THE ROLES OF COGNITIONS AND METACOGNITION IN PREDICTING OBSESSIVE COMPULSIVE SYMPTOMS

By

KOUN EUM

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This dissertation is dedicated to my parents, Rev. Dong Sung Eum and Soon Hee Park whose impacts on my life cannot be adequately described in words, and to Doyoung, Shinbee, and Jia, endless sources of happiness in my life
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ACKNOWLEDGMENTS</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>LIST OF TABLES</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>ABSTRACT</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>INTRODUCTION</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>REVIEW OF THE LITERATURE</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>The Cognitive Model of Obsessive Compulsive Disorder</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Obsessive Compulsive Disorder and Responsibility</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Obsessive Compulsive Disorder and Perfectionism</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>The Metacognitive Model of Obsessive Compulsive Disorder</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>A Mediation Effect of Metacognition between Trait Anxiety and Obsessive</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Compulsive Symptoms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Goals of the Present Study</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Hypotheses</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>METHODS</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Participants</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Measures</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Procedure</td>
<td>34</td>
</tr>
<tr>
<td>4</td>
<td>RESULTS</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Descriptive Statistics and Preliminary Analyses</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Hypotheses 1 and 2</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Hypothesis 3</td>
<td>39</td>
</tr>
<tr>
<td>5</td>
<td>DISCUSSION</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Implication for Practice</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Limitations and Future Directions</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Conclusion</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>APPENDIX</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>THE RESPONSIBILITY ATTITUDE SCALE</td>
<td>54</td>
</tr>
<tr>
<td>B</td>
<td>THE ALMOST PERFECT SCALE –REVISED</td>
<td>57</td>
</tr>
</tbody>
</table>
C INFORMED CONSENT ............................................................................................................. 58
LIST OF REFERENCES .................................................................................................................. 60
BIOGRAPHICAL SKETCH ............................................................................................................. 75
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-1</td>
<td>Means and Internal Consistency of Variables by Non-patients, Patients and Total Sample</td>
<td>41</td>
</tr>
<tr>
<td>4-2</td>
<td>Pearson Correlations between Variables</td>
<td>41</td>
</tr>
<tr>
<td>4-3</td>
<td>Summary of a Simultaneous Regression: O-C Symptoms Regressed on Responsibility, Maladaptive Perfectionism, and Metacognition.</td>
<td>41</td>
</tr>
<tr>
<td>4-4</td>
<td>Summary Statistics for the Final Equation with O-C symptoms as a Dependent Variable</td>
<td>42</td>
</tr>
</tbody>
</table>
Cognitions and metacognition have been identified as crucial predictors of compulsive (O-C) symptoms. Despite abundant research on the impacts of either on O-C symptoms, rarely have they been considered simultaneously in the literature.

The present study aimed to investigate the relative contributions of cognitions and metacognition in predicting O-C symptoms. Responsibility, maladaptive perfectionism and metacognition were examined among a total of 269 (females = 190) non-patient college students and OCD patients. The findings indicated that responsibility, maladaptive perfectionism, and metacognition accounted for 37% of the variance in O-C symptoms. When considered simultaneously, responsibility and metacognition were independent predictors of O-C symptoms but maladaptive perfectionism was no longer a significant predictor.

Another purpose of the present study was to examine a mediation effect of metacognition between trait anxiety and O-C symptoms. Consistent with the prediction, bootstrap analyses indicated that metacognition was a mediator (indirect effect = .16, 95% bias-corrected CI [.11, .20]).
CHAPTER 1
INTRODUCTION

Obsessive compulsive disorder (OCD) is an anxiety disorder that causes marked distress and impairment in daily function. It affects about 2.5% of population (American Psychiatric Association, 2000) and the fourth most common psychiatric disorder in the United States (Rasmussen & Eisen, 1998). Obsessions and compulsions are main characteristics of OCD. Obsessions refer to intrusive and unwanted thoughts, impulses, or images that a person recurrently experiences which result in anxiety or distress. Common themes of obsessions include fear of contamination, excessive doubting, obsessions on sex or aggression, pathological somatic concerns, and obsessions on symmetry (Rasmussen & Eisen, 1998). Compulsions are repetitive behaviors or mental acts that a person performs in efforts to neutralize, reduce, or prevent anxiety/distress from obsessions. Compulsions are excessive or have no realistic connection with neutralization or prevention efforts (Bebbington, 1998). Washing and cleaning, checking, and need to ask or confess are the most commonly observed compulsions (Rasmussen & Eisen, 1998).

The roles of beliefs have been recognized as critical factors in the development of OCD (Myers, Fisher, & Wells, 2009a, 2009b). Two lines of etiology models of OCD have developed based on this proposition: the cognitive and the metacognitive models. The cognitive models of OCD focus on beliefs that lead to dysfunctional appraisal of universally experienced intrusive thoughts. Intrusive thoughts are believed to be experienced by a majority of individuals (Rachman & de Silva, 1978). Researchers have reported that about 90% of non-clinical individuals reported experiencing unwanted intrusive thoughts (e.g., Freeston, Ladouceur, Thibodeau, & Gagnon, 1991;
Salkovskis, & Harrison, 1984; Sher, Martin, Raskin, & Perrigo, 1991). The contents of the intrusive thoughts do not differentiate individuals with and without OCD (Parkinson & Rachman, 1980; Salkovskis & Harrison, 1984). Intrusive thoughts are ignored when they are perceived to be useless or unimportant (Salkovskis & Freeston, 2001). They become clinical obsessions when they take on significance (Rachman, 1971, 1976a, 1976b). When intrusive thoughts are perceived as significant, they suggest a need for a reaction (Clark, 2004). In response, covert (e.g., attempts to avoid or suppress intrusive cognitions) or overt (e.g., neutralizing behaviors) reactions follow, which make intrusive thoughts salient and accessible. The more salience and accessibility intrusive thoughts gain, the more likely processing priority become. Beliefs are central in dysfunctional appraisals of intrusive thoughts. Cognitive models have proposed a variety of cognitive beliefs involved in dysfunctional appraisals of intrusive thoughts. Responsibility and perfectionism are cognitive features that have been reported to be highly associated with obsessive compulsive (O-C) symptoms (e.g., Frost, Martin, Lahart, & Rosenblate, 1990; Frost, Novara, & Rhéaume, 2002; Smári, J. & Hólsteinsson, 2001; Steketee, Frost, & Cohen, 1998).

Researchers have argued that excessive responsibility is a crucial cognitive component in pathological appraisals of intrusive thoughts (e.g., Salkovskis, 1989). OCD is developed when intrusive thoughts are associated with an inflated sense of responsibility. Persons with inflated responsibility tend to misinterpret that they are responsible for their mental activity (i.e., intrusive thoughts). They believe that having intrusive thoughts indicates that they are responsibility for the perceived harmful consequences that might occur as a result of having such thoughts (Salkovskis &
Responsibility bias is a characteristic of inflated responsibility in obsessional patients. They believe that any influence a person possesses over a negative outcome is equivalent to being responsibility for that outcome (Salkovskis & Wahl, 2003). Thus, they feel the responsibility for taking an action to prevent threatening consequences. Such perceived fearful consequences, in fact, are highly unlikely to happen or almost fictitious. Compulsive behaviors occur in order to reduce a sense of inflated responsibility and anxiety (O’Connor & Robillard, 1995).

Perfectionism has been believed to be associated with OCD since the early 1900s. Since Janet (1903; as cited in Pitman, 1987) identified perfectionism as a central component in his three stage theory of OCD, various conceptualizations of perfectionism have been posited for the perfectionism-OCD relationship. Perfectionism was conceptualized as beliefs in perfect solutions (Guidano & Liotti, 1983), a need for perfect certainty (Straus, 1948), perfect control over one’s behavior or environment (Mallinger, 1984; Mallinger & DeWyze, 1992; Salzman, 1979), and perfect performance or achievement (McFall & Wollersheim, 1979). The Obsessive Compulsive Cognitions Working Group (OCCWG, 1997) defined perfectionism in OCD as “the tendency to believe there is a perfect solution to every problem, that doing something perfectly (i.e., mistake free) is not only possible, but also necessary, and that even minor mistakes will have serious consequences” (p.678). The common theme of these different definitions of perfectionism in relation to OCD is “that perfectionism represents an attempt to avoid something unpleasant (i.e., criticism, disaster, uncertainty, or lack of control)” (Frost et al., 2002, p.92).
In the past few decades, research studies have reported that perfectionism is a multidimensional construct with both adaptive and maladaptive components. Adaptive perfectionism refers to a tendency to strive for excellence and set high performance standards without excessive self-criticism or emotional distress when the standards are not met. In contrast, maladaptive perfectionism is characterized as a tendency to set high performance standards and intolerance of failure to meet the standards (Bieling, Israeli, & Antony, 2004; Rice & Ashby, 2007; Suddarth & Slaney, 2001). In this recent multidimensional conceptualization of perfectionism, only maladaptive perfectionism has been reported to be associated with psychological distress including OCD (Hewitt & Flett, 1991; Rice & Pence, 2006).

Although the cognitive models of OCD emphasize particular themes of beliefs (e.g., responsibility, perfectionism) that lead to dysfunctional appraisals of intrusive thoughts, the metacognitive models of OCD focus on thinking about thinking and strategies used to control thought process (i.e., metacognition). The way individuals believe about thinking such as usefulness in threat monitoring, the importance of one’s own cognitive process, and a need to engage in coping strategies including worry and rumination determines emotions in response to intrusive thoughts (Flavell, 1979; Wells, 1997, 2009). Examples of metacognition are threat monitoring fixated on threats ("Focusing on danger will keep me safe"), a need to control thoughts ("Uncontrollable thoughts are a sign of madness"), worry that focuses on potential dangers ("Worrying helps me to avoid problems in the future"), and rumination that often does not have a clear answer ("Why me?") (Wells, 2009). Beliefs about rituals, another type of metacognition, refers to beliefs in a need to perform rituals or neutralizing behaviors and
reflects the idea that one cannot attain a peace of mind without performing rituals (e.g., “Something important will be forgotten without rituals”) (Solem, Myers, Fisher, Vogel, & Wells, 2010).

In the metacognitive models of OCD, interpretations of intrusive thoughts are determined by individual’s beliefs about the meaning and/or negative consequences of having the thoughts (Wells, 1997). Upon a negative appraisal of intrusive thoughts, negative emotional responses are produced. Then, metacognitive beliefs about rituals guide coping responses to emotional distress stemmed from the negative appraisal and develop compulsions.

A considerable body of research has supported that each of responsibility, perfectionism, and metacognition is linked to O-C symptoms (e.g., Janeck, Calamari, Riemann, & Heffelfinger, 2003; Smári & Hólmsteinsson, 2001). However, such support mostly came from examination of the relationship between only one of these three predictor variables and O-C symptoms (e.g., responsibility and O-C symptoms). Few studies examined the inter-relations of cognitions and metacognition in predicting O-C symptoms. Initial findings from these studies indicated that only metacognition is a significant predictor of O-C symptoms (Emmelkmp & Aardema, 1999; Myers et al., 2008, 2009a, 2009b). However, more studies are needed to confirm these findings.

The overall purpose of the present study is to investigate the roles of cognitions and metacognition in predicting O-C symptoms. Specifically, the relative contributions of responsibility and perfectionism, two cognitive variables that have long been supported as central factors in O-C symptoms, and metacognition are explored. Consistent with a
recent conceptualization of perfectionism as a multidimensional construct, the present study examines maladaptive form of perfectionism.

The current study also aims to explore a mediating role of metacognition in the trait anxiety and O-C symptom relationship. With a non-patient Turkish sample, Irak and Tosun (2008) reported that metacognition partially mediated the relationship between trait anxiety and O-C symptoms. This is the only published study that explored a mediation effect of metacognition between trait anxiety and O-C symptoms. In Irak and Tosun, O-C symptoms were assessed using a measure that mostly focuses on obsessional thoughts (Myers & Wells, 2005). More studies are needed to confirm this initial finding and advance previous research (i.e., Irak & Tosun) by addressing this limitation. The present study aims to explore a mediation effect of metacognition with a broader sample (a mixed sample of non-patients and patients) in U.S. using a more comprehensive measure of O-C symptoms.

Chapter 2 will summarize relevant literature and present the overall goals of the present study with specific hypotheses. Chapter 3 will describe study methodology. Chapter 4 will report the results. Finally, Chapter 5 will discuss the implications, limitations, and suggestions for future studies.
The Cognitive Model of Obsessive Compulsive Disorder

The cognitive aspects of OCD have been investigated since 1970s. Carr’s threat appraisal model (1974) is one of the earliest cognitive models of OCD. In this model, overestimation of the probability of a threatening event and its potential harm escalate the normal range of obsessions into clinical obsessions. Then, compulsions develop as a way to reduce the perceived probability of the occurrence or the negative consequences of the undesirable event. McFall and Wollersheim (1979) expanded Carr’s threat appraisal model and posited the primary and the secondary appraisal processes. The primary faulty appraisal is a process in which an individual overestimates the probability of threats. A secondary faulty appraisal is vulnerability appraisals in which an individual underestimates one’s ability to cope with the threats. The elevated subjective estimation of the likelihood of threats and the perceived inability to deal with threatening events result in feelings of uncertainty and loss of control. In this model, a person employs magical rituals and strategies because of perceived inability to handle this distress in a realistic way. Finally, Rachman (1971, 1976a, 1976b) also contributed to early cognitive models of OCD. He insisted that people with OCD overestimate the importance of intrusive thoughts commonly experienced by everyone and attempt to neutralize them with “amendatory, neutralizing, reparative, corrective, preventive, or restorative” efforts (1976a, p. 439). In his view, neutralization prevents intrusive thoughts from being disconfirmed, which, in turn, strengthens the obsessions.

Contemporary cognitive models have asserted various cognitive factors are associated with development and maintenance of OCD. Despite heterogeneity of each
model, faulty appraisals and beliefs and subsequent strategies to control intrusive thoughts, images, or impulses (i.e., compulsions) are main components across cognitive models of OCD (Clark, 2004). It is faulty appraisals on the mental intrusion that escalate natural intrusive thoughts, images, or impulses into clinical obsessions. In response to clinical obsessions, compulsions are conducted in order to control the obsessions or to reduce anticipated negative consequences of the obsessions. However, the compulsions relieve distress only temporarily and eventually make the mental intrusions salient. In the end, the cycle of obsessions and compulsions become more strengthened and frequent (Clark, 2004).

The OCCWG (1997), an international collaborative group of OCD experts identified six major faulty beliefs involved in OCD: 1) inflated responsibility, 2) over-importance of thoughts, 3) overestimation of threat, 4) importance of controlling thoughts, 5) intolerance of uncertainty, and 6) perfectionism. The present study focuses on the role of inflated responsibility and perfectionism in obsessive compulsive (O-C) symptoms, two constructs that have been consistently reported to be highly relevant to O-C symptoms (Clark, 2004; OCCWG, 2003).

**Obsessive Compulsive Disorder and Responsibility**

Responsibility, defined as “the belief that one has power which is pivotal to bring about or prevent subjectively crucial negative outcomes” (Salkovskis, Shafran, Rachman, & Freeston, 1999, p. 40), is a central and the most extensively studied construct in cognitive models of OCD (Clark, 2004; Yorulmaz, Karanci, & Tekok-Kılıç, 2006). Consistent with the theoretical perspective of the cognitive models of OCD, Salkovskis (1985) suggested that intrusive cognitions per se are emotionally neutral. The way cognitions are interpreted determines their significance (e.g., positive,
negative, or neutral significance) leading to different courses of actions. It is argued that the inflated responsibility appraisals of intrusive cognitions or the perceived negative outcomes of them assign negative significance to the intrusive thoughts. Once intrusive cognitions acquire negative significance, they are followed by controlling behaviors (e.g., excessive hand washing, suppressing intrusive thoughts) with an intention to reduce a sense of perceived responsibility. Such efforts eventually develop clinical obsessions by making intrusive cognitions salient and readily recognizable.

Researchers have argued that inflated responsibility for preventing feared consequences is particularly linked to OCD (Salkovskis, 1985; Salkovskis & Wahl, 2003). Along with that, persons with OCD are more concerned with what one failed to do than what one did in preventing harm (Salkovskis, 1985). Responsibility characteristics of OCD include the belief that one needs to foresee possible harms and take preventive actions related to intrusive cognitions (Salkovskis & Kirk, 1997; Salkovskis, Richard, & Forrester, 1995). Failing to act to prevent harmful consequences (e.g., forgetting to check that one locked the door) is perceived as a choice of the person. Thus, negative consequences or harms are believed to be caused by one’s choice (Salkovskis & Forrester, 2002). An inflated sense of responsibility is based on the assumption that if one has any influence on possible harm, one is responsible for a negative outcome (Salkovskis & Forrester, 2002).

A considerable body of research reveals an association between inflated responsibility appraisal and OCD in non-clinical (Myers & Wells, 2005; Rhéaume, Freeston, Dugas, Letarte, & Ladouceur, 1995; Smári & Hólmsteinsson, 2001; Wilson & Chambless, 1999) and clinical samples (OCCWG, 2001; OCCWG, 2003). Compared to
a matched control group, patients with OCD were more likely to endorse beliefs about responsibility (Freeston, Ladouceur, Gagnon, & Thibodeau, 1993). Further, experimental studies investigated causal impacts of responsibility on O-C symptoms. Lopatka and Rachman (1995) reported that decreasing perceived levels of responsibility reduced some O-C symptoms such as perceived distress, urge to check, and estimated harms and criticism among OCD patients with checking or cleaning compulsions. However, increasing responsibility did not significantly increase O-C symptoms. Finally, an experimental study indicated that OCD patients in a high responsibility condition experienced more O-C-like subjective experiences and checking behaviors compared to non-OCD anxiety control, non-patients, and OCD patients in a low responsibility condition (Arntz, Voncken, & Goosen, 2007). Together, researchers have consistently indicated that inflated perceived responsibility elicits O-C symptoms of checking behaviors. However, the effects of responsibility on other forms of compulsions (e.g., cleaning compulsions) has not yet been explored much and therefore warrant further investigation.

**Obsessive Compulsive Disorder and Perfectionism**

Perfectionism has been considered to be a crucial cognitive factor in the development of OCD (e.g., Guidano & Liotti, 1983; McFall & Wollersheim, 1979; Straus, 1948). In their cognitive model of OCD, McFall and Wollersheim (1979) stated that individuals with OCD tend to overestimate the costs of the occurrence of the perceived threatening events and underestimate their ability to cope with the aversive events. They argued that perfectionism is associated with the exaggerated perception of the negative outcomes of a perceived threat. They discussed that perfectionistic beliefs related to the development of OCD are: “(1) one should be perfectly competent,
adequate, and achieving in all possible respects in order to be worthwhile and to avoid
criticism or disapproval by others/oneself and (2) making mistakes or failing to live up to
one’s perfectionistic ideals should result in punishment or condemnation” (p.355).
Following the overestimation of threats, the secondary appraisal process begins where
persons with OCD perceive that they are not able to cope with the threats in an adaptive
way. As a result, they experience feelings of uncertainty, loss of control, and anxiety.
Compulsive behaviors develop in an effort to reduce emotional distress and regain a
sense of certainty and control.

Guidano and Liotti (1983) suggested that perfectionism played a prominent role
in the development of OCD. In line with other cognitive models of OCD, they argued
that dysfunctional beliefs lead to the development and maintenance of OCD. Their
cognitive model of OCD theorized three core beliefs underlying OCD: (1) perfectionism
(beliefs in perfection in reality), (2) strong beliefs in absolutely correct solutions, and (3)
a need for certainty. The first two of these core beliefs pertain to perfectionism.
Specifically, individuals with OCD tend to ruminate over mistakes and refuse any
solution that is not perfect. They view an imperfect solution that was implemented as a
failure. Devaluation or underestimation of their ability to adequately cope with
threatening events results in emotional distress. Further, they tend to employ avoidance
(achieved through compulsive behaviors) as a main coping strategy due to perceived
absence of adequate ability to handle threatening events.

Empirical findings have consistently supported a positive relationship between
perfectionism and O-C symptoms in both clinical and non-clinical samples. Persons with
sub-clinical O-C symptoms were more perfectionistic than those without O-C symptoms
on the Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990) (Frost, Steketee, Cohn, & Griess, 1994). Among college students, higher levels of perfectionism measured by the FMPS and the Perfectionism Cognitions Inventory (PCI: Flett, Hewitt, Blankstein, & Gray, 1998) were positively related to higher levels of O-C symptoms (Ferrari, 1995; Rhéaume et al., 1995) and compulsive checking (Gershuny & Sher, 1995). The composite scores of the Self-Oriented and Other Oriented Perfectionism on the Hewitt and Flett Multidimensional Perfectionism Scale (HFMPS; Hewitt & Flett, 1991) were positively related to subclinical compulsive checking and cleaning O-C symptoms (Wade, Kyrios, & Jackson, 1998). In clinical samples, patients with OCD scored higher on the Obsessive Beliefs Questionnaire (OBQ; OCCWG, 2001) than non-patients, although their scores were not significantly higher than anxious controls (OCCWG, 2001). In addition, in a sample of 126 patients with OCD, Julien, O'Connor, Aardema, and Todorov (2006) found that perfectionism predicted checking and precision scores on the revised version of the OBQ (OBQ-44; OCCWG, 2005).

An emerging issue is the multidimensional nature of perfectionism. Although perfectionism was once perceived as a one-dimensional and negative construct (Barrow & Moore, 1983, Burns, 1980, Hollender, 1965, Sorotzkin, 1985), perfectionism has emerged as a multidimensional construct in the past few decades. In particular, two fundamental dimensions have been widely supported. One type of perfectionism is non-deleterious or benign. Although the terms vary, ‘normal’ (Hamachek, 1978), ‘adaptive’ (Slaney, Rice, & Ashby, 2002), ‘healthy’ (Parker, 1997), and ‘positive’ (Slade & Owens, 1998) perfectionism are commonly characterized as striving for excellence and setting high standards of performance with tolerance of failure to meet the standards. In
contrast, their counterpart, ‘neurotic’ (Hamachek, 1978), ‘maladaptive’ (Slaney et al., 2002), ‘unhealthy’ (Parker, 1997), and ‘negative’ (Slade & Owens, 1998) perfectionism refer to a detrimental form of perfectionism represented by a tendency to set high personal standards with excessive negative self-criticism when one’s standards are not met (Frost et al., 1990). Only the neurotic/maladaptive/unhealthy/negative type of perfectionism is deleterious to psychological well-being linking to anxiety, depression, or eating disorders (Alden, Bieling, & Wallace, 1994; Dunkley, Blankstein, Masheb, & Grilo, 2006; Rice, Ashby, & Slaney, 1998).

In line with the conceptualization of multidimensional perfectionism, only certain dimensions of perfectionism have consistently demonstrated an association with O-C symptoms. The majority of the findings supportive of a perfectionism and O-C symptoms link are limited to the Concern Over Mistakes (COM) and the Doubts about Actions (DA) scales of the FMPS or the Socially Prescribed Perfectionism (SPP) scale of the HFMPS, all of which reflect maladaptive characteristics of perfectionism (Flett & Hewitt, 2005). The FMPS consists of six dimensions of perfectionism: COM (“negative reactions to mistakes, a tendency to interpret mistakes as equivalent to failure, and a tendency to believe that one will lose the respect of others following failure”) (Frost et al., 1990, p.453), DA, Personal Standard (PS), Parental Expectations (PE), parental Criticism (PC), and Organization (O). Empirical studies have consistently reported that COM and/or DA are positively related with compulsive checking (Frost et al., 1990; Frost et al., 1994), hoarding (Frost & Gross, 1993), and compulsive indecisiveness (Frost & Shows, 1993; Gayton, Cavin, Clavin, & Broida, 1994) among non-patients with overall O-C symptoms and among patients with OCD (Norman, Davies, Nicholson,
Additionally, patients with OCD indicated higher levels of COM and DA than non-patients, although COM or DA did not distinguish between patients with OCD and those with other anxiety disorders (Antony, Purdon, Huta, & Swinson, 1998; Frost & Steketee, 1997). The HMPS measures three types of perfectionism: SPP, Self-Oriented Perfectionism (SOP), and Other Oriented Perfectionism. Antony and colleagues found that individuals with subclinical O-C symptoms indicated higher levels of SPP, “the perception that others have unrealistic perfectionistic standards for oneself” (Hewitt, Flett, Turnbal-Donovan, & Mikail, 1991, p.273-274), than those without O-C symptoms (Antony et al., 1998).

With few exceptions (e.g. Rice & Pence, 2006), previous empirical findings supporting an association between perfectionism (as a multidimensional construct) and O-C symptoms used either the FMPS or the HMPS. However, important limitations of the FMPS and the HMPS are noted. First, the DA scale of the FMPS was directly derived from a measure of O-C symptoms (the Maudsley Obsessional Compulsive Inventory; MOCI; Hodgson, & Rachman, 1977). Therefore, the items of the DA scale are O-C symptoms rather than perfectionism. It is likely that the reported association between DA and O-C symptoms result from the identical constructs of the items of the FMPS and the MOCI (Shafran & Mansell, 2001). Second, it is important to note that the SPP of the HMPS should be considered as a predictor of, or consequence of perfectionism, rather than perfectionism per se. Shafran and Mansell (2001) argued that “people who score highly on this scale are unlikely to regard themselves as perfectionists unless their perception leads them to impose inflexible high standards on themselves” (p. 887). Finally, the dimensions of perfectionism of the HMPS do not tap
into the growing conceptualization of non-deleterious/benign versus deleterious perfectionism. For instance, the SOP scale on the HMPS is called an “ambivalent form of perfectionism” (Stoeber, Feast, & Hayward, 2009, p. 425) with both non-deleterious and debilitating impacts.

In response to aforementioned limitations, Rice and Pence (2006) examined the relationship between perfectionism and O-C symptoms using the Almost Perfect Scale-Revised (APS-R; Slaney, Rice, Mobley, Trippi, & Ashby, 2001). The APS-R contains three dimensions of perfectionism: a tendency to set high expectations on and standards for one’s performance/achievement (Standards), self-critical aspects of perfectionism in response to perceived discrepancy between one’s standards and performance (Discrepancy), and preference for organization (Order). On the APS-R, Standards without elevations on Discrepancy measures non-deleterious/benign perfectionism (adaptive perfectionism) and Discrepancy itself assesses deleterious perfectionism (maladaptive perfectionism). Using college students, Rice and Pence (2006) reported that maladaptive perfectionism, as measured by the Discrepancy scale, predicted overall obsessions and checking and washing compulsions. Further, an interaction effect was found that persons with high levels of maladaptive perfectionism (Discrepancy) and low levels of adaptive perfectionism (Standards) were more likely to experience compulsive washing than others. This is in line with Braver (1996) in which high levels of maladaptive perfectionism and low levels of adaptive perfectionism were positively related with O-C symptoms. Due to its relatively recent introduction into the OCD research, the APR-S needs more replication and extension to clinical populations.
The Metacognitive Model of Obsessive Compulsive Disorder

Metacognition is beliefs and knowledge about thinking and the ability to monitor or regulate one’s cognitive process (Flavell, 1979). The metacognitive model of OCD (Wells, 1997, 2000) assumes that beliefs about thinking (i.e., metacognition) are the center of OCD and focuses on how one thinks about or believes one’s intrusive thoughts. Individuals with OCD perceive intrusive thoughts negatively based on their beliefs about the importance of such thoughts. The negative appraisal of intrusive thoughts becomes persistent by neutralizing rituals (Wells & Cartwright-Hatton, 2004)

Wells asserted that the appraisals of intrusive thoughts are impacted by two domains of metacognition: (1) beliefs about the significance of thoughts/feelings, and (2) beliefs about the need to control thoughts or to carry out rituals. The first domain is called fusion beliefs and consists of three types of thought-fusion. First, thought-event fusion (TEF) indicates the belief that having a thought will cause an event to happen or the belief that having a thought implies that an event has already happened. Second, thought-action fusion (TAF) refers to the belief that an occurrence of a thought will uncontrollably lead one to conduct unwanted actions. Finally, thought-object fusion (TOF) is the belief that thoughts and feelings can be passed into objects and these objects can transfer the unwanted thoughts into other objects or people. The second domain of metacognition concerns the need to engage in compulsions. This domain reflects the belief that one needs to control thoughts, feelings, or behaviors and to keep specific states of mind or body in order to attenuate negative consequences associated with unwanted thoughts.

In the metacognitive model, the first domain of metacognitive beliefs (TEF, TAF, TOF) assigns over-importance to intrusive thoughts and appraises the intrusion as
threats. The negative appraisals in turn activate intensified negative emotional responses such as guilt, anger, or extreme anxiety. Negative appraisals of intrusive thoughts activate the second domain of metacognition, the belief about rituals, and lead to the implementation of compulsions. Like cognitive models of OCD, compulsions are fundamental to the maintenance of O-C symptoms because they prevent an opportunity to disconfirm one’s dysfunctional metacognitive beliefs, reinforcing the idea that they are important and meaningful (Wells, 2009).

Studies have supported the relationships between metacognition and OCD. Metacognition as measured by the Metacognitions Questionnaire-30 (MCQ-30; Wells & Cartwright-Hatton, 2004) was positively associated with O-C symptoms (Hermans, Martens, De Cort, Pieters, & Elen, 2003; Wells & Papageorgious, 1998). Emmelkamp and Ardema (1999) reported that TEF was positively related with obsessions on washing and checking in a community sample. Further, using MCQ-65 (Cartwright-Hatton & Wells, 1997), the original instrument of the MCQ-30, Cartwright-Hatton and Wells (1997) found that the two subscales of the MCQ-65 (the Negative Beliefs about Uncontrollability of Thoughts and Danger of Worry and the Negative Beliefs about the Thoughts in General) differentiated patients with OCD from people with other anxiety disorders and non-patients. Similarly, cognitive self-consciousness, a tendency to reflect one’s thought process, distinguished between OCD patients and those with other anxiety disorders (Janeck et al., 2003). Finally, in an experimental manipulation of metacognition study, patients with OCD reported reduced levels of anxiety and urges to neutralize after behavior experiments to challenge metacognition (Fisher & Wells, 2005a).
Some researchers assert that metacognition is central to O-C symptoms while cognitions are by-products of metacognition (e.g., Wells, 1997). Studies supportive of this proposition indicate that the contribution of cognitive variables becomes non-significant when metacognition is concurrently considered. When metacognition was controlled for, responsibility and/or perfectionism were no longer significant predictors of O-C symptoms (Gwilliam, Wells, & Cartwright-Hatton, 2004; Myers et al., 2008, 2009a, 2009b; Myers & Wells, 2005). The debate on the relative importance of metacognition and cognitions is ongoing because there exits relatively small amount of research that examined cognitions and metacognition concurrently. The present study examined whether cognitions or metacognition is central to O-C symptoms.

**A Mediation Effect of Metacognition between Trait Anxiety and Obsessive Compulsive Symptoms**

Anxiety plays a central role in OCD because O-C symptoms are provoked by and developed in efforts to diminish anxiety. In their study of the relationship between worry, O-C symptoms, and metacognition, Wells and Papageorigiou (1998) reported a mediation effect of metacognition between worry and O-C symptoms indicating that O-C symptoms may not be directly caused by anxiety per se. Irak and Tosun (2008) extended Wells and Papageorgiou (1998) by testing a mediation model of metacognition. They reported an intermediary role of metacognition between trait anxiety and O-C symptoms in a Turkish non-patient sample. When metacognition was considered, the beta coefficient between trait anxiety and OCD symptoms significantly dropped from $\beta = .45$ to $\beta = .30$, indicating mediation effect of metacognition. This is the only published study to-date that examined mediating effect of metacognition between trait anxiety and O-C symptoms. One limitation of this study is that O-C symptoms were
measured by the MOCI. Although the MOCI has been widely used as a measure of O-C symptoms (Frost, Steketee, Krause, & Trepanier, 1995), it is designed to assess obsessional thoughts rather than compulsive behaviors (Myers & Wells, 2005). One purpose of the present study is to explore whether this mediation effect exists with a sample in the U.S sample using a measure that detect the presence of both obsessions and compulsions and that “covers all different subtypes of OCD” (Solem, Håland, Vogel, Hansen, & Wells, 2009, p. 305).

Goals of the Present Study

As discussed above, empirical support existed for contribution of inflated responsibility, perfectionism, and metacognition in O-C symptoms. However, the inter-relationship between these three constructs in O-C symptoms is not well understood. Findings that the cognitive variables (responsibility, perfectionism) became non-significant once metacognition was controlled in O-C symptoms (e.g., Myers et al., 2008, 2009a, 2009b) provide warrant for more studies examining the inter-relations among these variables in O-C symptoms. In addition, to my knowledge, impacts maladaptive perfectionism as measured by the Discrepancy subscale of the APS-R, which is a more empirically clear form of maladaptive form of perfectionism, on O-C symptoms were examined only with non-clinical samples. The main goal of the present study is to examine the impacts of responsibility, perfectionism (measured by the Discrepancy scale), and metacognition on O-C symptoms with a more comprehensive sample (i.e., a mixed sample of patients and non-patients).

Another goal of the present study is to examine whether metacognition mediates the relationship between trait anxiety and O-C symptoms. Despite the significant amount of research studies on bivariate relationships between different types of anxiety
and O-C symptoms (e.g., Wheaton, Mahaffey, Timpano, Berman, & Abramowitz, 2012), and metacognition and O-C symptoms, no research has been conducted on the mediation role of metacognition between anxiety and O-C symptoms with a U.S. population sample. The present study intends to explore an intermediary role of metacognition between trait anxiety and O-C symptoms reported by Irak and Tosun (2008) with a U.S. population sample. A mediating role of metacognition may refine treatment approaches that primarily focus on anxiety reduction (e.g., exposure with response prevention).

**Hypotheses**

1. Responsibility, maladaptive perfectionism, and metacognition will explain significant variance in O-C symptoms.

2. Only metacognition will be a significant predictor of O-C symptoms when responsibility, maladaptive perfectionism, and metacognition are considered simultaneously.

3. Metacognition will mediate the relationship between trait anxiety and O-C symptoms. Specifically, there will be a significant indirect effect from trait anxiety through metacognition to O-C symptoms.
CHAPTER 3
METHODS

Participants

Researchers have reported that O-C symptoms lie on a continuum and exist in both non-clinical and clinical populations (Rachman & de Silva, 1978; Woods, Tolin, & Abramowitz, 2004). Therefore, this study included non-patients and patients in order to obtain a comprehensive understanding of O-C symptoms (Frost et al., 1995).

A total of 269 non-patients college students ($N = 213, 79\%$) and patient volunteers ($N = 56, 21\%$) participated in the study. Females comprised 70\% of the sample ($N = 190$). The majority of the participants were White ($N = 181, 67\%$), followed by Hispanic/Latino(a) ($N = 57, 21\%$), Asian ($N = 21, 7\%$), and African American ($N = 18, 6\%$). The mean age of the participants was 22.48 years ($SD = 7.49$).

Measures

*Responsibility Attitude Scale* (RAS; Salkovskis et al., 2000; see Appendix A). The RAS is a 26-item self-report measure that examines the general attitude about responsibility. Participants respond to the items using a 7-point Likert-type scale from 1 (*totally agree*) to 7 (*totally disagree*). The mean score (total sum of all items divided by 26) is used for the total RAS scores. The RAS has demonstrated excellent internal reliability with Cronbach’s alpha of .92 in a mixed sample of OCD patients and non-patients (Salkovskis et al., 2000) and of .95 in a non-patient sample (Pleva & Wade, 2002). Two week test-retest reliability was .94 in a mixed sample of OCD patients and non-patients (Salkovskis et al., 2000). Salkovskis et al. (2000) reported adequate criterion and concurrent validity. Patients with OCD scored higher than non-patients on the RAS. The concurrent validity with obsessionality measures was $r = .57$ with the
MOCI and $r = .54$ with the Obsessive Compulsive Inventory (Foa, Kozak, Salkovskis, Coles & Amir, 1998) in a sample of patients and non-patients.

*Almost Perfect Scale-Revised* (APS-R; Slaney, Rice, Mobley, Trippi, & Ashby, 2001; see Appendix B). The APS-R is a 23-item self-report measure designed to measure levels of perfectionism. The APS-R consists of three subscales: Standards (a tendency to set high standards for one’s performance), Discrepancy (perceived distress when one fails to meet a personal standard), and Order (a need for orderliness). The participants rate their agreement with the items using a 7 points scale from 1 (*strongly disagree*) through 7 (*strongly agree*). The APS-R has demonstrated good convergent validity with other perfectionism measures and concurrent validity with measures associated with perfectionism (e.g., depression, anxiety) in non-patient samples (Rice & Ashby, 2007). Internal consistency for the three subscales was in the .85-.92 ranges (Slaney et al., 2001) and the three-week test-retest reliability ranged from .72 to .83 (Grzegorek, Slanye, Franze, & Rice, 2004) in non-patient samples. In this study, the entire APS-R was administered, but only the Discrepancy subscale was used as an indicator for maladaptive perfectionism.

*Metacognitions Questionnaire-30* (MCQ-30; Wells & Cartwright-Hatton, 2004; see Appendix C). The MCQ-30 is composed of 30 items that measure metacognitive beliefs about thinking and monitoring tendencies. The MCQ-30 consists of five subscales: (1) Positive Beliefs about Worry (POS), (2) Negative Beliefs about Uncontrollability and Danger of Worry (NEG), (3) Cognitive Confidence (CC; confidence in attention and memory), (4) Need to Control Thoughts (NC), and (5) Cognitive Self-Consciousness (CSC; a tendency to focus attention on thought processes). Participants
rate their agreement with the items using a 4-point scale from 1 (do not agree) through 4 (agree very much). The sum of all items is the total metacognition score. The MCQ-30 has demonstrated good internal reliability (α = .72 - .93) and convergent validity with pathological worry and O-C symptoms in a non-patient sample (Wells & Cartwright-Hatton, 2004). In clinical samples, internal reliability was α = .90 (Solem et al., 2009). The MCQ-30 distinguished OCD patients from those with panic disorder or social phobia (Wells, 2006).

The State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Luschene, Vagg, & Jacobs, 1970). The STAI is a self-report measure of state and trait anxiety. It consists of two separate 20-item subscales. The first 20 items (STAIS) assess state anxiety (how an individual is currently feeling) and the last 20 items (STAIT) measure trait anxiety (how an individual generally feels). Participants rate their agreement with the items using a 4-point scale from 1 (almost never) through 4 (almost always). Scores on the STAI have demonstrated excellent reliability and validity. In their meta-analysis of 53 published studies, Barnes et al. (2002) reported that the average internal consistency for state and trait anxiety were α = .91 and α = .89, respectively. The average test-retest reliability was r = .70 for state anxiety and r = .88 for trait anxiety. The STAIT subscale demonstrated adequate concurrent validity with other anxiety measures, r = .73 with the Anxiety Scale Questionnaire and r = .85 with the Manifest Anxiety Scales in a mixed sample of college students and patients with psychological disorders (Spielberger, Reheiser, Ritterband, Sydeman, & Unger, 1995). In this study, the entire STAI was administered, but only the STAIT subscale was used as an indicator for severity of trait anxiety.
The Yale-Brown Obsessive-Compulsive Scale (Y-BOCS; Goodman et al., 1989):
The Y-BOCS is a 10 item semi structured measure assessing the severity of obsessions (item 1-5) and compulsions (item 6-10) in terms of frequency, control, resistance, interference, and distress. The therapist administers and rates the severity of each item on a five-point Likert scale from 0 (none) to 4 (extreme or severe), with higher scores indicating greater symptom severity. The total OCD severity score is derived by summing all 10 items scores. The Y-BOCS is the "gold standard" (Steketee, 1994) for assessing OCD severity with reliability, validity, and the considerable normative data (Clark, 2004; Taylor, 1995). In clinical samples, the interrater reliability ranged from .76 to .97 (Goodman et al., 1989; Nakagawa, Marks, Takei, de Araujo, & Ito, 1996; Woody, Steketee, & Chambless, 1995) and internal consistency was in the acceptable to good ranges (α = .69 - .91) (Goodman et al., 1989; Richter, Cox, & Direnfeld, 1994; Taylor, 1995; Woody et al., 1995). Both the convergent validity with most of other OCD measures (mean r = .51) and criterion validity (i.e., differentiating OCD from other anxiety disorders) were well supported (Taylor, 1995).

The Yale-Brown Obsessive Compulsive Scale - Self-Report (Y-BOCS-SR; Baer, 1991). The Y-BOCS-SR measures obsessions and compulsions in non-patients. On the first section of the Y-BOCS-SR, the participants are asked to indicate presence or absence of obsessions and compulsions they have on a checklist. Then, for both obsessions and compulsions they indicated, they rate the severity of obsessions (item 1-5) and compulsions (item 6-10) in terms of frequency, control, resistance, interference, and distress using a five-point Likert scale from 0 (none) to 4 (extreme or severe). The total O-C symptom severity score is derived by summing all 10 items.
scores. The Y-BOCS-SR has good test-retest reliability in a non-patient sample (α = .88) and internal consistency in both non-patient (α = .89) and patient (α = .78) samples (Steketee, Chambless, Tran, & Worden, 1996; Steketee, Frost, & Bogart, 1996). There is a strong correlation between scores derived from the Y-BOCS and the Y-BOCS-SR in non-patient (r = .75) and patient (r = .79) samples (Steketee, Frost et al., 1996; Woody et al., 1995).

_Demographics Questionnaire_. Participants completed a demographics questionnaire assessing age, gender, and racial/ethnic background.

**Procedure**

The study was approved by the University of Florida Institutional Review Board (IRB). Non-patients were college students recruited through undergraduate psychology courses at a major university located in the southeast region of the U.S. Data were collected online using Qualtrics (https://ufpsychology.qualtrics.com). The participants were presented with a consent form which described the purpose of the study, voluntary participation, confidentiality of responses, and contact information of the researcher (see Appendix D). Upon electronic endorsement of the consent form, the RAS, the APR-S, the MCQ-30, the STAI, the Y-BOCS-SR, and the demographic questionnaire were administered in random orders. Following the completion of the questionnaires, a debriefing statement was provided. Patients were recruited from an OCD treatment clinic at an outpatient clinic in the southeast region of the U.S. Before the intake interview, an informed consent form that included description of the study, voluntary participation, confidentiality of responses, and contact information of the researcher was provided. After they signed the consent form, the patient volunteers filled out the RAS, the APR-S, the MCQ-30, the STAI, and the demographic questionnaire. Therapists
(doctoral students or clinical/counseling psychologists) at the OCD treatment clinic who were blinded to this study administered the Y-BOCS during the intake interview. For both patient and non-patient volunteers, the questionnaires were completed anonymously (except the Y-BOCS) and confidentiality was insured.
CHAPTER 4
RESULTS

Descriptive Statistics and Preliminary Analyses

Analyses were conducted using IBM SPSS 20.0 (2011). Regression requires that independent variables have a linear relationship with a dependent variable. Visual examination of the scatterplot of standardized residuals indicated that each of independent variables (responsibility, maladaptive perfectionism, metacognition, trait anxiety) has a linear relationship with dependent variable (O-C symptoms). Collinearity statistics were within acceptable ranges. Tolerance ranged from .57 to .59 and VIF ranged from 1.66 to 1.75. Tolerance values less than .02 and VIFs greater than 10.0 indicate multicollinearity problem (Bowerman & O’Connell, 1990). In order to determine whether the residuals are independent of each other, a Durbin Watson test was conducted. A Durbin Watson statistics from 1.50 to 2.50 are considered an acceptable range. In this model, a Durbin Watson statistics was 2.22. Regression also requires that residuals are normally distributed. Both z-skewness and z-kurtosis of the residual distribution were less than 3.29, satisfying the normality assumption. Finally, visual inspection of the scatterplot of standardized residuals revealed that variance around the regression line was not the same for all the values of the predicted values, indicating that the homoscedasticity assumption was violated. A logarithm transformation was used with maladaptive perfectionism, metacognition, and trait anxiety to address homoscedasticity.

To address missing data, multiple imputation (MI) was utilized. Multiple imputation provides parameter estimates and standard errors based on several imputed data sets. This approach first creates several complete imputed data sets by replacing
missing values with estimates predicated from a probability model (e.g., a multivariate normal distribution) or a regression equation (Fox-Wasylyshyn & El-Masri, 2005; Schafer & Olsen, 1998). Then, analyses are conducted on each of imputed data sets. The final parameter estimates (aka “pooled” parameter estimates) are calculated by averaging parameter estimates across imputed data sets. Significance testing is made using the final standard errors of the parameter estimates that considered both the standard errors in each data set and the dispersion of parameter estimates across data sets (McCleary, 2002; Schlomer, Bauman, & Card, 2010). Multiple imputation is “one of the best options in handling missing data” (Schlomer et al., 2010, p. 5) because of its accurate estimations of parameter estimates and standard errors.

Following recommendations from Allison (2003), five imputed datasets were used to address missing data. Then a logarithm transformation was used. All analyses were completed with transformed scores and again with raw scores. There were no substantive differences in the results between the two sets of analyses and therefore, raw scores were reported here because they are easier to interpret.¹

Means, standard deviations, and internal consistency reliability coefficients calculated for total participants as well as by patient status (i.e., patients, non-patients) are provided in Table 4-1. For all of the variables of interest, patients scored significantly higher than non-patients, *ps < .001.*²

¹ Results with transformed scores are available upon request.

² Subsequent regression and mediation analyses were conducted with and without controlling patient status. No substantive differences in the results were found between the two sets of analyses.
All of the scores of the participants as a whole in this study had excellent internal consistency, with Cronbach’s coefficients alpha higher than .90. When examined by patient status, Cronbach’s coefficients alpha was around .70 and .80 for non-patients and patients, respectively. Cronbach’s coefficients alpha for maladaptive perfectionism, metacognition, and O-C symptoms were consistent with those found in past research (e.g., Goodman et al., 1989; Salkovskis et al., 2000; Wells & Cartwright-Hatton, 2004). For responsibility and trait anxiety, Cronbach’s coefficients alpha were slightly higher than those in other studies (e.g., Barnes et al., 2002; Rice & Pence, 2006). Table 4-2 displayed Pearson correlation coefficients for the variables of interest. The effect sizes were in the large range (Cohen, 1992). Consistent with the cognitive and the metacognitive models of O-C symptoms, there was a significant positive correlation between all of the variables (ps < .001). Tabachnick and Fidell (2007) reported that a multicollinearity problem occurs when a bivariate correlation is equal to or greater than .90. Together with the collinearity statistics (i.e., tolerance values and VIFs), the current findings did not suggest a presence of multicollinearity problems.

**Hypotheses 1 and 2**

Hypothesis 1 predicted that responsibility, maladaptive perfectionism, and metacognition would explain significant variance in O-C symptoms. In order to examine contributions of the independent variables in predicting O-C symptoms, simultaneous regression analysis was conducted. The results were summarized in Table 4-3. O-C symptoms were regressed on responsibility, maladaptive perfectionism, and metacognition. The independent variables were significantly associated with O-C symptoms. The pooled estimates for $R^2$ across the imputed data sets ranged .35 to .42, $ps < .001$. On average, responsibility, maladaptive perfectionism, and metacognition
accounted for 37% of the variance in O-C symptoms, $p < .001$. Thus, hypothesis 1 was supported.

Hypothesis 2 predicted that only metacognition would be a significant predictor of O-C symptoms when responsibility, maladaptive perfectionism, and metacognition were considered simultaneously. Regression analysis revealed that responsibility ($B = 1.19, SE_B = .48, p < .05$) and metacognition ($B = .18, SE_B = .03, p < .001$) were significant predictors. However, maladaptive perfectionism did not account for unique variance in O-C symptoms ($B = .02, SE_B = .03, p = .46$) (see Table 4-4). Hypothesis 2 was partially supported.

**Hypothesis 3**

Hypothesis 3 involved testing the indirect effect of trait anxiety to O-C symptoms through metacognition. Bootstrap analysis was used to test the indirect effect. As discussed in Preacher and Hayes (2004), the sampling distribution of the indirect effect is often not symmetrical and usually positively skewed. Bootstrapping is a preferred method to test a mediation effect by many researchers (e.g., Bollen & Stine, 1990; Shrout & Bolger, 2002) because it does not require a normality assumption in the sampling distribution and has greater statistical power (Mallinckrodt, Abraham, Wei, & Russell, 2006; Preacher & Hayes, 2008).

Based on an original sample, a bootstrap analysis generates multiple samples with replacement. The indirect effect, $ab$ ($a$: a path from an independent variable to a presumed mediator, $b$: a path from a presumed mediator to a dependent variable), and

---

3 An exploratory analysis was conducted where O-C symptoms were regressed on responsibility, perfectionism, and the subscales of the MCQ. Together with responsibility, the NEG and the NC subscales emerged as significant predictors, $B = .40, SE = .10, p < .01$, $B = .35, SE = .13, p < .05$, respectively. No other meaningful differences in the results were found compared to the original analysis.
its respective confidence interval are calculated in each sample. Then, the point estimate of $ab$ (the mean of $ab$ calculated over multiple samples) and the confidence interval for population value of $ab$ are computed. If the confidence interval (CI) does not contain zero, the null hypothesis that the true indirect effect is zero is rejected (Hayes, 2009).

Using Preacher and Hayes’ (2008) SPSS macro for bootstrapping, 1000 bootstrapped samples were created for each imputed data set. Then, the average indirect effect of bootstrapped samples across imputed data sets was calculated. The average indirect effect was .16. None of the 95% bias-corrected confidence intervals across imputed data sets included zero and the average confidence interval was .11 to .20. Thus, hypothesis 3 was supported.

An exploratory analysis was conducted to further identify the subscales of the MCQ-30 associated with indirect effects. A bootstrapping analysis for multiple mediators was conducted using the five subscales of the MCQ-30 as presumed mediators. The NEG and the NC subscales consistently emerged as significant mediators in all of imputed data sets. The average indirect effect of the NEG and the NC across imputed data sets was .12 with 95% bias-corrected CI [.05, .19] and .07 with 95% bias-corrected CI [.03, .12], respectively.
Table 4-1. Means and Internal Consistency of Variables by Non-patients, Patients and Total Sample

<table>
<thead>
<tr>
<th></th>
<th>Responsibility</th>
<th>Maladaptive Perfectionism</th>
<th>Metacognition</th>
<th>Trait Anxiety</th>
<th>O-C Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-patients</td>
<td>M 3.65</td>
<td>44.35</td>
<td>58.40</td>
<td>40.81</td>
<td>15.73</td>
</tr>
<tr>
<td>(N= 213)</td>
<td>SD 1.14</td>
<td>18.72</td>
<td>16.15</td>
<td>11.72</td>
<td>6.41</td>
</tr>
<tr>
<td></td>
<td>a .73</td>
<td>.73</td>
<td>.74</td>
<td>.74</td>
<td>.74</td>
</tr>
<tr>
<td>Patients</td>
<td>M 4.45</td>
<td>57.80</td>
<td>73.88</td>
<td>59.53</td>
<td>20.57</td>
</tr>
<tr>
<td>(N= 54)</td>
<td>SD 1.30</td>
<td>17.82</td>
<td>16.81</td>
<td>12.61</td>
<td>9.25</td>
</tr>
<tr>
<td></td>
<td>a .80</td>
<td>.81</td>
<td>.80</td>
<td>.82</td>
<td>.81</td>
</tr>
<tr>
<td>Total</td>
<td>M 3.81</td>
<td>47.07</td>
<td>61.53</td>
<td>44.60</td>
<td>16.71</td>
</tr>
<tr>
<td>(N = 267)</td>
<td>SD 1.21</td>
<td>16.07</td>
<td>17.40</td>
<td>14.07</td>
<td>7.32</td>
</tr>
<tr>
<td></td>
<td>a .95</td>
<td>.91</td>
<td>.93</td>
<td>.95</td>
<td>.91</td>
</tr>
</tbody>
</table>

Pooled means were reported. Standard deviations and Cronbach’s coefficients alpha were calculated by averaging standard deviations and alphas across imputed data sets.

Table 4-2. Pearson Correlations between Variables

<table>
<thead>
<tr>
<th></th>
<th>Responsibility</th>
<th>Maladaptive Perfectionism</th>
<th>Metacognition</th>
<th>Trait Anxiety</th>
<th>O-C Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Perfectionism</td>
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<td></td>
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<td></td>
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<tr>
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<td>.57</td>
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<td>.67</td>
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<td>O-C Symptoms</td>
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<td>.41</td>
<td>.58</td>
<td>.49</td>
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</tr>
</tbody>
</table>

N = 267. Pooled correlation coefficients were reported. All correlations were significant at the .001 level (2 tailed).

Table 4-3. Summary of a Simultaneous Regression: O-C Symptoms Regressed on Responsibility, Maladaptive Perfectionism, and Metacognition.

<table>
<thead>
<tr>
<th>Imputation</th>
<th>R</th>
<th>R²</th>
<th>F (3,263)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.60</td>
<td>.36</td>
<td>49.35</td>
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</tr>
<tr>
<td>2</td>
<td>.60</td>
<td>.35</td>
<td>48.07</td>
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</tr>
<tr>
<td>3</td>
<td>.59</td>
<td>.35</td>
<td>46.23</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>4</td>
<td>.65</td>
<td>.42</td>
<td>63.95</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>5</td>
<td>.60</td>
<td>.36</td>
<td>49.44</td>
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</tr>
</tbody>
</table>
Table 4-4. Summary Statistics for the Final Equation with O-C symptoms as a Dependent Variable.

<table>
<thead>
<tr>
<th>Imputation</th>
<th>Individual Variables in the Final Regression Equation</th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>.19</td>
<td>&lt; .01</td>
</tr>
<tr>
<td></td>
<td>Maladaptive Perfectionism</td>
<td>.04</td>
<td>.02</td>
<td>.11</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>Metacognition</td>
<td>.16</td>
<td>.03</td>
<td>.39</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2</td>
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<td>.15</td>
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<td>.02</td>
<td>.04</td>
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</tr>
<tr>
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<td>.03</td>
<td>.47</td>
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<tr>
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<td>.17</td>
<td>&lt;.05</td>
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<tr>
<td></td>
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<td>.02</td>
<td>.01</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>Metacognition</td>
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<td>.03</td>
<td>.46</td>
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<td>.26</td>
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<td>.02</td>
<td>.04</td>
<td>n.s.</td>
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<tr>
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<td>Metacognition</td>
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<td>.03</td>
<td>.44</td>
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</tr>
<tr>
<td>5</td>
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<td>.40</td>
<td>.21</td>
<td>&lt;.05</td>
</tr>
<tr>
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<td>.03</td>
<td>.09</td>
<td>n.s.</td>
</tr>
<tr>
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<td>Metacognition</td>
<td>.16</td>
<td>.03</td>
<td>.38</td>
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<tr>
<td>Pooled</td>
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<td>.48</td>
<td>-</td>
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<td>.18</td>
<td>.03</td>
<td>-</td>
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</table>

$N = 266$. 
The overall purpose of the present study was to investigate the roles of cognitions and metacognition in predicting O-C symptoms. Responsibility and perfectionism, two of the most widely supported cognitive factors of O-C symptoms (OCCWG, 2003), and metacognition were investigated. In particular, in line with the up-to-date conceptualization of perfectionism, a maladaptive form of perfectionism was examined using a measure of perfectionism (the APS-R) that improved the weaknesses of other measures of perfectionism commonly used in studies of the perfectionism and O-C symptom relationship.

Correlation analyses were conducted to explore the inter-relations of variables of interest. Consistent with findings in other studies and the propositions of the cognitive and the metacognitive models of OCD, all variables were positively associated with each other. The magnitudes of correlations were in the large range. The large effect sizes of correlation coefficients were generally consistent with findings in the few existing studies (Myers et al., 2008, 2009a, 2009b) that examined all of the variables of interest (i.e., responsibility, perfectionism, metacognition, O-C symptoms). Previous studies that examined correlations between some of our variables of interest reported large effect sizes, for instance, between responsibility and perfectionism ($r = .65$, Jeffery, 2007), metacognition ($r = .57$, Myers & Wells, 2005), or O-C symptoms ($r = .54$, Calleo, Hart, Björgvinsson, & Stanley, 2010; $r = .44$, Rhéaume et al., 1995), and between O-C symptoms and perfectionism ($r = .53$, Rhéaume et al., 1995; $r = .45$, Wu & Cortesi, 2009) or metacognition($r = .46$, Irak & Tosun, 2008; $r = .53$, Wells & Cartwright-Hatton, 2004).
One primary goal of the current study was to address the scarcity of research studies on the relative contributions of cognitions and metacognition to O-C symptoms. Responsibility, maladaptive perfectionism, and metacognition were simultaneously examined in predicting O-C symptoms. Results of regression analyses were generally consistent with previous findings but also diverged in important ways from past research.

In the present study, about 37% of the variance in O-C symptoms could be attributed to responsibility, maladaptive perfectionism, and metacognition. This is in line with the general agreement that beliefs play a critical role in the development and persistence of O-C symptoms (e.g., Abramowitz, Khandker, Nelson, Deacon, & Rygwall, 2006; Coles & Horng, 2006; Salkovskis, 1985; Wells, 1997; Wells & Matthews, 1994; Wells & Purdon, 1999). In terms of the relative contributions of cognitions and metacognition to O-C symptoms, however, the results of the current study were different from findings in other studies. Studies that examined both cognitions and metacognition in predicting O-C symptoms have reported that cognitive factors were no longer unique predictors of O-C symptoms when simultaneously considered with metacognition (e.g., Myers et al., 2008, 2009a, 2009b). Although the average beta coefficient of metacognition across imputed data sets ($\beta = .43$) was about twice the size of the effect for responsibility ($\beta = .20$), responsibility was a significant predictor of O-C symptoms in the present study. It is important to note that research studies on the relative contributions of responsibility, perfectionism, and metacognition is in its infancy, and therefore, robust findings have not yet been established. To my knowledge, there exist only four studies that
investigated the relative contributions of the three constructs (i.e., responsibility, perfectionism, metacognition) and all of these studies examined non-patients (Myers et al., 2008, 2009a, 2009b; Emmelkamp & Aardema, 1999). The results of the present study confirmed a central role of metacognition, a relatively new construct in the OCD literature, in O-C symptoms, but also added new information to findings in the previous studies.

The present findings of independent roles of responsibility and metacognition may reflect a proposition that an aspect of metacognition, thought-action-fusion (TAF), might be intertwined with responsibility. Salkovskis and Forrester (2002) asserted that TAF is a form of responsibility. Further, they argued that responsibility is closely linked to some metacognitive beliefs, all of which form a single construct: “Thus, an inflated sense of responsibility, the over-importance of thoughts and beliefs about the importance of controlling one’s thought are so closely linked as to tap a single construct linked to the idea of causing harm through things that one does, things that one does not do or by things that one thinks or does not think” (p. 59). In sum, this view suggests that there is a single construct of responsibility and metacognition. Other researchers, in contrast, argued that TAF is distinct from responsibility (Shafran, Thordarson, & Rachman, 1996). Still others reported that responsibility contributes to and also is a product of TAF (Rachman, 1997). So far, this debate is inconclusive. A clearer delineation of the construct of responsibility will be necessary (Berle & Starcevic, 2005), which could possibly lead to different results in determining the relative contributions of cognitions and metacognition to O-C symptoms. To address potential overlap with metacognition, the current findings that support a unique role of responsibility in
predicting O-C symptoms may need to be confirmed by future studies that concurrently consider the impact of TAF. The Thought-Action Fusion scale of the Thought Fusion Instrument (Wells, Gwilliam, & Cartwright-Hatton, 2001) is specifically designed to assess TAF. Future studies, for instance, may include the TAF scale and examine if responsibility remains as a significant predictor after TAF is controlled.

In the present study, perfectionism did not emerge as a unique predictor of O-C symptoms when concurrently considered with responsibility and metacognition. One explanation can be derived from the overall proposition of the cognitive models of OCD. Contrary to the premise of the metacognitive models where beliefs are irrespective of specific domains of O-C symptoms (Emmelkamp & Aardema, 1999), the cognitive models have taken a content specificity perspective (Beck, 1976). That is, specific thoughts underlie dysfunctional appraisals of intrusive thoughts, and, in turn, are related to specific domains of O-C symptoms (e.g., washing compulsion) (Taylor, Abramowitz, Mckay, & Cuttler, 2002). Along with this premise, efforts have been made to identify specific beliefs and corresponding particular subtypes of O-C symptoms associated with the specific beliefs (e.g., Sookman, Abramowitz, Calamari, Wilhelm, & McKay, 2005; Wilhelm & Steketee, 2006). Indeed, previous studies supportive of an association between perfectionism and O-C symptoms have reported a link to a specific type of O-C symptoms while also reporting an absence of a significant relationship with a different subtype of O-C symptoms. For instance, Ferrari (1995) reported that perfectionism was related to compulsive checking but not to compulsive washing. The current finding of a non-significant relationship between perfectionism and O-C symptoms could either support that perfectionism is no longer an independent predictor when simultaneously
considered with metacognition or imply that the perfectionism and O-C symptom link might be better detected in specific types of O-C symptoms rather than global O-C symptoms.

An alternative explanation is that perfectionism may be a predisposition to psychopathology in general (Emmelkamp & Aardema, 1999), rather than a unique predictor for O-C symptoms. Some researchers have argued that perfectionism may not be specifically related to O-C symptoms because it does not distinguish O-C symptoms from other psychopathology (Antony et al., 1998; Emmelkamp & Aardema, 1999). For instance, perfectionism has been found to be also associated with other types of anxiety disorders such as social phobia (Juster, Heimberg, Frost, Holt, Mattia, & Facenda, 1996) and panic disorder (Antony et al., 1998; Forst & Steketee, 1997), eating disorders (Bastiani, Rao, Weltzin, & Kaye, 1995), depression (Hewitt & Flett, 1991), and performance anxiety (Mor, Day, Flett, & Hewitt, 1995). Perfectionism seems to be a “necessary but insufficient trait” (Yorulmaz et al., 2006, p. 323) for O-C symptoms.

Another purpose of the present study was to explore a mediation effect of metacognition between trait anxiety and O-C symptoms. The results supported a mediation model of metacognition between trait anxiety and O-C symptoms such that higher levels of trait anxiety are related to higher levels of metacognition, which, in turn, are associated with more O-C symptoms. This finding suggests that modifying metacognition will decrease O-C symptoms. This is consistent with Solem et al. (2009) that changes in metacognition predicted symptom reduction at post-treatment among OCD patients. Additional results of this study indicated that only specific types of metacognition, negative beliefs about uncontrollability and danger of worry, and need to
control thoughts, mediated the relationship between trait anxiety and O-C symptoms. This agreed with Wells' view (1997, 2000) that beliefs about uncontrollability and danger, and need for control are “markers of the meta-cognitive beliefs” (Irak & Tosun, 2008, p.1323).

**Implication for Practice**

The findings of the present study provide important clinical implications. The first-line psychological treatment of choice for OCD is exposure with response prevention (ERP) (Clark, 2000), a behaviorally based intervention. ERP has demonstrated high treatment efficacy with success rates as high as 80% (Foa, Franklin, & Kozak, 1998; Stanley & Turner, 1995). However, several limitations to ERP have been raised. Stanley and Turner (1995) reported that treatment refusal or premature termination rates were about 20%-30%. When these rates were considered, the average success rate for ERP reduced to 63%. In addition, previous OCD patients continue to report higher levels of O-C symptoms than non-patients even after completion of ERP (Abramowitz, 1998). Another shortcoming is that ERP is less likely to be effective with compulsive hoarding (Frost, Steketee, & Greene, 2003) or obsessive ruminations without covert rituals (Salkovskis & Westbrook, 1989).

In response to these limitations, researchers have asserted that cognitive interventions need to be added to ERP (Clark, 2000). Although therapists usually address erroneous beliefs in ERP treatment (Clark, 2000), the findings of the present study suggest that therapists specifically target inflated responsibility and metacognitive beliefs. Cognitive therapy (CT) that targeted inflated responsibility significantly reduced O-C symptoms (McLean et al., 2001) and cognitive biases related to threat appraisals among OCD patients (Barrett & Healy-Farrell, 2003). Wells (1997, 2009) outlined
metacognitive therapy (MCT) for OCD where beliefs about intrusive thoughts and rituals are explicitly identified, targeted, and modified. Preliminary outcomes of treatment efficacy studies indicated that MCT is as good as ERP alone (e.g., Fisher, & Wells, 2005b). Along with Wells (1997, 2009), the results of the mediation analyses in the current study suggest that therapists might focus on the patient’s beliefs about danger and worry, and the importance of thought control. Combined with ERP, CT and MCT might augment treatment outcomes. Further, although the general consensus is that CT or MCT should be used in addition to, not in place of, ERP (Clark, 2000), CT or MCT appears to be particularly useful for ERP refusers or drop-outs.

In addition, the present study that confirmed contributions of beliefs to O-C symptoms suggests that different forms of treatment might be an option beyond ERP which is a therapist-guided and individually delivered therapy. For instance, it is possible that group psychotherapy that focuses on contents of dysfunctional thoughts (e.g., responsibility) or thought process may result in treatment gains. Some researchers reported that group psychotherapy targeting inflated responsibility (Barrett & Healy-Farrell, 2003) or metacognition (Rees & van Koesveld, 2008) reduced O-C symptoms among OCD patients. Although more research studies are needed to confirm these preliminary findings, group therapy might be an attractive treatment avenue. Group therapy increases accessibility to treatment in a more timely manner (Anderson & Rees, 2007), saves costs (approximately $600 for each patient) (Himle, van Etten, & Fischer, 2003), and offers additional benefits such as peer modeling, peer support, and the experience of universality (Yalom & Leszcz, 2005).
Limitations and Future Directions

Findings from this study should be considered in light of several limitations. Although the present study addressed that most of the previous studies on O-C symptoms have been conducted with non-patient samples, the sample of this study may differ from general population because most of the participants resided in the southeast region of the U.S, were White and educated (i.e., college students) young adults, and/or economically advantaged who could afford ERP. Therefore, one should be cautious in generalizing the findings of this study. Future studies may recruit diverse participants in terms of racial/ethnic, economical, and educational backgrounds. In addition, future studies might enhance generalizability by using diverse recruitment methods. For instance, implementing a snowball technique, recruiting participants through the OCD foundation listserv, using multi-site data collection, and inclusion of community population may yield more broadly representative samples.

Another limitation is that the design of the present study does not permit conclusions regarding causal relations between variables. For example, O-C symptoms might contribute to the development of inflated responsibility and metacognition, and not vice versa. Findings in other studies (e.g., Myers et al., 2009b; Solem et al., 2009) demonstrated that metacognition caused O-C symptoms, that this causal relationship is unidirectional, and a causal role of responsibility for certain types of O-C symptoms was also plausible (Berle, 2007; Lopatka & Rachman, 1995). Future studies using experimental designs would strengthen causality inferences suggested in the present study.

With the exception of the Y-BOCS, the measures used in the present study are self-report questionnaires. Self-report methods are one of the most commonly used
methods to assess personality traits (e.g., Vazire, 2006) because they are practical and efficient in terms of time and money and allow access to information that others may not be aware of (Paulhus & Vazire, 2007). However, some weaknesses of self-report methods are that they are susceptible to response biases affected by social desirability (Paulhus, 1991) or inaccurate self-perceptions (McDonald, 2008). In their comparison of self-report and interview methods in assessing borderline personality disorder symptoms, Hopwood et al. (2008) reported that self-report methods better assess experiential symptoms (e.g., identity disturbance) while interview methods are more effective in assessing behavioral, observable symptoms. Future research might include a social desirability measure, add significant-other reports, and assess O-C symptoms using an interview method.

The present study extended the literature on the relative contributions of cognitions and metacognition to O-C symptoms. Perfectionism was assessed using the APS-R, a measure that does not possess problems addressed in other perfectionism measures in the literature. Also, to my knowledge, the present study is the only study on this topic that included OCD patients. Due to the scarcity of research on this topic, replication with different study designs (e.g., an experimental design) or with different measures of the variables of interest is necessary.

In addition, exploring the relative contributions of changes in cognitions and metacognition to O-C symptom improvement might be a reasonable next step. To my knowledge, there is only one study (Solem et al., 2009) that explored contributions of changes in responsibility, perfectionism, and metacognition to treatment outcomes. In Solem et al. (2009), findings indicated that only change in metacognition was a
significant predictor for O-C symptom reduction after ERP. However, as the authors discussed, responsibility and perfectionism were measured by the subscales of the OBQ-44 and more detailed measures of responsibility and perfectionism could result in different findings. In line with the current study, Solem et al. might be replicated with the RAS and the APS-R.

Findings in the present study suggest that it is worthwhile to examine treatment efficacy of cognitive intervention approaches that specifically target inflated responsibility and metacognition in addition to ERP. Further, future studies might also examine whether the cognitive interventions could be an effective substitute for EPR for patients who refused or dropped out from ERP.

**Conclusion**

In conclusion, the present study explored the roles of cognitions and metacognition in O-C symptoms. Specifically, the relative contributions of responsibility, maladaptive perfectionism, and metacognition to O-C symptoms were examined with a mixed sample of college students and OCD patients. In addition, an intermediary role of metacognition between trait anxiety and O-C symptoms was investigated. Results suggest that responsibility and metacognition were independent, significant predictors of O-C symptoms with metacognition being a more powerful predictor than responsibility. The results also support a mediating role of metacognition in the trait anxiety and O-C symptom relationship. This study extended literature and provided important clinical insights. In particular, findings in the present study suggest that some of the weaknesses of the commonly practiced treatment (i.e., ERP) could be complemented by cognitive intervention approaches. Future studies that replicate and extend the current study with more sophisticated study designs, representative samples, and
enhanced measures will strengthen our understanding in the roles of cognitive and metacognitive factors in the development and maintenance of O-C symptoms and offer directions for advanced treatment approaches.
APPENDIX A
THE RESPONSIBILITY ATTITUDE SCALE

This questionnaire lists different attitudes or beliefs which people sometimes hold. Read each statement carefully and decide how much you agree or disagree with it. For each of the attitudes, show your answer by putting a circle around the words which best describe how you think. Be sure to choose only one answer for each attitude. Because people are different, there is no right answer or wrong answer to these statements. To decide whether a given attitude is typical of your way of looking at things, simply keep in mind what you are like most of the time.

1. I often feel responsible for things which go wrong.
   Totally Disagree Disagree Neutral Agree Agree Totally Agreedisagree
   Disagree Very Slightly Slightly Very Much Agree
   Much

2. If I don’t act when I can foresee danger, then I am to blame for any consequences if it happens.
   Totally Disagree Disagree Neutral Agree Agree Totally Agreedisagree
   Disagree Very Slightly Slightly Very Much Agree
   Much

3. I am too sensitive to feeling responsible for things going wrong.
   Totally Disagree Disagree Neutral Agree Agree Totally Agreedisagree
   Disagree Very Slightly Slightly Very Much Agree
   Much

4. If I think bad things, this is as bad as doing bad things.
   Totally Disagree Disagree Neutral Agree Agree Totally Agreedisagree
   Disagree Very Slightly Slightly Very Much Agree
   Much

5. I worry a great deal about the effects of things which I do or don’t do.
   Totally Disagree Disagree Neutral Agree Agree Totally Agreedisagree
   Disagree Very Slightly Slightly Very Much Agree
   Much

6. To me, not acting to prevent disaster is as bad as making disaster happen.
   Totally Disagree Disagree Neutral Agree Agree Totally Agreedisagree
   Disagree Very Slightly Slightly Very Much Agree
   Much

7. If I know that harm is possible, I should always try to prevent it, however unlikely it seems.
   Totally Disagree Disagree Neutral Agree Agree Totally Agreedisagree
   Disagree Very Slightly Slightly Very Much Agree
   Much

8. I must always think through the consequences of even the smallest actions.
   Totally Disagree Disagree Neutral Agree Agree Totally Agreedisagree
   Disagree Very Slightly Slightly Very Much Agree
   Much
9. I often take responsibility for things which other people don’t think are my fault.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
<th>Very</th>
<th>Much</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>Very</td>
<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>Much</td>
<td>Slightly</td>
<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
</tr>
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</table>

10. Everything I do can cause serious problems.

<table>
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<tr>
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<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
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<th>Much</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
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<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>Much</td>
<td>Slightly</td>
<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
</tr>
</tbody>
</table>

11. I am often close to causing harm.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
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<th>Much</th>
<th>Agree</th>
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<tbody>
<tr>
<td>Disagree</td>
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<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
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<td>Slightly</td>
<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
</tr>
</tbody>
</table>

12. I must protect others from harm.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
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<th>Much</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>Very</td>
<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>Much</td>
<td>Slightly</td>
<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
</tr>
</tbody>
</table>

13. I should never causes even the slightest harm to others.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
<th>Very</th>
<th>Much</th>
<th>Agree</th>
</tr>
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<tbody>
<tr>
<td>Disagree</td>
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<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
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</tr>
<tr>
<td>Disagree</td>
<td>Much</td>
<td>Slightly</td>
<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
</tr>
</tbody>
</table>

14. I will be condemned for my actions.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
<th>Very</th>
<th>Much</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
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<td>Agree</td>
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<td>Totally</td>
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<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
</tr>
</tbody>
</table>

15. If I can have even a slight influence on things going wrong, then I must act to prevent it.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
<th>Very</th>
<th>Much</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
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<td></td>
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<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
</tr>
</tbody>
</table>

16. To me, not acting where disaster is a slight possibility is as bad as making that disaster happen.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
<th>Very</th>
<th>Much</th>
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<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
</tr>
</tbody>
</table>

17. For me, even slight carelessness is inexcusable when it might affect other people.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
<th>Very</th>
<th>Much</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
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</tr>
</tbody>
</table>

18. In all kinds of daily situations, my inactivity can cause as much harm as deliberate bad intentions.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Slightly</th>
<th>Agree</th>
<th>Slightly</th>
<th>Very</th>
<th>Much</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
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<td>Neutral</td>
<td>Agree</td>
<td>Agree</td>
<td>Totally</td>
<td></td>
</tr>
</tbody>
</table>
19. Even if harm is a very unlikely possibility, I should always try to prevent it at any cost.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Very</th>
<th>Slightly</th>
<th>Neutral</th>
<th>Agree</th>
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<td>Very</td>
<td>Agree</td>
<td>Totally</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>

20. Once I think it is possible that I have caused harm, I can’t forgive myself.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Very</th>
<th>Slightly</th>
<th>Neutral</th>
<th>Agree</th>
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<td>Agree</td>
<td>Totally</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>

21. Many of my past actions have been intended to prevent harm to others.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Very</th>
<th>Slightly</th>
<th>Neutral</th>
<th>Agree</th>
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<td>Very</td>
<td>Agree</td>
<td>Totally</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>

22. I have to make sure other people are protected from all of the consequences of things I do.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Very</th>
<th>Slightly</th>
<th>Neutral</th>
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<td>Very</td>
<td>Agree</td>
<td>Totally</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>

23. Other people should not rely on my judgment.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Very</th>
<th>Slightly</th>
<th>Neutral</th>
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<td>Very</td>
<td>Agree</td>
<td>Totally</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>

24. If I cannot be certain I am blameless, I feel that I am to blame.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Very</th>
<th>Slightly</th>
<th>Neutral</th>
<th>Agree</th>
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<td>Totally</td>
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</tr>
</tbody>
</table>

25. If I take sufficient care then I can prevent any harmful accidents.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Very</th>
<th>Slightly</th>
<th>Neutral</th>
<th>Agree</th>
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<td>Very</td>
<td>Agree</td>
<td>Totally</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>

26. I often think that bad things will happen if I am not careful enough.

<table>
<thead>
<tr>
<th>Totally</th>
<th>Disagree</th>
<th>Very</th>
<th>Slightly</th>
<th>Neutral</th>
<th>Agree</th>
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</table>
APPENDIX B
THE ALMOST PERFECT SCALE –REVISED

The following items are designed to measure certain attitudes people have toward themselves, their performance, and toward others. It is important that your answers be true and accurate for you. In the space next to the statement, please enter a number from "1" (strongly disagree) to "7" (strongly agree) to describe your degree of agreement with each item.

<table>
<thead>
<tr>
<th>STRONGLY DISAGREE</th>
<th>DISAGREE</th>
<th>SLIGHTLY DISAGREE</th>
<th>NEUTRAL</th>
<th>SLIGHTLY AGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

_____ 1. I have high standards for my performance at work or at school.
_____ 2. I am an orderly person.
_____ 3. I often feel frustrated because I can’t meet my goals.
_____ 4. Neatness is important to me.
_____ 5. If you don’t expect much out of yourself you will never succeed.
_____ 6. My best just never seems to be good enough for me.
_____ 7. I think things should be put away in their place.
_____ 8. I have high expectations for myself.
_____ 9. I rarely live up to my high standards.
_____ 10. I like to always be organized and disciplined.
_____ 11. Doing my best never seems to be enough.
_____ 12. I set very high standards for myself.
_____ 13. I am never satisfied with my accomplishments.
_____ 15. I often worry about not measuring up to my own expectations.
_____ 16. My performance rarely measures up to my standards.
_____ 17. I am not satisfied even when I know I have done my best.
_____ 18. I am seldom able to meet my own high standards for performance.
_____ 19. I try to do my best at everything I do.
_____ 20. I am hardly ever satisfied with my performance.
_____ 21. I hardly ever feel that what I’ve done is good enough.
_____ 22. I have a strong need to strive for excellence.
_____ 23. I often feel disappointment after completing a task because I know I could have done better.
APPENDIX C
INFORMED CONSENT

Please read this consent document carefully before you decided to participate in this study.

Purpose of the study
Thank you for your interest in the current project. The current project is designed to explore the relationship between personality traits and internal cognitive experience.

What you will be asked to do in this study & Time required
You will be asked to fill out self-report questionnaires. It will take about 45 minutes to complete this session.

Risk and Benefits
Participation of this study will offer an opportunity to learn how empirical research is designed and administered. In addition, your participation will help counselors and researchers understand psychological factors involved in cognitive experience. However, because the current study asks private information, it is possible that you may feel discomfort in you have negative thoughts about yourself. Some of the issues dealt with in this study or some of the questionnaire items may raise some personal issues for you. If so, please contact a counselor through the University of Florida Counseling and Wellness Center (352-392-1575) to speak about your concerns.

Compensation
Participants will receive research credit through the SONA system or extra credit from course instructors allowing such credit for participating in research. For non-SONA participants, any extra credit for research participation or alternative extra credit opportunities will be decided by course instructors; if instructors offer extra credit, the extra credit points for participation or alternative opportunities cannot exceed 2% of the student’s final grade

Confidentiality
Your identity will be kept confidential to the extent provided by law. Your responses on the questionnaires will be associated with a subject identification number and not a name. The information for proper crediting will be collected in a complete separate survey after you complete the study survey and it will not be in any way associated with your responses on the questionnaires. All study data will be kept securely in password-protected files. There is a minimal risk that security of any online data may be breached. Your name or other uniquely identifying information will not be requested. Thus, your name cannot be used for any reports based on this study and it is unlikely that a security breach of the online data will result in an adverse consequence for you.

Voluntary participation/Right to withdraw from the study
In order to participate in this study, you must be 18 years of age, or older. Your participation in this study is completely voluntary. You may discontinue at anytime without any penalty.

Right to withdraw from the study:
You have the right to withdraw from the study at any time without consequence.

Whom to contact about your rights as a research participant in the study
If you have any questions about this research, you may contact KoUn Eum (koun@ufl.edu) or Dr. Kenneth Rice (kgr1@ufl.edu or 352-273-2119).
Whom to contact about your rights as a research participant in the study:
IRB02 Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; phone: 392-0433.

Agreement:
If you have read the information described above and would like to participate, please click the “I accept” button, indicating that you voluntarily agree to participate in this study. If you click “I accept,” you will be directed to the questionnaires. You may print this page for your records.

_____ I accept and agree to participate in this study.
_____ I do not want to participate in this study.
LIST OF REFERENCES


60


BIOGRAPHICAL SKETCH

KoUn Eum was born in Seoul, South Korea. She graduated summa cum laude with a Bachelor of Arts in English language and literature and science of education from Sogang University, Seoul, South Korea. She earned her master's degree in clinical psychology at Murray State University. Her master's thesis examined whether forgiveness is a moderator for later onset of depression among previous bully victims. She started a doctoral program in counseling psychology at University of Florida in 2007. She completed an APA accredited pre-doctoral internship at the University of Akron Counseling Center. She completed her doctoral degree in August 2013.