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EXAMINING THE INDIRECT EFFECT OF TRAUMA ON OBSESSIVE-
COMPULSIVE SYMPTOMS THROUGH RESPONSIBILITY/THREAT BELIEFS

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Arts and Sciences
at the University of Kentucky

By

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2022

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ABSTRACT OF THESIS

EXAMINING THE INDIRECT EFFECT OF TRAUMA ON OBSESSIVE-COMPULSIVE SYMPTOMS THROUGH RESPONSIBILITY/THREAT BELIEFS

Inflated responsibility beliefs and threat estimations have been implicated in the etiology and maintenance of obsessive-compulsive (OC) symptoms. Research suggests that early life experiences that involve actual or perceived serious harm to oneself or others may lead to inflated responsibility/threat beliefs and OC symptoms. Research has yet to explore if traumatic experiences influence responsibility/threat beliefs or if the associations between trauma and OC symptoms are at all dependent on trauma's influence on responsibility/threat beliefs. The present study aims to examine associations among exposure to potentially traumatic events (PTEs), responsibility/threat beliefs, and OC symptoms. A sample of 886 undergraduate students completed a battery of self-report questionnaires online, including measures of lifetime exposure to PTEs, pathways to responsibility beliefs, obsessive beliefs, including responsibility/threat estimation, and OC symptoms. Multiple regression using the PROCESS macro was used to examine the effects of cumulative exposure to PTEs on responsibility/threat beliefs and OC symptoms, the effects of responsibility/threat beliefs on OC symptoms, and the indirect effect of cumulative exposure to PTEs on OC symptoms through responsibility/threat beliefs. The three primary variables were significantly and positively correlated, and the indirect effect of cumulative exposure to PTEs on OC symptoms was significant, even when controlling for other obsessive belief categories. These findings suggest that trauma exposure may influence responsibility/threat beliefs to increase OC symptomatology, though longitudinal studies are needed to support this interpretation.

KEYWORDS: obsessive-compulsive disorder, trauma, responsibility, obsessive beliefs, indirect effects

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CHAPTER 1. INTRODUCTION

1.1 Obsessive-Compulsive Disorder

Obsessive-compulsive disorder (OCD) is a psychiatric disorder in which an individual experiences clinically significant obsessions (repetitive thoughts, images, and impulses that are unwanted and involuntary), compulsions (repetitive behaviors or mental acts that are carried out to minimize negative emotions or prevent negative consequences and are difficult to control), or a combination of the two (American Psychiatric Association [APA], 2013). Obsessions and compulsions are heterogeneous, and clinical presentations can vary significantly between individuals (Miguel et al., 2005). A meta-analysis of 21 factor analytic studies using the Yale-Brown Obsessive-Compulsive Scale Checklist (Y-BOCS; Goodman et al., 1989) identified four OC symptom dimensions: symmetry (consisting of symmetry obsessions and repeating, ordering, and counting compulsions), forbidden thoughts (consisting of aggressive, sexual, religious, and somatic obsessions and checking compulsions), contamination (consisting of contamination obsessions and cleaning/washing compulsions), and hoarding (consisting of hoarding obsessions and compulsions; Bloch et al., 2008). Of note, hoarding has since been distinguished as a separate diagnosis in the most recent edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013).

Obsessions and compulsions are common in the general population (Ruscio et al., 2010), though the prevalence of individuals who meet criteria for OCD is significantly lower (Ruscio et al., 2010; Subramaniam et al., 2019). There has been no nationally representative study addressing OCD prevalence using DSM-5 criteria. Nonetheless, a nationally representative survey of U.S. adults reported a lifetime prevalence of 2.3% and

a 12-month prevalence of 1.2% using DSM-IV criteria (Ruscio et al., 2010). Save for the distinction of hoarding disorder as a discrete diagnosis, which has a low base rate in the general population, the diagnostic criteria for OCD were only marginally changed from the DSM-IV (APA, 1994) to the DSM-5 (APA, 2013). Thus, the prevalence of OCD per the DSM-5 is likely similar to those reported with DSM-IV criteria. In untreated individuals, OCD is typically chronic, with low rates of spontaneous remission (Ruscio et al., 2010). Obsessive-compulsive disorder is also associated with marked impairment and high rates of disability (Hartl et al., 2005). Individuals diagnosed with OCD report significant distress and impairment in occupational, social, and family functioning due to their symptoms (Bobes et al., 2001; Ruscio et al., 2010; Steketee, 1997). Additionally, OCD diagnosis and symptom severity are positively correlated with impairments in multiple quality of life domains (Coluccia et al., 2016).

1.2 Cognitive Models of OCD

Cognitive models of OCD suggest that dysfunctional beliefs are central to the development of obsessions and compulsions (Rachman, 1998; Salkovskis, 1985; see also Rachman, 1976, 1997, 1998, 2002; Rachman & de Silva, 1978; Rassin & Muris, 2007). Intrusive thoughts are common in the general population (Freeston et al., 1991; Rachman & de Silva, 1978) but develop into obsessions, in part, when the perceived significance of intrusive thoughts is inflated (Rachman, 1998; Salkovskis, 1985). For example, an individual who experiences an intrusive thought about walking in front of a moving car can evaluate this thought in a variety of ways; they might recognize the thought as strange but fleeting, having no inherent meaning, or they might believe that having such a thought suggests they are suicidal or going insane. Compared to the former interpretations, the latter

interpretations would be more likely to heighten anxiety and motivate avoidance and repetitive behaviors geared toward preventing intrusive thoughts and associated fear consequences (Calkins et al., 2013; Salkovskis, 1985).

Interpretations of intrusions as unacceptable or particularly meaningful may derive from maladaptive beliefs that are characteristic of obsessive thinking, otherwise known as obsessive beliefs (Salkovskis, 1985). The Obsessive Compulsive Cognitions Working Group (OCCWG) originally proposed six domains of obsessive beliefs; (1) inflated responsibility, (2) overestimation of threat, (3) intolerance of uncertainty, (4) importance of thoughts, (5) control of thoughts, and (6) perfectionism (OCCWG, 1997). Inflated responsibility involves overestimations of one's personal liability for preventing harm and the belief that not doing anything to prevent harm is as bad as causing harm. Overestimation of threat involves overestimations of the likelihood and severity of potentially dangerous events. Intolerance of uncertainty involves an aversion to ambiguity and a need for control, particularly in situations perceived as dangerous. Importance of thoughts involves beliefs that the mere presence of a thought is meaningful, indicating something about the nature of the individual or the likelihood of experiencing the content of the thought. Control of thoughts involves beliefs that it is possible and, at times, necessary to control the content of one's thoughts. Perfectionism involves a need for exactness and inflated concern about mistakes. Factor analytic research of item pools designed to measure these six factors revealed three latent obsessive beliefs: perfectionism/certainty, importance/control of thoughts, and responsibility/threat estimation (OCCWG, 2005).

While some models of OCD implicate obsessive beliefs collectively in the development and maintenance of the disorder, others highlight the influence of individual

belief domains (Mantz & Abbott, 2017). Beliefs about responsibility and threat have been highlighted in multiple cognitive models of OCD (Rachman, 1998, 2002, 2004; Salkovskis, 1985, 1999; Salkovskis et al., 2000). Salkovskis originally proposed that individuals with OCD interpret their intrusive thoughts based on beliefs about personal responsibility for harm (Salkovskis, 1985, 1989). He suggested that dysfunctional assumptions related to the importance of negative intrusive thoughts involve themes of responsibility and blame. For example, OCD patients may report that “failing to prevent harm is as bad as causing harm” or “responsibility for preventing a harmful event is not attenuated by a low probability of the event’s occurrence” (Salkovskis, 1985). Resulting maladaptive interpretations of intrusions can then motivate avoidance of said intrusions or neutralizing behaviors aimed at preventing harm or mitigating responsibility for harm (Salkovskis, 1985). For example, a woman experiencing intrusive thoughts about cosmetic items becoming carcinogenic may interpret these thoughts to mean that her use of cosmetics will cause her to develop cancer and die. This could lead to reassurance seeking, avoidance of cosmetics, and repetitive hand-washing to remove any residual, potentially contaminated, cosmetic products (Salkovskis, 1985).

Extrapolating on this model, Rachman (2002) highlighted the combined influence of beliefs about responsibility and perception of threat to explain compulsive checking. Rachman (2002) suggested that the intensity and duration of checking behaviors can be understood as a function of perceived responsibility, perceived probability of harm, and perceived seriousness of harm. He suggested that compulsive checking behaviors are maintained by the following processes: 1) checking leads to increases in perceived responsibility, 2) when individuals feel particularly responsible, their ratings of the

probability of harm occurring increase, 3) repeated checking decreases confidence in memories of the checking, which motivates additional checking, and 4) due to the vague nature of most perceived threats, it is often impossible to be certain that the threat has been removed (Rachman, 2002).

Rachman (2004) also highlighted the influence of responsibility beliefs and perception of threat in his model of contamination fears. He proposed that perceived contamination signals threat to an individual's physical, mental, and social well-being. Compulsive washing and cleaning emerge as behavioral responses aimed at mitigating this threat. As in the case of compulsive checking (Rachman, 2002), it is often impossible to determine that the threat of potential contamination has been eradicated, thus the washing and cleaning behaviors continue (Rachman, 2004). Further, Rachman (2004) suggested that individuals with inflated beliefs about responsibility are more likely to view the possibility of contaminating others as a significant threat. An individual who believes it is imperative to prevent harm to others may respond by attempting to remove all possible contaminants from their surroundings to keep themselves and others safe. Thus, the presence of inflated responsibility beliefs among individuals with contamination fears may be associated with even greater impulses to wash and clean (Rachman, 2004).

A substantial body of literature has evaluated associations between responsibility/threat beliefs and OCD (Mantz & Abbott, 2017). Individuals with OCD reliably report greater responsibility/threat beliefs than non-anxious controls (Julien et al., 2008; Kim et al., 2021; OCCWG, 2003; OCCWG, 2005; Pozza & Dèttore, 2014; Rector et al., 2009; Wang et al., 2015, Wolters et al., 2011), and most, though not all (Kim, McKay, et al., 2021; Tolin et al., 2006), studies suggest that OCD patients report greater

responsibility/threat beliefs compared to individuals with other anxiety and related disorders (Julien et al., 2008; OCCWG, 2005; Pozza & Dèttore, 2014; Tolin et al., 2007). Responsibility/threat beliefs are also strongly correlated with OCD symptoms (Falkenstein et al., 2020; Haciomeroglu, 2020; Mauzay & Cuttler, 2018; Ramezani et al., 2016; Wang et al., 2015; Weingarden & Renshaw, 2014), but there is some heterogeneity in associations between responsibility/threat beliefs and specific OC symptom dimensions (Brakoulias et al., 2014; Cordeiro et al., 2015).

Studies among individuals with OCD have consistently demonstrated positive associations between responsibility/threat beliefs and responsibility/checking OC symptoms (Hellberg et al., 2020; Smith et al., 2012; Wheaton et al., 2010). Additionally, most of these studies, though not all (Hellberg et al., 2020), have demonstrated a positive association between responsibility/threat beliefs and both contamination/washing and unacceptable thoughts/mental neutralizing OC symptoms (Smith et al., 2012; Wheaton et al., 2010). However, the majority of these studies have failed to detect a significant association between responsibility/threat beliefs and symmetry/exactness OC symptoms (Hellberg et al., 2020; Smith et al., 2012). The relation between responsibility/threat beliefs and OC symptom dimensions appears to be more homogeneous among convenience samples; multiple studies have demonstrated a positive association between responsibility/threat beliefs and responsibility/checking, contamination/washing, unacceptable thoughts/mental neutralizing, and symmetry/exactness OC symptoms among non-selected students (Olatunji et al., 2019; Viar et al., 2011; Wheaton et al., 2013).

Responsibility beliefs (as measured by the Responsibility Attitudes Scale; Salkovskis et al., 2000) have been shown to mediate the relation between intrusive thoughts

and OC symptoms in a convenience sample of undergraduates (Smári & Hólmsteinsson, 2001). Additionally, a recent study of unselected undergraduates evaluated specific components of Salkovskis' (1999) model. In support of the inflated responsibility model, responsibility/threat beliefs predicted responsibility appraisals/misinterpretations, which predicted counterproductive safety strategies (e.g., avoidance, thought suppression), neutralizing actions (e.g., washing, checking, ordering, mental neutralizing), and mood (depression, anger, confusion; Mitchell et al., 2020). Further, there was an indirect effect of responsibility/threat beliefs on the OCD-related outcome measures via responsibility appraisals/misinterpretations (Mitchell, 2020).

1.3 Pathways to Inflated Responsibility Beliefs

In contemplating the possible origins of responsibility beliefs, Salkovskis et al. (1999) drew on Beck's (1976) cognitive theory of emotional problems which suggests that dysfunctional beliefs may evolve from attitudes acquired through early life experiences. Salkovskis et al. (1999) proposed five types of early life experiences that may lead to inflated responsibility beliefs. These include 1) having excessive responsibility in childhood (e.g., a child that must take on the care of younger siblings at an early age); 2) growing up with rigid rules and codes of conduct (e.g., a child raised in a very religious family with strict behavioral expectations); 3) having over-protective parents (e.g., a child who is sheltered from difficult situations and consistently told they are "delicate"); 4) experiencing event(s) in which the individual is responsible for negatively impacting the health or welfare of themselves or others (e.g., an individual who accidentally left a candle burning, causing a house fire), and; 5) experiencing event(s) in which the individual believes (correctly or incorrectly) that they are responsible for negatively impacting the

health or welfare of themselves or others (e.g., an individual who argued with their father and wished for his death, who subsequently learned of their father dying of a heart attack).

The Pathways to Inflated Responsibility Beliefs Scale (PIRBS) was developed to assess these early life experiences (Coles & Schofield, 2008). Factor analyses of the PIRBS suggested four distinct pathways to responsibility beliefs (Coles & Schofield, 2008). The first three factors were consistent with the model advanced by Salkovsis and colleagues (1999) and included heightened responsibility in childhood, rigid rules and codes of conduct in childhood, and over-protective parents (Coles & Schofield, 2008). The fourth factor was a combination of questions that were designed to separately assess event(s) involving actual and imagined harm to self or others (Coles & Schofield, 2008). Coles and Schofield (2008) suggested that, although actual and imagined harm are theoretically distinct, respondents may struggle to perceive the subtle difference between events in which they caused harm and those in which they believe they caused harm.

In a convenience sample of undergraduate volunteers, PIRBS total score and all subscale scores were positively correlated with inflated responsibility/threat beliefs and OC symptoms (Coles & Schofield, 2008). Additionally, PIRBS total score, heightened responsibility in childhood, over-protective parents, and actual/imagined harm demonstrated a stronger correlation with responsibility/threat beliefs than perfectionism/certainty (Coles & Schofield, 2008). PIRBS total score, heightened responsibility in childhood, and actual/imagined harm demonstrated a stronger correlation with responsibility/threat beliefs than importance/control of thoughts (Coles & Schofield, 2008). Similarly, total and all subscale scores of the Icelandic translation of the PIRBS were correlated with OC symptoms and responsibility attitudes, as measured by the

Responsibility Attitudes Scale (Salkovskis et al., 2000), in a sample of unselected undergraduates (Smari et al., 2010). Of the PIRBS subscales, actual/imagined harm had the largest effect size on total OC symptom severity (Smari et al., 2010). Among individuals with OCD, Coles et al. (2015) found that inflated responsibility/threat beliefs and OC symptom severity were significantly correlated with PIRBS total score, over-protective parents, and actual/imagined harm, but not with heightened responsibility in childhood or rigid rules. Among psychiatric healthy controls, responsibility/threat beliefs were associated with PIRBS total score but not PIRBS subscale scores; moreover, total OC symptom severity was not significantly related to PIRBS total or subscale scores (Coles et al., 2015). Similarly, neither responsibility/threat beliefs nor OC symptom severity were significantly associated with any PIRBS scores among anxious controls (Coles et al., 2015). Taken as a whole, this research suggests that, of the PIRBS subscales, actual/imagined harm is the most consistent predictor of responsibility/threat beliefs and OC symptoms among convenience samples and individuals with OCD.

Studies have found that pathways to responsibility have an indirect effect on OC symptoms through responsibility attitudes and interpretations in convenience samples (Adams, 2012; Smári et al., 2010). Specifically, Smári et al. (2010) found an indirect effect of PIRBS total score on Revised Obsessive-Compulsive Inventory total score (OCI-R; Foa et al., 2002) through responsibility attitudes, as measured by the Responsibility Attitudes Scale (Salkovskis et al., 2000); individual PIRBS and OCI-R factors were not reported. Similarly, Adams (2012) found an indirect effect of heightened responsibility in childhood and actual/imagined harm on the obsessing, hoarding, arranging, and checking subscales

of the OCI-R via responsibility interpretations, as measured by the Responsibility Interpretations Questionnaire (Salkovskis et al., 2000).

Among the four pathways to responsibility beliefs, actual/imagined harm is unique in that experiences that fall into this category may also function as critical incidents prompting the development of OC symptoms (Salkovskis et al., 1999). Some incidents involving actual or imagined harm can overlap, conceptually, with traumatic experiences. The DSM-5 criteria for a traumatic event involves actual experience or threat of death, serious injury, or sexual violence (APA, 2013). The individual may have experienced the event directly, witnessed it, learned of it happening to a close friend or relative, or been repeatedly exposed to aversive details of the event (APA, 2013). Many stressors involving actual/imagined harm could also constitute traumatic events. For example, an incident in which an individual caused a fatal car crash would meet criteria for both a traumatic event (due to the direct experience of an event involving a death) and for actual/imagined harm so long as the individual believes that they are responsible for harm caused by the car crash. However, some stressors involving actual/imagined harm would not meet criteria for a traumatic event (e.g., causing someone to lose their job), and some traumatic experiences occur without perceptions of responsibility for harm (e.g., experiencing a natural disaster while recognizing its uncontrollable nature). Nonetheless, given the overlap between actual/imagined harm and trauma, investigation of the relations among trauma, responsibility/threat beliefs, and OC symptoms is warranted.

1.4 Stress, Trauma, and OCD

A growing body of literature has demonstrated positive associations between stressful and traumatic life events and OC symptoms (Brander et al., 2016; Carpenter &

Chung, 2011; Cath et al., 2008; Cromer et al., 2007; Fontenelle et al., 2011; Miller & Brock, 2017; Murayama et al., 2020; Sarkhel et al., 2010; Vidal-Ribas et al., 2015). Multiple studies have found that individuals with OCD report more past traumatic experiences than individuals without OCD (Carpenter & Chung, 2011; Lafleur et al., 2011), and that trauma-exposed individuals are more likely to meet criteria for OCD than individuals who report no prior traumas (Carpenter & Chung, 2011; Fricke et al., 2007; Gothelf et al., 2004; Lafleur et al., 2011; Mathews et al., 2008). Similarly, the number of traumatic events endorsed (cumulative trauma) predicts OC symptom severity among individuals with OCD (Semiz et al., 2014) and convenience and community samples (Barzilay et al., 2019; Kroska et al., 2018). Among individuals with OCD, the association between trauma and OC symptoms remains statistically significant when controlling for other relevant factors such as age-of-onset of OCD, psychiatric comorbidity, and depressive symptomatology (Cromer et al., 2007).

There is some evidence to suggest that stressful and traumatic life events are differentially related to OC symptom dimensions. Cromer et al. (2007) found that, among individuals with OCD, past exposure to trauma was associated with Y-BOCS obsessions/checking and symmetry/exactness, but not contamination/washing or hoarding. Rosso et al. (2012) found some stressful life events (i.e., hospitalization of a family member, major personal physical illness, and loss of a personally valuable object) to be significantly associated with symmetry/exactness. A meta-analysis of 24 studies found that exposure to past trauma was associated with compulsions, but not obsessions (Miller & Brock, 2017), however associations with OC symptom dimensions were not reported. Additionally, unique associations have been demonstrated between specific trauma types

and OC symptom dimensions (Pinciotti et al., 2021). In particular, several studies have demonstrated associations between interpersonal and sexual traumas and contamination-related obsessions and compulsions (Badour et al., 2012; de Silva & Marks, 1999; Gershuny et al., 2008). However, more research is needed to understand the relation between cumulative trauma exposure and specific OC symptom dimensions.

Intrusive cognitions play an important role in PTSD as well as OCD (de Silva & Marks, 2001); in both disorders they are experienced as unpredictable and distressing, and they are persistent despite attempts to ignore or suppress them (de Silva & Marks, 2001). While intrusive cognitions in PTSD typically involve memories of the traumatic experience (de Silva & Marks, 2001), obsessions can be about a near infinite range of topics; however, they can also relate to traumatic experiences (Lipton et al., 2010; Speckens et al., 2007). Theoretical examinations of OCD symptom development following trauma have incorporated cognitive models of both OCD and PTSD, highlighting similarities between these disorders (de Silva & Marks, 2001; de Silva & Marks, 1999; Dykshoorn, 2014). Negative appraisals of intrusions have been linked to both OCD and PTSD symptom development (Ehlers & Clark, 2000; Rachman, 1998; Salkovskis, 1985). Given this etiological similarity, theories on the role of negative appraisals in PTSD may provide insights into possible mechanisms underlying the relations among trauma, events involving actual or imaged harm, and OCD.

Foa and Rothbaum (1998) suggested that ideas about the self or world prior to traumatic experiences interact with the experience of trauma to promote the development of maladaptive schemas that prevent successful recovery following trauma. Information related to the experience of a traumatic event must be incorporated into preexisting

schemas about the self/world (e.g., the world is generally safe). This can be accomplished through assimilation (i.e., incorporation or modification of the new information to fit an existing schema) or accommodation (i.e., modification of a schema to integrate the new information; Resick & Schnicke, 1996). Additionally, traumatized individuals will sometimes overaccommodate their schemas, creating new, maladaptive schemas that are overgeneralized and inaccurate (Resick & Schnicke, 1996). The two basic maladaptive schemas that are thought to prevent natural recovery processes following trauma include: the world is completely dangerous, and one's self is totally incompetent (Foa & Rothbaum, 1998). These schemas influence appraisals of trauma-related intrusions, which can exacerbate other PTSD symptoms (Foa & Rothbaum, 1998). For example, an individual who, prior to experiencing trauma, believes that the world is very safe may have difficulty processing their traumatic experience. To reconcile their worldview with the fact that they experienced a traumatic event, they may overaccommodate their schema about the world, deciding that it is completely dangerous (Foa & Rothbaum, 1998). This schema can then promote persistent PTSD symptoms such as hypervigilance and avoidance.

Ehlers and Clark (2000) also highlighted the importance of dysfunctional appraisals in the etiology and maintenance of PTSD. They proposed that persistent PTSD develops when negative appraisals of a trauma and related factors lead to an inflated sense of current threat (Ehlers & Clark, 2000). Negative appraisals are diverse but can include thoughts such as "Nowhere is safe," "I attract disaster," or "I'm going mad" (Ehlers & Clark, 2000). These negative appraisals reinforce schemas that the world is extremely dangerous and that constant care must be taken to prevent harm (Ehlers & Clark, 2000), beliefs that are integral

to the concept of responsibility/threat beliefs implicated in the etiology and maintenance of OCD (OCCWG, 2005).

To better understand the trauma-related cognitions and beliefs most salient to the development of PTSD, Foa et al. (1999) created the Posttraumatic Cognitions Inventory (PTCI). Factor analysis of a large item pool revealed a three-factor model consisting of negative cognitions about self, negative cognitions about the world, and self-blame. Importantly, negative cognitions about the world and self-blame are highly related to the concepts of responsibility and threat beliefs outlined in the OCD literature. Negative cognitions about the world includes items such as “The world is a dangerous place,” “I have to be on guard all the time” and “I have to be especially careful, because you never know what can happen next” (Foa et al., 1999). Self-blame includes items such as “There is something about me that made the event happen,” “The event happened because of the way I acted,” and “Somebody else would have stopped the event from happening” (Foa et al., 1999).

Two studies have investigated relations among potentially traumatic life events, dysfunctional beliefs, and OC symptoms (Despotes et al., 2021; McKay et al., 2016). McKay et al. (2016) studied the relation among obsessive beliefs, as measured by combining inflated responsibility/threat and intolerance of uncertainty scores (OCCWG, 2005), posttraumatic cognitions, as measured by the PTCI (Foa et al., 1999), and OC symptoms, as measured by the Obsessive-Compulsive Inventory (OCI; Foa et al., 1998) in a sample of 211 undergraduates who reported having directly experienced or witnessed at least one traumatic event on the Life Events Checklist (LEC-5; Weathers et al., 2013). Results suggested that total posttraumatic cognitions were positively associated with OC

symptom severity. Moreover, posttraumatic cognitions were found to moderate the relations between obsessive beliefs and OC symptom severity such that individuals who reported greater obsessive beliefs and greater posttraumatic cognitions endorsed the most severe OC symptoms across all OCI symptom domains. Unfortunately, specific associations between posttraumatic cognitions and responsibility/threat beliefs were not reported.

Despotes et al. (2021) examined associations among abuse and family disruption (Vidal-Ribas et al., 2015), obsessive cognitions (Foa et al., 1999; OCCWG, 2005; Wells, 2009), posttraumatic cognitions (Foa et al., 1999; Vogt et al., 2012; Wells, 2009), posttraumatic stress symptoms (Weathers, 2013), and OC symptom dimensions (Abramowitz et al., 2010) among a convenience sample (N = 402). A principal component analysis of obsessive-compulsive and posttraumatic cognition measures included in the study yielded two components, which the authors labelled obsessive cognitions (i.e., obsessive beliefs, positive metacognitions, and negative beliefs about the world), and posttraumatic cognitions (i.e., posttraumatic cognitions, negative metacognitions, and posttraumatic maladaptive beliefs). Abuse and family disruption was significantly associated with obsessive cognitions, posttraumatic cognitions, posttraumatic stress symptoms, and three of the four OC symptom dimensions (responsibility/checking, unacceptable thoughts/mental neutralizing, and symmetry/exactness, but not contamination/washing). Further, abuse and family disruption had a significant indirect effect on unacceptable thoughts/mental neutralizing OC symptoms through obsessive cognitions, posttraumatic cognitions, and posttraumatic stress symptoms, and a significant indirect effect on symmetry/exactness OC symptoms through obsessive cognitions and

posttraumatic stress symptoms. These results provide support for a possible indirect effect of stressful life events on OC symptoms, through obsessive beliefs. However, a similar model addressing traumatic events more broadly, and the relation between traumatic events and OC symptoms through responsibility/threat beliefs, has yet to be evaluated.

The present study aimed to examine associations among exposure to potentially traumatic events (PTEs), responsibility/threat beliefs, and OC symptoms in a non-selected sample of undergraduate students. Hypotheses included predictions that: 1) cumulative PTE exposure would be positively associated with OC symptoms; 2) cumulative PTE exposure would be positively associated with responsibility/threat beliefs; 3) responsibility/threat beliefs would be positively associated with OC symptoms; and 4) there would be a positive indirect effect of cumulative PTE exposure on OC symptoms through increased responsibility/threat beliefs, such that greater cumulative PTE exposure would be associated with greater responsibility/threat beliefs, which would, in turn, be associated with greater OC symptoms.

CHAPTER 2. METHOD

2.1 Participants

A total of 1,058 undergraduate students recruited from introductory psychology courses at a large public university participated in the study. Students were eligible if they were at least 18 years of age and could read and comprehend English. After excluding cases based on age requirements and missing data, a sample of 886 undergraduate students ($M_{age} = 19.4$, 77.1% female, 74.5% white/non-Hispanic or Latino) were included in analyses.

2.2 Procedure

A battery of questionnaires was administered online via the Research Electronic Data Capture (REDCap) platform. Previous research has supported the validity of online data collection for constructs related to OCD (Coles et al., 2007). The measures analyzed herein were collected as part of a larger study of stress, trauma, and OC and related disorders. This study was approved by the Institutional Review Board at the University of Kentucky (IRB# 59638). All participants were presented with a cover letter which described the study purpose, procedures, risks, and benefits, and were informed that they could skip any question and discontinue the survey at any time. By continuing to the start of the questionnaire battery, participants indicated their informed consent. Participants were awarded research credit for their participation.

2.3 Measures

2.3.1 Demographics

A questionnaire was developed to assess socio-demographic characteristics. Age, sex and race/ethnicity were included in the present study.

2.3.2 Life Events Checklist for DSM-5 (LEC-5)

The LEC-5 (Weathers et al., 2013) measures lifetime exposure to 17 PTEs (e.g., sexual assault, natural disaster). For each event, respondents are asked to indicate one or more of the following options regarding event exposure: “happened to me,” “witnessed it,” “learned about it,” “part of my job,” “not sure,” and “doesn’t apply.” They are then asked to briefly describe the event they consider to be the “worst event,” and to report whether that event was life threatening or involved serious injury, accidental or violent death, or sexual violence. In the current study, and consistent with past research using similar samples (McKay et al., 2016), cumulative exposure to PTEs was measured continuously by the number of LEC-5 items experienced directly, witnessed, or experienced as part of a job with PTE scores ranging from 0 to 17. Although the psychometric properties of the LEC-5 have not been evaluated, the original LEC has been widely validated. The revisions to the original LEC were minimal; the wording of item 15 was slightly edited, and the response category labeled “part of my job” was added. Thus, psychometric properties of the two versions are likely comparable. Items from the LEC have demonstrated adequate temporal stability over approximately seven days ($\kappa = 0.23$ to $\kappa = 0.66$; Gray et al., 2004). Life Events Checklist items and total score converge with established measures of trauma exposure (e.g., the Traumatic Life Events Questionnaire; Kubany et al., 2000) and trauma-related psychopathology (e.g., the Modified PTSD Symptom Scale; Coffey et al., 1998; Gray et al., 2004).

2.3.3 Obsessive Beliefs Questionnaire-44 (OBQ-44)

The OBQ-44 (OCCWG, 2005) measures cognitive appraisals or beliefs that are obsessional in nature and predictive of OC symptomology. The 44-item measure is divided

into three subscales: Responsibility/Threat Estimation (16 items), Perfectionism/Certainty (16 items), and Importance/Control of Thoughts (12 items; OCCWG, 2005). Respondents rate level of agreement with each item based on a seven-point Likert-type scale (1 = disagree very much to 7 = agree very much). Higher scores indicate a greater degree of obsessional beliefs. The OBQ-44 and its subscales have demonstrated good to excellent internal consistency (total: $\alpha = 0.95$, responsibility/threat estimation: $\alpha = 0.93$, perfectionism/certainty: $\alpha = 0.93$, importance/control of thoughts: $\alpha = 0.89$; OCCWG, 2005). Test-retest reliability is not reported for the OBQ-44 (OCCWG, 2005), however an earlier 87-item version of the measure demonstrated strong test-retest reliability among individuals with OCD ($r = 0.48$ to $r = 0.83$) and student controls ($r = 0.75$ to $r = 0.82$) over a period of 2 and 3 months, respectively (OCCWG, 2003). The OBQ-44 has also demonstrated strong convergent validity, with most subscales demonstrating significant correlations with subscales of another widely validated measure of OC symptoms (OCCWG, 2005). The OBQ-44 demonstrated very high reliability in the current sample ($\alpha = 0.975$).

2.3.4 Dimensional Obsessive-Compulsive Scale (DOCS)

The DOCS (Abramowitz et al., 2010) is a 20-item self-report measure designed to assess the severity of four OC symptom dimensions: 1) Contamination (i.e., germ and contamination concerns and cleaning and washing compulsions), 2) Responsibility for Harm (i.e., concerns about being responsible for harm or bad luck, checking behaviors, and reassurance seeking), 3) Unacceptable Thoughts (i.e., concerns about unwanted, unpleasant thoughts and neutralizing behaviors), and 4) Symmetry (i.e., the need for symmetry, completeness, or a sense that things are “just right” and counting and arranging

compulsions). Symptom dimensions are assessed in individual modules. Each module begins with a description of the target symptom dimension that is followed by five items designed to assess the severity of 1) obsessions and compulsions, 2) avoidance, 3) distress, 4) impairment, and 5) degree of control over obsessions and compulsions. Items are rated on a seven-point Likert-type scale ranging from 0 to 4, where lower scores suggest less severe OC symptoms (e.g., 0 = “Not at all distressed/anxious”) and higher scores reflect more severe OC symptoms (e.g., 4 = “Extremely distressed/anxious”). The DOCS total score and its subscales have demonstrated good to excellent internal consistency (total: $\alpha = 0.93$, Contamination: $\alpha = 0.83$, Responsibility for Harm: $\alpha = 0.86$, Unacceptable Thoughts: $\alpha = 0.88$, Symmetry: $\alpha = 0.89$) and acceptable 12-week test-retest reliability (total: $r = 0.66$, Contamination: $r = 0.58$, Responsibility for Harm: $r = 0.56$, Unacceptable Thoughts: $r = 0.55$, Symmetry: $r = 0.66$; Abramowitz et al., 2010) in a student sample. The DOCS was also shown to be strongly correlated with a convergent measure of OC symptoms ($r = 0.71$) and significantly less correlated with divergent measures of depression, stress, general anxiety, and social anxiety ($r = 0.37$ to $r = 0.52$) in a student sample (Abramowitz et al., 2010). Reliability in the current sample was very high ($\alpha = .95$).

2.3.5 Pathways to Inflated Responsibility Beliefs Scale (PIRBS)

The PIRBS (Coles & Schofield, 2008) is a 23-item measure of pathways to inflated sense of responsibility originating from childhood and adolescent experiences. The PIRBS measures four pathways, including: 1) heightened responsibility in childhood (5 items), 2) rigid rules (5 items), 3) over-protective parents (5 items), and 4) actual or imagined harm (8 items). Items are scored on a five-point Likert-type scale (0 = never to 4 = always). The PIRBS total and subscale scores have demonstrated strong internal consistency (total: $\alpha =$

0.86, subscales: $\alpha = 0.78$ to $\alpha = 0.90$) and fairly strong 6-month test-retest reliability (total: $r = 0.71$, subscales: $r = 0.58$ to $r = 0.79$; Coles & Schofield, 2008). The PIRBS total and subscale scores have also demonstrated acceptable convergent and divergent validity (Coles & Schofield, 2008). The PIRBS total and all subscale scores were significantly correlated with the responsibility/threat estimation subscale of the OBQ-44 ($r = 0.20$ to $r = 0.46$), and PIRBS total, heightened responsibility in childhood, and actual/imagined harm were more strongly correlated with responsibility/threat estimation than perfectionism/certainty ($z = 2.23$, $p < .05$, $z = 2.08$, $p < .05$, and $z = 2.88$, $p < .01$ respectively) or importance/control of thoughts ($z = 3.78$, $p < .001$, $z = 3.23$, $p = .001$, and $z = 3.68$, $p < .001$ respectively; Coles & Schofield, 2008). Additionally, PIRBS over-protective parents was significantly correlated with a measure of maternal and paternal authoritarianism ($r = 0.45$ and $r = 0.34$) and protectiveness ($r = 0.51$ to $r = 0.38$), and PIRBS heightened responsibility in childhood was significantly correlated with number of weekly childhood chores ($r = 0.31$) and percentage of childhood chores resembling adult responsibilities ($r = 0.56$; Coles & Schofield, 2008). Finally, PIRBS total and all subscale scores were significantly correlated with OC symptom frequency ($r = 0.19$ to $r = 0.42$; Coles & Schofield, 2008). In the current sample, the PIRBS demonstrated high reliability ($\alpha = .86$).

2.4 Analytic Approach

Participants were included in the analyses if they completed the LEC-5 (Weathers et al., 2013), OBQ-44 (OCCWG, 2005), DOCS (Abramowitz et al., 2010), PIRBS (Coles & Schofield, 2008), and demographics measures. Data were inspected for missingness. Any participants missing age, sex, or race/ethnicity data, any LEC-5 items, or over 25% of data

on any DOCS, OBQ-44, or PIRBS subscales were excluded from analyses. Randomness of the missing data was analyzed using Little's missing completely at random (MCAR) test (Little, 1988). Data were imputed using the Expectation-Maximization (EM) algorithm for subscales with data determined to be MCAR or missing less than 5% of items (Dempster et al., 1976). All analyses were conducted using the imputed dataset ($N = 886$).

In all analyses, cumulative PTE exposure was measured continuously based on the number of LEC-5 items experienced directly, witnessed, or experienced as part of a job. Responsibility/threat beliefs, perfectionism/certainty and importance/control of thoughts were measured continuously based on the corresponding subscale scores of the OBQ-44. OC symptoms were measured continuously based on the DOCS total score which was square root transformed to improve normality of the residuals; exploratory analyses used square root transformed DOCS subscale scores. Pathways to inflated responsibility were measured continuously based on the PIRBS subscale scores. Preliminary analyses included descriptive statistics and Pearson's correlations among relevant variables.

The PROCESS macro version 3.5 (Hayes, 2018) in SPSS 27 was used to examine associations among cumulative PTE exposure, responsibility/threat beliefs, and OC symptoms, as well as the hypothesized indirect effect of responsibility/threat beliefs on the relation between cumulative PTE exposure and OC symptoms. The PIRBS pathways of heightened responsibility in childhood, rigid rules, and over-protective parents were entered as covariates in each of the analyses. Actual or imagined harm was not included as a covariate due to its conceptual overlap with trauma. Age was measured continuously and entered as a covariate in each of the analyses. Sex has been shown to be differentially associated with OC symptoms (Thomas et al., 2000; Vidal-Ribas et al., 2015; Wheaton et

al., 2013). It was dummy coded (0 = male, 1 = female) and entered as a covariate in each of the analyses. Additionally, based on previous findings that race/ethnicity is differentially associated with responsibility/threat beliefs (Wheaton et al., 2013), race/ethnicity was dummy coded (0 = white/non-Hispanic or Latino, 1 = other) and included as a covariate in each of the analyses. A confidence interval of 95% was used to evaluate the significance of the indirect effect.

Specificity of the current model was tested by rerunning the indirect effect analysis with the OBQ subscales of perfectionism/certainty and importance/control of thoughts included as covariates. Additional models were tested in which first perfectionism/certainty, and then importance/control of thoughts replaced responsibility/threat beliefs as the mediator, with the other two OBQ subscales entered as covariates. Exploratory analyses were conducted with each of the square root transformed DOCS symptom dimension scores modeled as the dependent variable, cumulative PTE exposure as the independent variable, and responsibility/threat beliefs as the mediator. The paucity of studies examining associations between trauma load and OC symptom dimensions precludes specific predictions regarding these analyses.

An a priori power analysis was completed to determine a sufficient sample size to reject the null hypothesis for the indirect effect. Based on prior studies, a small effect size was predicted for path a (the path from cumulative PTE exposure to responsibility/threat beliefs; $\beta = .22$) and a medium effect size was predicted for path b (the path from responsibility/threat beliefs to OC symptoms $\beta = .40$; Adams, 2012; Sassaroli et al., 2015). A percentile bootstrap test with a 95% confidence interval, moderate power ($\beta - 1 = .8$),

and the aforementioned effect sizes, suggested that a sample of 406 participants would be needed to detect a statistically significant ($\alpha=0.05$) effect (Fritz & MacKinnon, 2007).

CHAPTER 3. RESULTS

3.1 Descriptive Statistics and Zero-Order Correlations

Little's MCAR test revealed that the perfectionism/certainty and importance/control of thoughts subscales of the OBQ-44, unacceptable thoughts and symmetry subscales of the DOCS, and rigid rules subscale of the PIRBS were not missing completely at random. However, no item was missing more than 0.9% of data. All other subscales of the OBQ-44, DOCS, and PIRBS were determined to be MCAR. Data were imputed for each subscale.

Descriptive statistics, including the mean, standard deviation, and range for all study variables are presented in Table 3.1. The mean number of PTEs experienced was 2.88 ($SD = 2.67$) and the modal number of PTEs, representing 19.3% of the sample, was 0. The mean of responsibility/threat beliefs scores was 47.45 ($SD = 20.97$) and the mean of DOCS scores was 13.09 ($SD = 12.66$). There were significant positive correlations between PTE exposure and responsibility/threat beliefs, perfectionism/certainty, and importance/control of thoughts (all $p < .001$). There were also positive correlations between PTE exposure and total OC symptom severity and all DOCS subscales (all $p < .001$). Responsibility/threat beliefs, perfectionism/control, and importance/control of thoughts were all positively correlated with total OC symptom severity and each DOCS subscale (all $p < .001$). Age was positively associated with PTE exposure ($p = .007$) but was not associated with any other study variables. Zero-order correlations between all study variables are presented in Table 3.2.

Females reported higher OBQ perfectionism/control ($M = 54.17$, $SD = 22.87$) than males ($M = 48.41$, $SD = 20.86$; $t(884) = 3.21$, $p = .001$) and higher DOCS total scores (M

= 14.40, $SD = 13.22$) than males ($M = 8.70$, $SD = 9.30$; $t(884) = 6.90$, $p < .001$). Regarding DOCS subscales, females reported higher contamination ($M = 3.05$, $SD = 3.52$) than males ($M = 1.92$, $SD = 2.41$, $t(884) = 5.24$, $p < .001$), higher responsibility ($M = 3.81$, $SD = 4.08$) than males ($M = 2.24$, $SD = 3.03$, $t(884) = 5.95$, $p < .001$), higher unacceptable thoughts ($M = 4.31$, $SD = 4.57$) than males ($M = 2.61$, $SD = 3.48$, $t(884) = 5.66$, $p < .001$), and higher symmetry ($M = 3.22$, $SD = 4.10$) than males ($M = 1.93$, $SD = 2.92$, $t(884) = 5.03$, $p < .001$). Individuals who identified as white and non-Hispanic or Latino reported lower OBQ importance/control of thoughts ($M = 28.90$, $SD = 13.63$) than individuals who identified as another race, Hispanic, or Latino ($M = 32.28$, $SD = 14.78$; $t(884) = 3.16$, $p = .002$). Individuals who identified as white and non-Hispanic or Latino also reported lower DOCS contamination ($M = 2.58$, $SD = 3.13$) and lower PIRBS heightened responsibility in childhood ($M = 5.25$, $SD = 4.61$) than individuals who identified as another race, Hispanic, or Latino ($M = 3.41$, $SD = 3.82$, $t(884) = 2.96$, $p = .003$; and $M = 6.64$, $SD = 5.06$; $t(884) = 3.67$, $p < .001$, respectively). Individual t -tests comparing biological sex and race/ethnicity differences among all study variables are included in Table 3.3.

3.2 Regression Analyses

The proposed model explained 37.8% of the total variance in OC symptom severity, $p < .001$ (see Figure 3.1). After controlling for age, sex, race/ethnicity, and PIRBS heightened responsibility in childhood, rigid rules, and over-protective parents there was a significant direct effect of cumulative PTE exposure on responsibility/threat beliefs, $\beta = 0.19$, $p < .001$ and a significant effect of responsibility/threat beliefs on OC symptom severity, $\beta = 0.47$, $p < .001$. Additionally, there were significant total, $\beta = 0.24$, $p < .001$, and direct, $\beta = 0.15$, $p < .001$, effects of cumulative PTE exposure on OC symptom severity.

There was a significant indirect effect of cumulative PTE exposure on OC symptom severity through responsibility/threat beliefs, $\beta = 0.09$.

To test the specificity of the role of responsibility/threat beliefs in this model, beyond general obsessive beliefs, the same model was run with the OBQ subscales of perfectionism/certainty and important/control of thoughts included as covariates (see Figure 3.2). The indirect effect of cumulative PTE exposure on OC symptom severity through responsibility/threat beliefs maintained significance in this more rigorous model, $\beta = 0.01$. The direct effects of cumulative PTE exposure on responsibility/threat beliefs, $\beta = 0.05$, $p = .002$, and of responsibility/threat beliefs on OC symptom severity, $\beta = 0.25$, $p < .001$ were also significant in this model. Additionally, there were significant total, $\beta = 0.16$, $p < .001$, and direct, $\beta = 0.15$, $p < .001$, effects of cumulative PTE exposure on OC symptom severity.

To further test the specificity of the hypothesized model, additional analyses were conducted in which first perfectionism/certainty, and then importance/control of thoughts replaced responsibility/threat beliefs as the mediator, with the other OBQ subscales included as covariates. The indirect effects of cumulative PTE exposure on OC symptom severity through perfectionism/certainty and importance/control of thoughts were not significant ($\beta = -0.003$ and $\beta = 0.00$, respectively).

Exploratory analyses of the hypothesized model predicting OC symptom dimensions indicated that the total effects of cumulative PTE exposure on DOCS contamination/washing ($\beta = 0.15$), responsibility/checking ($\beta = 0.21$), unacceptable thoughts ($\beta = 0.21$), and symmetry ($\beta = 0.16$) were positive and significant. Additionally, there were significant indirect effects of cumulative PTE exposure on DOCS

contamination/washing ($\beta = 0.06$), responsibility/checking ($\beta = 0.09$), unacceptable thoughts ($\beta = 0.07$), and symmetry ($\beta = 0.06$) through responsibility/threat beliefs. These exploratory models are displayed in Figures 3.3-3.6.

Table 3.1 Descriptive Statistics

	<i>M</i>	<i>SD</i>	Min	Max
Age	19.39	2.38	18	45
PTE exposure	2.88	2.67	0	16
OBQ RT	47.45	20.97	16	112
OBQ PC	52.85	22.55	16	111
OBQ ICT	29.76	14.00	12	83
DOCS Total	13.09	12.66	0	73
DOCS Contamination	2.79	3.33	0	18
DOCS Responsibility	3.45	3.92	0	18
DOCS Unacceptable Thoughts	3.92	4.40	0	20
DOCS Symmetry	2.93	3.90	0	20
PIRBS HR	5.60	4.77	0	20
PIRBS RR	12.95	4.68	0	20
PIRBS OP	8.67	3.80	0	20

Table 3.2 Zero-Order Correlations among Study Variables

	1	2	3	4	5	6
1. Age	-					
2. PTE exposure	.091**	-				
3. OBQ RT	-0.011	.240**	-			
4. OBQ PC	-0.013	.196**	.847**	-		
5. OBQ ICT	-0.044	.186**	.800**	.721**	-	
6. DOCS Total	0.026	.295**	.556**	.562**	.444**	-
7. DOCS C	0.018	.189**	.380**	.361**	.307**	.730**
8. DOCS R	-0.003	.254**	.534**	.504**	.400**	.815**
9. DOCS UT	-0.002	.262**	.455**	.441**	.371**	.811**
10. DOCS S	0.027	.210**	.411**	.458**	.339**	.780**
11. PIRBS HR	0.011	.206**	.221**	.169**	.193**	.218**
12. PIRBS RR	-0.024	.084*	.145**	.174**	.122**	.142**
13. PIRBS OP	-0.041	.079*	.259**	.257**	.246**	.243**

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Note. “RT” denotes responsibility/threat, “PC” denotes perfectionism/certainty, “ICT” denotes importance/control of thoughts, “C” denotes contamination, “R” denotes responsibility, “UT” denotes unacceptable thoughts, “S” denotes symmetry, “HR” denotes heightened responsibility in childhood, “RR” denoted rigid rules, “OP” denotes overprotective parents. DOCS Total and all DOCS subscales were square root transformed prior to analysis.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 3.2 (continued)

	7	8	9	10	11	12	13
1. Age							
2. PTE exposure							
3. OBQ RT							
4. OBQ PC							
5. OBQ ICT							
6. DOCS Total							
7. DOCS C	-						
8. DOCS R	.508**	-					
9. DOCS UT	.441**	.578**	-				
10. DOCS S	.519**	.563**	.518**	-			
11. PIRBS HR	.150**	.181**	.177**	0.011	-		
12. PIRBS RR	.091**	.100**	.082*	.133**	-0.024	-	
13. PIRBS OP	.123**	.212**	.237**	.165**	.068*	.371**	-

Table 3.3 Comparison of Study Variables (*M* [*SD*]) across Biological Sex and Race/Ethnicity.

	Biological Sex			Race/Ethnicity		
	Female	Male	Test of the Difference	Non-Hispanic or Latino	Other/Hispanic or Latino	Test of the Difference
PTE Exposure	2.95 (2.72)	2.64 (2.51)	$t = 1.45$	2.94 (2.70)	2.71 (2.58)	$t = 1.11$
OBQ RT	48.11 (21.26)	45.23 (19.86)	$t = 1.72$	46.84 (21.24)	49.24 (20.08)	$t = 1.48$
OBQ PC	54.17 (22.87)	48.41 (20.86)	$t = 3.21^{***}$	52.44 (23.09)	54.05 (20.89)	$t = 0.98$
OBQ ICT	30.07 (14.00)	28.71 (13.99)	$t = 1.22$	28.90 (13.63)	32.28 (14.78)	$t = 3.16^{**}$
DOCS Total	14.40 (13.22)	8.70 (9.30)	$t = 6.90^{***}$	12.63 (12.32)	14.45 (13.54)	$t = 1.78$
DOCS C	3.05 (3.52)	1.92 (2.41)	$t = 5.24^{***}$	2.58 (3.13)	3.41 (3.82)	$t = 2.96^{**}$
DOCS R	3.81 (4.08)	2.24 (3.03)	$t = 5.95^{***}$	3.36 (3.86)	3.71 (4.09)	$t = 1.16$
DOCS UT	4.31 (4.57)	2.61 (3.48)	$t = 5.66^{***}$	3.83 (4.29)	4.18 (4.70)	$t = 0.98$
DOCS S	3.22 (4.10)	1.93 (2.92)	$t = 5.03^{***}$	2.85 (3.86)	3.14 (4.02)	$t = 0.96$
PIRBS HR	5.44 (4.79)	6.14 (4.68)	$t = 1.83$	5.25 (4.61)	6.64 (5.06)	$t = 3.67^{***}$
PIRBS RR	12.97 (4.69)	12.88 (4.65)	$t = 0.25$	12.82 (4.58)	13.32 (4.94)	$t = 1.39$
PIRBS OP	8.77 (3.84)	8.31 (3.63)	$t = 1.52$	8.62 (3.70)	8.82 (4.08)	$t = 0.69$

Note. “RT” denotes responsibility/threat, “PC” denotes perfectionism/certainty, “ICT” denotes importance/control of thoughts, “C” denotes contamination, “R” denotes responsibility, “UT” denotes unacceptable thoughts, “S” denotes symmetry, “HR” denotes heightened responsibility in childhood, “RR” denoted rigid rules, “OP” denotes overprotective parents.

***. Correlation is significant at the 0.001 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 1.1 Primary Models of the Indirect Effect of PTE Exposure on OC Symptoms Through Responsibility/Threat Beliefs

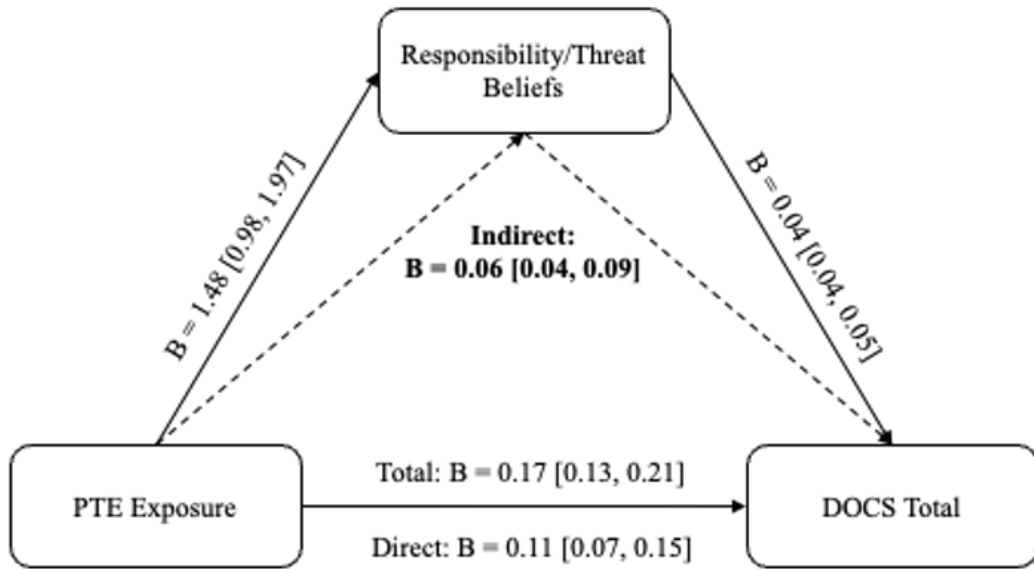


Figure 2.2 Indirect Effect of PTE Exposure on OC Symptom Through Responsibility/Threat Beliefs Controlling for Perfectionism/Certainty and Importance/Control of Thoughts

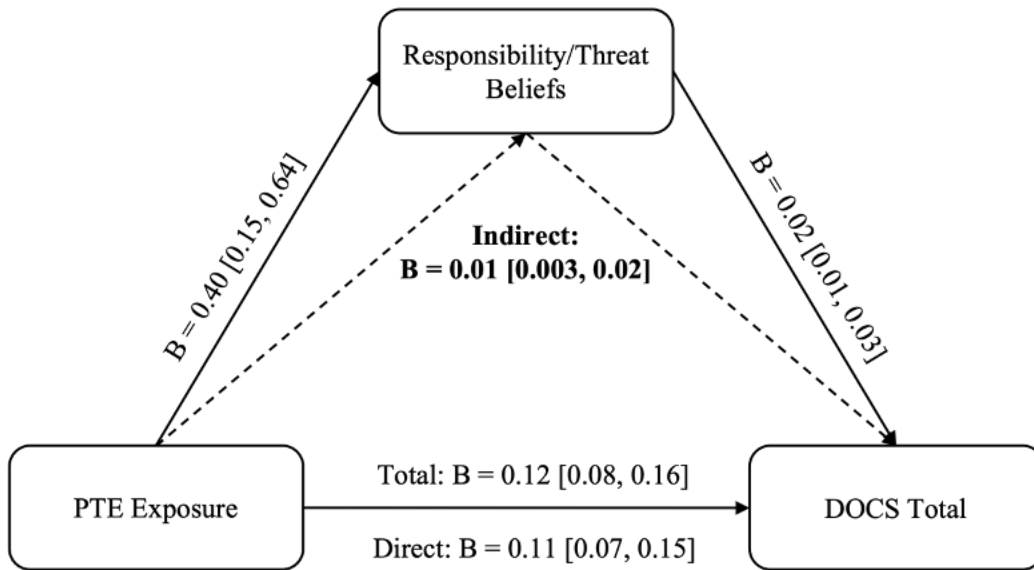


Figure 3.3 Indirect Effect of PTE Exposure on DOCS Contamination Symptoms Through Responsibility/Threat Beliefs

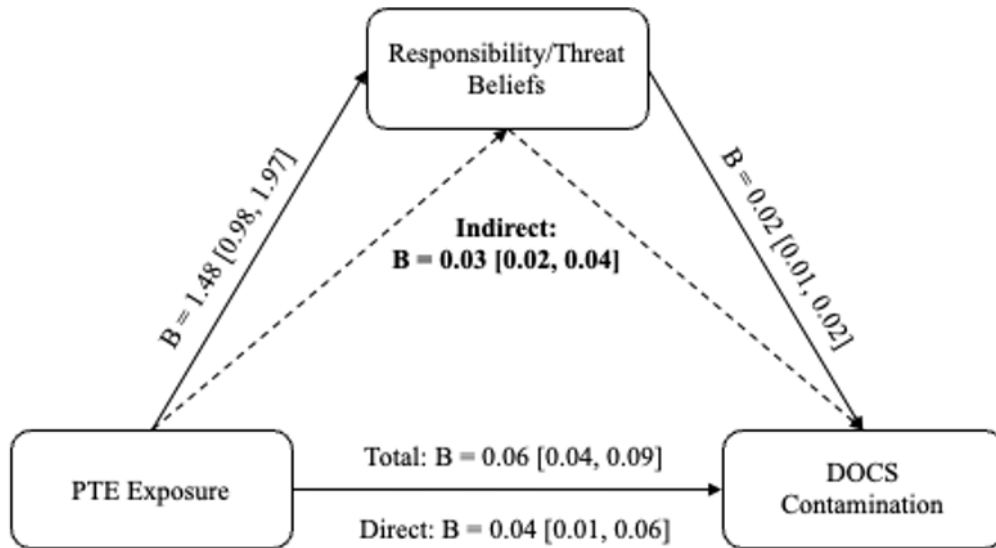


Figure 4.4 Indirect Effect of PTE Exposure on DOCS Responsibility Symptoms Through Responsibility/Threat Beliefs

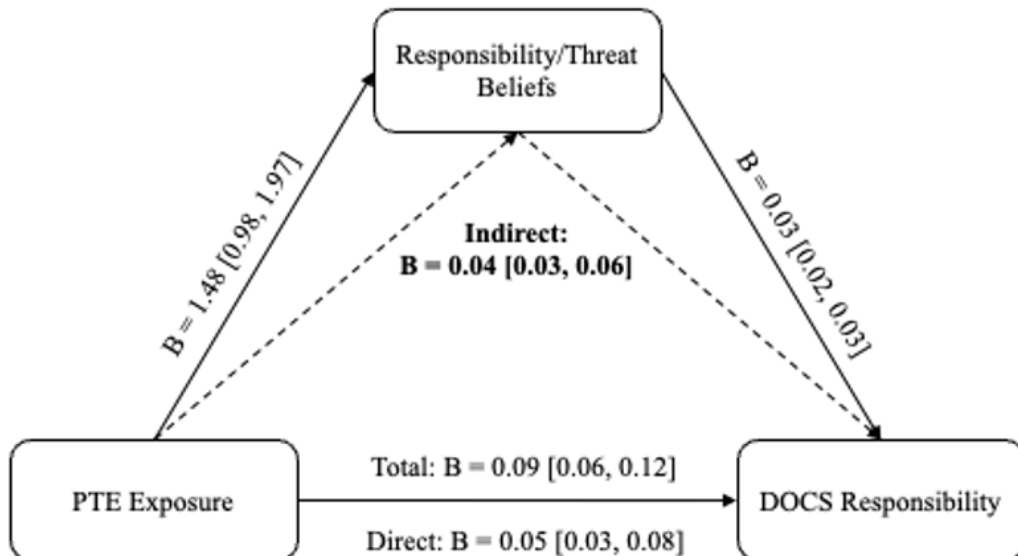


Figure 5.5 Indirect Effect of PTE Exposure on DOCS Unacceptable Thoughts Symptoms Through Responsibility/Threat Beliefs

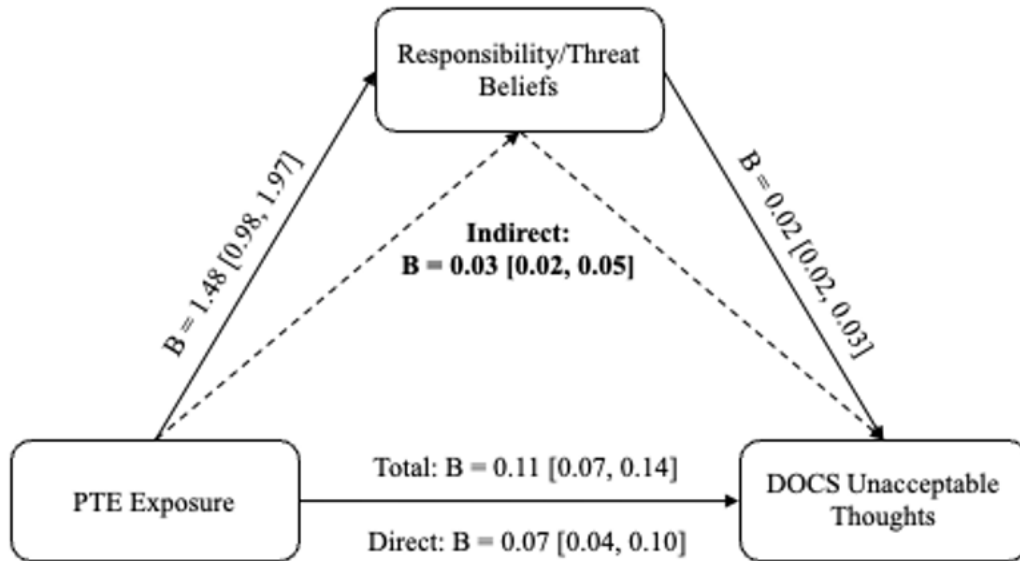
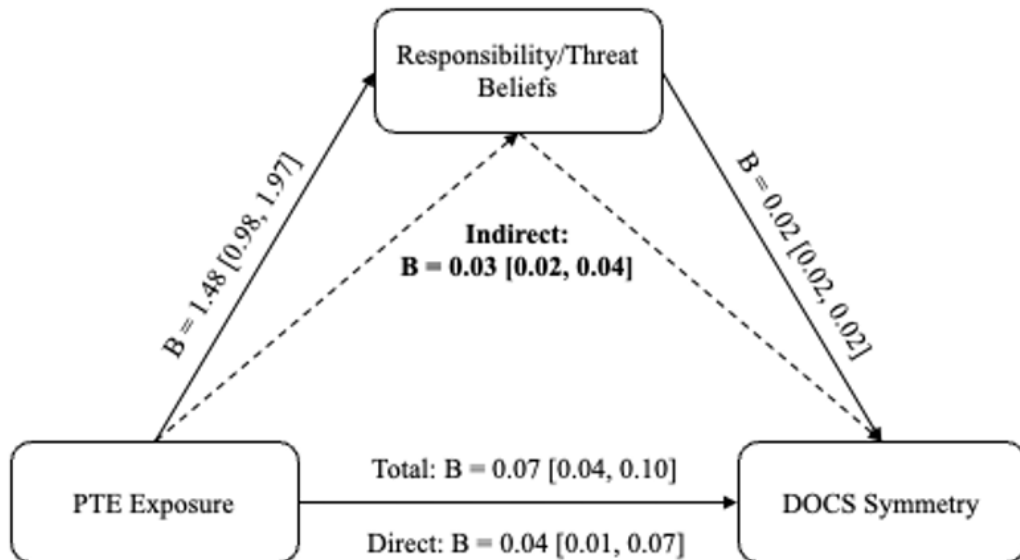


Figure 6.6 Indirect Effect of PTE Exposure on DOCS Symmetry Symptoms Through Responsibility/Threat Beliefs



CHAPTER 4. DISCUSSION

Obsessive beliefs, including responsibility/threat beliefs, have been implicated in the development of OC symptoms (Salkovskis, 1985). Additionally, an increasing number of studies have demonstrated positive associations between trauma exposure and OC symptoms (Barzilay et al., 2019; Cromer et al., 2007; Kroska et al., 2018; Semiz et al., 2014). Early life experiences involving actual or imagined harm, including traumatic experiences, have also been theorized to lead to inflated responsibility/threat beliefs (Coles & Schofield, 2008; Salkovskis et al., 1999). The present study was the first to evaluate the association between exposure to PTEs and responsibility/threat beliefs, and the first to test whether responsibility/threat beliefs partially explain the association between PTE exposure and OC symptoms.

Consistent with hypotheses, PTE exposure, responsibility/threat beliefs, and OC symptoms were positively correlated, and the indirect effect of PTE exposure on OC symptoms through responsibility/threat beliefs was significant. Importantly, this indirect effect maintained significance when controlling for other categories of obsessive beliefs (i.e., perfectionism/control and importance/control of thoughts). Additional analyses were run in which perfectionism/control, and subsequently importance/control of thoughts were modeled as the mediator with the other OBQ subscales included as covariates. The indirect effects of PTE exposure on OC symptoms through perfectionism/control and importance/control of thoughts were both insignificant, further supporting the specificity of the proposed model.

The relations between trauma exposure and responsibility/threat beliefs may be explained by theoretical models of PTSD development which suggest that trauma exposure

can lead to overaccommodation of schemas about the world (Foa & Rothbaum, 1998). Overaccommodated schemas may include responsibility/threat beliefs, including that the world is dangerous, and that one must do everything they can to prevent harm. These schemas may derive from or be exacerbated by dysfunctional appraisals of the trauma, such as “nowhere is safe” (Ehlers & Clark, 2000). The resulting belief systems, which are likely to maintain symptoms such as hypervigilance and avoidance in the case of PTSD (Foa & Rothbaum, 1998), may also trigger avoidance and compulsions in the case of OCD (Rachman, 2002; Salkovskis, 1985). Thus, an increase in responsibility/threat beliefs may confer increased risk for OCD symptom development or exacerbation following trauma.

While responsibility/threat beliefs and trauma have been repeatedly shown to be related to OC symptoms, less is known about how they relate to individual OC symptom dimensions. Exploratory models of the proposed indirect effect were run with DOCS subscales modeled as the dependent variable. PTE exposure had a significant indirect effect on all DOCS subscales through responsibility/threat beliefs. These findings suggest that responsibility/threat beliefs may mediate relations between trauma exposure and OC symptomatology, regardless of the nature of the OC symptoms. However, among individuals with OCD, evidence suggests that the relations between responsibility/threat beliefs and OCD dimensions are heterogeneous (Hellberg et al., 2020; Smith et al., 2012; Wheaton et al., 2010). Additionally, some evidence suggests that trauma is differentially related to OC symptom dimensions (Cromer et al., 2007). Thus, if the current exploratory models were tested among individuals with OCD or analogue samples, a more variable pattern of results may be expected. Further research is warranted to explore these nuances.

While the current study benefits from a large sample size and well-validated measures, there are also some limitations. This study employed a correlational design, and the lack of temporal precedence precludes the ability to make causal claims. Thus, while a mediation model is hypothesized to explain the relations between study variables, only an indirect effects model can be statistically tested. Additionally, PTE exposure was measured retrospectively. Relying on memory, particularly for traumatic events, can be unreliable and susceptible to biases. For example, it is possible that individuals who experienced more negative beliefs, including responsibility/threat beliefs, following traumatic experience(s) are more likely to remember and retrospectively report said trauma. Finally, the current sample is a convenience sample comprised primarily of younger, white, non-Hispanic or Latino, female college students. Despite a large sample size, this sample is not representative of the general population or of individuals with OCD. It is possible that the relations between trauma exposure, responsibility/threat beliefs and OC symptoms may function differently among more representative community samples or samples of individuals with OCD.

Additional research is needed to replicate and extend the present findings. Future studies should employ more diverse community samples and samples of individuals with elevated OC symptoms or clinically diagnosed OCD. Longitudinal research is needed to evaluate the causal component of the proposed theoretical model. In particular, prospective cohort designs would provide valuable insight into the temporal precedence of trauma exposure, responsibility/threat beliefs, and OC symptoms, as well as other relevant variables such as posttraumatic appraisals. Interpretations of the traumatic event and its causes may impact the development of heightened responsibility/threat beliefs. Future

studies should evaluate perceived responsibility for trauma as a moderator of the present model. Additionally, research on the impact of specific trauma types is warranted. Prior research has demonstrated that trauma type may differentially impact OC symptom severity and OC dimensions (Miller & Brock, 2017; Pinciotti et al., 2021). Thus, the proposed indirect effects model may also be moderated by trauma type, particularly when predicting individual OC symptom dimensions. For example, the indirect effect of trauma exposure on OC contamination symptoms through responsibility/threat beliefs may be stronger for individuals exposed to sexual trauma, compared with other trauma types.

The current findings have important research and clinical implications. First, they provide insight into one method by which trauma exposure conveys increased risk for OC symptom development and maintenance. Second, they point to a potential target for intervention. Clinicians working with individuals experiencing new or increased OC symptoms following trauma exposure should consider evaluating beliefs about responsibility and threat, which may be an important treatment target with cognitive therapy. Third, although the literature is limited and findings are mixed (Shavitt et al., 2010), some evidence suggests that cognitive-behavioral treatment of OCD symptoms may be less effective for individuals with a history of trauma, including those with comorbid PTSD (Gershuny et al., 2002; Gershuny et al., 2008; Semiz et al., 2014). Responsibility/threat beliefs may play a role in this treatment resistance, which has clear implications for the treatment of OCD, particularly trauma-related OCD.

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VITA

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Education

Bachelor of Science in Psychology **July 2018**
University of Georgia, Honors Program
Magna Cum Laude
Minors: French, Dance

Professional Positions Held

Assistant Director **2022-Present**
Jesse G. Harris, Jr. Psychological Services Center
Supervisors: David Susman, Ph.D., Shannon Sauer-Zavala, Ph.D.

Graduate Student Researcher **2020-Present**
University of Kentucky Center for Emotional Health
Supervisor: Tom Adams, Ph.D.

Graduate Student Therapist **2021-Present**
Jesse G. Harris, Jr. Psychological Services Center
Supervisor: Mary Beth McGavran, Ph.D.

Orofacial Pain Clinic Practicum **2021-2022**
University of Kentucky
Supervisor: Ian Boggero, Ph.D.

Study Therapist **2021-2022**
University of Kentucky Orofacial Pain Clinic
Supervisor: Ian Boggero, Ph.D.

Teaching Assistant **2020-2021**

Research Interviewer **2018-2020**
Trauma and Anxiety Recovery Program/Emory Healthcare Veterans Program
Supervisor: Barbara Rothbaum, Ph.D., ABPP

Undergraduate Intern **2017-2018**
University of Georgia Psychology Clinic
Supervisor: Emily Moulso, Ph.D.

Care Coordinator Intern **2016**
Skyland Trail
Supervisor: Ethan Jordan, CTRS, LRT

Scholarships and Honors

Phi Beta Kappa	2018-Present
Psi Chi: The International Honor Society in Psychology	2017-Present
Zell B. Miller Scholarship, <i>University of Georgia</i>	2014-2018
Dean's List (6 semesters), <i>University of Georgia</i>	2014-2018

Professional Publications

- Badour, C. L., Tipsword, J. M., Jones, A. C., McCann, J. P., **Fenlon, E. E.**, Brake, C. A., Alvarran, S., Hood, C. O., & Adams, T. G. (in press). Obsessive-compulsive symptoms and daily experiences of posttraumatic stress and mental contamination following sexual trauma. *Journal of Obsessive-Compulsive and Related Disorders*.
- Adams, T. G., **Fenlon, E. E.**, Penn, C., Hubert, T., & Pietrzak, R. H. (2022). A significant U-shaped association between physical activity level and posttraumatic stress disorder in U.S. military Veterans: Results from the 2019-2020 National Health and Resilience in Veterans study. *Mental Health and Physical Activity*. <https://doi.org/10.1016/j.mhpa.2022.100460>
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- Burton, M. S., Sherrill, A. M., Zwiebach, L. C., **Fenlon, E. E.**, Rauch, S. A. M., & Rothbaum, B. O. (2021). Consultation Competencies in Prolonged Exposure Therapy for PTSD. *Psychological Trauma: Theory, Research, Practice, and Policy*. <https://doi.org/10.1037/tra0001115>