The Role of the Looming Cognitive Style as a Cognitive Vulnerability to Obsessive-Compulsive Symptoms

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at George Mason University

By

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Dedication

To my family, without whom I would have never gotten to this point.
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Abstract

THE ROLE OF THE LOOMING COGNITIVE STYLE AS A COGNITIVE VULNERABILITY TO OBSESSIVE-COMPULSIVE SYMPTOMS

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George Mason University, 2009

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Cognitive models of Obsessive Compulsive Disorder (OCD) posit that obsessions and compulsions develop from maladaptive beliefs and catastrophic interpretations of intrusive thoughts. These cognitive models of OCD are able to explain a significant amount of the variance in OC symptoms. The research to date, however, suggests that there is potential to improve the prediction of OC symptoms by examining factors outside of those included in existing cognitive models. The Looming Cognitive Style (LCS), a global cognitive vulnerability for anxiety symptoms, is an important predictive factor. Our study is specifically interested in the role of anxiety disorder specific LCS. This study examined OCD-Specific Looming as a cognitive antecedent of OC Symptoms. The presented study examined the role of OCD-specific looming as a predictor of OC Symptoms by examining OC Symptoms in a non-clinical undergraduate student sample
during a period of naturally occurring stress, final exams. Using structural equation modeling the role of OCD-Specific Looming, LCS, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms was examined. OCD-Specific Looming contributed significantly to the prediction of variance in OC Symptoms over and above the influence of OC Beliefs and Appraisals, Distress, and Looming Cognitive Style. Our results provide additional support for the inclusion of OCD-Specific Looming in cognitive models of OCD.
Introduction

Obsessive-Compulsive Disorder (OCD) is an anxiety disorder characterized by recurrent obsessions and/or compulsions, which cause significant distress or impairment. OCD is a heterogeneous disorder with a range of symptoms. The manifestation of OCD symptoms and the content of obsessions and compulsions vary from individual to individual. The core themes of OCD obsessions commonly focus on contamination, violence, sexual imagery, recurring doubts, and order and symmetry (APA, 2000; Rachman, 1997, McKay, Abramowitz, Calamari, Kyrios, Radomsky, Sookman, Taylor, & Wilhelm, 2004; Calamari, Wiegartzm Riemann, Cohen, Greer, Jacobi, Jahn, & Carmin, 2004; Calamari, Weigartz, & Janeck, 1999). Patients engage in neutralizing or compulsive behaviors such as washing, checking, mental rituals, or arranging in response to their obsessions (APA, 2000; Rachman, 1997; McKay, et al., 2004; Calamari, et al., 2004; Calamari, et al., 1999). The symptoms of OCD can cause significant personal distress and functional impairment.

OCD is posited to have several subtypes, which have been identified using factor analysis and principal components analysis of measures of OCD. A recent review of the literature on the structure of obsessive-compulsive symptoms found that the following OCD subtypes have been consistently identified and empirically supported: contamination/washing, checking, hoarding, and symmetry/ordering (McKay, et al.,
2004; Calamari, et al., 2004; Calamari, et al., 1999). In contrast the pure obsessional, sexual/religious obsessions, and harming obsessions have received mixed empirical support but the research examining the presence of these symptom subtypes is limited by use of primarily self-report measures (McKay, et al., 2004).

The contamination/washing subtype is characterized by obsessions about contamination and cleanliness and compulsions to wash and/or clean. The checking subtype is characterized by doubting obsessions such as the thought that one did not lock the door or left the oven on and the compulsion to check whether the act had been performed. The hoarding subtype is differentiated from other subtypes by obsessional thoughts about losing or discarding items that may be needed in the future and the thought that not having that object will cause some negative outcome. The hoarding subtype is also characterized by compulsive hoarding of items that may be needed in the future. The symmetry/ordering subtype is exemplified by obsessional thoughts of a negative event occurring if objects or actions are not in order or symmetrical, coupled with compulsions to maintain symmetry and/or order. The pure obsessional subtype is characterized by patients who experience significantly distressing obsessional thoughts without any overt compulsions. The sexual/religious obsessions and harming obsessions subtypes are distinguished by the experience of distressing obsessions with sexual/religious content or harm content (McKay et al., 2004; Calamari et al., 2004; & Calamari et al., 1999).

The lifetime prevalence rates of OCD have been found to range from 1.96-3.29%, indicating a significant percentage of the population experience distress and impairment.
due to their obsessive-compulsive symptoms (APA, 2000; Robins, Helzer, Weissman, Oraschel, Gruenburg, Burke, & Reiger, 1984; Kanno, Goldring, Sorenson, & Burnam, 1988). OCD can be associated with a number of other mental health disorders such as Major Depressive Disorder, other Anxiety Disorders, Eating Disorders, and Personality Disorders (APA, 2000). Due to the high prevalence rate and the functional impairment the symptoms can cause, it is important for cognitive behavioral therapists to fully understand the cognitive antecedents to the onset and maintenance of obsessive-compulsive symptoms. There is an increasing emphasis in the literature on the cognitive factors that are thought to be central to the onset and maintenance of obsessive-compulsive symptoms (Abramowitz et al., 2006; Abramowitz et al., 2007; Abramowitz et al. 2009; Clark, 2003; Frost & Steketee, 2002; Riskind & Rector, 2007; Taylor, 2006).

Rachman describes intrusive thoughts as the foundation of obsessions (1981, 1993, 1997, 1998). Intrusive thoughts are considered to be reoccurring, unwanted thoughts, images, or impulses that are hard to control, interrupt regular activity, and are attributed to an internal cause (Rachman, 1981; Rachman, 1993; Frost & Steketee, 2002; Clark, 2003; Salkovskis, 1985; Salkovskis, 1999). It has been estimated that intrusive thoughts are a common occurrence, with approximately 80-99% of the population reporting that they have experienced intrusive thoughts, images, or impulses (Rachman & de Silva, 1978; Salkovskis & Harrison, 1984; Clark & de Silva, 1985; Purdon & Clark, 1993; Salkovskis, 1999). Rachman (1997) and others (Clark & Purdon, 1993) have posited that the content of intrusive thoughts tend to reflect issues of importance in the individual’s life and can be triggered by internal and external cues. Research has shown that the
frequency of intrusive thoughts increases during stressful experiences or when individuals are exposed to stressful materials (Rachman & Hodgson, 1980; Rachman, 1998).

The growing literature supports the theory that OC symptoms occur on a continuum (Salkovskis, 1999). For the majority of the population, intrusive thoughts are viewed as strange fleeting thoughts that are without consequence (Rachman & de Silva, 1978; Salkovskis & Harrison, 1984). For a small percentage of the population, intrusive thoughts are perceived or appraised in a manner that leads to an escalation in obsessions and distress that may increase to the level of clinical significance (Rachman & de Silva, 1978; Salkovskis & Harrison, 1984; Salkovskis, Richards, & Forrester, 1995; Clark, 2003).

Obsessions are described as recurrent ideas, thoughts, or impulses, which are considered to be intrusive and inappropriate. For individuals with OCD the experience of obsessions can cause significant distress or anxiety. There are numerous cognitive models of OCD discussed in the literature. The current cognitive models of OCD focus mainly on the interpretation and appraisal of intrusive thoughts in the development of obsessions in OCD (Rachman, 1993; Rachman, 1997; Salkovskis, 1985; Salkovskis, 1999; Frost & Stekette, 2002; Clark, 2003; OCCWG, 1997, 2001, 2003, 2005).

According to Rachman’s theory of obsessions, obsessions are caused by the “catastrophic misinterpretation of the significance of one’s intrusive thoughts” (1997, pg. 793). It is the exaggerated significance that an individual attributes to their intrusive thought and their tendency to perceive their intrusive thoughts in an extremely negative
way that causes the intrusive thought to develop into an obsession. When attaching this exaggerated significance to the thought the individual believes that the intrusive thought is extremely important, significant to and revealing about them, and threatening.

Rachman described the vicious cycle that maintains obsessions and compulsions (1993, 1997, & 1998). An individual experiences an obsession and then describes the thought in a negative way (e.g. being disgusting, immoral, repugnant, horrific, etc.). The individual then interprets this thought as revealing something important about themselves or their character, which then causes distress or fear of experiencing a negative consequence because of the intrusive thought (Rachman, 1997, 1998).

The literature describes the importance of the ego-dystonic qualities of intrusive thoughts beyond the contribution of the content. As such, the meaning of one’s intrusive thoughts are considered inconsistent with the individual’s sense of self and what they would normally think of and is perceived to be outside their control (APA, 2000). The individual is more likely to describe the thought negatively and interpret the thought as revealing something about their character if the content of the thought is not consistent with their view of themselves (Clark & Purdon, 1993; Rachman, 1993). The individual may fear that they will cause harm or be rejected by others because of the content of the thought or what they believe the thought reveals about their character (Clark & Purdon, 1993; Rachman, 1993). Individuals then attempt to suppress or resist the obsessions, which will lead to an increased occurrence of the unwanted thought. Individuals may also attempt to neutralize the obsessional thought by engaging in a behavior, which they believe will prevent or mitigate the effect of the obsession. These behaviors can manifest
as either mental acts such as counting, or in overt behaviors such as repetitive checking, washing, etc. Neutralizing behaviors succeed in providing temporary relief for the discomfort caused by the obsessional thought which reinforces the use of neutralizing behaviors in the future. The negative description of the obsession, the interpretation of the obsession, the distress and fear experienced, and the consequence that follows are all part of the vicious cycle which maintains the obsessional thoughts (Rachman, 1993, 1997, 1998; Frost & Steketee, 2002; Clark, 2003).

Cognitive theories of OCD have been further expanded in the literature by describing the cognitive construct of Thought-Action Fusion. Thought-Action Fusion (TAF) is a cognitive bias shown to be associated with OCD (Shafran et al., 1996; Salkovskis, 1999; Berle & Starcevic, 2005). TAF has two components. The first component is the belief that thinking about a disturbing event makes the event more likely to happen (Likelihood TAF). The second component is the belief that having a disturbing or immoral thought is the moral equivalent of the actual event the thought is about (Moral TAF) (e.g. thinking about hitting someone with your car is the moral equivalent of actual hitting someone with your car) (Rachman et al., 1995; Shafran et al., 1996; Salkovskis, 1999). Salkovskis (1985) posited that it is the over-exaggeration of responsibility that is the link between the obsessional thought and the compulsion. Individuals with this cognitive bias perceive themselves to be responsible for harm that might occur because of the thought they experienced and thus feel the need to perform some sort of action to prevent the negative outcome. The research to date has found that the likelihood TAF measures are more strongly associated with obsessional symptoms than the moral TAF measures (Shafran &
Rachman, 2004). A recent review of the literature has found that likelihood TAF is 
significantly associated with obsessional symptoms (Shafran & Rachman, 2004). This 
provides support for the inclusion of Likelihood TAF in the cognitive model of OCD.

The Obsessive Compulsive Cognitions Working Group (OCCWG) has extended 
the theoretical models and research to date on obsessive-compulsive symptoms by 
empirically examining the dysfunctional beliefs believed to underlie these symptoms. 
Through their research they have identified three cognitive domains that underlie the 
development of OCD (OCCWG, 1997, 2005). The first of these is the 
“Responsibility/Threat Estimation” domain, which is the tendency to exaggerate the 
probability and implications of negative events associated with their intrusive thoughts. 
This includes the extent to which individuals believe they are responsible for the 
occurrence of or the prevention of the negative consequences associated with their 
obsessional thought. The second domain, “Perfectionism/Certainty”, is the extent to 
which individuals with OCD are able or unable to tolerate uncertainty or imperfection. 
The third domain, “Importance/Control of Thoughts”, is the extent to which individuals 
with OCD believe that intrusive thoughts are an indication of the importance of the 
thought and the extent to which it is important and feasible to control their intrusive 
thoughts. These three belief domains are thought to capture the dysfunctional beliefs at 
Several studies have found that the belief factors are highly correlated in non-clinical 
samples ($r = 0.64-0.75$) and may represent a single global factor in non-clinical samples 
(Abramowitz et al., 2007, OCCWG, 2005).
The Obsessive-Compulsive Cognitions Working Group developed the Interpretations of Intrusions Inventory (III), which assesses beliefs related to the need to control the thoughts, their exaggerated importance, and responsibility about the importance of the intrusive thoughts (OCCWG, 1997, 2001). Research to date has identified that the negative personal meaning attributed to intrusive thoughts is related to OCD. Patients with OCD have been found to have higher scores on the III than control subjects (OCCWG, 2003).

Recent research has found that dysfunctional or obsessiona...
the development and/or maintenance of obsessive-compulsive symptoms in a clinical population, that OC beliefs do not contribute to the explanation of OC symptoms to the same degree in all patients, or that there are additional cognitive factors that have not yet been identified.

Recently, Abramowitz and colleagues (2006; 2007) conducted a longitudinal study to examine the causal effects of dysfunctional beliefs on OC severity in a postpartum population. The postpartum period was considered to be an ideal opportunity to examine the causal relationship because previous research has identified the postpartum period as a period of increased risk for the development of OC symptoms and infant related intrusive thoughts. This period is also ideal for a prospective study because birth is a predictable event and thus researchers are able to easily examine cognitive variables before and after the event (Abramowitz et al., 2006; Abramowitz et al., 2007). This prospective, longitudinal study found that scores on a measure of dysfunctional beliefs (Obsessional Beliefs Questionnaire, OBQ-44; OCCWG, 2005) significantly predicted increases in OC symptoms after controlling for baseline OC symptoms, anxiety, and depression. The OBQ-44 explained 23% of the variance in OC symptoms at time-2 as measured by the Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman et al., 1989) when controlling for OC symptoms, anxiety, and depression at time-1 (Abramowitz et al., 2006). Although research suggests that there is a causal relationship between dysfunctional beliefs and the development of obsessive-compulsive symptoms, a substantial portion of the variance in OC symptoms at time-2 was not explained by the participants’ dysfunctional beliefs. This research further supports the belief that OCD is
a multidimensional disorder, which is likely caused by a complex constellation of cognitive and biological factors.

The contribution of experiential avoidance and obsessional beliefs to OC symptoms has also been examined (Abramowitz, Lackey, & Wheaton, 2009). Results of the study indicated that individuals who were high in OC symptoms reported more obsessional beliefs and experiential avoidance than individuals who reported lower levels of OC symptoms. However, when the relationship was further examined, experiential avoidance did not explain a significant amount of the variance in OC symptoms beyond the contribution of obsessional beliefs. Consistent with previous research, obsessional beliefs explained a significant amount of the variance in OC symptoms beyond the contribution of experiential avoidance (Abramowitz et al., 2006; Abramowitz et al., 2007; Taylor, 2006). Results of this study revealed that obsessional beliefs explain a significant amount of the variance in OC symptoms; however a significant amount of the variance in OC symptoms remains unaccounted.

The looming vulnerability model is posited to be a cognitive model specific to anxiety and anxiety disorders. According to Riskind and colleagues, the looming vulnerability model involves dynamic mental representations of intensifying danger and rapidly increasing risk (Riskind, Williams, Gessner, Chrosniak, & Cortina, 2000; Williams, Shahar, Riskind, & Joiner, 2005). The looming vulnerability model of anxiety is distinctive from other cognitive models of anxiety in that it focuses on the temporal and spatial advancement of danger and threat rather than a static perception of threat. This “dynamic danger content” makes the looming vulnerability model unique to anxiety,
suggesting that it is the static conceptualization of anxiety and threat that greatly overlap with depression (Riskind & Williams, 2005). The looming vulnerability model posits that exaggerated perceptions of threat as rapidly increasing in risk and danger lead to intense fear and anxiety. Individuals with this cognitive vulnerability are likely to have dynamic perceptions of threat and a tendency to develop mental scenarios in which they envision anticipated threats as increasing in risk, approaching a poor or feared outcome, and moving at a rapid or even an increasing rate of speed through time toward the impending outcome. Thus, the looming vulnerability leads individuals to become hypervigilent to threat stimuli, biases their processing of threat related information, and leads to more persistent symptoms of anxiety (Riskind, 1997; William et. al, 2005; Riskind & Williams, 2005).

Looming appraisals, as described above, can be experienced as a state response to threat or danger. It is posited that individuals may develop an overarching looming cognitive style after repeated exposure to certain antecedent conditions (Riskind et al., 2006). Some individuals may learn a proximal disorder specific or stimulus specific type of looming in which they interpret or generate scenarios of rapidly rising risk and threat for their specific fear (i.e. spiders or contamination). The looming cognitive style, however, is posited to be a global, pervasive danger schema which causes individuals to generate mental representations that over-generalize their appraisal of potential threats as rapidly approaching and rising in intensity and danger (Riskind & Williams, 2005; Riskind et al., 2000; Williams et al., 2005). Thus, the looming cognitive style represents a global cognitive vulnerability to the development of anxiety states and disorders.

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Individuals with the looming cognitive style are assumed to consistently appraise the
temporal and spatial movement of future threat in a biased manner. Due to the perception
that threat and/or harm is rapidly increasing in risk, gradually worsening and
accelerating, individuals are hypervigilant to potential threat or harm, experience more
anxiety, and have difficulty habituating to perceived threats (Riskind & Williams, 2005).

Riskind and colleagues have demonstrated the relationship between looming
vulnerability and anxiety or fear in a number of studies (Levin, Riskind, & Li, 2006;
Riskind & Williams, 2006; Riskind, Williams, & Joiner, 2006; Riskind & Williams,
2005; Williams et al., 2005; Riskind et. al, 2000; Riskind, Abreu, Strauss, & Holt, 1997,
Riskind, Moore, & Bowley, 1995; Riskind & Maddux, 1994; Riskind & Maddux, 1993).
Studies have examined both the role of the global looming cognitive vulnerability and the
role of fear or anxiety disorder specific looming cognitive vulnerabilities.

Riskind and colleagues have found correlations between looming and fear of
contamination (Riskind et al., 1997), fear of individuals with Auto-Immune Deficiency
Syndrome or HIV virus (Riskind & Maddux, 1994), fear of spiders (Riskind et al. 1995)
and undergraduate students' fears of psychiatric patients (Riskind & Wahl, 1992). When
examining specific populations, relationships between looming vulnerability and fears of
pain in chronic pain populations (Suttonfield, Riskind, & Holt, 1999) and looming and
anxiety in a caner cohort (Levin, Riskind, & Li, 2006) have been found. Looming
vulnerability has also been linked with fears of performance mistakes by professional
musicians who were socially anxious (Riskind & Mizrahi, 1999).
The growing research on the looming cognitive style (LCS) provides evidence for the applicability of the LCS to a number of anxiety disorders. Using structural equation modeling Williams et al. (2005) found that LCS predicted the common variance in a number of anxiety disorder symptoms when controlling for depressive symptoms. These results were replicated by Reardon & Williams (2007). These results, in addition to prior research, suggest that the looming cognitive style is a global dimension of specific vulnerability to anxiety (Riskind & Williams, 2005; Riskind et al. 2000; Riskind, 1997; Williams et al., 2005; Reardon & Williams, 2007). In this study we examine the role of the looming cognitive style as an overarching vulnerability for obsessive-compulsive symptoms.

The looming vulnerability model theorizes that individuals differ in the extent to which they develop global cognitive biases or domain specific cognitive vulnerabilities to generate dynamic mental representations of threats moving toward an impending or dreaded outcome. The theory postulates that the general tendency to generate broadly based mental representations of events unfolding, the “looming cognitive style”, may lead to the expansive development of anxiety symptoms, obsessional symptoms, worry, or neutralizing behaviors. Beyond the broad-based, looming cognitive style these dynamic mental representations of threat are posited to be related to the development of specific fears or phobias such as the fear of disease contamination (Riskind & Maddux, 1994) and the fear of spiders (Riskind et al. 1995) or specific anxiety disorders such as Obsessive Compulsive Disorder (Riskind, 1997; Riskind, Williams, & Kyrios, 2002;
Recent research suggests that there is a relationship between the looming cognitive style and obsessive-compulsive symptoms (Riskind & Williams, 2005). Previous research has found support the implication of the looming cognitive style in OC relevant fears; specifically fear of contamination (Riskind, Abreu, et al., 1997; Riskind, Wheeler, & Paceno, 1997). Riskind and colleagues found that the global LCS looming cognitive style was a significant predictor of short-term changes in OC symptoms and worry over a week long period when controlling for intolerance of uncertainty and depression (Riskind, Tzur, Williams, Mann, & Shahar, 2007). The LCS also served as a moderator in this research study. Among participants who had high anxiety at time 1, changes in reported levels of OC symptoms were predicted by LCS (Riskind et al., 2007).

A recent study examined the role of global looming vulnerability as a cognitive antecedent for obsessive compulsive disorder (Scott & Riskind, in preparation). Participants completed measures of OC symptoms, anxiety, and levels of the LCS and then were randomized to a control or experimental manipulation group. Following exposure to either a neutral or anxiety provoking video news story, participants then completed a second set of measures of OC symptoms, anxiety, and levels of LCS. The hypothesis that LCS at time 1 and video manipulation would explain a significant amount of the variance in OC symptoms at time 2 was not supported. The interaction between Padua scores at time 1 and the video manipulation was a significant predictor of changes in OC symptoms suggesting that individuals who had higher levels of OC symptoms at
time one experienced increases in their OC symptoms after being exposed to the anxiety
provoking video. In addition, the interaction between physical LCS and the video
manipulation was significant indicating that individuals who had high levels of baseline
looming experienced an increase in their OC symptoms after being exposed to an anxiety
provoking stimulus. This study provided further support for role of the looming
cognitive vulnerability in the development of OC symptoms (Scott & Riskind, in
preparation).

Although the research to date has found that there is a relationship between LCS
and OC symptoms, there have been limited empirical studies to examine the relationship.
Riskind & Rector (2007) examined the role of the domain specific OCD looming
maladaptive styles as specific cognitive vulnerabilities to obsessive-compulsive
symptoms in a clinical sample of participants with OCD. The OCD Looming
Vulnerability Measure developed for the study conducted by Riskind and Rector (2007)
examined the role of specific maladaptive looming styles related to the OCD subtypes.

The measure analyzed the role of five OCD maladaptive looming styles by asking
participants to imagine mental scenarios and answer questions about looming related to
the threat in each scenario. Contamination looming maladaptive subtype was assessed
with three items which focused on contamination related threat (e.g. smelling the strong
odor of urine on a man wearing dirty clothing on a man who sits next to you). The
Hoarding looming maladaptive subtype was assessed with three items such as having to
discard objects one has been collecting over a number of years and believing that the
object will then be needed. The Doubting looming maladaptive subtype was assessed by
three scenarios such as having the sudden thought or image of one’s house burning down because the oven was left on when rushing out of the house. The Ordering/Symmetry looming maladaptive subtype was assessed by three scenarios such as noticing that a room in one’s home is filled with a mess while rushing out of the home and believing that things will get out of control the rest of the day if the mess is not cleaned up. The Impulse looming maladaptive subtype was made up of three subthemes: sexual looming, harm looming, and blasphemous looming.

Riskind & Rector (2007) found that the OCD looming subtypes predicted a significant amount of unique variance in the severity of clinical obsession and compulsion symptoms as measured by the Y-BOCS, beyond the variance explained by the OBQ and III, measures developed by the OCCWG to assess obsessional beliefs and the interpretations of intrusive thoughts. There were significant positive Beta weights for Contamination Looming and Hoarding Looming. In addition there was a surprising significant negative Beta weight for Impulse Looming. It was posited that the different directions of the relationships between Contamination and Hoarding Looming and Impulse Looming and OCD symptoms may be related to the fact that contamination and hoarding involve external objects whereas impulse looming focuses on an internal processes. It was suggested that the looming vulnerability to impulses might be quite different than the other looming subtypes due to this internal focus. Overall, these results suggest there is a direct relationship between OCD looming maladaptive styles and obsessive-compulsive symptoms beyond the effects of the cognitive factors commonly included in cognitive models of OCD.
The research to date on the looming cognitive vulnerability suggests that LCS is an overarching global cognitive vulnerability for obsessive-compulsive symptoms (Riskind, Abreu, et al., 1997; Riskind, Wheeler, & Paceno, 1997; Riskind & Williams, 2006; Riskind, et al., 2007). Riskind and Rector (2007) have provided support for the role of OCD domain specific looming vulnerability as an antecedent of overall OC symptoms. The findings to date suggest that looming is an important construct and one study indicates that, in clinical patients, OC specific looming predicts OC symptoms beyond the contribution of obsessional beliefs and appraisals. As a result, the looming vulnerability construct is thought to add to the current cognitive models by focusing on a different cognitive construct. Thus, it is important to look beyond the content of threat and patients’ beliefs about threat by including the appraisal of the rate at which the threat is increasing over time in cognitive models of OCD.

The primary purpose of this study is to further substantiate the role of looming vulnerability as an important construct in the cognitive vulnerability model of OC symptoms. This study is unique in that it will examine the relationship between OCD specific looming vulnerability and OC symptoms using a structural equation modeling design. This is of particular interest because there has been only one other study to date, which has specifically examined the contribution of OCD-Looming Vulnerability to OC symptomatology (Riskind & Rector, 2007). The previous study focused exclusively on a clinical patient population. This study will expand the literature to date on the nature of the specific cognitive biases of the OCD-Looming Vulnerability by examining the role of OCD-Looming in a non-clinical sample during a naturally occurring period of stress,
final exams. In addition, this study is unique in that it looks at the direct paths from OCD-Looming subscales to corresponding OCD symptom clusters. This study further supports the importance of the role of domain specific dynamic representations of threat in the development of specific anxiety symptoms subtypes.

In this study, undergraduate student participants completed measures of dysfunctional beliefs, anxiety, depression, the looming cognitive style, and OCD looming specific subtypes during the first two months of the semester. Participants then completed measures of dysfunctional beliefs, anxiety, depression, the looming cognitive style, OCD looming specific subtypes, interpretations of intrusive thoughts, and OC symptoms during the week prior to the final exam period to assess the role of LCS and OCD looming specific subtypes along with existing constructs in cognitive models of OC symptoms. Although this is a non-clinical sample, a growing amount of the OCD research to date has been conducted with non-clinical and student samples (Burns, Formea, Keortge, & Sternberger, 1995; Tolin, Woods, & Abramowitz, 2003). The growing literature supports the theory that OC symptoms occur on a continuum (Salkovskis, 1999). Research with non-clinical samples has found that 80-99% of participants experience intrusive thoughts, which are thought to be the foundation of obsessions (Clark & de Silva, 1985; Purdon & Clark, 1993).

The aim of the current study is to expand upon existing literature on the role of OCD specific looming vulnerability as a cognitive antecedent of OC symptoms. The overarching hypothesis of this study is that OCD specific looming vulnerability explains additional variance in OC symptoms beyond what is explained by existing cognitive
vulnerability models of OC Symptoms. Specifically, it is hypothesized that when running a series of Structural Equation of Modeling:

1. The latent variable of OC beliefs & appraisals, measured by the OBQ-44 and III, the latent variable of Looming Cognitive Style (LCS), measured by physical and social looming, and/or General Distress as measured by DASS subscales, will predict changes in the latent variable of OC symptoms, as measured by the OCI-R.

2. The OC looming latent variable, measured by the OCD-LVM subscales, will predict variance in the OC symptoms latent variable when controlling for OC beliefs & appraisals, LCS, and/or distress.

An exploratory analysis of the stability of OCD-Looming scores during a period of stress will be conducted. This will examine the extent to which these scales are more state-like or have stability across conditions that differ in their general level of stress. The point of these analyses is to conduct an additional exploratory analysis of the trend in the relationships over time between OCD-Loom and OCD Beliefs and whether one has temporal precedence in relation to the other.
Methods

Participants

A sample of 245 self-selected undergraduate students enrolled in psychology courses at George Mason University completed a series of online questionnaires at two time points over the course of the semester. Not all students completed both sets of questionnaires or completed all the questionnaires at the second time point. As a result, 196 participants were included in the analyses. The participant in this group ranged in age from 18 to 57 years of age and had a mean age of 21.9 years (SD=5.44). The sample was 13.3% male and 81.6% female. The racial distribution of the study is as follows: 18.9% Asian, 7.1% African American, 7.1% Hispanic/Latin/Mexican American, 53.1% Caucasian, 3.1% Middle Eastern, and 9.2% other.

Procedures

The purpose of the study is to examine the role of the looming maladaptive style as a risk or predictive factor for elevations in obsessive-compulsive (OC) symptoms. Study participants were recruited from the George Mason University student population. The participants were students enrolled in undergraduate psychology courses who received research credits for their course in exchange for their participation. Participants took part in the study at two time points over the course of the semester. The first phase of the study took place during in the first two months of the semester. After signing up
for study participation on the SONA system, participants were provided with a link to the online survey. After indicating Informed Consent, participants completed self-report questionnaires online to measure their level of anxiety, depression, stress, LCS, OCD-Looming Vulnerability, OCD beliefs, and OCD appraisals. The participants completed a second set of the same questionnaire measures online during the last week of the semester prior to their final exam period. In addition to the previously mentioned questionnaires, participants completed a measure of OC symptoms and their interpretation of intrusive thoughts. Initially the study was meant to be a two time-point longitudinal study of the cognitive antecedents of OC symptoms. Unfortunately, due to internet difficulties, the OC symptom measure (OCI-R) and the measure of interpretations of intrusive thoughts (III) were not completed at the first time point. The data analyses were therefore conducted using data from the second time-point.

Measures

*Looming Cognitive Style Questionnaire* (LMSQ; Riskind et al., 2000) is a self-report measure of an individual’s tendency to generate mental representations of perceived threat as rapidly in risk as they progress through time towards an impending negative outcome. Participants are asked to read six vignettes about potentially stressful situations. Three of the vignettes focus on social looming (e.g. people in a group look bored or uninterested while you are speaking) and three of the vignettes focus on physical looming (e.g. hear a strange engine noise from your car). Participants then are asked to respond to three questions about the threat described in the vignette using a five-point Likert scale (e.g. “In this scene, are the chances of your having a difficulty decreasing, or
expanding with each moment? Is the level of threat you are experiencing staying fairly constant, or is it growing rapidly larger with each passing moment? How much do you visualize the threat as progressively worsening?”). The total score is an aggregate of three looming relevant scores across all the vignettes. Two subscale scores can be generated by aggregating the scores on the looming relevant questions across the social looming and physical looming vignettes. The scale has high test-retest reliability (r=.84) over a six-week interval (Williams, 2002). There is evidence of discriminant validity on the LCS between anxiety and depression (Riskind et al., 2000; Williams, 2002).

**OCD Looming Vulnerability Measure** (OCD-LVM; Riskind & Rector, 2007) is a measure constructed by Riskind and Rector (2007) for the study of looming vulnerability in OCD. The OCD-LVM is a domain specific measure of an individual’s tendency to create dynamic mental representations of OCD relevant perceived threats (e.g. contamination, loss of order or symmetry) that are rapidly increasing in risk as it moves toward an impending outcome. Participants are asked to read several brief vignettes which describe stressful situations that are relevant to OCD symptoms and imagine themselves as the subject of the vignette. Participants then rate the extent to which the threat is considered to remain stable versus increasing in risk on a 1-7 Likert Scale. The vignettes are specific to the following OCD subtypes: contamination, hoarding, ordering, doubting, and pure obsessions which consist of sexual, harming, and blasphemous content. The five looming content scales have been shown to have good internal consistency (Looming Contamination, α=.95; Impulse Looming, α=.96; Looming Symmetry, α=.95; Looming Hoarding, α=.95; Looming Doubt, α=.89). The looming
subscales were not found to be highly inter-correlated, substantiating their consideration as separate scale measures of OCD domains in data analyses. The subscale item-total scores on the OCD-LVM will be used in these data analyses.

*Obsessional Beliefs Questionnaire* (OBQ-44; OCCWG, 2001, 2003, 2005). This 44-item, self-report inventory was developed by an international group of leading researchers. It assesses three belief factors: Responsibility and threat estimation, perfectionism and intolerance for uncertainty, and importance and control of thoughts. The belief factors have good internal consistency (Responsibility/Threat Estimation, $\alpha=.93$; Perfectionism/Certainty, $\alpha=.93$; Importance/Control of Thoughts, $\alpha=.89$). There is a high Cronbach alpha for the Total Score ($\alpha=.95$) indicating strong internal consistency. There is also evidence for convergent and discriminant validity. A total score will be created by summing the ratings of all 44 items. Subscale scores can be generated by summing the ratings of the subscale items. The total belief score will be used for data analyses, several studies have found that the belief factors are highly correlated in non-clinical samples ($r=0.64-0.75$) and may represent a single global factor (Abramowitz et al., 2007, OCCWG, 2005).

*Interpretations of Intrusions Inventory* (III; OCCWG, 1997, 2001, 2003, 2005). The III asks respondents to write down two intrusive thoughts (images, impulses) that they have experienced, indicate the recency and frequency of the intrusive thoughts, and the distress those thoughts cause them. It provides a total score reflecting the extent, on 0 to 100 point scales, to which respondents make fearful interpretations of intrusive thoughts (e.g., “I need to make sure something awful won’t happen because of this
thought.”). The III assesses beliefs in three domains related to the need to control the thoughts, their exaggerated importance, and responsibility about the importance of the intrusive thoughts. A total score for the III (III-Total) will be created by summing the ratings of the 31 items.

The Obsessive-compulsive Inventory- Revised (OCI-R; Foa et al., 2002) is an 18-item self-report measure of obsessive-compulsive symptoms. The measure yields a total score by aggregating across all items and six subscales: washing, checking, ordering, obsessing, hoarding, and neutralizing. There are three items for each subscale and the subscale score is generating by summing across the three items for each subscale. The OCI-R has been found to have strong psychometric properties in both clinical and undergraduate student populations. Foa et al. (2002) analyzed the psychometric properties of the OCI-R with a sample of OCD patients, patients with other anxiety disorders, and non-anxious controls. The OCI-R had good internal consistency with the Cronbach’s alpha for each scale ranging from 0.83-0.90. The OCI-R had moderate to excellent test-retest reliability for the subscale and total scores ($r = 0.57-0.91$). The convergent validity of the total symptoms score on the OCI-R and other measures of OCD in this sample was good ($r = 0.53-0.85$).

Hajcak et al. (2004) analyzed the psychometric properties of the OCI-R in an undergraduate student population and found that the OCI-R had strong psychometric properties. The Cronbach’s alpha for the total scale (0.88) and subscales of the OCI-R (washing (0.76), checking (0.76), ordering (0.84), obsessing (0.77), hoarding (0.68), and neutralizing (0.61)) demonstrate excellent to moderate internal consistency. The test-
retest reliability for the total and subscale scores was good \( r = 0.54-0.77 \). The OCI-R was found to have moderate convergent validity with the Maudsley Obsessive–Compulsive Inventory \( r = 0.56-0.65 \) and the Padua Inventory—Washington State University Revision \( r = 0.75 \) and good divergent validity.

*The Depression Anxiety Stress Scales (DASS)* is a 42 item self-report questionnaire designed to measure depression, anxiety, and stress (Lovibond & Lovibond, 1995). Confirmatory factor analysis has shown support for the three factor latent structure of the DASS (CFI=0.93) with a non-clinical sample (Crawford & Henry, 2003). The construct validity has been found to be adequate when assessed in both clinical and non-clinical samples (Lovibond & Lovibond, 1995; Anthony, Bieling, Cox, Enns, & Swinson, 1998; Crawford & Henry, 2003). The scale reliability has been found to be acceptable for the depression, anxiety and stress scales in both clinical and non-clinical samples with Cronbach’s alphas ranging from .84 to .96 (Lovibond & Lovibond, 1995; Anthony et al., 1998; Crawford & Henry, 2003). Research also indicates that the DASS has adequate discriminant validity (Crawford & Henry, 2003).
Data Analyses

Psychometric Properties

The psychometric properties of the OCD-LVM were examined in order to further establish the validity and reliability of this scale as its use has been documented in only one other study with a clinical sample (Riskind & Rector, 2007). The psychometric properties of this scale were examined in a non-clinical sample. The scale’s reliability was examined by calculating the Cronbach alpha for the entire scale as well as each of the subscales. In addition, the test-retest validity of this scale was examined.

Descriptive Statistics and Univariate analyses

The means and standard deviations of each measure were calculated. The zero-order correlations between each of the measures were analyzed and presented in a table. The LCS and OCD-LVM were expected to be correlated as they both measure the looming vulnerability. The LMS and OCD-LVM and its subscales were hypothesized to be positively correlated with OC symptoms as research has previously found a relationship between the looming cognitive style and OCD specific looming and OC symptoms (Riskind & Rector, 2007). Cognitive models posit that OC beliefs and III are cognitive antecedents to OCD and as such the zero-order correlations between these variables should also be significant. Partial correlation analyses were conducted to examine the relationships between the cognitive variables.
Structural Equation Modeling

Our hypotheses were tested using Structural Equation Modeling (SEM) (Hoyle & Smith, 1994) using the AMOS 17 program. Analyses were run using Maximum Likelihood estimation and model fit was examined using the following indices: comparative fit index (CFI); root mean square error of approximation (RMSEA); Tucker-Lewis Index (TLI, rho2). Although the chi-squared index was assessed in all cases, research suggests the chi squared significance test is largely influenced by sample size and is often found to be significant indicating poor model fit (Schumaker & Lomax, 2004). As a result, the normal chi-square (CMIN/DF), the chi-square fit index divided by degrees of freedom, which is thought to be less dependent on sample size was used in this study. CMIN/DF values in the range of 3 to 1 indicate acceptable model fit (Carmines & McIver, 1981; Marsh & Hocevar, 1985).

The Structural Equation Models were conducted in accordance with the recommended two-step approach to testing structural models was employed (Anderson & Gerbing, 1988). In the first step of this approach a confirmatory factor analysis was conducted on the correlation matrix for the variables included in each of the three hypothesized model in order to establish an adequate measurement model. Once an adequate measurement model was established structural equation models were run. Modifications were made to the models after examination of the modification indices for each model if and when modifications fit with the hypothesis driving each model.

The following latent variables were included in the models: Looming Cognitive Style (LCS), OCD Appraisals and Beliefs, OCD-Looming, Distress, and OC Symptoms.
The LCS latent variable was assessed via the social looming and physical looming indicators of the LMSQ. The OCD Beliefs & Appraisals latent variable was assessed via the total score on the OBQ-44 and the III. The Looming Contamination, Impulse Looming, Looming Symmetry, Looming Hoarding, Looming Doubt subscales of the OCD-LVM were the indicators used to assess the latent variable of OC-Loom. The General Distress latent variable was assessed via the DASS Stress and DASS Depression indicators. The latent variable of Obsessive-Compulsive Symptoms was assessed via the Washing, Checking, Ordering, Obsessing, Hoarding, and Mental Neutralizing indicators of the OCI-R. In each model all predictor variables were allowed to correlate with one another.

Three models were tested using SEM. The primary hypothesis of this study is that the looming cognitive vulnerability explains unique variance beyond that which is explained by variables usually included in cognitive vulnerability models of OCD. This hypothesis was examined using Structural Equation Modeling to examine the common variance predicted by the looming cognitive vulnerability, OC-specific looming, OCD appraisals and beliefs, and general distress. The structural model has been specified (See figure 1, SEM Model 1) which involves the OC Symptoms latent variable as the outcome variable and four predictor, latent variables: LCS, OCD-Loom, General Distress, and OC Beliefs & Appraisals. This analysis allowed for the examination of the effect of OCD-LOOM on OC Symptoms while controlling for the effect of General Distress, OC Beliefs & Appraisals, and LCS, all of which have been previously shown to have associations with OCD symptoms in both college students and clinical patients.
A second SEM examined the common variance in OC symptoms predicted by the OCD specific looming cognitive vulnerability, OCD beliefs & appraisals, and general distress. The structural model has been specified (See figure 2, SEM Model 2) in which four latent variables, OCD-Loom, General Distress, OC Beliefs & Appraisals, predict the Obsessive-Compulsive Symptoms latent variable. This model tested two predictions. First, that OCD Loom predicts OC symptoms while controlling for OCD beliefs and appraisals and general distress. The second prediction is that specific OCD-Loom subscales (e.g., loom contamination and looming hoarding) are uniquely related to corresponding OCD symptom subscales. These paths included: Looming Contamination to OCIR Washing, Order/Symmetry Looming to OCIR Order; Looming Doubt to OCIR Checking; Hoarding Looming to OCIR Hoarding; Impulse Looming to OCIR Neutralizing.

A third SEM examined a cognitive model of OC symptoms without controlling for general distress. This model is meant to specifically examine cognitive antecedents of OC symptoms without the effect of general distress or depression and stress in order to better understand the role of OC Loom and OC Beliefs and Appraisals specifically. Our hypothesis is that both obsessional beliefs and appraisals and obsessive-compulsive specific looming cognitive vulnerability are antecedents to the development of OC symptoms. The structural model has been specified which involves three latent variables (See figure 3, SEM Model 3): OCD-Loom, OC beliefs & appraisals, and Obsessive-Compulsive Symptoms. This analysis allowed for the addition of specific paths from the
subscales of OCD specific looming to the specific indicators of the OCD symptoms when it fits with the model.

*Exploratory Analyses*

While the primary focus of this study is on the role of OC specific looming vulnerability, two additional exploratory SEM analyses were conducted to further examine the relationships between LCS and OC Symptoms and OC Beliefs and Appraisals and OC Symptoms. The first exploratory SEM assessed the common variance in OC symptoms predicted by distress and maladaptive OC beliefs. For this model, the Obsessive Compulsive Symptoms latent variable was the outcome variable, and was predicted by the Distress and OC Beliefs & Appraisals latent variables. This exploratory analysis was conducted to assess the predictive contribution of OC Beliefs & Appraisals and Distress under different conditions, without the inclusion of the influence of OC specific looming and the global looming vulnerability variables. The second exploratory SEM assessed the relationship between LCS and OC Symptoms with a different combination of variables. In this model the common variance in OC symptoms was predicted by LCS, Distress, and OC Beliefs & Appraisals. This analysis allowed for the examination of the role of LCS as a predictor latent variable without the inclusion of the influence of OC specific looming variable.

An exploratory cross-lag panel analysis examined the trend overtime in the relationship between OCD-Loom and OCD Beliefs and whether one variable contributed to change in the other over time. This model helped to clarify the state-like quality of OC Looming and the role of OCD Beliefs in change in OC Looming over time and vice
versa. The cross-lag panel SEM analysis examined if the OCD looming latent variable predicted obsessional beliefs (time 2) while controlling for obsessional beliefs and distress at time 1. The analysis was then run to examine whether the obsessional beliefs latent variable predicted the OCD looming latent variable (time 2) while controlling for OCD looming and distress at time 1.
Results

Psychometric Properties

The psychometric properties of the OCD-LVM were examined and the overall scales as well as the five OCD looming content scales showed adequate internal consistency for use in a non-clinical undergraduate student population. Since the majority of the analyses being conducted in this study are utilizing the data collected at the second data collection, the data analyses of the psychometric properties have been conducted using the OCD-LVM data collected at time 2. The Cronbach’s Alpha for the OCD-LVM scale was .97. The coefficient alpha for the looming contamination scale was .94, for the impulse looming scale was .96, for the looming order/symmetry scale was .95, for the looming doubt scale was .93, and for the looming hoarding scale was .95. The coefficient alphas are consistent with those found by Riskind & Rector (2007) in their analysis of the psychometric properties of the OCD-LVM. For each OCD looming content scale, the item-total correlations showed adequate item-total correlations. The item-total correlations ranged from .77 to .87 on the looming contamination scale, .51 to .83 on the impulse looming scale, .77 to .90 on the looming order/symmetry, .77 to .85 on the looming doubt scale, and .77 to .87 on the looming hoarding scale. Riskind & Rector (2007) found that item correlations ranged from .50 to .89. The content scales were found
to be significantly correlated with each other (Table 1). The test-retest reliability of the OCD-LVM was assessed over a two to four month delay. In general, the test-retest reliability is adequate. The test-retest reliabilities for the content scales of the OCD-LVM ranged from 0.49 to 0.67 (Table 2) with Looming Hoarding ($r=0.49$) and Looming Contamination ($r=0.53$) having the lowest test-retest reliabilities. The test-retest reliability for the OCD-LVM as a whole was good ($r=0.66$). Overall, the test-retest reliability for the individual subscales ranged from moderate to large and the scales as a whole are considered to be adequate.

*Descriptive Statistics and Univariate analyses*

The correlations between total summary scores on the LMSQ, DASS, III, OBQ-44, OCD-LVM, and the OCI-R were all significant (see Table 3). The intercorrelations between the indicators of cognitive vulnerabilities, indicators of distress, and OC symptom factors that are included in the structural equation models were all significant at the $p < .05$ level (see Table 4). The means and standard deviations of the indicator variables are presented in Table 4. The skewness and kurtosis for all indicators suggest multivariate normality as all skewness values are less than 3.00 and kurtosis values are less than 10.0 (see Table 4). These values are consistent with values suggestive of multivariate normality (Kline, 2005). Partial correlation analyses were conducted to further examine the relationships between the cognitive vulnerability variables and OC Symptoms as measured by the OCI-R. When controlling for OCD-LVM, DASS ($r = 0.16, p <0.001$), OBQ ($r = 0.39, p<.001$), and III total score ($r = 0.52, p<.001$) remain significantly correlated with OCI-R total scores. In contrast, LMSQ was no longer
significantly correlated with OCI-R total scores when controlling for OCD-LVM ($r = -0.004, p=.96$) (see Table 5). When controlling for LMSQ total scores, all other variables remained significantly correlated with OCI-R. The total scores for each scale remained significantly correlated with OCI-R when controlling for DASS, OBQ-44, and III (see Table 5).

*Measurement Model 1: LCS, OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms*

The path coefficients in Figure 4 show that OC Looming, LCS, OC Beliefs & Appraisals, General Distress, and OC Symptoms are correlated, but are psychometrically distinct constructs. In this confirmatory factor analysis (CFA), all of the manifest variables demonstrated strong loading on their respective latent variables with factor loadings ranging from 0.66 to 0.95. Loadings of manifest variables on their respective variables were all highly statistically significant ($p<.001$).

The indices of model fit revealed less than adequate model fit for this measurement model ($\chi^2 [109] = 319.99, p = .000; \text{TLI} = .86; \text{CFI} = .891; \text{RMSEA} = .10$). The CMIN/DF measure of model fit, which is the preferred measure for small sample sizes because it is less influenced by sample size, was is less than three suggesting adequate model fit (CMIN/DF = 2.94) (Carmnines & McIver, 1981; Marsh & Hocevar, 1985). Examination of Model Fit Indices revealed that model fit would be improved by adding a correlation path that was added was between the error terms for OCIR Obsessions and III Total (M.I. = 19.37). The correlation path between OCIR Obsessions and III Total was positive ($r=.43, p< 0.01$). This is likely due to the fact that the content
of these scales is related. The III assesses an individual’s tendency to perceive and interpret intrusive thoughts in a maladaptive way and OCI-R obsessions assess the extent to which one is upset by, attempts to control, and is bothered by their intrusive thoughts.

After adding this correlations to the measurement model, the model fit improved and was considered adequate with the exception of the chi square statistic ($\chi^2[108] = 298.98, p = .000; \text{CMIN/DF} = 2.77; \text{TLI} = .88; \text{CFI} = .90; \text{RMSEA} = .95$). The CMIN/DF value is less than 3 indicating adequate model fit in spite of a significant chi-square statistic (CMIN/DF=2.77) (Carmnines & Mclver, 1981; Marsh & Hocevar, 1985). Modification indices suggested that little could be gained from the inclusion of additional paths from measures of one latent variable to another latent variable.

Structural Model 1: LCS, OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms

As previously mentioned, we are following the two-step approach to structural equation modeling suggested by Anderson & Gerbing (1988). In the first step of this approach a confirmatory factor analysis was conducted on the correlation matrix for the variables in order to establish an adequate measurement model. Since the confirmatory factor analysis indicates adequate model fit, the structural equation models were then run. A review of the Modification Indices suggested that the inclusion of a path from the manifest variable of OC Looming Hoarding directly to the manifest variable OCI-R Hoarding (M.I. = 4.91) and a path from the manifest variable of OC Looming Order/Symmetry directly to the manifest variable OCI-R Order (M.I. = 11.58) would improve model fit. The addition of these paths fits with our hypothesis that specific
OCD-looming subtypes predict variance in specific categories of OC symptoms, indicating a direct effect of OC Looming Hoarding and OC Looming Order/Symmetry and specific hoarding OC symptoms. The addition of this path improved model fit and yielded the following model fit estimates ($\chi^2 [106] = 268.73, p = .000; \text{CMIN/DF} = 2.54; \text{TLI} = .89; \text{CFI} = .92; \text{RMSEA} = .089$).

Consistent with the existing literature on the role of obsessional beliefs, maladaptive appraisals of intrusive thoughts in the onset and maintenance of OC symptoms, the structure equation model (SEM) found that the path between OC Beliefs & Appraisals and OC Symptoms was significant ($\beta=0.38, p<0.01$). Distress also significantly predicted associated with OC Symptoms ($\beta=0.38, p<0.01$). In addition, the SEM demonstrates a significant path from OC Looming to OC Symptoms demonstrating that OC Looming contributed incremental prediction of OC Symptoms, over and above the prediction of OC Beliefs and Appraisals and General Distress ($\beta=0.41, p<0.01$). An unexpected finding was that LCS significantly predicted lower levels of OC symptoms ($\beta=-0.23, p<0.05$) despite the significant positive bivariate correlation. The path from the manifest indicator, OC Loom Hoarding, to the manifest indicator of OCI-R Hoarding was significant ($\beta=0.21, p<0.01$). The path from the manifest indicator, OC Loom Order/Symmetry, to the manifest indicator of OCI-R Order was also significant ($\beta=0.33, p<0.01$). All of the latent predictor variables were significantly correlated ($p<0.01$) with correlations ranging from 0.34 to 0.69. In addition, the correlation path between the error terms OCIRO Obsessions and III Total was significant ($r=.41, p<0.01$). As shown in figure 5, this model indicated that all latent predictor variables contributed to the prediction of
OC Symptoms. Consistent with our hypotheses, the inclusion of OC Looming in this model allowed for the prediction of incremental validity beyond that which was explained by other latent variables.

**Measurement Model 2: OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms**

In this model, the contribution of LCS in the prediction of OC symptoms was removed in order to focus on the role of OC Looming and look at the direct between OC Looming Subtypes and related OC Symptom subtypes. As seen in figure 6, the path coefficients show that all the manifest variables are significantly correlated ($p<.001$). The results of the CFA for revealed strong loadings of all of the manifest variables on their respective latent variables with factor loadings ranging from 0.67 to 0.93. Model fit indices revealed less than adequate model fit for this measurement model ($\chi^2[84] = 258.07, p = .000$; CMIN/DF = 3.07; TLI = .87; CFI = .897; RMSEA = .103).

As found in Model 1, the modification indices revealed that model fit would be improved by adding a correlation between the error terms of two manifest variables, III Total and OCIR Obsessions (M.I. = 19.73). Just as was described for model 1, these paths have been included after examination of the items included on each scale. After adding this path to the measurement model, the model fit improved and was considered adequate with the exception of the chi square statistic ($\chi^2[83] = 236.69, p = .000$; CMIN/DF = 2.85; TLI = .89; CFI = .91; RMSEA = .097). As previously noted, a CMIN/DF less than 3 is indicative of adequate model fit despite the significance of chi-
square which is impacted by sample size. No further modifications were made to the measurement as the model fit indices indicate adequate model fit (See Figure 6).

Structural Model 2: OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms

In addition to examining the predictive contribution of the latent constructs of OC Looming, Obsessional Beliefs & Appraisals, and General Distress. This structural model assessed the direct paths from OC Looming Subscales to corresponding OC Symptom subtypes. The following direct paths were included in this model: Contamination Looming to OCIR Washing; Order/Symmetry Looming to OCIR Order; Looming Doubt to OCIR Checking; Hoarding Looming to OCIR Hoarding; Impulse Looming to OCIR Neutralizing. The significance of path coefficients between OC Looming subscales and corresponding OC symptom subtypes were examined, paths that were not significant were eliminated for the model. As a result the path between Looming Impulse and OCIR Neutralizing was eliminated from the model (β=.07, p = 0.22).

The final structural model demonstrated that Obsessional Beliefs and Appraisals was demonstrated to significantly contribute to the prediction of OC Symptoms (β=0.44, p<0.01). Consistent with results from Model 1, Distress significantly predicted higher levels of OC Symptoms (β=.39, p<0.01, respectively). Although OC Looming did not significantly predict higher levels of OC Symptoms (β=.16, p = 0.06), there is a trend towards significance suggesting that OC Looming has a near-significant effect on OC Symptoms above and beyond the effect of the individual OC Looming subscales on individual OCD symptom clusters. In Model 1 the direct path from the latent variable OC
Looming to the latent variable OC Symptoms was significant. The significance of this path has likely decreased due to the inclusion of the direct paths from the manifest OC Looming subscale variables to the corresponding manifest variables of OCI-R symptom subtypes as these paths share the variance predicted by the latent variables OC Looming. Consistent with our hypothesis that OC Looming subscales would significantly predict the corresponding symptom subtypes, the paths between Contamination Looming and OCIR Washing ($\beta=.22$, $p < 0.01$), Order/Symmetry Looming and OCIR Order ($\beta=.36$, $p < 0.01$), Hoarding Looming and OCIR Hoarding ($\beta=.23$, $p = 0.001$), and Looming Doubt and OCIR-Checking ($\beta=.12$, $p < 0.05$) were significant. All of the latent predictor variables were significantly correlated ($p<0.01$). In addition, the correlation path between the error terms for III Total and OCIR Obsessions was significant ($r=0.39$, $p <0.01$).

Overall, the model shows good fit with the data ($\chi^2 [79] = 190.87$, $p = .000$; CMIN/DF = 2.42; TLI = .91; CFI = .93; RMSEA = .085). The final model is presented in Figure 7.

**Measurement Model 3: OC Looming and OC Beliefs & Appraisals as predictors of OC Symptoms**

The third model focuses specifically on the cognitive constructs thought to be important in cognitive vulnerability models of OC symptoms. This model examines the contribution of OC Looming and OC Beliefs and Appraisals without including the predictive contribution of general distress. As indicated in models 1 and 2, the measurement model revealed strong loadings on all of the manifest variables on their respective latent variables with factor loadings ranging from 0.66 to 0.86 ($p<.001$). The
correlations shown in figure 8 indicate that OC Looming, OC Beliefs and Appraisals, and OC Symptoms were statistically significant \(p<.001\).

The initial measurement model had less than adequate model fit \(\chi^2 [62] = 198.36, p = .000; \) CMIN/DF = 3.20; TLI = .87; CFI = .897; RMSEA = .106). As in Model 1 and Model 2, indices of model fit indicated that goodness of fit would be improved by adding a correlation between the error terms of the manifest variables OCIR Obsessions and III Total (M.I. = 22.04). After adding this correlation path to the measurement model (see Figure 8), the model fit improved and was considered adequate with the exception of the chi square statistic \(\chi^2 [61] = 174.46, p = .000; \) CMIN/DF = 2.86; TLI = .89; CFI = .91; RMSEA = .098). The CMIN/DF is less than 3 indicating adequate model fit despite the significant chi-square test. No further modifications were made to the measurement as the model fit indices indicate adequate model fit.

**Structural Model 3: OC Looming and OC Beliefs & Appraisals as predictors of OC Symptoms**

A review of the Modification Indices indicated that the inclusion of paths from the manifest variable of OC Looming Hoarding directly to the manifest variable OCI-R Hoarding (M.I. = 5.55) and from OC Order/Symmetry Looming to OCI-R Order (M.I. = 11.28) would improve model fit. The addition of these paths fit with our hypothesis that OC Looming predicts variance in OC symptoms, indicating a direct contribution of OC Looming Hoarding to specific hoarding OC symptoms and a direct effect of OC Order/Symmetry Looming on OC Order/Symmetry symptoms. The addition of these
paths improved model fit ($\chi^2 [59] = 143.64, p = .000; \text{CMIN/DF} = 2.43; \text{TLI} = .92; \text{CFI} = .94; \text{RMSEA} = .086$).

Consistent with the existing body of literature on cognitive antecedents of OCD, OC Beliefs & Appraisals was significantly related to OC Symptoms ($\beta=0.58, p < 0.01$). As hypothesized, the path between the latent variable OC Loom and the latent variable OC Symptoms was significant ($\beta=.30, p < 0.01$), indicating it contributes incremental prediction above and beyond the contribution of OC Beliefs & Appraisals. The path between the specific manifest indicator of OC Loom Hoarding and the manifest indicator OCI-R Hoarding was significant ($\beta=.22, p < 0.01$) as was the path between the specific manifest indicator OC Loom Order and the manifest indicator OCI-R Order ($\beta=.32, p < 0.01$). All of the latent predictor variables were significantly correlated ($p < 0.01$). In addition, the correlation path between the error terms for OCIR Obsessions and III Total was significant ($r=.43, p < 0.01$). The final model is presented in figure 9.

Results of Exploratory Analyses

Measurement Model 4: OC Beliefs & Appraisals and Distress as Predictors of OC Symptoms

In order to better understand the contribution of OC Looming to the cognitive vulnerability of OC Symptoms, it was thought that it would be helpful to examine the predictive contribution of OC Beliefs & Appraisals and General Distress to OC symptoms without OC Looming. All observed variables loaded significantly on their respective latent constructs with factor loadings ranging from 0.64 to 0.93 ($p < .001$). All of the latent variables were significantly correlated with one another ($p < .001$).
While model fit indices demonstrated adequate model fit ($\chi^2 [32] = 79.41, p = .000; \text{CMIN/DF} = 2.48; \text{TLI} = .94; \text{CFI} = .96; \text{RMSEA} = .087$), examination of modification indices revealed that model fit would be improved by adding a correlation between the error terms of two manifest variables, III Total and OCIR Obsessions (M.I. = 15.00). Following the addition of this path, model fit indices indicated this measurement model is a good fit with the data ($\chi^2 [31] = 63.44, p = .001; \text{CMIN/DF} = 2.05; \text{TLI} = .96; \text{CFI} = .97; \text{RMSEA} = .073$).

**Structural Model 4: OC Beliefs & Appraisals and Distress as Predictors of OC Symptoms**

The structural model is an adequate fit with the data ($\chi^2 [31] = 63.44, p = .001; \text{CMIN/DF} = 2.05; \text{TLI} = .96; \text{CFI} = .97; \text{RMSEA} = .073$). Consistent with the results of the other models examined in this study and the existing literature on obsessical beliefs and interpretations of intrusive thoughts, OC Beliefs & Appraisals significantly predicted OC Symptoms ($\beta=0.53, p<0.01$). Distress also significantly predicted OC Symptoms ($\beta=0.40, p<0.01$). All of the latent predictor variables were significantly correlated ($p<0.01$). In addition, the correlation path between the error terms for the manifest variables of III Total and OCIR Obsessions was significant ($r=0.41, p<0.01$). Modification Indices suggested that the addition of paths to this model would not improve this model. These results indicate that a model including OC Beliefs & Appraisals and Distress as the latent predictors of OC Symptoms is a good fit with the data and both variables contribute incrementally to the prediction of OC Symptoms. The final model is presented in figure 11.
Measurement Model 5: LCS, OC Beliefs & Appraisals, and Distress as Predictors of OC Symptoms

The purpose of this model was to remove OC Looming from the model in order to minimize the possible suppression effect of OC Looming on the relationship between LCS and OC Symptoms. Once again, the observed variables in this model significantly loaded on their respective latent variables (β range from 0.65 to 0.94, p<.001). The correlations between the four latent variables were all statistically significant (p<.001). The initial measurement model fit indices revealed adequate model fit ($\chi^2 [48] = 103.71$, $p = .000$; CMIN/DF = 2.16; TLI = .94; CFI = .95; RMSEA = .077). As with other models, the addition of a correlation path between the error terms of the manifest variables III Total and OCIR Obsessions was demonstrated to improve model fit (M.I. = 16.49). After adding this path to the measurement model (see Figure 12), the model fit improved and was considered adequate ($\chi^2 [47] = 86.07, p < .001$; CMIN/DF = 1.83; TLI = .96; CFI = .97; RMSEA = .065).

Structural Model 5: LCS, OC Beliefs & Appraisals, and Distress as Predictors of OC Symptoms

Consistent with the results from Model 1, LCS did not significantly predict OC Symptoms ($\beta = .02, p = .71$). Although OC Looming has been shown to significantly contribute to the prediction of OC Symptoms in the other models run in this study, the global construct of looming vulnerability was not a significant incremental predictor in the models. When OC Looming is removed from the model the possible suppression effect of OC Looming on LCS is no longer an issue in the model. Even with the removal
of OC Looming, LCS does not incrementally predict OC Symptoms beyond the
correlation of OC beliefs and appraisals. It is possible that the latent variables of OC
Beliefs & Appraisals or Distress are suppressing the effect of LCS on OC Symptoms as
the significant bivariate correlation between LCS and OC Symptoms indicates that there
is a relationship between these two variables.

Consistent with previous models, OC Beliefs & Appraisals and Distress
significantly predicted OC Symptoms ($\beta = 0.53, p<0.01; \beta = .38, p<0.01$, respectively).
All of the latent predictor variables were significantly correlated ($p<0.01$). In addition,
the correlation path between the error terms for III Total and OCIR Obsessions was
significant ($r=-.41, p<0.01$). The model fit indices indicate this structural model is a good
fit with the data ($\chi^2[47] = 86.07, p < .001$; CMIN/DF = 1.83; TLI = .96; CFI = .97;
RMSEA = .065). A review of the modification indices suggested that there was no
benefit to adding any additional paths to this model. The final model is presented in
figure 13.

*Confirmatory Factor Analysis of Cross-Lagged Panel SEM 2*

An exploratory analysis of the state-like quality of OCD-Looming was examined
by using a cross-lag panel SEM to examine whether obsessional beliefs predict OCD
specific looming cognitive vulnerability during a period of stress or if OCD specific
looming cognitive vulnerability predicts obsessional beliefs during a period of stress
while controlling for distress at time 1. The path coefficients in model 14 show that OC
Looming at Time 1, OC Looming at Time 2, OC Beliefs & Appraisals at Time 1, OC
Beliefs & Appraisals at Time 2, and Distress at Time 1 are all significantly correlated. All
manifest variables revealed strong loadings on the respective latent variables with factor loadings ranging from 0.64 to 0.95 ($p < .001$). The correlations between the five latent variables were statistically significant ($p < .001$). This model demonstrates adequate model fit ($\chi^2[117] = 239.45, p = .000; \text{CMIN/DF} = 2.05; \text{TLI} = .92; \text{CFI} = .94; \text{RMSEA} = .077$).

No modifications additional modifications were made to this model (see Figure 14). Since the measurement model adequately fits with the data, we are able to test the structural equation model.

*Cross-Lagged Panel Structural Equation Model*

OC Looming at Time 1 significantly predicted higher levels OC Looming at Time 2 ($\beta = 0.65, p < 0.001$) and OC Beliefs & Appraisals at Time 1 significantly contributed to the prediction of OC Beliefs & Appraisals at Time 2 ($\beta = 0.65, p < 0.001$). OC Looming at Time 1 did not significantly in predict OC Beliefs & Appraisals at Time 2 ($\beta = 0.12, p = 0.196$). OC Beliefs & Appraisals at Time 1 did not predict OC Looming at Time 2 ($\beta = 0.10, p = 0.281$). The structural equation model fit is the same as the measurement model fit by definition ($\chi^2[117] = 239.45, p = .000; \text{CMIN/DF} = 2.05; \text{TLI} = .92; \text{CFI} = .94; \text{RMSEA} = .077$). Modification indices indicated that there were no additional paths to add to the model that would improve model fit. The final model is presented in Figure 15. Based on this model, OC Looming and OC Beliefs and Appraisals appear to be relatively independent constructs as neither predicts changes in the other.
Discussion

The present study provides the first data on the direct contribution of OC looming subscales to specific OC symptom subtypes. In addition, this was the first study to examine the predictive contribution of OC looming to OC Symptoms using structural equation modeling (SEM). Previous studies have shown that the global looming makes a predictive contribution to future symptoms beyond tolerance of uncertainty and initial symptoms (Riskind, Tzur, Williams, Mann, & Shahar, 2007). The primary purpose of this study was to examine the hypothesis that disorder-specific OC looming, as measured by the OCD specific looming scales, underlies the onset and maintenance of obsessive-compulsive symptoms.

Specifically, it was hypothesized that the OC Loom would predict a latent factor made up of the six OC symptom subtypes. Our results were consistent with this hypothesis. In the first SEM model, we examined the contribution of the following latent predictors of OC symptom severity: OC Looming, LCS, OC Beliefs & Appraisals, and Distress. This model indicated that all latent predictor variables contributed to the prediction of OC Symptoms. Consistent with our hypotheses, the inclusion of OC Looming in this model allowed for the prediction of incremental variance in OC symptom severity beyond that which was explained by other latent variables. In this model, direct paths from OC Looming Hoarding to OCIR Hoarding and OC Looming
Order/Symmetry to OCI-IR Order were added to the model to improve model fit. These
direct paths indicate that OC Looming subtypes predict unique variance in the specific
related symptom subtypes beyond the common variance in OC Symptoms that is
predicted by the latent variable OC Loom. These results indicate that OC-specific
looming and OC-specific looming subtypes incrementally predict variance in OC
symptom severity beyond the effect of OC Beliefs & Appraisals, the cognitive constructs
traditionally included in cognitive models of OIR Order were added to the model to
improve model fit. These direct paths indicate that OC Looming subtypes predict unique
variance in the specific related symptom subtypes beyond the common variance in OC
Symptoms that is predicted by the latent variable OC Loom. These results indicate that
OC-specific looming and OC-specific looming subtypes incrementally predict variance in
OC symptom severity beyond the effect of OC Beliefs & Appraisals, the cognitive
constructs traditionally included in cognitive models of OCD.

The second SEM model examined the same latent predictors of OC symptom
severity, with the exception of LCS and included the direct paths from the OC Looming
manifest indicators to the corresponding OC Symptom manifest indicators. The final
structural model demonstrated that Obsessional Beliefs & Appraisals and Distress
significantly predicted higher levels of OC Symptoms. Once the direct paths from
specific OC Looming subscales to corresponding symptom subtypes were included the
path from the latent variable OC Loom to OC symptoms was no longer significant
however there was a trend towards significance. This finding does not indicate that OCD
looming is not incrementally predictive, but that after specifying specific paths between
OCD looming subscales and their corresponding OCD subscales, the latent factor of OCD looming did not independently predict the variance in the latent variable OC Symptoms. Consistent with our hypothesis that OC Looming subscales would significantly predict the corresponding symptom subtypes, the paths between Contamination Looming and OCIR Washing, Order/Symmetry Looming and OCIR Order, Hoarding Looming and OCIR Hoarding, and Looming Doubt and OCIR-Checking were significant. The path from Impulse Looming to OCIR Neutralizing was not significant and was removed from the final model. These direct paths revealed significant relationships between OC-specific looming measures related to order and symmetry, contamination, hoarding, and disgust and OC symptoms even after controlling for the effect of obsessional belief and appraisal measures (OBQ-44 & III) and measures of stress and depression (DASS-S & DASS-D).

The final hypothesis driven model was conducted to examine the contribution of the latent predictors of OC Loom and OC Beliefs & Appraisals to OC symptom severity. Consistent with the results from model 1, both latent variables were significantly related to OC symptom severity. In this model, direct paths from OC Looming Hoarding to OCIR Hoarding and OC Looming Order/Symmetry to OCIR Order were added to the model to improve model fit. These direct paths indicate that OC Looming subtypes predict unique variance in the specific related symptom subtypes beyond the common variance in OC Symptoms that is predicted by the latent variable OC Loom. These results indicate that OC-specific looming and OC-specific looming subtypes incrementally predict variance in OC symptom severity beyond the effect of OC Beliefs & Appraisals.
These significant findings linking OC-specific looming cognitive vulnerability to clinical symptom severity on the OCI-R extend the literature to date on cognitive vulnerabilities to anxiety. Previous studies have identified a relationship between the global looming cognitive vulnerability and OC related fears (contamination) and symptoms in non-clinical samples (Riskind, Abreu, et al., 1997; Riskind, Wheeler, et al., 1997; Williams, et al., 2005; Reardon & Williams, 2007). Riskind and Rector (2007) found that in a clinical patient sample OC-specific looming vulnerability (contamination and hoarding) contributed significant, incremental variance to the prediction of OC symptom severity beyond the contribution of obsessional beliefs and appraisals.

Current cognitive theories of OCD focus primarily on the role of distorted obsessional beliefs and exaggerated or catastrophic interpretations of intrusive thoughts as cognitive antecedents to the onset and maintenance of OC symptoms (Rachman, 1993; Rachman, 1997; Salkovskis, 1985; Salkovskis, 1999; Frost & Stekette, 2002; Clark, 2003; OCCWG, 1997, 2001, 2003, 2005). Although the research continues to support the relationship between these cognitive constructs and OC symptom severity, recent studies have found that a significant amount of the variance in OC symptom severity remains unaccounted for (Abramowitz et al., 2006; Abramowitz et al., 2007; Taylor, 2006). The purpose of this study is to add to the existing cognitive models in order to improve our understanding of the cognitive antecedents of OC symptoms and our predictive abilities. These findings that in a non-clinical population OC-specific looming vulnerability contributed significant, incremental variance to the prediction of OC symptom severity beyond the contribution of obsessional beliefs, obsessional appraisals, and stress and
depression indicate that it may be important to include looming in future cognitive models of OC Symptoms. These results indicate that, in a non-clinical population, individuals experience more OC symptoms severity as a function of their tendency to generate dynamic mental scenarios of OC related threat content which depict a rapidly escalating and approaching threat. It seems that the tendency to consistently appraise the temporal and spatial movement of future OC specific threat in a biased manner is an important addition to the existing cognitive models. These findings reinforce and complement the findings of Riskind and Rector (2007) with a small clinical sample of OCD patients.

An unexpected finding was that the global looming cognitive vulnerability was not consistently related to OC Symptom severity in the SEMs, despite its significant bivariate correlation, which was predicted by our hypotheses. In the first model, LCS was significantly related to OC Symptom severity, but the beta weight for this path was negative indicating that higher levels of LCS were related to lower OC symptom severity. When OC Looming was removed from the model (Model 5) and the role of LCS, OC Beliefs & Appraisals, and Distress as latent predictors of OC symptoms was examined, the path between LCS and OC Symptoms was not significant. While these findings were not expected, there may be several possible explanations for the inconsistent and unexpected relationship between LCS and OC symptoms severity. It is possible that OC Looming suppressed the effect of LCS on OC Symptom severity, however, if this was the case we would have expected to see an effect once OC Looming was removed from the model.
It is posited that this relationship may be due to the fact that this research was conducted with a non-clinical sample. Although previous research on the global looming cognitive vulnerability was conducted primarily with nonclinical samples, previous analyses have not controlled for OCD-Looming or OC Beliefs & Appraisals. The inclusion of these variables in the model may suppress the effect of LCS on OC Symptoms. These results may indicate that participants may experience proximal, OC specific looming, which has not developed into a global cognitive vulnerability (Riskind & Williams, 2006; Riskind, Williams, & Joiner, 2006). It has been posited that individuals may develop an overarching looming cognitive style after repeated exposure to certain antecedent conditions (Riskind, Williams, & Joiner, 2006). Some individuals may learn a proximal disorder specific or stimulus specific type of looming in which they interpret or generate scenarios of rapidly rising risk and threat for their specific fear (i.e. spiders or contamination) (Riskind, Williams, & Joiner, 2006).

Our exploratory analyses revealed that changes in OC Looming and OC Beliefs over time were significantly related to baseline levels of OC Looming and OC Beliefs, respectively. The paths between OC Looming at Time 1 and OC Beliefs at Time 2 and OC Beliefs at Time 1 and OC Looming at Time 2 were not significant. These results indicate that OC Looming and OCD Beliefs were independent of each other over time, that one was not an antecedent of the other.

Limitations

There are several limitations of this study that should be mentioned. First, this study relied solely on self-report measures to assess the latent variables included in this
study. It is possible that the common variance predicted by these measures influenced the results of the study. Second, the sample size in this study is small considering the number of latent and manifest variables included in the structural equation models. The small sample size limited the statistical power of our analyses and may have limited our ability to fully understand the relationships between these variables. In addition, this study was conducted with a college student population. It will be important to replicate these findings with a clinical population. Finally, the cross-sectional nature of this study limited our ability to determine directional relationships. It is recommended that future studies will examine the causal role of cognitive antecedents in the onset and maintenance of obsessive-compulsive symptoms by using a longitudinal design.
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*p < .05. **p < .001.
TABLE 2. Correlations Between OCD Looming Themes at Time 1 (T1) and Time 2 (T2)

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*p < .05. **p < .001.
**TABLE 4**  
Means, standard deviations, and intercorrelations between indicators of cognitive vulnerabilities and indicators of distress and OC symptom factors

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| Mean   | 29.67 | 28.20 | 147.55 | 841.73 | 21.57 | 24.64 | 21.80 | 26.29 | 69.41 | 14.52 | 9.49 | 2.39 | 2.50 | 3.37 | 4.10 | 3.10 | 2.01 |
| S.D.   | 8.10  | 7.96  | 43.57  | 593.14 | 9.18  | 9.06  | 9.26  | 9.66  | 26.36 | 10.22 | 10.02 | 2.60 | 2.56 | 2.89 | 3.02 | 2.61 | 2.50 |
| Skewness | -0.45 | -0.29 | 0.06  | 0.73  | 0.66  | 0.25  | 0.33  | 0.22  | 0.68  | 0.59  | 1.18  | 1.23  | 0.85  | 0.86  | 0.66  | 0.92 | 1.43 |
| Kurtosis | -0.08 | -0.08 | 0.14  | 0.12  | -0.14 | -0.56 | -0.83 | -0.76 | -0.03 | -0.22 | -0.59 | 1.09  | -1.15 | 0.30  | -0.15 | 0.50 | 1.82 |

All r's are significant at p<.05
TABLE 5. Partial Correlations with OCI-R Total Scores

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*p < .05. **p < .001.
Figure 1. Hypothesized Structural Equation Model 1: LCS, OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms
Figure 2. Hypothesized Structural Equation Model 2: OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms
Figure 3. Hypothesized SEM Model 3: OC Looming and OC Beliefs & Appraisals as predictors of OC Symptoms
Figure 4. Final Measurement Model 1: LCS, OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms
Figure 5. Final Structural Equation Model 1: LCS, OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms
Figure 6. Final Measurement Model 2: OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms
Figure 7. Final Structural Equation Model 2: OC Looming, OC Beliefs & Appraisals, and Distress as predictors of OC Symptoms
Figure 8. Final Measurement Model 3: OC Looming and OC Beliefs & Appraisals as predictors of OC Symptoms
Figure 9. Final Structural Equation Model 3: OC Looming and OC Beliefs & Appraisals as predictors of OC Symptoms
Figure 10. Final Measurement Model: OC Beliefs & Appraisals and Distress as Predictors of OC Symptoms
Figure 11. Final Structural Equation Model: OC Beliefs & Appraisals and Distress as Predictors of OC Symptoms
Figure 12. Final Measurement Model for LCS, OC Beliefs & Appraisals, and Distress as Predictors of OC Symptoms
Figure 13. Final SEM Model: LCS, OC Beliefs & Appraisals, and Distress as Predictors of OC Symptoms
Figure 14. Cross-Lagged Panel Analysis Measurement Model 2
References
References


Curriculum Vitae

Megan N. Scott graduated from Valhalla High School, El Cajon, California, in 1998. She received her Bachelor of Arts from the University of North Carolina at Chapel Hill in 2002. She was employed as a research assistant in Boston, Massachusetts for two years and received her Master of Arts in Psychology from George Mason University in 2004. She completed her clinical internship at Oregon Health & Science University in 2009.