stored separately from the survey data.

This survey contains a questionnaire related to mental health. If your scores on this measure are cause for concern, would you like to be contacted with suggestions for services that may assist you? If so, please enter your email below.

_____

If you are completing this study as part of your course requirements and would like to receive credit for your participation, please enter your student number and RPS code ID number below.

_____

If you are not completing this study as part of your course requirements, and would like to enter the draw to win one of two $50 vouchers to a store of your choosing please enter your email below.

_____

If you would like to receive a summary of the results of this study, please enter your email below.

_____

End of Block: Final questions

Appendix B

Details of Regression Equations for Mediation Models

Table B1

Regression Equations for Simple Mediation Model Linking Thought Fusion Beliefs to OCD Symptom Severity Through Dispositional Shame.

Predictor	Path	Coeff.	SE	*t*	*p*
		Equation 1: Computing total effect, predicting OCI-R			
		R^2 = .31, F(1,227) = 103.53, p < .001			
TFI	(*c*)	0.31	0.03	10.18	< .001
		Equation 1: Predicting ESS			
		R^2 = .39, F(1,227) = 146.57, p < .001			
TFI	(*a*)	0.31	0.05	6.43	< .001
		Equation 2: Predicting OCI-R-C			
		R^2 = .47, F(2,226) = 100.52, p < .001			
ESS	(*b*)	0..31	0.04	8.20	< .001
TFI	(*c*')	0.22	0.03	7.42	< .001

Table B2

Regression Equations for a Simple Mediation Model Linking Metacognitions to OCD Symptom Severity Through Dispositional Shame.

Predictor	Path	Coeff.	SE	*t*	*p*
		Equation 1: Computing total effect, predicting OCI-R			
		R^2 = .40, F(1,227) = 152.06, p < .001			
MCQ-30	(*c*)	0.58	0.05	12.33	< .001
		Equation 1: Predicting ESS			
		R^2 = .40, F(1,227) = 150.30, p < .001			
MCQ-30	(*a*)	0.81	0.07	12.26	< .001
		Equation 2: Predicting OCI-R-C			
		R^2 = .47, F(2,226) = 100.52, p < .001			
ESS	(*b*)	0.22	0.05	4.87	< .001
MCQ-30	(*c*')	0.40	0.06	6.96	< .001

Table B3

Regression Equations for a Serial Mediation Model Linking Obsessions to Compulsions Through Thought Fusion Beliefs and Dispositional Shame.

Predictor	Path	Coeff.	SE	*t*	*p*
		Equation 1: Computing total effect, predicting OCIR-C			
		R^2 = .37, F(1,227) = 133.67, p < .001			
OCI-R-O	(*c*)	2.02	0.18	11.56	< .001
		Equation 1: Predicting TFI			
		R^2 = .23, F(1,227) = 66.91, p < .001			
OCI-R-O	(a_1)	33.38	4.14	8.18	< .001
		Equation 2: Predicting ESS			
		R^2 = .40, F(2,226) = 76.50, p < .001			
OCI-R-O	(a_2)	3.17	0.33	9.73	< .001
TFI	(a_3)	0.10	0.05	2.07	.039
		Equation 3: Predicting OCIR-C			
		R^2 = .47, F(3,225) = 65.55, p < .001			
TFI	(b_1)	0.14	0.03	5.25	< .001
ESS	(b_2)	0.11	0.04	2.83	.005
OCI-R-O	(*c*')	1.19	0.22	5.41	< .001

Table B4

Regression Equations for a Serial Mediation Model Linking Obsessions to Compulsions Through Metacognitions and Dispositional Shame.

Predictor	Path	Coeff.	SE	*t*	*p*
		Equation 1: Computing total effect, predicting OCIR-C			
		R^2 = .37, F(1,227) = 133.67, p < .001			
OCI-R-O	(*c*)	2.02	0.18	11.56	< .001
		Equation 1: Predicting MCQ-30			
		R^2 = .40, F(1,227) = 148.83, p < .001			
OCI-R-O	(a_1)	2.74	0.23	12.17	< .001
		Equation 2: Predicting ESS			
		R^2 = .49, F(2,226) = 106.66, p < .001			
OCI-R-O	(a_2)	2.12	0.34	6.19	< .001
MCQ-30	(a_3)	0.50	0.08	6.40	< .001
		Equation 3: Predicting OCIR-C			
		R^2 = .47, F(3,225) = 65.55, p < .001			
MCQ-30	(b_1)	0.21	0.05	3.96	< .001
ESS	(b_2)	0.07	0.04	1.67	.096
OCI-R-O	(*c*')	1.21	0.23	5.23	< .001

Table B5

Regression Equations for a Serial Mediation Model Linking Obsessions to Compulsions Through Beliefs Concerning the Need to Control Thoughts and Dispositional Shame.

Predictor	Path	Coeff.	SE	*t*	*p*
		Equation 1: Computing total effect, predicting OCIR-C			
		R^2 = .37, F(1,227) = 133.67, p < .001			
OCI-R-O	(*c*)	2.02	0.18	11.56	< .001
		Equation 1: Predicting MCQ-30			
		R^2 = .30, F(1,227) = 95.24, p < .001			
OCI-R-O	(a_1)	0.63	0.06	9.76	< .001
		Equation 2: Predicting ESS			
		R^2 = .42, F(2,226) = 83.06, p < .001			
OCI-R-O	(a_2)	2.86	0.34	8.50	< .001
MCQ-30-NFC	(a_3)	1.02	0.29	3.50	< .001
		Equation 3: Predicting OCIR-C			
		R^2 = .42, F(3,225) = 54.24, p < .001			
MCQ-30-NFC	(b_1)	0.48	0.18	2.68	.008
ESS	(b_2)	0.11	0.04	2.74	.007
OCI-R-O	(*c*')	1.34	0.23	5.80	< .001

Table B6

Regression Equations for Simple Mediation Model Linking Obsessions to Compulsions Through Dispositional Shame.

Predictor	Path	Coeff.	SE	*t*	*p*
		Equation 1: Computing total effect, predicting OCI-R-C			
		R^2 = .37, F(1,227) = 133.67, p < .001			
OCI-R-O	(*c*)	2.02	1.8	11.56	< .001
		Equation 1: Predicting ESS			
		R^2 = .40, F(1,227) = 150.30, p < .001			
OCI-R-O	(*a*)	3.50	0.29	12.11	< .001
		Equation 2: Predicting OCI-R-C			
		R^2 = .47, F(2,226) = 100.52, p < .001			
ESS	(*b*)	0.13	0.04	3.39	< .001
OCI-R-O	(*c*')	1.56	0.22	7.09	< .001