Efficacy of a Brief Mindfulness Intervention for Not-Just-Right Experiences

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ABSTRACT

EFFICACY OF A BRIEF MINDFULNESS INTERVENTION FOR NOT-JUST-RIGHT EXPERIENCES

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Northern Illinois University, 2023
Kevin Wu, Ph.D., Director

The obsessions and compulsions that define the diagnosis of Obsessive-Compulsive Disorder (OCD) traditionally have been characterized by harm avoidance. However, harm avoidance is neither specific to OCD nor does it comprehensively explain all symptoms with which individuals with OCD present. Emerging research has focused on incompleteness—and its manifestation through the phenomenon of not just right experiences (NJREs)—as a potential motivating factor for OCD symptoms. Whereas Exposure and Response Prevention (ERP) is conceptually relevant to—and empirically supported for treating—symptoms characterized by harm avoidance, there is an unclear connection between ERP and symptoms characterized by incompleteness. Research has begun to explore ways to more effectively intervene when working with presentations marked by incompleteness and NJREs. The current study sought to examine the utility of mindfulness in reducing distress following induction of an NJRE.

One hundred sixty-two participants self-selected from Amazon’s Mechanical Turk platform and completed this remote study. Participants completed questionnaires, a task meant to induce NJRE-related distress, and were randomly assigned to complete one of three 10-minute interventions—mindfulness, progressive muscle relaxation, or an active control activity. Baseline symptom scores did not illustrate the predicted pattern of results such that there was no clear
differentiation between harm avoidance and incompleteness ($r = .91$) or in their relation with OC-relevant symptom scores. Additionally, the NJRE induction task did not significantly increase distress ($t_{(161)} = 1.38, \ p = .17$). Following the randomly assigned interventions, there were no significant differences in distress ($F_{(2, 159)} = 0.52, \ p = .59$). The findings and limitations of the present study are discussed, as well as implications for future research.

*Keywords:* Obsessive-compulsive disorder, incompleteness, not-just-right experiences
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EFFICACY OF A BRIEF MINDFULNESS INTERVENTION FOR
NOT-JUST-RIGHT EXPERIENCES

BY
SAMUEL RICHARD CARES
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A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL
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Kevin Wu, Ph.D.
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DEDICATION

To my grandfather, Henry D. Leinon, in memory of your selflessness and work ethic
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CHAPTER 1
INTRODUCTION

Obsessive-Compulsive Disorder is characterized by the presence of either obsessions or compulsions, or both (American Psychiatric Association [APA], 2013a). Obsessions are defined as intrusive or unwanted urges or images that cause stress for an individual. It is common for individuals experiencing obsessions to try to ignore or neutralize them through compulsions. Compulsions are defined as repetitive behaviors or acts performed to reduce anxiety caused by obsessions. Common obsessions include concerns about contamination, responsibility for harm to self or others, a persistent need for certain ordering patterns, or preoccupations with sex, violence, or religion (Abramowitz & Jacoby, 2014). Compulsions commonly include behaviors functionally related to the obsessions—including counting, ordering, checking, cleaning, and washing—but also can include behaviors seemingly unrelated to the obsessions, such as counting aimed at preventing an intrusive thought about harm of a loved one (Abramowitz et al., 2009).

History of OCD Conceptualization: Harm Avoidance

The theoretical nature of obsessions has undergone a number of changes over the past half-century. Rachman (1981) defined intrusive thoughts as “repetitive thoughts, images, or impulses that are unacceptable and/or unwanted,” adding that for a thought to be intrusive, it must be ongoing, attributed to an internal origin, and be difficult to control (p. 89). Salkovskis, in his seminal 1985 paper, noted that repetitive intrusive thoughts are importantly different from
automatic thoughts that are perceived as negative, a mainstay in Beck’s theory of depression (Beck, 1976; Beck et al., 1983). According to Salkovskis, whereas negative automatic thoughts generally are believed to be the result of an externally-based event, intrusive thoughts are internal in origin, not necessarily requiring a sensory experience to occur. The cognitive-behavioral model that Salkovskis (1985) proposed posits that the automatic thought arrives as a function of the intrusive thought, or obsession, similar to an externally-based event. According to Salkovskis, the individual will experience distress as a result of the arrival of the automatic thought, with the anxiety and discomfort triggered by a sense of personal responsibility. Salkovskis described such responsibility as the possibility that should something negative occur, it might be the individual’s fault. Salkovskis (1985) stated that neutralizing behavior, or a compulsion, occurs to reduce the distress, allowing the individual to absolve oneself of responsibility by engaging in behaviors that negate the realization of the intrusive thoughts. These behaviors can be active or passive in nature, and this may vary depending on the situation and the number of times the neutralizing behavior previously has occurred. In this manner, neutralizing behavior serves the function of harm avoidance. That is, neutralizing behavior is performed in response to the anxiety and discomfort one feels about the possibility of unwanted outcomes in a threatening situation, thus serving as negative reinforcement.

Theoretical and empirical work has focused on this idea of harm avoidance as the main motivation for neutralizing behaviors as a response to intrusive thoughts. Rachman’s subsequent cognitive theory of OCD (Rachman, 1997, 1998) emphasized catastrophic misinterpretations of intrusive thoughts in the importance of obsessions leading to compulsions. Rachman discussed how cognitions, or obsessions, can be given an exaggerated significance by someone with OCD,
such that individuals believe that the presence of such thoughts is abhorrent (even though, in fact, many people experience similar intrusive thoughts). As a result, individuals with OCD will work by any means to rid themselves of the anxiety caused by having the thought. Rachman (1997, 1998) pointed to Clark’s (1986) cognitive theory of panic as support for the role of an individual’s inflated beliefs on their behavioral response to distress. Clark (1986) introduced a model of panic that posited catastrophic misinterpretations of inner bodily sensations as the driving force behind panic attacks. According to Clark (1986), some panic attacks may involve perception of a certain bodily sensation, wherein an individual interprets the sensation in a catastrophic manner, thereby triggering a panic attack. It was this catastrophic misinterpretation that Clark (1986) opined was the driving force behind panic attacks. In a similar manner, Rachman’s theory of OCD (Rachman, 1997, 1998) pointed toward the misinterpretation of intrusive thoughts and their importance as a driving factor behind compulsions. Further, Rachman (1997) contended that certain treatments for OCD which had been largely unsuccessful (e.g., thought-stopping and habituation training; Likierman et al., 1982; Roth & Church, 1994; Stern et al., 1973) were unsuccessful specifically because they failed to meaningfully account for the catastrophic misinterpretations that serve to perpetuate obsessions and compulsions. Rachman (1998) described types of behavioral experiments similar to what is now known as Exposure and Response Prevention (ERP; e.g., Foa et al., 2012) as a way to target these misinterpretations—that intrusive thoughts would lead to real-world harm should neutralization not occur—in treatment. Although the experiments he described (and subsequent manualized ERP) target behaviors more directly, the indirect effect is to address the underlying belief or thought that drive said behaviors (e.g., Foa et al., 2012).
Indeed, ERP has become the gold standard treatment for OCD (e.g., APA, 2013b), in part due to its focus on harm avoidance. A main goal of ERP is to illustrate to persons experiencing an urge to engage in compulsions that, in the absence of said compulsions, the feared consequence will not occur (Foa et al., 2012). Importantly, however, there appears to be a form of OCD presentation that does not involve an identified feared consequence. And in fact, individuals who have an articulated feared outcome tend to show more improvement following ERP treatment than individuals with OCD who do not identify a specific feared outcome (Foa et al., 1999).

The emphasis on harm avoidance in OCD was in part the basis for its inclusion in the DSM Anxiety Disorders chapter prior to DSM-5 (e.g., Summerfeldt et al., 2014). Researchers pointed to a number of commonalities between harm avoidance in OCD and harm avoidance in anxiety disorders, including anticipatory anxiety and the acquisition of avoidance behaviors (e.g., Cloninger, 1986; Zinbarg & Barlow, 1996). Barlow (2000) suggested that OCD and anxiety-related disorders—including Panic Disorder and Social Phobia—are the result of focal anxiety surrounding situations wherein the individual experiences a “false alarm” induced stress when confronted with such situations. As DSM-5 was being developed, some researchers advocated that OCD remain part of the Anxiety Disorders chapter due to considerable overlap between the two, which notably includes the presence of anxiety similar to that of traditional anxiety disorders (e.g., Stein et al., 2010). However, as harm avoidance plays such an important role in anxiety disorders, a reliance on harm avoidance as the sole motivation for neutralization may be insufficient in distinguishing OCD from anxiety disorders. That is, harm avoidance is not the only reason why some individuals diagnosed with OCD engage in neutralization.
Beyond Harm Avoidance: Incompleteness and Not-Just-Right Experiences

Incompleteness vs. NJREs

OCD was removed from the anxiety disorders chapter upon the release of DSM-5 and made the flagship disorder in a new chapter titled “Obsessive-Compulsive and Related Disorders” (OCRDs; APA, 2013a). The creation of the OCRD chapter was the result of expanding research on OCD and related disorders in the late 1990s and early 2000s. With new research suggesting expanded cognitive models, OCD became distinguished from harm avoidance-driven anxiety-based disorders. An important development from a cognitive perspective during this time came in research of “incompleteness” or “not-just-right experiences (NJREs).”

Before discussing specifics, it is important to first acknowledge how the terms incompleteness and NJREs are used within the literature. Unfortunately, some of this literature has not clearly differentiated between the two. In fact, many published papers within this literature have discussed the two interchangeably, failing to mention any differences in conceptualization or even acknowledge the poor differentiation. Incompleteness generally is defined as “the troubling and irremediable sense that one’s actions or experiences are not ‘just right’” (Summerfeldt, 2004, p. 1155; Summerfeldt et al., 2001). However, Coles et al. (2003) had defined NJREs as “times when you have the subjective sense that something isn’t just as it should be” and that these experiences are rooted “in the individual or in their perception that the world around them is not right” (p. 684). Pietrefesa and Coles (2008) acknowledged the disconnect between the two constructs and suggested that NJREs are the subjective experience of
incompleteness. A footnote of Coles and Ravid (2016) acknowledged that “fine-grained” distinctions may be drawn between incompleteness and NJREs, although such distinctions were not made in that particular study. Similarly, Belloch et al. (2016) suggested that incompleteness refers to a “stable predisposition,” whereas NJREs refer to temporally-specific obsessions. These fine-grained conceptual distinctions are further reflected in the comparison of measures designed to assess incompleteness and NJREs, respectively. As a result, although the literature on the differences between incompleteness and NJREs is relatively lacking, a general sentiment emerges wherein incompleteness is the general tendency toward a preference for experiences to be “just right,” and NJREs are the moment-to-moment experiences or specific instances of this tendency. In a hierarchical model of the two, NJREs would be akin to lower-level variables of incompleteness as a broader construct. This is the general conceptualization of incompleteness versus NJREs that the present paper will utilize.

**History of Incompleteness and NJREs**

Research exploring these experiences has appeared under different names since the mid-1990s. “Just right” experiences first emerged from Leckman and colleagues’ research on the overlap between Tourette syndrome and OCD (e.g., Leckman, Walker, et al., 1994). Leckman, Grice, et al. (1994) found that of 177 participants with OCD, 92% reported experiencing at least once a need to perform a compulsion until it was “just right,” with approximately 73% experiencing this within the previous week. In 1996, Tallis presented a type of washing compulsion that occurred in the absence of a previously-acquired avoidant response to anxiety—that is, the washing persisted in the absence of what previously had been thought to precipitate
that compulsion. Tallis (1996) explained the case of a 28-year-old woman who avoided contaminants and washed excessively—not because she believed contamination would result in serious disease or illness, but because she needed to engage in a “perfect wash.” This inherent or internal need for an action to be completed a certain way based on something other than a feared harmful outcome flouted the proposed models of OCD based on harm avoidance (e.g., Rachman, 1997, 1998). Coles et al. (2003) examined sensations of needing things to be “just right” in individuals with OCD, which they termed “not just right experiences (NJREs).” Using their newly-developed NJRE Questionnaire (NJRE-Q), they found that 95% of participants in a female undergraduate sample ($N = 117$) reported experiencing NJREs, illustrating that NJREs are a prevalent experience. This is notably similar to the widespread prevalence (94.3%) of intrusive thoughts in the general population (Radomsky et al., 2014). Further, ratings of frequency, intensity, importance, and anxiety related to the experiences of NJREs all were significantly correlated with the Padua Inventory (PI) total score and subscales of Impaired Mental Control, Checking, and Loss of Control of Actions ($rs = .23-.45$, all $ps < .01$).

Additionally, ratings of NJRE intensity, importance, and related anxiety were significantly associated with the Frost Multidimensional Perfectionism Scale (FMPS) total score (all $ps < .001$), a measure closely related to symptoms of OCD (e.g., Frost & Steketee, 1997). Perfectionism, as measured by the FMPS, has been found to be significantly elevated in individuals with OCD compared to nonclinical individuals (all $ps < .05$; Frost & Steketee, 1997) and is correlated with measures of OCD such as the Obsessive-Compulsive Inventory-Revised (e.g., $r = .44$ in Martinelli et al., 2014). These findings are representative of a broader field of research which consistently illustrates significant ($p < .05$) associations between perfectionism
and OCD (e.g., Julien et al., 2006; Manos et al., 2010). Therefore, that aspects of NJREs are related to the FMPS is a nontrivial finding in the context of their relevance to OCD.

A second study by Coles et al. (2003) examined a revised version of the NJRE-Q (the NJRE-QR) in an attempt to discern whether the symptoms tapped by this scale were specific to respective OCD features as measured by the Obsessive-Compulsive Inventory (OCI; Foa et al., 1998). In an undergraduate sample (N = 242), the NJRE-QR was most closely correlated with OCI Checking (distress; r = .55, p < .01) and OCI Ordering (distress; r = .55, p < .01), although correlations with all other OCI subscales were at least r = .44. Additionally, NJREs were more strongly correlated in an absolute sense with the OCI Frequency and OCI Distress total scores (r = .63 and r = .57, respectively; ps < .001) than with the BDI (r = .33, p < .01), BAI (r = .45, p < .01), or PSWQ (r = .35, p < .01).

The concept of NJREs, and the research supporting their existence beyond an interesting conceptualization, has not been without critique. Davey (2003) noted that NJRE as a construct was born out of clinical experience rather than experimental research. He asserted that the concept itself was a somewhat shallow one that failed to offer useful explanation of the mechanisms underlying the processes in OCD. Davey (2003) suggested that methodologically sound research was necessary to investigate and validate concepts like NJREs as more than “trivial.” Specifically, Davey asserted that psychological research needs to focus less on the epiphenomenal aspects of clinically interesting constructs, and more on the instructive mechanisms of psychological processes.

Still, Summerfeldt (2004) presented a model of OCD in which incompleteness and harm avoidance are two separate dimensions of OCD. Summerfeldt (2004) stated that the concept of
incompleteness was not new, per se, but had been presented in research under multiple monikers, including “just right” experiences, “feeling of knowing,” “sensory phenomena,” and “sensitivity of perception.” She posited that incompleteness underlies many symptoms in OCD and can manifest visually, auditorily, tactiley, and through proprioception. Importantly, Summerfeldt (2004) suggested that cognitions often are secondary to a sensory or affective disturbance in incompleteness-related OCD. Importantly, these cognitions are primary in harm avoidance models. In concluding, Summerfeldt noted the general lack of research surrounding incompleteness, both in the role it plays in the development and maintenance of OCD as well as the most effective form of treatment. Further, Summerfeldt (2007) asserted that existing cognitive models of OCD did not include a place for incompleteness, due to an over-emphasis on the content of cognitions and no room for—as Summerfeldt (2007) termed incompleteness—internal sensory-affect dysregulation.

**Distinguishable from Harm Avoidance?**

If incompleteness is conceptualized as a distinct basis for the occurrence of OCD symptoms, then it is important to establish that it is (a) not merely a reconceptualization of those OCD symptoms and (b) measurably different from harm avoidance. If both are established, then one may argue that the constructs of incompleteness and NJREs go beyond the superficial nature Davey (2003) accused NJREs of being, and warrant integration into existing cognitive models of OCD (i.e., Summerfeldt, 2007). The Obsessive-Compulsive Trait Core Dimensions Questionnaire (OC-TCDQ) contains subscales for Incompleteness and Harm Avoidance (Summerfeldt et al., 2001). Importantly, research suggests that these subscales generally are not
correlated at a problematic level with one another. For example, Summerfeldt et al. (2014) examined the structural validity of the OC-TCDQ. Although the two factors were highly correlated in a nonclinical sample ($r = .70$), there was a more modest correlation in a clinical sample ($r = .36$); the latter offers basic support that the OC-TCDQ measures two different constructs in clinical settings. Similarly, Belloch et al. (2016) observed a strong significant correlation between the subscales for harm avoidance and incompleteness in a nonclinical sample ($r = .67$) but a more modest correlation in a clinical sample ($r = .39$). Important to the aims of the current study, other research has found a more moderate correlation in nonclinical undergraduates (e.g., .34 in Cougle et al., 2013).

The subscales of incompleteness-based measures also show expected specificity to conceptually relevant measures, a somewhat separate but important step in evaluating the utility of incompleteness as a construct. Ecker and Gönner (2008) examined the relationship between incompleteness and harm avoidance in 202 individuals diagnosed with OCD. Participants completed a number of self-report questionnaires related to OCD, including the OC-TCDQ. Both subscales were significantly correlated (all $p$s < .01) with total scores from the Padua Inventory-Revised (PI-R), the Obsessive-Compulsive Inventory-Revised (OCI-R), the Yale-Brown Obsessive-Compulsive Scale Self-rating Scale (Y-BOCS-SRS), and the Vancouver Obsessional Compulsive Inventory (VOCI), suggesting widespread occurrence of both in the sample. In each case, OC-TCDQ Incompleteness was correlated higher—but not necessarily statistically significantly higher—with each total score (OCI-R $r = .69$; PI-R $r = .62$; VOCI $r = .70$; Y-BOCS-SRS $r = .48$) than was the Harm Avoidance subscale (OCI-R $r = .48$; PI-R $r = .58$; VOCI $r = .54$; Y-BOCS-SRS $r = .41$) by absolute value. Hierarchical regression revealed that
symptoms of symmetry ($\beta = .48$) and ordering ($\beta = .43$) were uniquely predictive of incompleteness, but not harm avoidance, whereas obsessional thoughts ($\beta = .41$) were uniquely predictive of harm avoidance, but not of incompleteness. Checking was predictive of both harm avoidance ($\beta = .26$) and incompleteness ($\beta = .27$). It is important to note that it is not entirely clear to the current author why diagnoses were used to predict incompleteness and harm avoidance levels, rather than the other way around as would be expected conceptually. It is possible this was done to utilize the dichotomous variables (i.e., diagnoses) as the predictors. These results provided support for Summerfeldt’s (2004) assertion that incompleteness serves as a second core dimension underlying symptoms of OCD.

Other research similarly supports the claim made by Summerfeldt (2004) that incompleteness is a separate and important underpinning of OCD symptomatology. In Pietrefesa and Coles (2008), an undergraduate sample ($N = 377$) completed the OC-TCDQ, the OCI, and the FMPS. A confirmatory factor analysis (CFA) on the OC-TCDQ reaffirmed that each item loaded onto the expected factor—either harm avoidance or incompleteness. The two-factor model provided adequate to good fit (RMSEA = .08; CFI = .90; SRMR = .06), although the two factors were highly correlated with one another ($r = .76$). Additionally, both OC-TCDQ subscales of the were significantly correlated with all subscales of the OCI and the FMPS (all $ps < .008$), further suggesting relevance to OCD symptomatology. Similar to the results of Ecker and Göner (2008), Pietrefesa and Coles (2008) found that incompleteness was more strongly correlated with symptoms of ordering ($r = .59$) than was harm avoidance ($r = .41$), whereas harm avoidance was more strongly correlated with symptoms of obsessing ($r = .67$) than was incompleteness ($r = .46$). Incompleteness also was statistically more strongly correlated than was
harm avoidance with doubts about actions \((r = .68)\), personal standards \((r = .55)\), and organization \((r = .34)\).

Through behavioral tasks, Pietrefesa and Coles (2009) expanded on these findings illustrating the distinction between incompleteness and harm avoidance. Undergraduate students \((N = 97)\) completed three tasks meant to prime harm avoidance: (1) washing dirty dishes to prevent illness, (2) sorting vials of what they believed to be hazardous material, and (3) proofreading the résumé of a fellow student who was at risk of losing job opportunities due to grammatical errors. Additionally, participants completed three tasks designed to induce incompleteness: (1) arranging a bookshelf, (2) hanging pictures on the wall, and (3) sorting contents of a recycle bin. All six tasks were completed in a randomized order. After each task, they reported their levels of anxiety, discomfort, desire to prevent harm, desire to perform tasks correctly, and checking behaviors. They found that the OC-TCDQ Harm Avoidance subscale was significantly \((p < .01)\) correlated with the total amount of anxiety/nervousness (e.g., feelings of dread) experienced across tasks \((r = .42)\), the desire to prevent harm \((r = .41)\), and the amount of checking behaviors \((r = .34)\), but not the amount of discomfort/tension (e.g., feeling dissatisfied or insufficient; \(r = .18)\) reported or the desire to perform tasks perfectly \((r = .24)\) according to the adjusted \(p < .01\) level. Conversely, OC-TCDQ Incompleteness was significantly \((p < .01)\) correlated with the desire to perform tasks perfectly \((r = .41)\), the overall discomfort/tension experienced \((r = .35)\), checking behaviors \((r = .32)\) and desire to prevent harm \((r = .28)\), but not with anxiety/nervousness experienced \((r = .18)\). Additionally, baseline harm avoidance scores (but not incompleteness scores) predicted variance in anxiety/nervousness \((\beta = .45)\) and desire to prevent harm \((\beta = .36)\), whereas incompleteness scores (but not harm
avoidance scores) uniquely predicted variance in discomfort/tension ($\beta = .36$) and desire to perform tasks perfectly ($\beta = .39$). These findings generally were in line with the results of Pietrefesa and Coles (2008). Across both studies, a pattern emerged wherein harm avoidance and incompleteness each predicted unique variance of OCD symptoms, in both clinical and nonclinical samples. Such findings further support Summerfeldt’s (2004) assertion that incompleteness and harm avoidance represent separate constructs underlying OCD, and that incompleteness is more related to sensory-affect dysregulation as described by Summerfeldt (2007).

More recent research has continued to support the notion that harm avoidance and incompleteness are readily distinguished from one another. A series of studies by Summerfeldt et al. (2014) investigated the structure of the proposed harm avoidance-incompleteness model in student and clinical populations. Using a structured interview (the Obsessive-Compulsive Core Dimensions Interview; OC-CDI) and both state (OC-SCDQ) and trait (OC-TCDQ) versions of the OC-CDQ, researchers found strong structural validity in all four presented studies across all samples involved. The OC-CDI two-factor structure (harm avoidance and incompleteness) illustrated excellent fit in a clinical sample (CFI = 1.00; SRMR = .006). The OC-TCDQ two-factor model also provided excellent fit in a nonclinical sample (CFI = 0.99; SRMR = .048), as did the OC-CDQ state version in a clinical sample (CFI = .99; SRMR = .090). Harm Avoidance and Incompleteness were strongly correlated ($r = .70$) in the nonclinical sample. Among the clinical sample, there was a more moderate correlation between the two subscales ($r = .36$). These results suggest the measure holds the ability to evaluate the two constructs, although these data suggest a co-existence, rather than complete distinction, between them. To further
distinguish incompleteness from harm avoidance, Taylor et al. (2014) conducted an online study to explore the relations between the Obsessive Beliefs Questionnaire (OBQ), the OC-TCDQ, and the NJRE-QR in a nonclinical sample. After controlling for OC-TCDQ Harm Avoidance, OC-TCDQ Incompleteness significantly correlated with OBQ subscales for Checking, Hoarding, Neutralizing, Ordering, and Washing (partial $r = .11$-.36, $p < .005$). Similarly, Lee and Wu (2019) examined self-reported incompleteness and harm avoidance as measured by the OC-TCDQ, as well as the Schedule of Compulsions, Obsessions, and Pathological Impulses (SCOPI; Watson & Wu, 2005). In an undergraduate sample ($N = 238$), results suggested that incompleteness significantly ($p < .001$) predicted scores on three OCD symptom dimensions—checking ($\beta = .30$), contamination ($\beta = .43$), and rituals ($\beta = .63$)—after controlling for self-reported harm avoidance. Taken together, the results of these studies illustrate that (1) the two factors of harm avoidance and incompleteness appear to be separable constructs and (2) incompleteness explains significant incremental variance in some forms of OCD symptoms beyond the variance explained by harm avoidance.

**Specificity to OCD**

Although the literature suggests that incompleteness and harm avoidance are separate constructs, illustrating simple relationships between incompleteness and OCD is not sufficient to establish the special relevance of the construct and the disorder. After all, elevated levels of harm avoidance consistently are present in OCD as well as other anxiety disorders (e.g., Barlow, 2000). It is important to understand whether incompleteness holds a similar non-specific
relationship with OCD or if, unlike general harm avoidance, it is a construct capable of
distinguishing symptoms of OCD from symptoms of anxiety disorders.

A series of studies by Coles et al. (2005) sought to explore NJREs beyond the self-report
approach utilized by Coles et al. (2003). In Study 1, Coles et al. (2005) asked undergraduates (\(N = 50\)) to complete a series of questionnaires followed by a behavioral task. Participants were
sorted into one of two groups based on their self-report of both number and severity of NJREs in
the past month—either high intensity (“moderately” or “extremely” intense) or low intensity
(“not intense at all”) defined by the present study—as measured by the NJRE-QR. Researchers
then exposed participants to eight stimuli meant to evoke varying degrees of NJREs, including a
tidy bookshelf, a messy bookshelf, a dirty sink, a chair missing an armrest, a dirty rug, a desk
with broken drawers, crooked posters, and a recycling bin with paper shavings on the floor. The
group which had experienced high intensity NJREs in the past month reported significantly (\(p < .01\)) more distress in response to the stimuli than the low intensity group, although there was
not a significant difference in urge to respond to the stimuli (\(p > .05\)). Additionally, the average
urge to change the experimental stimuli (rated on a 0-100 scale) in order for them to be
considered just right was significantly correlated with participant scores on the OCI Frequency
subscale (\(r = .44, p < .001\)) and scores of ordering and arranging as measured by the Symmetry,
Ordering, and Arranging Questionnaire (\(r = .38, p < .01\)), but not (\(p > .01\)) with scores of overall
worry (Penn State Worry Questionnaire; \(r = .18\)), social anxiety (Social Interaction Anxiety
Scale; \(r = .07\)), or depression (Beck Depression Inventory; \(r = .31\)), suggesting relative
specificity of NJRE-related distress to OCD. Importantly, both groups illustrated low rates of
feared consequences following exposure to the stimuli (averages of 0.64 and 1.04 on an 8-point
scale). Since the participants reported distress in response to the stimuli, but did not report a feared consequence as a result of the stimuli, this suggests that NJREs may be experienced separately from harm avoidance. In a follow-up study, 46 participants from Study 1 logged experiences of NJREs over the course of the next week. Participants from the high intensity group reported significantly higher scores of discomfort ($p < .01$) and urge to respond ($p < .05$) to NJREs than did the low intensity group. This result suggested a relative stability of NJRE experiences over a short period of time. Further, whereas neither frequency ($r = .18$) nor duration ($r = .37$) of naturally-occurring NJREs was significantly associated with OCD symptoms ($p > .01$), the urge to respond to the NJREs was significantly ($p < .01$) correlated with OCI Frequency ($r = .52$) and Ordering / Arranging ($r = .43$), in addition to FMPS Perfectionism ($r = .40$), OC-TCDQ Harm Avoidance ($r = .43$), OC-TCDQ Incompleteness ($r = .46$), and the Responsibility Attitudes Scale ($r = .53$), although some of these correlations are close to nonsignificant values in an absolute sense. This suggests that, although NJREs may be a widespread occurrence not necessarily exclusive to association with symptoms of OCD—or even psychopathology in general—individuals with elevated obsessive-compulsive symptoms have a greater distress response to these experiences. Overall, these studies by Coles et al. (2005) provided support for the notion that, although NJREs appear to be a common occurrence for many individuals, those with higher scores on OC-related measures experience more distress and higher urges to react when confronted with such a situation. Additionally, Coles et al. (2005) provided evidence suggesting that NJREs are specific to symptoms of OCD and not related as strongly to general worry, social anxiety, or depression.
Other research has examined the specificity of incompleteness and NJREs to OCD. Ghisi et al. (2010) compared scores on the NJRE-QR, the BDI-II, the Beck Anxiety Inventory (BAI), and Hewitt and Flett’s Multidimensional Perfectionism Scale in both a student sample and clinical samples consisting of individuals with OCD, individuals with generalized anxiety or a simple phobia but not depression, and individuals with depression but not anxiety. Additionally, the combined clinical sample completed the OCI-R and the OBQ, whereas the undergraduate sample completed only the OCI-R. Notably, it is not clear from Ghisi et al. (2010) why the samples completed different questionnaires. It is also not clear why analyses for the undergraduate sample utilized the OCI-R, whereas analyses among the clinical sample utilized the OBQ. In the undergraduate sample, the NJRE-QR Severity scale was correlated significantly ($ps < .001$) with the OCI-R total score ($r = .42$) and all subscales ($rs = .28-.31$) except Mental Neutralizing ($r = -.03, p > .05$). The NJRE-QR Severity scale also was significantly correlated with the BAI ($r = .33, p < .001$), BDI-II ($r = .26, p < .001$), and perfectionism ($rs = .20-.30, ps < .001$). However, the NJRE-QR and OCI-R total score correlation was significantly higher than correlations with the non-OCD measures (all $z$ values $> 1.96, ps < .05$). Additionally, and perhaps most importantly, the correlations between the NJRE-QR and OCI-R remained significant (partial $rs = .20-.25$) after controlling for the BAI, BDI-II, and perfectionism. Across the three separated clinical groups, the individuals with OCD scored significantly higher ($p < .001$) than individuals with anxiety or depression on all NJRE-QR scores. In a covariance analysis with the samples as the independent variable, the BAI, BDI-II, and OBQ as covariates, and the NJRE-QR Severity subscale as the dependent variable, the NJRE-QR Severity subscale discriminated among groups ($p < .001$). When the OBQ and NJRE-QR Severity subscale
swapped places in the analyses, the OBQ did not discriminate among groups ($p > .05$). Although the correlations were modest among the undergraduate sample, results from this study offered support to the relative specificity of NJREs to OCD.

Ecker et al. (2014) sought to comprehensively evaluate the validity of Summerfeldt’s (2004) model. In clinical groups (OCD, anxiety, depression) and nonclinical controls, OC-TCDQ Harm Avoidance was significantly higher in the OCD group compared to depression ($Z = 5.05, p < .01$) and nonclinical ($Z = 11.36, p < .01$) groups, but not the anxiety group ($Z = 2.26, p > .05$). However, the OCD group scored significantly ($ps < .01$) higher than all other groups on OC-TCDQ Incompleteness. Ecker et al. (2014) also investigated the extent to which diagnoses of OCD, anxiety disorders, and depressive disorders separately predicted baseline levels of OC-TCDQ Incompleteness and Harm Avoidance. All three diagnostic predicted Harm Avoidance ($\beta$s = .09-.50, $ps < .05$), whereas Incompleteness was predicted by OCD ($\beta = .51, p < .01$) and, to a significantly less extent, depression ($\beta = .10, p < .05$). As with Ecker and Gönner (2008), it is not entirely clear why the diagnoses were used as predictors in these analyses. Nevertheless, this study provided partial support for the validity of Summerfeldt’s (2004) model, as it illustrates a specificity of incompleteness to OCD contrary to the findings regarding harm avoidance. These results suggest that harm avoidance is similarly relevant to OCD and anxiety, whereas incompleteness is somewhat more relevant to OCD than other diagnoses.

Importantly, NJREs appear to be quite prevalent for individuals with a diagnosis of OCD. For example, Starcevic et al. (2011) found that NJREs occurred before compulsions for 44% of participants with OCD. Ferrão et al. (2011) asked 1,001 individuals with OCD to report a number of sensory experiences that precede compulsions, including both external and internal
“just right” experiences. Ferrão et al. (2011) differentiated these as either triggered by an external stimulus or induced via an internal experience of incompleteness. In total, 51.8% experienced an externally-induced NJRE and 17.6% reported experiencing an internally-induced NJRE. Similarly, Coles and Ravid (2016) found that 55% of individuals with OCD experienced NJREs. Thus, the prevalence of incompleteness and NJREs in OCD appears meaningful and merits further investigation to understand the heterogeneous presentations of the disorder.

In summary, incompleteness and NJREs are distinguishable from harm avoidance, with research suggesting that they hold special relevance to OCD. Additionally, it is important that incompleteness generally is found to be related to symptoms of ordering, even after controlling for harm avoidance, offering empirical support to theoretical assertion. Further, research suggests that these experiences are common – but not specific to – individuals with OCD. Therefore, research to this point generally supports the claim by Summerfeldt et al. (2004) that incompleteness may serve as a second motivating factor underlying certain OCD symptoms.

**Behavioral Induction**

A number of studies have utilized in vivo priming of incompleteness and induction of NJREs in both clinical and nonclinical populations. Coles et al. (2005) and Pietrefesa and Coles (2009) utilized similar approaches in undergraduate samples. As previously mentioned, these studies utilized messy bookshelves, crooked posters, and a recycle bin to successfully induce NJREs in their samples. Importantly, both Coles et al. (2005) and Pietrefesa and Coles (2009) were able to induce NJREs in unscreened nonclinical populations. The induction of NJREs from
Coles et al. (2005) has been utilized in other research to similar, successful effect (Cougle et al., 2011; Fitch & Cougle, 2013).

However, that the incompleteness inductions based on Coles et al. (2005) induce distress does not necessarily indicate a specificity to OC-related phenomena such as incompleteness or checking behaviors. Therefore, to explore the nature of Coles et al.’s (2005) induction of NJREs, Cougle et al. (2013) examined an in vivo induction experimentally. Undergraduate participants in both the experimental and control conditions completed a stove task meant to elicit checking behavior, after which they provided ratings of anxiety and their urge to check. Following this task, participants in the experimental condition were shown a cluttered desk for ten seconds, and then asked to rate current anxiety and discomfort. This task previously was used in Cougle et al. (2011), wherein discomfort in response to the task was significantly correlated with self-reported intensity of NJREs as measured by the NJRE-QR ($r = .32, p < .05$). In Cougle et al. (2013), the control condition was shown a neat and orderly desk. Upon reporting current anxiety, participants were asked to report their urge to check on the stove from the first task. Among individuals who reported high baseline OCI-R Checking scores (1 SD above the local mean), the experimental condition reported significantly greater urge to check on the stove following the incompleteness induction than did the control condition ($t = 3.29, p < .002$). Similarly, among individuals who reported high baseline OC-TCDQ Incompleteness (1 SD above the local mean), the experimental condition reported significantly greater urge to check on the stove following the incompleteness induction than did the control condition ($t = 3.14, p < .003$). The results of this study suggest that exposure to NJREs via in vivo exposures is related specifically to relevant phenomena and therefore operate as intended.
Other studies have expanded on ways to induce such experiences for the purpose of research. For example, Summers et al. (2014) sought to induce NJREs utilizing multiple sensory modalities. Undergraduate participants (N = 284) completed a battery of questionnaires, including the NJRE-QR, OC-CDQ, and OCI-R. For the visual NJRE task, participants viewed clutter on a table similar to the protocol by Coles et al. (2005) and were asked to rate their discomfort or general distress, as well as their urge to arrange the items on the table to be more “just right” using 0-100 scales. Additionally, Summers et al. (2014) created two tactile-based NJRE inductions. In one, participants were told to wear a lab coat in such a way that the buttons were mismatched and one sleeve was rolled up. In the other, participants were told to clean the back of their nondominant hand, but not their dominant hand. Still another task, auditory in nature, required participants to listen to the popular nursery rhyme “Frère Jacques” played out of tune. Following each of these, participants rated both their discomfort and their urge to rectify each situation. The discomfort and urge to make things “just right” for all four tasks were significantly correlated with scores on the NJRE-QR (Total Count and Severity; rs = .26-.45, ps < .002) and OC-CDQ (Incompleteness and Harm Avoidance; rs = .24-.43, ps < .002), as well as the OCI-R subscales for Ordering, Checking, Washing, and Obsessing (rs = .20-.59, ps < .002). Additionally, the discomfort in the visual task, the hand wipe task, the auditory task, and the urge to make things “just right” in the lab coat task all were significantly correlated with DASS Depression (rs = .19-.34, ps < .002). However, there were no significant correlations between the urge to make things “just right” in the visual task, the hand wipe task, or the auditory task and DASS Depression (rs = .15-.18, p > .002), nor with the discomfort from the lab coat task and DASS Depression (r = .19, p > .002). These results suggest that NJREs are experienced through
multiple sensory inputs, and that the in-vivo tasks all successfully induced NJREs in visual, auditory, and tactile modalities consistent with Summerfeldt’s (2004) assertion that incompleteness and NJREs can be experienced in a variety of ways.

Breaking away from tasks similar to that used by Coles et al. (2005), Fornés-Romero and Belloch (2017) sought to develop a new protocol to induce NJREs through an in vivo task. In the task, a nonclinical sample of participants was given a list of 18 words reflecting items commonly found in an office. After being given two minutes to memorize the list, participants in the control condition were given as much time as they needed to recall as many items as they could. Conversely, participants in the experimental condition were instructed to stop writing very soon after beginning the free recall portion of the task. Relative to the control condition, participants in the experimental condition reported more physical discomfort ($t = 2.247, p < .05, d = .47$) and higher urge to go back and continue the task ($t = 3.011, p < .05, d = .64$). Additionally, among the experimental group, OC-CDO Incompleteness was significantly correlated with experiences of NJREs and incompleteness during the task ($r = .31$), as well as general discomfort during the task ($r = .33$). When a similar study was conducted in a clinical group of individuals with OCD, discomfort at the mandatory stop in the free recall portion was significantly correlated ($r = .48, p < .05$) with OC-CDO Incompleteness (Fornés-Romero & Belloch, 2017). Taken together, these results suggest that the protocol used by Fornés-Romero and Belloch (2017) induced discomfort related to the experience of NJREs and trait-level incompleteness.

Therefore, as the literature regarding incompleteness and NJREs continues to grow, there are a number of validated inductions of NJREs that have been used in both clinical and nonclinical samples. This collection of studies suggests that NJREs may be induced using a
number of different modalities with consistent rates of success, allowing for the further exploration of the role incompleteness and NJREs play in the experience of obsessive-compulsive symptoms.

**Treatment**

Treatment for OCD overwhelmingly utilizes ERP, which has become the gold standard in the field (APA, 2013b). ERP aims to both help individuals with OCD learn to tolerate the anxiety associated with their symptoms as well as illustrate that the expected “worst case scenario” likely will not occur—even if compulsions are not performed (Foa et al., 2012). Evidence suggests that ERP is more effective than medication alone in reducing symptoms of OCD and ERP-plus-medication does not significantly improve on results of ERP alone (Foa et al., 2005). As such, ERP is widely used as the frontline treatment for OCD.

As research emerges suggesting the specificity of incompleteness to OCD, and the high prevalence of NJREs among individuals with OCD, the treatment of such experiences has become increasingly important to consider. Whereas ERP is especially relevant for individuals for whom harm avoidance is a primary motivator of their compulsions, it is not immediately apparent how ERP may be applied to incompleteness in OCD. Summerfeldt (2004) opined that, given the internal nature of the response in incompleteness as opposed to a learned reaction to a feared consequence—such that incompleteness generally results in distress to an internal feeling, whereas harm avoidance is typically distress in response to an external stimulus—ERP may not be especially effective for incompleteness OCD. Summerfeldt (2007) expanded on this, stating that traditional cognitive-based therapy (i.e., ERP) may not be particularly applicable as, per
Summerfeldt’s (2004) model, the cognitive component is not the primary difficulty for individuals with incompleteness OCD, but rather sensory-affect dysregulation. Additionally, Summerfeldt (2007) asserted that behavior-based therapy such as ERP for symptoms characterized by incompleteness may require continued clinician-provided support to maintain progress. This is in part due to the lack of coherent relationship between ERP and the process through which incompleteness is maintained. Therefore, Summerfeldt (2007) suggested that acceptance-based interventions may be useful for addressing the sensory-affect dysregulation observed in symptoms characterized by incompleteness.

That said, there is some evidence that ERP may be efficacious for incompleteness-based symptoms. Coles and Ravid (2016) examined treatment outcomes for individuals with OCD who had completed at least 14 ERP-based treatment sessions (range = 14-17). Upon completion, participants who had completed a trial of ERP reported significantly lower frequency of NJREs than prior to treatment ($t = 2.79, p < .01, d = .54$). However, there was no change in the severity of NJREs when they did occur post-treatment compared to the pre-treatment baseline ($p > .05, d = .36$). Notably, Coles and Ravid (2016) did not report data regarding whether these improvements were maintained following treatment.

Some doubt exists regarding the efficacy of ERP for symptoms characterized by incompleteness and NJREs. Schwartz (2018) conducted a meta-analysis of treatment effectiveness on incompleteness, including studies with ($N = 4$) and studies without ($N = 13$) a control group. The majority of the studies utilized established CBT/ERP approaches for treating OCD. In the group of studies with no control group, there was a medium effect size of overall treatment efficacy on symptoms characterized by incompleteness from pre- to post-treatments ($g$
Studies utilizing a control group found overall treatment efficacy on symptoms characterized by incompleteness with a small-to-medium effect size (g = 0.44). Whereas symptoms characterized by incompleteness in both analyses improved, the effect sizes were much smaller compared to the improvement in overall obsessive-compulsive symptoms. Among studies included in both methodologies, broad OCD symptoms improved from pre- to post-treatment with a very large effect size (g = 1.45).

Mindfulness for Incompleteness-Related OCD?

Several authors have suggested potential avenues for improving treatment of incompleteness-related OCD. One such suggestion involves cognitive techniques aimed at awareness and acceptance of internal sensory experiences (Summerfeldt, 2007). Although much of the research reviewed to this point has indicated the secondary nature of cognitions in incompleteness, Bragdon and Coles (2017) asserted that cognitive therapy based on intolerance of uncertainty may be useful. Among individuals diagnosed with OCD (N = 85), they found a strong correlation between OC-TCDQ Incompleteness and OBQ-44 Perfectionism / Intolerance of Uncertainty (r = .60) and a somewhat smaller correlation between OC-TCDQ Incompleteness and OBQ-44 Responsibility / Overestimation of Threat (r = .44). There was a small observed correlation between OC-TCDQ Incompleteness and OBQ-44 Importance / Control of Thoughts (r = .12). Additionally, cluster analysis revealed that a subgroup of the sample was characterized by high incompleteness, low harm avoidance, and high levels of perfectionism and intolerance of uncertainty. This relationship between incompleteness and perfectionism / intolerance of
uncertainty is one consistently illustrated in the literature (e.g., Coles et al., 2005; Pietrefesa & Coles, 2008).

Bragdon and Coles (2017) speculated that treatment related to emotion regulation may be appropriate, and that rather than utilizing ERP to change the reaction to an external stimulus, treatment may instead focus on reappraisal of the affective experience individuals experience internally, similar to the suggestion by Summerfeldt (2007). Schwartz (2018) agreed, stating that research may consider examining acceptance and mindfulness techniques for individuals with elevated incompleteness concerns and frequent NJREs. Mindfulness is broadly defined as “paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally” (p. 4; Kabat-Zinn, 1994). The use of mindfulness, with an emphasis on redirecting focus on the present moment, for treating OCD is not a novel idea. Singh et al. (2004) suggested that mindfulness may be successfully incorporated into OCD treatments as a way to complement existing modalities. Singh et al. (2004) presented a case study wherein an individual with OCD—who had not experienced meaningful improvement via medication or exposure—found significant symptom reduction utilizing mindfulness-based techniques aimed to validate and accept her internal experience. Fairfax (2008) opined that mindfulness may not only complement existing treatments for OCD but also increase their efficacy. Fairfax (2008) went as far as to suggest that mindfulness may help prevent relapse by offering individuals a relatively easy way to engage in helpful techniques after formal treatment has concluded.

A review of the literature suggests promise in the use of mindfulness for OCD—broadly, not specific to incompleteness. Hale et al. (2013) conducted a meta-analysis of studies investigating the utility of mindfulness in the treatment of OCD. Although such research remains
relatively sparse, Hale et al. (2013) found evidence suggesting that decreases in Y-BOCS scores from mindfulness-based treatment are similar to those for ERP, CT, and CBT treatment (combined ERP and CT) over similar periods of time. Four empirical studies investigating the utility of mindfulness for OCD, with a range of 6 to 16 sessions, were included. Across these studies, the decrease in Y-BOCS scores from baseline to post-treatment ranged from 8 to 23. Comparatively, of the studies included (with a range of 1 to 31 sessions) in Hale et al. (2013), the average decrease from baseline to post-treatment for ERP was 11.4; the average decrease in Y-BOCS scores for CT was 12.9; and the average decrease for CBT was 10.6. Further, initial research suggests that individuals with OCD appreciate the use of mindfulness from a qualitative perspective. Hertenstein et al. (2012) found that a majority \((n = 9)\) of individuals in a small \((N = 12)\) sample found exclusive mindfulness-based treatment to be both acceptable and beneficial. Key et al. (2017) examined the utility of mindfulness-based treatment for individuals with OCD \((N = 36)\) who continued to experience meaningful symptoms after completion of ERP and during continued use of medication. Prior to beginning mindfulness treatment, participants reported an average score of 17.7 on the Y-BOCS, indicative of moderate symptoms of OCD. They found that an 8-week mindfulness-based intervention significantly reduced symptoms of OCD compared to individuals in a waitlist control group \((d = 1.38)\). These studies provide initial support for the hypothesis that mindfulness may be a beneficial treatment modality for individuals experiencing broad OCD symptoms.

To my knowledge, only one study provides insight into the utility of a mind-body treatment method for individuals with meaningful incompleteness-related OCD symptoms. Fitch (2016) conducted a randomized controlled trial with students who had elevated dispositional
incompleteness as measured by the OC-CDQ Incompleteness subscale to evaluate the impact of ERP on feelings of incompleteness. Participants ($N = 48$) completed a battery of questionnaires, followed by four behavioral tasks meant to induce feelings of incompleteness. Following this, all participants completed three sessions of either ERP or progressive muscle relaxation (PMR), with the latter being deemed the control group for the study. Upon completion of three sessions, they again completed a battery of questionnaires and the same four behavioral tasks. Whereas there were no significant pre-treatment differences on either OC-CDQ Harm Avoidance or Incompleteness, the group that received ERP scored significantly lower on Harm Avoidance post-treatment ($p < .05$, partial $\eta^2 = .12$). Conversely, no difference was found on OC-CDQ Incompleteness post-treatment. The ERP group reported significantly lower discomfort during a task where participants were instructed to wear a lab coat in an asymmetrical manner ($p < .01$, partial $\eta^2 = .22$). However, levels of discomfort were not significantly different on a cluttered desk task ($p > .05$). Additionally, there were no differences in post-treatment hand washing following a behavioral approach task ($p > .05$). Finally, there were no significant differences between groups post-treatment on avoidance of behavioral approach task steps ($p > .05$). There were no group differences in task-related urges to engage in OC-related behaviors following each task, such as ordering or arranging.

Results broadly similar to Fitch (2016) suggests that ERP is not more effective than PMR for incompleteness-related symptoms in OCD, which may be interpreted in one of two ways. That is, it might suggest significant effectiveness of both, or it may indicate poor effectiveness across the two treatment modalities. However, the specific results of Fitch (2016) suggest the former. Fitch (2016) found no significant differences pre-treatment or post-treatment between
ERP and PMR conditions in reported discomfort following a cluttered desk task. Given that both ERP and PMR conditions saw a significant decrease in distress from pre-treatment to post-treatment ($d = .71$ and $d = .74$, respectively), this suggests an alternate hypothesis. Namely, it is possible that their results indirectly illustrate the efficacy of mind-body interventions such as PMR and mindfulness for individuals with elevated levels of incompleteness experiencing acute NJREs.

Importantly, there is some debate surrounding the difference in function and outcomes between PMR and mindfulness. As previously stated, mindfulness is broadly defined as a redirecting attention to the present moment in a nonjudgmental manner (Kabat-Zinn, 1994). On the other hand, PMR aims to create feelings of relaxation through intentional tensing and releasing of specific muscle groups (e.g., Jacobsen, 1938). Luberto et al. (2020) noted a number of similarities between the two, perhaps most notably that both can elicit a relaxation response that overrides a stress response. However, Luberto et al. (2020) also noted a number of differences between the two. Specifically, as evidenced by their definitions, the mechanism through which this relaxation response is elicited is somewhat different. Whereas PMR focuses directly on the physiological response of the body to distress, mindfulness focuses on the cognitive aspect of distress—that is, mindfulness focuses on present moment awareness and attention with an emphasis on adopting a nonjudgmental attitude. Research comparing the effectiveness of PMR and mindfulness in reducing anxiety and stress is somewhat mixed. Agee et al. (2009) found no significant ($p > .05$) differences in reduction of tension between the two interventions over a four-week period across a relatively small sample ($N = 43$), suggesting a general similarity in effectively decreasing tension. In a large ($N = 870$) undergraduate sample,
Rausch et al. (2006) found differences in the effectiveness of PMR and mindfulness based on the type of anxiety gauged. Participants engaged in 20 minutes of meditation, PMR, or a nonspecific “eyes closed” control. This preceded a brief stress induction followed by a second 10 minutes of the assigned intervention. Both PMR and mindfulness conditions saw a significant ($p < .01$) decrease in anxiety following the second intervention relative to the control condition. Additionally, individuals in the PMR condition saw a significant ($p < .05$) decrease in somatic anxiety relative to mindfulness and the control. Similarly, Lancaster (2016) examined a similar protocol among undergraduate students ($N = 194$). Relative to the mindfulness condition, individuals in the PMR condition experienced a significant decrease in somatic anxiety ($d = .44$). Further, they found that, relative to the PMR condition, individuals in the mindfulness condition did not exhibit significantly lower cognitive anxiety ($d = .17$). The latter is consistent with data from Jain et al. (2007), who found that mindfulness is more specific to cognitive rumination than PMR. Specifically, Jain et al. (2007) found that reduced rumination scores partially mediated the effect between mindfulness and lower distress scores ($R^2 = .244$). Gao et al. (2018) also evaluated mindfulness and PMR compared to a control condition in an undergraduate sample ($N = 80$). Relative to the control condition, mindfulness significantly reduced stress ($p < .01$, $d = .66$). There were no significant differences between mindfulness and PMR, nor between PMR and the control condition ($p > .05$).

Thus, both PMR and mindfulness are considered mind-body interventions, but the mechanism by which each reduces stress is not necessarily the same. Therefore, the results of Fitch (2016)—which illustrate relative similarity between ERP and PMR in targeting distress following NJREs—may not generalize to mindfulness. Conversely, given the conceptual and
empirical relevance of mindfulness to cognitive symptoms, it is possible that mindfulness may be superior to PMR in addressing distress caused by NJREs.

Limitations to the Extant Literature and The Current Study

Although research surrounding incompleteness and NJREs initially was critiqued as being based in clinical experience rather than empirically derived, research reviewed thus far has moved to validate the constructs beyond theory. However, effective interventions for incompleteness-based OCD symptoms manifested as NJREs are only beginning to be explored systematically. With uncertainty regarding the most efficacious intervention for incompleteness-related OCD, and the conceptual mismatch between established OCD treatments and incompleteness-related OCD, there is a need to examine potential alternatives to reduce incompleteness-related OCD symptoms. As not just right experiences are heretofore considered specific experiences of incompleteness, treatment for incompleteness may look to target this area. The reviewed literature suggests that NJREs are a common experience across different samples (i.e., clinical, nonclinical, student, community), but that their prevalence is higher in individuals diagnosed with OCD as compared to individuals diagnosed with other disorders and nonclinical samples (e.g., Ecker et al., 2014). However, current treatments of OCD, including ERP, do not align well conceptually with obsessive-compulsive symptoms related to incompleteness. Therefore, based on the suggestions of Bragdon and Coles (2017) and Schwartz (2018), and given the relative similarity in efficacy between ERP and PMR (Fitch, 2016), the proposed study aims to investigate the utility of a brief mindfulness intervention to reduce symptoms related to acute NJREs. Additionally, the proposed study aims to replicate the findings
of Fitch (2016) that PMR significantly reduces discomfort related to NJREs. Specifically, this will be the first study to evaluate the efficacy of both mindfulness and PMR on anxiety related to NJREs relative to an active control condition.

Hypotheses

Hypothesis 1

Whereas it was expected that baseline assessments of the OCI-R, OC-TCDQ, and NJRE-QR all would intercorrelate significantly ($p < .05$), a specific pattern was predicted based on both conceptual and initial empirical grounds. Namely, in the total sample (i.e., prior to random assignment to condition), it was hypothesized that: (1a) OC-TCDQ Harm Avoidance would be significantly ($p < .05$) more strongly correlated with OCI-R Washing than with OCI-R Ordering. (1b) OC-TCDQ Incompleteness would be significantly ($p < .05$) more strongly correlated with OCI-R Ordering than with OCI-R Washing. (1c) NJRE-QR Severity would be significantly ($p < .05$) more strongly correlated with OCI-R Ordering than with OCI-R Washing.

Manipulation Check

The messy table protocol has been successfully utilized in a number of research studies. It was hypothesized that, in the total sample, Positive and Negative Affect Scale Negative Affect (PANAS-NA) mean scores would increase significantly ($p < .05$) from Time 1 to Time 2.
Hypothesis 2

It was hypothesized that, in the total sample: (2a) Time 2 PANAS-NA would be significantly \((p < .05)\) more strongly correlated with OC-TCDQ Incompleteness than with OC-TCDQ Harm Avoidance. (2b) Time 2 PANAS-NA would be significantly \((p < .05)\) more strongly correlated with NJRE-QR Severity than with OC-TCDQ Harm Avoidance. Given the specific relevance of ordering symptoms to incompleteness and NJREs, and the specific relevance of washing symptoms to harm avoidance, it was hypothesized that (2c) Time 2 PANAS-NA would be significantly \((p < .05)\) more strongly correlated with OCI-R Ordering than with OCI-R Washing.

Hypothesis 3

Previous research has illustrated that PMR and mindfulness outperform both active and waitlist control conditions in reducing distress. Therefore, it was hypothesized that there would be significant group differences in Time 3 PANAS-NA. Specifically, it was hypothesized that both the mindfulness and PMR conditions would show significantly \((p < .05)\) lower Time 3 PANAS-NA compared to the control condition.

Hypothesis 4 (exploratory)

Given that no research has explored the efficacy of PMR relative to mindfulness in response to NJREs, the comparison between the PMR and mindfulness conditions was considered exploratory. Based on the reviewed literature, the hypothesis for this exploratory analysis was that mindfulness would outperform PMR. Given the sensory-affect dysregulation
implicated as the basis of symptoms related to incompleteness and NRJE—s—and the conceptual relevance of mindfulness interventions to those experiences—it was thought that mindfulness would result in decreased Time 3 PANAS-NA relative to the impact of PMR.
CHAPTER 2

METHOD

Participants

Due to a lack of methodologically similar research, there was no published effect size considered obviously appropriate to use in power analyses (e.g., G*Power; Faul et al., 2007). Fitch (2016) utilized different methodology than the present study, using relatively modest group sizes ($n = 24$). Using Fitch’s (2016) observed effect size in discomfort reduction from pre- to post-PMR ($d = .74$) suggests a group size of $n = 17$ would be sufficient. However, given the reduction from the three-session intervention utilized by Fitch (2016) to one session, the inclusion of three groups within the current study, as well as the novel nature of the subject matter, it was determined that larger group sizes would be appropriate to safeguard against underpowered analyses. The present study aimed to recruit 50 participants per condition for a total sample size of 150.

Participants self-selected from Amazon’s Mechanical Turk (MTurk) platform and were eligible if they (1) were 18 years of age or older, (2) were located in the United States, and 3) speak English as their first language. Additionally, only Amazon MTurk workers with an approval rating $\geq 95\%$ were allowed to participate in order to preserve data quality (e.g., Peer et al., 2014). A total of 222 English speaking participants at least 18 years of age began the study; however, only 190 individuals completed all portions. Of these 190 participants, 28 were excluded from analyses: two failed the instructional validity check questions and 26 were
missing greater than 5% of data on a given questionnaire on at least half of all questionnaires. This resulted in a total sample size of 162 for analysis. Of that sample, 62% (n = 100) identified as male, 37% (n = 60) identified as female, and 1% (n = 2) selected “Other” or “Prefer not to respond.” The average age of the sample was 38.06 (SD = 11.84) years. The sample was 87.0% White/European American, 4.3% Asian/Asian American, 3.7% Black/African American, 2.5% Multiracial, and 1.9% Native American. Additionally, 0.6% did not report racial identification. Further, 18.5% identified as Hispanic/Latino. Table 1 presents full descriptive statistics for the sample.

Measures

Demographics questionnaire

Participants completed a demographics questionnaire upon beginning the study. This was included in order to characterize the sample, not as part of any planned main analyses. The questionnaire included age, sex, and race. Additionally, participants were asked about their familiarity with mindfulness and progressive muscle relaxation practices. Sex was used in the randomization procedure to ensure roughly equal sex representation among the three conditions. Table 1 presents ANOVA results for the distribution of age, sex, race, and ethnicity across conditions. There were no significant differences among conditions on any of these variables.
Table 1

Descriptive Statistics

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Note. Total N = 162. *Other categories include all participants who selected “Other” and “Prefer Not To Respond.”
PMR = Progressive Muscle Relaxation.
Obsessive-Compulsive Trait Core Dimensions Questionnaire (OCTCDQ; Summerfeldt et al., 2001)

The OC-TCDQ is a 20-item self-report questionnaire which consists of two subscales: Harm Avoidance (10 items) and Incompleteness (10 items). Respondents are asked to rate items on a scale that ranges from 1 (never applies to me) to 5 (always applies to me). Research has suggested that the measure has adequate psychometric properties.

Namely, Summerfeldt et al. (2014) found good internal consistency in nonclinical groups for both the Harm Avoidance subscale ($\alpha = .89$) and the Incompleteness subscale ($\alpha = .88$). The two subscales have shown adequate convergent and discriminant validity. Pietrefesa and Coles (2008) found in an undergraduate sample that OC-TCDQ Harm Avoidance was strongly correlated with OCI Obsessing ($r = .67$), significantly greater than the correlation between Incompleteness and OCI Obsessing ($r = .46$). Conversely, Incompleteness was strongly correlated with OCI Ordering ($r = .59$) and FMPS Doubts About Actions ($r = .68$), both statistically greater than the correlations between Harm Avoidance and OCI Ordering ($r = .41$) and Doubts About Actions ($r = .53$). On the other hand, Belloch et al. (2016) found that DASS Depression was significantly but more modestly correlated with Incompleteness ($r = .22$) and Harm Avoidance ($r = .36$). Taken together, these data suggest that the OC-TCDQ performs as would be expected conceptually, with Incompleteness showing relative specificity to expected OCD domains. Harm Avoidance is similarly relevant in OCD and anxiety disorders and shows expected convergence with relevant OCD domains.
However, it is important to note that the OC-TCDQ subscales sometimes are highly correlated in nonclinical undergraduate samples (e.g., .70 \( n = 2090 \)) in Summerfeldt et al., 2014, and .67 \( n = 267 \) in Belloch et al., 2016). Interestingly, more modest correlations have been found in both nonclinical (e.g., \( r = .34 \); Cougle et al., 2013) and clinical samples (e.g., \( r = .36 \); Summerfeldt et al., 2014). That the two are highly correlated with one another does not preclude Harm Avoidance and Incompleteness as being unique constructs. Both harm avoidance and incompleteness are offered as motivational factors underlying obsessive-compulsive symptoms and are in fact related. The important question for the present study was whether or not the OC-TCDQ subscales are too highly correlated so as to preclude the predictions offered for the current study which aim to distinguish incompleteness from harm avoidance. Although this may set a high bar for finding the expected differences, it is generally reflective of Summerfeldt’s (2004) model. Importantly, research finds strong fit in the two-factor model of the OC-TCDQ (Summerfeldt et al., 2014), superior to that of the one-factor model (Pietrefesa & Coles, 2008). Therefore, conceptual relevance and at least some empirical support suggest it is appropriate to separate the two subscales as long as careful consideration is given to their potential overlap and co-existence, especially in nonclinical samples.

**Not Just Right Experiences Questionnaire – Revised (NJRE-QR; Coles et al., 2003)**

The NJRE-QR is a 19-item self-report scale. The measure’s first 10 items offer examples of NJREs, and respondents are asked to indicate if they have experienced each of these within the past month. Items 11 and 12 ask respondents to state which of the NJRE examples they endorsed occurred most recently and when it occurred. For items 13-19, respondents rate their
experience of the most recent NJRE in terms of frequency, intensity, immediate and delayed
distress, rumination, urge to respond, and responsibility to act. For these items, ratings range
from 1 (*not intense at all*) to 7 (*extremely intense*). The number of NJREs endorsed in the first 10
items are summed to create a total “Count” score, and items 13-19 are summed to create a
“Severity” score.

The NJRE-QR has exhibited adequate psychometric properties. The Severity subscale
showed good internal consistency in Ghisi et al. (α = .87; 2010). Ghisi et al. (2010) found a
significant correlation between the NJRE-QR Severity scale and the OCI-R total score (r = .42),
illustrating convergent validity. This correlation was significantly (p < .05) higher than
correlations between the Severity scale and the BAI (r = .33), BDI-II (r = .26), and perfectionism
(rs = .20-.30), indicating discriminant validity of the Severity subscale of the NJRE-QR.

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

The OCI-R is an 18-item self-report measure that consists of six subscales with three
items each: Washing, Checking, Ordering, Obsessing, Neutralizing, and Hoarding. Additionally,
these subscales may be summed to create a total score. Respondents are asked to rate how much
each item has caused them distress within the past month on a scale from 0 (*not at all*) to 4
(*extremely*).

The OCI-R generally has illustrated adequate psychometric properties. Foa et al. (2002)
found strong internal consistency in a mixed clinical/nonclinical sample for all subscales (αs = .83-.90) and the total score (α = .90). Additionally, the OCI-R illustrated convergent validity
with other measures of OCD, including the Maudsley Obsessive-Compulsive Inventory ($r_{\text{rho}} = .85$). However, the OCI-R correlated strongly with the BDI, a measure of depression ($r_s = .70$). Hajcak et al. (2004) found the OCI-R correlated strongly with the MOCI ($r = .65$) and the Padua Inventory ($r = .75$), and more modestly with the BDI ($r = .39$) and the PSWQ ($r = .42$). Similarly, Abramowitz and Deacon (2006) found a more modest correlation between the OCI-R and the BDI ($r = .41$).

Positive and Negative Affect Schedule – Negative Affect (PANAS-NA; Watson et al., 1988)

The Negative Affect subscale of the Positive and Negative Affect Schedule is a 10-item scale designed to measure Negative Affect. Respondents are asked to indicate to what extent they feel each item at the present moment on a scale from 1 (very slightly or not at all) to 5 (extremely). The 10 items that comprise the Negative Affect subscale are: distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid. Scores on each of these items are summed to obtain a total Negative Affect score.

The PANAS-NA has been found to have adequate psychometric properties. Watson et al. (1988) found the subscale to have good internal consistency for present-moment ratings ($\alpha = .85$). To illustrate convergent validity, Watson et al. (1988) examined the correlation between the PANAS-NA and the Beck Depression Inventory, and they found significant convergent validity ($r = .56$). Additionally, Crawford and Henry (2004) found that the subscale also shows significant convergent validity with the Depression, Anxiety, and Stress subscales for depression ($r = .60$) and anxiety ($r = .60$). Furthermore, Lucas et al. (1996) found evidence of discriminant validity of the PANAS-NA subscale. In a series of studies, they found the PANAS-NA was
significantly negatively correlated with a measure of optimism (Life Orientation Test; \( r = -0.57 \)) and life satisfaction (Satisfaction With Life Scale; \( r = -0.36 \)).

**NJRE Induction Task**

The present study utilized a protocol modeled after the messy table induction from Coles et al. (2005). This visual NJRE induction has been used in subsequent research by other authors (e.g., Cougle et al., 2011; Fitch, 2016; Fitch & Cougle, 2013; Summers et al., 2014). The version of the task used in the present study asked participants to view a table, wherein some items (e.g., notebook paper, pens, paperclips, binders) were placed in a disorganized fashion. Participants were given 10 seconds to view the table, after which they were asked to report their level of discomfort as well as their urge to straighten the items on a 0 (none) to 100 (extreme) scale.

Studies have found that this task successfully increases anxiety among participants. For example, Cougle et al. (2013) found that the task significantly increased anxiety from pre- to post-task \( (p < .01) \) in a nonclinical undergraduate population. Given the notable relationship between NJREs and symptoms of ordering (e.g., Coles et al., 2003; Ecker & Gönner, 2008), this induction is meant to induce an NJRE related to ordering and arranging. Indeed, Fitch and Cougle (2013) observed significant \( (p < .01) \) correlations between the Symmetry, Ordering, and Arranging Questionnaire and both task discomfort \( (r = .52) \) and urge to straighten \( (r = .57) \). Similarly, Summers et al. (2014) observed significant \( (p < .002) \) correlations between OCI-R Ordering and both task discomfort \( (r = .45) \) and urge to straighten \( (r = .59) \), with both associations remaining significant after controlling for baseline levels of anxiety and depression. Further, the discomfort induced by the task is consistently related to experiences of NJREs.
Cougle et al. (2011) observed a significant ($p < .001$) correlation ($r = .32$) between the discomfort related to completing the task and NJRE-QR Severity. Similarly, Summers et al. (2014) found significant ($p < .002$) correlations between task discomfort and the NJRE-QR Count ($r = .39$) and Severity ($r = .33$) scales, as well as between discomfort and OC-TCDQ Incompleteness ($r = .38$). Urge to straighten also was significantly correlated with NJRE-QR Count ($r = .44$) and Severity ($r = .31$), as well as OC-TCDQ Incompleteness ($r = .43$).

Controlling for baseline levels of depression and anxiety, Summers et al. (2014) found that all of these correlations remained significant. Conversely, although task discomfort and the OC-TCDQ Harm Avoidance were significantly correlated ($r = .25$), this did not remain significant after controlling for baseline levels of depression and anxiety.

**Interventions**

**Mindfulness**

Participants in the mindfulness condition listened to a 10-minute adaptation of the “Be Where You Are” exercise (Hayes & Smith, 2005). This is a body-focused mindfulness exercise where participants are asked to direct their attention to different body parts, noticing their experiences in a nonjudgmental manner. Importantly, participants are not asked to alter their body in any way, explicitly distinguishing it from the aims of PMR. This exercise is focused on the cognitive experience of the senses—a hallmark of mindfulness (e.g., Luberto et al., 2020).
Progressive Muscle Relaxation

Participants in the PMR condition listened to a 10-minute muscle relaxation exercise adapted from Craske and Barlow (2006), the same exercise completed by the PMR group in Fitch (2016). Participants completed the 8-muscle relaxation exercise wherein they were guided through systematic tensing and releasing of these muscle groups: upper and lower arms, upper and lower legs, abdomen, chest, shoulders, neck, eyes, and forehead. This exercise focuses on the physiological experience of the senses—a hallmark of PMR (e.g., Luberto et al., 2020).

Control

Participants in the control condition listened to a 10-minute closed-eyes breathing exercise similar to Rausch et al. (2006). Participants are asked to sit with their eyes closed and breathe for a time equivalent to the mindfulness and PMR groups. This is done to control for the nonspecific nature of mindfulness and PMR, as well as control for the expectations that participants may have (i.e., a placebo effect). Importantly, participants are not given instructions to focus on the present moment, cues to tense or release any muscles, or any information on how to control their awareness. This approach to an active control condition has been utilized in a number of studies, and consistently is found to underperform mindfulness and PMR in reducing anxiety and distress (e.g., Noone & Hogan, 2018; Rausch et al., 2006).

Procedure

Participants self-selected from Amazon’s Mechanical Turk platform and were compensated $2.00 for the roughly 40-minute study, although the study was self-paced and did
not require proctoring. Participants were redirected from MTurk to Qualtrics to complete the study. To begin the study, prospective participants completed a reCAPTCHA task to help ensure appropriate participation. Following this, participants were provided with an informed consent document, time to read the document, and contact information for the researcher if they had any questions. They were then asked to provide informed consent by typing “agree.” During the first phase of the study, participants completed the demographics questionnaire, followed by the OCI-R, OC-TCDQ, and NJRE-QR in a counterbalanced fashion. Three instructional validity check questions were embedded within the measures, checking whether or not participants were paying attention. Following this, they completed the PANAS Negative Affect subscale (Time 1), as well as the discomfort question from Summers et al. (2014; Appendix F). During the next phase of the study, they viewed an image of a cluttered table for 10 seconds. See Figure 1 for the image used, which was adapted from Cougle et al. (2013). The image was embedded within the survey and the page automatically advanced at the end of the time limit. Immediately after viewing the image of the cluttered table, participants were asked to rate their discomfort related to viewing the table, as well as their urge to straighten or engage in behaviors to neutralize discomfort (Appendix F). Additionally, they again completed the PANAS-NA (Time 2). Subsequently, participants were randomly assigned to one of the three study conditions: mindfulness, PMR, or the active control condition. Participants were randomized in a manner that stratified by sex. This was completed using the Qualtrics Randomizer and Branch Logic, which allows block randomization based on participants’ reported sex within the demographic questionnaire. Each condition engaged with their assigned task for approximately 10 minutes. Participants were not able to advance until the 10 minutes elapsed in order to ensure they completed the full task.
Following the conclusion of the intervention, participants completed the PANAS-NA one final time (Time 3) and were asked to respond to the treatment fidelity question (Appendix G).

Finally, participants were debriefed.
Figure 1. Cluttered table ‘NJRE’ induction based on Cougle et al. (2013).
CHAPTER 3

RESULTS

Data Cleaning and Preliminary Analyses

Prior to main analyses, the data were cleaned in a systematic manner. Participants were excluded from all analyses if they failed two or three of the three instructional validity check questions embedded within the measures. In total, 106 participants correctly responded to all three questions; 82 correctly answered two of the three; two participants correctly answered just one of the three questions and were subsequently excluded from analyses. Further, 26 participants were removed for missing greater than 5% of data on a given questionnaire on at least half of all questionnaires (based on Schafer, 1999) to safeguard against including those with excessive missing data. The following presents the number of individuals missing greater than 5% of data on each questionnaire: 41 (21.6%) on the OC-TCDQ; 55 (28.9%) on the NJRE-QR; 38 (20.0%) on the OCI-R; 22 (11.6%) on the Time 1 PANAS-NA; 14 (7.4%) on the Time 2 PANAS-NA; 18 (9.5%) on the Time 3 PANAS-NA. This led to a final sample of \( N = 162 \).

Next, missing data were analyzed using Little’s MCAR test (Little, 1988). Results suggested the data were not missing completely at random, \( \chi^2 (6032) = 6416.67, p < .01 \). In total, 350 data points (2.3% of all data) were missing. Of these 350 missing values, 82 came from the OC-TCDQ; 140 from the NJRE-QR; 81 from the OCI-R; 11 from the Time 1 PANAS-NA; 26 from the Time 2 PANAS-NA; and 18 from the Time 3 PANAS-NA.

\(^1\) To determine the impact that this finding had on the present study’s results, primary analyses were compared when utilizing listwise deletion versus mean imputation. There were no notable differences in hypothesis testing; therefore, it was determined there were no relevant biases to the present study’s results due to this MCAR finding.
NA; 9 from the Time 2 PANAS-NA; and 27 from the Time 3 PANAS-NA. Scale mean imputation was used to replace these 350 values. Table 1 provides descriptive statistics for the final sample. Next, all data were screened for outliers by analyzing total scores for all measured variables and subscales, with absolute standardized values greater than 3.29 being considered outliers (Tabachnick & Fidell, 2013). Additionally, boxplots were created to aid in identifying outliers. There were no data points that met these criteria to identify statistical outliers.

The data also were examined for normality using the Kolmogorov-Smirnov and Shapiro-Wilk tests. An alpha level of .01 was used to identify significant non-normality (Field, 2009). As Table 2 illustrates, all baseline variables except NJRE-QR Severity violated the assumption of normality per both normality tests. Skew and kurtosis of the data also were examined—see Table 3 for the raw and standardized values. Per Field (2009), these results are considered significant if standardized values are greater than 2.58. The OC-TCDQ Incompleteness subscale, OCI-R Total score, and OCI-R Checking subscale all were found to be significantly negatively skewed. Results also suggested that the data for the OC-TCDQ Harm Avoidance subscale, as well as the OCI-R Total score and scores from subscales of Washing, Ordering, Obsessing, Neutralizing, and Hoarding, were significantly platykurtic.

Despite the observed violations of normality assumptions, data were left untransformed for two reasons. First, the majority of the primary analyses in the present study rely on the use of Pearson correlations, and normality is not considered to be an assumption of this statistical approach (Schober et al., 2018). Second, the transformation of variables may lead to more

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2 To confirm this as a sound approach, separate analyses were conducted wherein the data were transformed using a logarithmic transformation. This transformation did not change any decisions regarding the present study’s hypothesis testing.
Table 2

Normality Tests

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Note. All analyses N = 162. OC-TCDQ = Obsessive-Compulsive Trait Core Dimensions Questionnaire. NJRE-QR = Not Just Right Experiences Questionnaire – Revised. OCI-R = Obsessive-Compulsive Inventory – Revised.
Table 3

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Note. All analyses N = 162. OC-TCDQ = Obsessive-Compulsive Trait Core Dimensions Questionnaire. NJRE-QR = Not Just Right Experiences Questionnaire – Revised. OCI-R = Obsessive-Compulsive Inventory – Revised.
significant statistical problems than violating the normality assumption (e.g., Field, 2009; Games, 1983; Games & Lucas, 1966). For example, Games and Lucas (1966) suggested that transformations may alter the accuracy of the $F$ statistic in ANOVA tests, potentially resulting in incorrect decisions regarding the null hypothesis. After considering the relative arguments for and against transformation, the data were not transformed for correlation-based analyses. However, for the analyses involving one-way ANOVA, for which normality is an assumption of the parametric results, the current study instead utilized the bootstrap method with 5,000 bootstrap samples to evaluate the ANOVA results to account for the non-normality of the data (e.g., Efron & Tibshirani, 1993).

Next, descriptive statistics were calculated for all measures. Table 4 presents the mean, standard deviation, and internal consistency estimate for each measure included across the entire sample. Additionally, Table 5 presents the mean and standard deviation for each measure by randomly assigned condition (i.e., Mindfulness, Progressive Muscle Relaxation, Control). Table 5 also includes ANOVA comparisons for each measure across condition. Of note, there were no significant differences across condition on any baseline measure.

Primary Analyses

All statistical analyses were conducted using IBM SPSS Statistics 29. Analyses were conducted using an a priori alpha level of .05. See Table 6 for all correlations in the present study. All correlations involved in hypothesis testing were statistically significant at the $p < .01$ level. In fact, all but one of the total correlations observed in the present study were statistically significant at the $p < .01$ level. The exception to this was the correlation between Time 2 urge to
Table 4
Total Sample Means, Standard Deviations, and Internal Consistency

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<th>Variable (#{ items})</th>
<th>M</th>
<th>SD</th>
<th>Possible Min/Max</th>
<th>Observed Min/Max</th>
<th>Coefficient alpha</th>
<th>Average inter-item correlation</th>
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<td>.67</td>
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Note. All analyses N = 162. OC-TCDQ = Obsessive-Compulsive Trait Core Dimensions Questionnaire.
NJRE-QR = Not Just Right Experiences Questionnaire – Revised. OCI-R = Obsessive-Compulsive Inventory – Revised.
Summers 1 = “How uncomfortable, tense, or ‘not just right’ do you feel right now?”
Summers 2 = “How strong is your urge to arrange or straighten the table?”
PANAS NA = Positive and Negative Affect Schedule – Negative Affect subscale.
Table 5: Condition Means, Standard Deviations, and ANOVA Statistics

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Note. All analyses N = 162. OC-TCDQ = Obsessive-Compulsive Trait Core Dimensions Questionnaire. NJRE-QR = Not Just Right Experiences Questionnaire – Revised. OCI-R = Obsessive-Compulsive Inventory – Revised. Summers 1 = “How uncomfortable, tense, or ‘not just right’ do you feel right now?” Summers 2 = “How strong is your urge to arrange or straighten the table?” PANAS NA = Positive and Negative Affect Schedule – Negative Affect subscale.

*OCI-R Total includes Hoarding subscale in presented values. However, analyses utilizing an OCI-R Total score without the Hoarding subscale were consistent with those presented here; namely, no overall or group-level differences were observed.
Table 6

Measure Correlations

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*Note. All analyses N = 162. OC-TCDQ = Obsessive-Compulsive Trait Core Dimensions Questionnaire. NJRE-QR = Not Just Right Experiences Questionnaire – Revised. OCI-R = Obsessive-Compulsive Inventory – Revised. Summers 1 = “How uncomfortable, tense, or ‘not just right’ do you feel right now?” Summers 2 = “How strong is your urge to arrange or straighten the table?” PANAS NA = Positive and Negative Affect Schedule – Negative Affect subscale. *All values significant at p < .01 (2-tailed) unless indicated by parentheses.
straighten the table and Time 3 not just right feelings ($r = .15; p > .05$). Of particular importance, the present study found very high correlations among the OCI-R subscales ($rs$ ranged from $.75-.93$). Specifically relevant to the hypotheses of this study is the strong intercorrelation between OCI-R Washing and OCI-R Ordering ($r = .76$). This significant overlap poses problems for Hypotheses 1 and 2, which relate to possible differential relationships between these OCI-R subscales and third variables. Similarly, relevant to Hypotheses 1 and 2 is the significant overlap between OC-TCDQ Harm Avoidance and OC-TCDQ Incompleteness ($r = .91$). The magnitude of this association likely precludes the ability to find any significant differences involving third variables. Finally, in the total sample, the correlations among PANAS-NA Time 1, Time 2, and Time 3 were very high ($rs$ ranged from $.82-.87$). That these momentary ratings were so highly correlated does not necessarily preclude the present study from finding significant between-condition differences as suggested in Hypotheses 3 and 4. However, these results do provide context through which the main hypotheses of the present study are viewed.

**Hypothesis 1**

Hypothesis 1a was that OC-TCDQ Harm Avoidance would be significantly ($p < .05$) more strongly correlated with OCI-R Washing than with OCI-R Ordering. Results showed a significant correlation with the OC-TCDQ Harm Avoidance for both OCI-R Washing ($r = .81$) and OCI-R Ordering ($r = .75$). Consistent with the hypothesis, a Z test from Meng et al. (1992) revealed that the difference between these correlations was significant, $Z = 1.95, p < .05$.

Hypothesis 1b was that OC-TCDQ Incompleteness would be significantly ($p < .05$) more strongly correlated with OCI-R Ordering than with OCI-R Washing. Results showed a
significant correlation with OC-TCDQ Incompleteness for both OCI-R Ordering \((r = .78)\) and OCI-R Washing \((r = .78)\). Inconsistent with study hypotheses, there was no significant difference between these correlations, \(Z = 0.00, p = 1.00\). Hypothesis 1c was that NJRE-QR Severity would be significantly \((p < .05)\) more strongly correlated with OCI-R Ordering than with OCI-R Washing. Results showed a significant correlation between NJRE-QR Severity and both OCI-R Ordering \((r = .40)\) and OCI-R Washing \((r = .45)\). However, the difference between these correlations was not statistically significant, \(Z = 1.02, p = .15\).

**Manipulation Check**

It was expected that the NJRE induction would significantly increase PANAS-NA scores from pre- to post-task. To assess whether the induction was successful, a paired-samples \(t\) test with 5,000 bootstrap samples was used to compare Time 1 PANAS-NA scores with Time 2 PANAS-NA scores. Contrary to expectation, there was no a significant increase in PANAS-NA scores from pre-task \((M = 25.46)\) to post-task \((M = 24.81)\), \(t_{(161)} = 1.38, p = .17\). Similarly, there was no significant increase in self-reported not just right feelings (as measured by a single question taken from Summers et al., 2014) from pre-task \((M = 34.48)\) to post-task \((M = 34.91)\), \(t_{(161)} = .297, p = .77\).

**Hypothesis 2**

Hypothesis 2a predicted that Time 2 PANAS-NA would be more strongly \((p < .05)\) correlated with OC-TCDQ Incompleteness than with OC-TCDQ Harm Avoidance. Results did not support this hypothesis. There were significant correlations between Time 2 PANAS-NA and
both OC-TCDQ Incompleteness ($r = .68$) and OC-TCDQ Harm Avoidance ($r = .70$). However, the difference between these correlations was not significant, $Z = -0.84, p = .20$. Hypothesis 2b predicted that Time 2 PANAS-NA would be more strongly ($p < .05$) correlated with NJRE-QR Severity than with OC-TCDQ Harm Avoidance. Contrary to expectations, the opposite was found—Time 2 PANAS-NA was more strongly correlated with OC-TCDQ Harm Avoidance ($r = .70$) than with NJRE-QR Severity ($r = .33$), $Z = 6.11, p < .01$. Hypothesis 2c predicted that Time 2 PANAS-NA would be significantly ($p < .05$) more strongly correlated with OCI-R Ordering than with OCI-R Washing. Time 2 PANAS-NA was significantly correlated with both OCI-R Ordering ($r = .64$) and OCI-R Washing ($r = .61$). However, inconsistent with this hypothesis, the difference between these correlations was not significant, $Z = 0.73, p = .23$.

**Hypotheses 3 and 4**

Hypothesis 3 was that, relative to the control condition, both the mindfulness and PMR conditions would exhibit significantly ($p < .05$) less Time 3 PANAS-NA. Hypothesis 4 was exploratory and predicted that mindfulness would outperform PMR, resulting in decreased Time 3 PANAS-NA relative to the PMR condition. It is important to note that prior to completion of the intervention, there were no significant differences in Time 2 PANAS-NA scores across conditions, $F_{(2, 159)} = 0.90, p = .41$. Additionally, there were no significant differences in Time 2 self-reported not just right feelings $F_{(2, 159)} = 2.74, p = .07$. Following the intervention, the mindfulness ($M = 21.92$) and PMR ($M = 21.74$) conditions showed numerically lower Time 3 PANAS-NA than the Control condition ($M = 24.00$). However, contrary to the hypothesis, a one-way ANOVA found no significant differences among the conditions, $F_{(2, 159)} = 0.52, p = .59$. 
Similarly, there were no significant differences across conditions in Time 3 self-reported not just right feelings, $F_{(2, 159)} = 1.79, p = .17$. Planned contrasts on Time 3 PANAS-NA revealed no significant difference between the mindfulness and control conditions, $t_{(159)} = .841, p = .40$, or between the PMR and control conditions, $t_{(159)} = .92, p = .36$. Additionally, contrary to the hypothesis, there was no significant difference between the mindfulness and PMR conditions, $t_{(159)} = .07, p = .94$.

**Post-Hoc Analyses**

Post hoc analyses revealed that, in the entire sample, PANAS-NA scores did decrease significantly from pre-intervention (Time 2; $M = 24.81$) to post-intervention (Time 3; $M = 22.55$), $t_{(161)} = 3.87, p < .01$. Similarly, self-reported not just right feelings decreased significantly from pre-intervention ($M = 34.91$) to post-intervention ($M = 30.99$), $t_{(161)} = 2.00, p < .05$. At the condition level, PMR was the only condition wherein PANAS-NA scores decreased significantly from pre-intervention ($M = 25.03$) to post-intervention ($M = 21.74$), $t_{(53)} = 3.67, p < .01$. Similarly, only the PMR condition significantly decreased in self-reported not just right feelings from pre-intervention ($M = 38.74$) to post-intervention ($M = 31.89$), $t_{(53)} = 2.16, p < .05$. 
CHAPTER 4

DISCUSSION

The primary purpose of the present study was to investigate the utility of a brief mindfulness intervention to reduce NJRE symptoms by comparing its efficacy to that of both PMR and an active control condition. Previous literature has suggested that active use of mindfulness during heightened NJRE-related discomfort may be an effective way to reduce that discomfort (e.g., Bragdon & Coles, 2017; Schwartz, 2018; Summerfeldt, 2007). Despite previous suggestions that this relationship merits investigation, just one study has attempted to empirically investigate the efficacy of a mind-body intervention for NJREs. Fitch (2016) provided preliminary evidence that PMR may hold utility for reducing NJRE-specific distress at a level similar to ERP. To the author’s knowledge, the current study is the first to attempt to expand upon and clarify the Fitch (2016) results, comparing mind-body interventions to an active control condition. Additionally, the current study investigated the utility of another conceptually-relevant mind-body intervention—mindfulness—and its efficacy in relation to both PMR and the active control condition.

Baseline Correlations

It was expected that baseline measures would intercorrelate significantly given the conceptual relevance among the OCI-R, OC-TCDQ, and NJRE-QR. It also was expected that the predicted NJRE-specific distress reported via the PANAS-NA and questions from Summers et
al. (2014) would correlate significantly with the baseline measures. As such, it was not surprising that 152 of the 153 observed correlations were significant at the $p < .01$ level, a finding consistent with previous research and which supports the convergent validity of the measures selected for this study (e.g., Coles et al., 2005; Ecker & Gönner, 2008; Ghisi et al., 2010).

Conversely, beyond the observed convergence, the pattern of correlations predicted a priori on conceptual and previous empirical grounds largely was unsupported. In fact, just one hypothesis regarding symptom measure correlations was supported. Consistent with conceptualization of harm avoidant OCD and previous research (e.g., Pietrefesa & Coles, 2008), the present study found that OC-TCDQ Harm Avoidance was significantly more strongly correlated with OCI-R Washing than with OCI-R Ordering. Conversely, the present study found no significant difference in the correlations between each OC-TCDQ subscale and OCI-R Ordering. This is inconsistent with previous research by Ecker and Gönner (2008), who found that ordering symptoms as measured by the OCI-R were uniquely related to harm avoidance but not incompleteness. Similarly, the difference between the correlations of NJRE-QR Severity with each OCI-R Ordering and OCI-R Washing was not statistically significant. This also is inconsistent with previous research that suggested a specific relationship between NJREs and symptoms of ordering (e.g., Coles et al., 2005). Of note, Coles et al. (2005) utilized the Symmetry, Ordering, and Arranging Questionnaire (Radomsky & Rachman, 2004) as the marker of ordering symptoms. On the other hand, Ghisi et al. (2010) utilized the OCI-R Ordering subscale as the marker for symptoms of ordering and did not observe this difference. Therefore, the use of a different measure is one possible explanation for why the findings of Coles et al. (2005) were not replicated in the present study.
Several other factors may have influenced the present study’s findings, and these possibilities are considered in detail in the Limitations section. However, it is critical to highlight one issue that relates to the baseline correlations. Namely, the present study almost certainly was complicated by the very strong intercorrelation between the OC-TCDQ subscales. Some, but not all, previous research had reported significant intercorrelations between Harm Avoidance and Incompleteness (e.g., $r = .70$ in a nonclinical undergraduate sample; Summerfeldt et al., 2014), and this was a known concern when designing the present study. However, the OC-TCDQ subscales were even more starkly intercorrelated in the present study ($r = .91$). This finding of near-unity association likely foreclosed on the possibility that several of the planned analyses would return significant differences in correlations involving these subscales and any third variable. In the current sample, the OC-TCDQ subscales did not represent two clearly distinguishable constructs. Although the reason for this stark intercorrelation is uncertain, I have three main hypotheses to account for the value: (1) A genuinely large overlap between the subscales; (2) Highly skewed data in the present study; (3) Inattentive response patterns amongst participants of the present study, an issue discussed in further detail in the Limitations section.

NJRE Induction Task

Whereas the messy table NJRE induction has been used to successfully increase acute NJRE-related distress in past research (e.g., Cougle et al., 2011; Fitch, 2016; Summers et al., 2014), the task did not increase distress in the present study. In fact, across all participants, mean PANAS-NA scores showed a decrease in absolute value from pre-task to post-task. Self-reported
not just right feelings assessed using a single question from Summers et al. (2014) also did not increase following the task, which is contrary to what was predicted.

One possible explanation for this unexpected finding relates to the method of presentation of the task itself. To the author’s knowledge, past research utilizing the messy desk task has been conducted exclusively through in-person sessions. Although participants generally are asked to not directly interact with the physical stimuli and therefore the task is strictly visual, it is possible that the lack of proximity relevant to a virtual format decreased the salience of the stimulus or the emotional valence for participants. When participants complete the task in person—again, although they are not asked to directly interact with the desk—they have a more immediate ability to do so; the online administration does not allow for this and therefore is less likely to elicit such an urge. As such, seeing the desk through a computer monitor simply may not have had the same impact as physically being in the same room with it. However, previous research has suggested that online administration of other behavioral tasks may yield results similar to in-person administrations. For example, Casler et al. (2013) found that Amazon’s MTurk workers who watched a non-interactive recording responded to forced-choice questions in a manner consistent with those who completed the study in-person with an interactive component. Specifically, online and in-person participants did not differ regarding pre- or post-task response ($p > .05$). Notably, the purpose of Casler et al. was not to increase distress, but rather focused on a forced-choice decision-making process. Similarly, Crump et al. (2013) found that a variety of experimental tasks—including tasks of reaction time, attention, and learning studies—translated well to MTurk administration, with the authors noting that data quality and outcomes were comparable to their in-person counterparts when instructional check questions were included.
Crump et al. (2013) found similar outcomes for in-person vs. online administrations in terms of mean-level values, response times, and learning rates on various behavioral tasks. Whereas these studies also were not meant to induce distress, and therefore are notably different from the aims of the present study, other research has suggested it is possible to use methods typically conducted in-person to induce stress in an online format. Almazrouei et al. (2022) utilized the Trier Social Stress Test and found that, relative to a control condition, participants in the active condition exhibited significantly ($p < .01$) more state anxiety. Based on this evidence from the literature, there was reason to believe that an online administration of the NJRE task in the present study might reasonably yield comparable results to its in-person counterpart. However, the current findings did not conform to these cited findings from the literature that informed and gave confidence to the present study’s design.

**Symptom Score Correlations with Time 2 Distress**

It was predicted that Time 2 PANAS-NA would correlate more strongly with OC-TCDQ Incompleteness than with OC-TCDQ Harm Avoidance due to the task’s purported induction of a not just right experience—defined here as an acute manifestation of incompleteness symptoms. Given the unsuccessful manipulation (i.e., the NJRE induction task’s lack of efficacy in increasing distress in the present study), it is unsurprising that the predicted correlations between Time 2 PANAS-NA and baseline symptom scores were not observed. This is inconsistent with previous results which found that task-related discomfort correlated more strongly with OC-TCDQ Incompleteness ($r = .38$) than with OC-TCDQ Harm Avoidance ($r = .25$; Summers et al., 2014). In fact, when controlling for pre-task discomfort and symptoms of depression, Summers
et al. (2014) found a non-significant correlation ($r = .07$) between post-task discomfort and OC-TCDQ Harm Avoidance.

Similarly, the present study did not find support for the hypothesis that Time 2 PANAS-NA would be more strongly correlated with NJRE-QR Severity than with OC-TCDQ Harm Avoidance. In fact, the opposite was found—Time 2 PANAS-NA was more strongly correlated with OC-TCDQ-Harm Avoidance than with NJRE-QR Severity. This remained true when using Summers et al. (2014)’s question as the marker of distress. These findings are in direct contrast with Cougle et al. (2013), which found a significant relationship between post-task anxiety and NJRE-QR Severity ($r = .45$) but not between post-task anxiety and OC-TCDQ Harm Avoidance ($r = .31$). Summers et al. (2014) also observed a larger correlation between post-task discomfort and NJRE-QR Severity ($r = .33$) than between post-task discomfort and OC-TCDQ Harm Avoidance ($r = .25$). Although it was not reported whether those correlations were significantly different from one another, their absolute value and pattern reflect the trend observed in the extant literature.

Results of the present study also did not support the hypothesis that task-related distress would be more strongly correlated with symptoms of ordering than washing. This hypothesis was based on both conceptual relevance of ordering to symptoms of incompleteness, as well as past research finding that incompleteness is more specifically related to symptoms of ordering than to symptoms of washing (Ecker & Gönner, 2008; Pietrefesa & Coles, 2008). The present study found no significant difference in correlations between Time 2 PANAS-NA and each of OCI-R Ordering and OCI-R Washing.
The discrepancy between the present correlational results and past research must be interpreted with caution for two major reasons. First, and as mentioned, the unusually strong correlation between the OC-TCDQ subscales \( r = .91 \) set an extremely high bar for observing any discriminant correlations involving these subscales. A strong intercorrelation between OC-TCDQ subscales had been observed in previous research (e.g., \( r = .70 \) in Summerfeldt et al., 2014), but the intercorrelation between these subscales observed in the present study reflects an exceptional overlap between the two, an issue discussed at length in the Limitations section. Second, the very high intercorrelation observed in the present study between OCI-R Ordering and OCI-R Washing \( r = .76 \) was unexpected given the more modest intercorrelation between the subscales observed in past studies (e.g., \( r = .34 \) in Abramowitz & Deacon, 2006). Therefore, the sheer magnitude of the baseline intercorrelations may have doomed the relevant hypotheses prior to participants even completing the NJRE induction task. Of course, the separate failure of the NJRE induction task to successfully increase distress further muddled the meaning of any analyses involving Time 2 PANAS-NA scores. As the task did not increase distress, subsequent analyses involving post-task distress are rendered less interesting and likely less meaningful. In this context, these analyses are somewhat nonsensical and perhaps akin to utilizing Time 1 PANAS-NA scores—or baseline general distress unrelated to the present study or NJRE-specific distress—in the relevant comparisons. Overall, the measure correlations and failure of the messy desk image to increase distress render it impossible for the present study to draw conclusions regarding the relationship between these variables.
Intervention Efficacy

Results of the present study did not support the hypothesis that the mindfulness and PMR conditions would show less distress at Time 3 when compared with the control condition. In fact, there were no significant differences in Time 3 PANAS-NA scores among any of the conditions. Although there also were no differences on Time 2 PANAS-NA scores, post-hoc analyses revealed a significant difference between Time 2 and Time 3 such that distress significantly decreased in the sample as a whole. Further investigation revealed that of the conditions, only the PMR condition exhibited significantly lower Time 3 scores; there was no significant difference between Time 2 and Time 3 PANAS-NA scores in either the mindfulness or control condition. One caveat to these findings is the razor-thin margin between these results and the determination of statistical significance. For example, PANAS-NA scores decreased from Time 2 to Time 3 by an absolute value of 2.26 in the entire sample and represented a statistically significant change. However, PANAS-NA scores decreased from Time 2 to Time 3 by an absolute value of 2.22 in the control condition, a finding which did not represent a statistically significant change. This discrepancy likely is due to a difference in power between full-sample and condition-level analyses and necessarily underscores a lens through which all results from the present study must be viewed.

Although these findings offer evidence in direct contrast of the study’s hypotheses, there is a possible explanation based on the failure of the NJRE induction task to increase NJRE-related distress. Had the induction been successful, it is possible that the mindfulness condition would have illustrated lower Time 3 PANAS-NA scores relative to the PMR condition, with the relevance of mindfulness to sensory-affect dysregulation (e.g., Summerfeldt, 2007). As this did
not occur, it is not immediately clear what post-task/pre-intervention (Time 2) distress reflects. If this reflects general baseline distress—as Time 2 PANAS-NA scores did not differ significantly from Time 1 PANAS-NA scores—it is unclear the mechanism through which PMR “outperformed” mindfulness. Previous research has found that PMR and mindfulness do not differ significantly in their efficacy to reduce symptoms of tension (Agee et al., 2009) or stress (Gao et al., 2018). However multiple studies have found that PMR significantly outperforms mindfulness in reducing somatic anxiety (Lancaster, 2016; Rausch et al., 2006). Therefore, one possible explanation is that Time 1 and Time 2 PANAS-NA scores are reflective of a degree of somatic anxiety and, in the absence of NJRE-induced distress, PMR was better-suited in reducing this score. However, this is purely speculation. A more nuanced explanation is beyond the reach of the findings provided by the present study.

Limitations

The present study found results that largely are inconsistent with hypotheses and previous research. Therefore, the limitations of the study will be discussed through the lens of Cronbach and Meehl (1955), which posited three main reasons why research may yield null findings: (1) incorrect use of measures for the construct of interest; (2) incorrect or incomplete theoretical framework; (3) poor experimental design. As any combination of these possibilities may account for null findings, all three will be considered in the context of the present study.
Measuring Constructs of Interest

As noted, the significant intercorrelation of the OC-TCDQ subscales of Harm Avoidance and Incompleteness likely posed insurmountable hurdles for some of the relevant hypotheses. Previous research regarding this relationship has varied, with some studies observing this relationship to be large in nonclinical samples (e.g., $r = .76$ in Lee & Wu, 2019; $r = .70$ in Summerfeldt et al., 2014) whereas others have observed much lower values in nonclinical samples (e.g., $r = .34$; Cougle et al., 2013). The present study observed an especially strong relationship between these subscales ($r = .91$). Notably, an observation of significant overlap did not prevent Summerfeldt et al. (2014) from concluding that the two-factor model of the OC-TCDQ was most appropriate. Indeed, Summerfeldt et al. (2014) described all fit indices for this model observed in their study as “very good.” At levels observed in previous research, strong correlations between the Harm Avoidance and Incompleteness subscales may be reflective of two constructs that are inherently interrelated and carry some overlap but—as suggested by Summerfeldt (2004) and observed by Ecker and Gönner (2008)—also show distinct relationships with certain obsessive-compulsive symptoms. However, the results of the present study add to a literature illustrating inconsistent and sometimes very highly intercorrelated OC-TCDQ subscales. Notably, the significant intercorrelation between the two OC-TCDQ subscales in the present study would be the highest in the published literature to date. Further, at the very least, that other studies have found the two subscales to be highly correlated calls into question the structural validity of the OC-TCDQ. Explicitly, the primary aim of the present study was not to perform a series of validation analyses to determine whether the OC-TCDQ is a viable measure of harm avoidance and incompleteness as two distinct constructs. Nevertheless, the study’s
design relied heavily on the OC-TCDQ to perform that critical role. Unfortunately, the results observed in the present study undoubtedly suffered from the significant overlap between OC-TCDQ subscales. Based on the intercorrelation between OC-TCDQ subscales—and the observed correlations between the OC-TCDQ subscales and any third variable—the viability of the instrument itself is called into question and should be a continued focus of investigation. At present, any use of the OC-TCDQ as a measure viewing harm avoidance and incompleteness as distinct constructs should be done with caution.

The use of the PANAS-NA to gauge distress in the present study may not have been the best evaluation of participants’ NJRE-related distress. Watson et al. (1988) found that the PANAS-NA was significantly related to perceived distress and is sensitive to fluctuations in mood. In fact, this measure has become one of the most widely used measures of momentary mood in all extant literature, with specific frequent use in studies of nonclinical populations and studies whose primary aim is to assess moment-to-moment mood changes (Rossi & Pourtois, 2012). Therefore, it was hypothesized that the items would be sufficient to capture respondent’s distress in response to both the NJRE induction as well as the active intervention of the present study. Nevertheless, it is possible that the distress induced by the present task requires a more pointed evaluation than the nonspecific nature of the PANAS-NA items (Appendix E), as it is not immediately clear what relevance items 3, 4, 5, 7, and 10 have to the present task. However, previous research in this area has utilized verbal anxiety scales which enquire broadly about participants’ anxiety or discomfort (Cougle et al., 2011; Cougle et al., 2013; Fitch, 2016), as well as more NJRE-specific distress (Summers et al., 2014)—and observed an increase in distress from pre- to post-task in all instances. Notably, when examining an NJRE-specific distress
question (from Summers et al., 2014) instead of PANAS-NA as the marker of distress, the pattern of results in the present study remained unchanged. Therefore, although possible, it seems unlikely that the nature of the PANAS-NA content was the key consideration regarding the lack of support for relevant hypotheses in the present study.

**Theoretical Framework**

As Davey (2003) suggested, investigation and validation of concepts must rise beyond that of epiphenomenal constructs—including his pointed commentary about NJREs. Subsequent research sought to validate incompleteness and its lower-level manifestation of NJREs as distinct from harm avoidance in a meaningful way. Indeed, much of the research that followed explored the relationship between incompleteness and harm avoidance with specific interest into how these purportedly distinct constructs related to well-defined symptoms of OCD. This research (e.g., Cougle et al., 2013; Ecker & Gönner, 2008; Summerfeldt et al., 2014) offered evidence that the two constructs, although sharing overlap, were uniquely empirically associated with theoretically relevant symptoms. Therefore, the extant literature to date indicates that incompleteness as a separate construct explains significant incremental variance of certain OCD symptoms beyond that of harm avoidance. As such, the present study offered hypotheses predicated on the notion that incompleteness and harm avoidance are meaningfully distinct. However, it is possible that this is not the case. That harm avoidance and incompleteness are not distinct from one another as separate constructs provides one rather parsimonious explanation for such significant statistical overlap between the OC-TCDQ subscales. Further research is needed, perhaps with new or revised means of measurement of harm avoidance and incompleteness, to
disentangle the relationship between these two purportedly distinct constructs. At the very least, such research must *consistently* illustrate a meaningful distinction between harm avoidance and incompleteness. Preferably, research would illustrate the importance of acknowledging these constructs as distinct by clearly identifying separate and unique relationships with lower-order symptoms of OCD (e.g., ordering, washing).

It also is important to consider the relevance of mindfulness to symptoms of OCD, specifically those symptoms supposedly related to incompleteness. Although there is some evidence to the contrary (e.g., Cludius et al., 2015), previous research generally has shown mindfulness practice to be an effective intervention for OCD symptoms (e.g., Hale et al., 2013). Some have argued that there is a conceptual mismatch between traditional ERP for OCD and symptoms of incompleteness due to the focus of the ERP model on cognitions as primary in the OCD cycle. Specifically, Summerfeldt (2004) conceptualized incompleteness to be an experience of sensory-affect dysregulation as primary, with cognitions as a secondary experience. This conceptualization was supported by Schwartz (2018), who found evidence to suggest that ERP is more effective for harm avoidance than incompleteness. Therefore, the approach of the present study was predicated on the idea of Bragdon and Coles (2017) that emotion regulation and focus on an internal affective experience may be most appropriate for treatment of incompleteness-related symptoms. It was believed that mindfulness would be an appropriate intervention to accomplish this based on what Shapiro et al. (2006) termed as the mindfulness process of “reperceiving” or a shift in perspective. They asserted that mindfulness encourages a nonjudgmental reperception, which in turn is supported by additional mindfulness mechanisms of self-regulation, flexibility, and exposure. It was hypothesized that mindfulness
would encourage a nonjudgmental focus on individuals’ momentary experiences, including NJRE-related distress, and thereby reduce negatively-valenced emotions related to this distress through the mechanisms of self-regulation, flexibility, and exposure. It is possible that these mechanisms of mindfulness practice would be more appropriate when presented through alternate mindfulness exercises than what was used in the current study. Alternatively, it is possible that these mechanisms of mindfulness practice in any sense are not relevant to NJRE-related distress beyond academic conceptualization and hold no real-world application.

However, the results of the present study cannot lead to definitive conclusions regarding the match between NJREs and mindfulness. The failure of the NJRE induction task to induce NJRE symptoms, rather than the use of mindfulness as an intervention, may account for this discrepancy between predicted and observed outcomes. If no acute NJRE-related distress was present at Time 2 above and beyond baseline scores, there would be no reason to suspect mindfulness would outperform PMR in reducing general nonspecific distress. Future research may consider fleshing out this further—namely, whether the results of the present study were influenced more by the absence of NJRE-related distress or a lack of applicability to NJRE distress.

**Experimental Design**

Previous research has found evidence that behavioral tasks can be successfully administered online with similar outcomes to their in-person counterparts (Casler et al., 2013; Crump et al., 2013). However, others have observed notable decline in the reliability and validity of research conducted through Amazon’s MTurk (Chmielewski & Kucker, 2020). This is important as, to my knowledge, previous research utilizing the messy desk NJRE induction has
been conducted exclusively in-person. Further, there are no known cases in published literature of this task failing to increase NJRE-related distress from pre- to post-task. The most parsimonious explanation here is that the induction did not have the desired effect because it was administered in a novel, untested manner and it simply did not work in this format due to the extent to which participants were removed from physical stimuli.

It also is important to examine the manner in which mindfulness was utilized in the present study. Formal mindfulness practice, sometimes referred to as mindfulness meditation, differs from informal mindfulness meditation in several ways (Birtwell et al., 2019). Formal mindfulness practice, as laid out by Kabat-Zinn (2013), typically involves intentionally setting aside time daily to practice mindfulness skills. The goal of this type of mindfulness, then, is to reduce broad anxiety symptoms (and other symptoms) and increase attention rather than address acute instances of distress. However, this formal mindfulness approach is not the manner in which the present study utilized mindfulness. Informal practice can be used at unplanned times, with research showing this can lead to increased awareness and openness to experiencing negatively-valenced emotions (e.g., Cebolla et al., 2017). Multiple studies have suggested that the use of mindfulness when experiencing acute distress in response to an internal or external trigger can lower associated tension and fusion with thoughts (e.g., Feldman et al., 2010; Johnson et al., 2015), as well as decrease negative affect—notably, as measured by the PANAS-NA scale (Lancaster et al., 2016). Previous research has investigated the utility of informal or brief mindfulness practice in reducing acute nonspecific distress (e.g., Lancaster et al., 2016; Rausch et al., 2006) with findings generally suggesting similar effectiveness between mindfulness and PMR. Therefore, the present study sought to apply an informal use of
mindfulness to address the sensory-affect dysregulation present in symptoms of incompleteness. Nevertheless, it is possible that a more formal and traditional approach to mindfulness would be more appropriate to address distress related to NJREs.

Beyond the NJRE induction task and the way in which mindfulness was utilized, the results of the present study should be considered in the context of its online administration—specifically through the use of Amazon’s Mechanical Turk platform. Landers and Behrend (2015) asserted that MTurk provided researchers with a convenient tool to address longstanding issues with typical student samples, including lack of diversity and demographic representation. However, they acknowledged concerns with quality of data collected via crowdsourcing and suggested the use of attention-checking questions. Although Peer et al. (2014) suggested that only allowing MTurk respondents with \( \geq 95\% \) approval rating should ensure high quality data in the absence of attention check questions, the present study included approval rating requirements, attention check questions, and a reCAPTCHA task in an effort to increase the quality of the data collected.

Despite these efforts, there is sufficient reason to exercise caution when considering the validity and overall quality of data included in these analyses. First, there was a lack of racial diversity in the present study, with 87\% of final participants identifying as White, which is consistent with some previous research finding an overrepresentation of White-identifying workers on MTurk (e.g., Berinsky et al., 2012). Further, the observed scores in the purportedly non-clinical sample call into question the accuracy of responses. For example, the OCI-R utilizes a cutoff score of 21 to differentiate clinical from non-clinical individuals. In the present study,
the average OCI-R total score was $M = 38.30$. This figure is surprisingly elevated and would represent scores more akin to those expected in a selected clinical sample.

Additionally, prior to conducting any analyses, it was determined that data from 60 participants (27% of 222 total respondents) were unusable. Of these, 32 participants provided incomplete data due to exiting the study prematurely; 26 participants missed greater than 5% on at least half of all questionnaires; 2 participants failed the instructional validity check questions, answering only one of the three questions correctly. That data from 27% of participants were immediately excluded was disappointing but did not necessarily preclude the study from finding support for hypotheses or, at the very least, being comprised of otherwise high-quality data. Unfortunately, concerning patterns within the data did not stop there. For example, of the 162 remaining participants who ultimately were included in analyses, 61 (37.7%) failed one of the instructional validity check questions. This does not inherently identify the data from those 61 participants as poor but is concerning given the nature of the check questions—specifically, the check questions are designed to be elementary and therefore any incorrect response necessarily indicates a certain level of inattention.

Concerns regarding the data quality from MTurk are not unique to the present study. Research has noted significant negative impacts on the reliability and validity of research conducted through MTurk as the use of “bots”—automated computer programs designed to complete specific tasks—has emerged (e.g., Chmielewski & Kucker, 2020). Chmielewski and Kucker (2020) found that from 2015 to 2019, there were significant increases in MTurk respondents who failed validity questions and decreased reliability and validity on symptom measures. Kennedy et al. (2020) noted a rise in MTurk workers’ use of programs to mask or
change IP address information, thereby circumventing potential restrictions related to duplicate IP addresses. Dennis et al. (2020) expanded upon this issue, noting that software developed to identify such fraud is often unreliable. Additionally, both Kennedy et al. (2020) and Dennis et al. (2020) highlighted the relative ease with which non-U.S.-based individuals may appear to be located within the United States.

Interestingly, other location-based screening may provide further insight into fraudulent responses. Ryan (2018) discussed the screening of geographic information routinely collected by some, but not all, survey programs in the form of approximate latitude and longitude coordinates. Ryan (2018) specifically noted the emergence of identical repeated geographic information and explored the quality of these responses. Ryan (2018) stated that, although the responses may appear to be legitimate at first look, a deeper examination provided suspicion as to the validity of each response set. Ryan (2018) also noted that these response sets were often duplicated elsewhere in the dataset, but not always with a case sharing identical geographic information. Therefore, Ryan (2018) concluded that whereas there is reason to believe such repetition of geographic information is indicative of fraudulent responses of some variety—whether completion by bots or duplicate human responses—there is no immediately clear process to determine which response sets were legitimate and valid. Alarmingly, this appears to have relevance to the present study’s results. Although safeguards were in place on both MTurk and Qualtrics to prevent individuals from completing the present study multiple times, 32 of the final 162 cases included in the present study had identical geographic coordinates. However, as noted by Ryan (2018), this could be indicative of a number of problematic response approaches, including a single individual with multiple completions or bots with artificial intelligence
designed to automatically complete studies. Alternatively, although unlikely, this also could be reflective of many people in one location completing the same study.

Other factors beyond location data may hold insight into data quality as well. Burnette et al. (2022) conducted a study with protections for data quality similar to that of the present study; specifically, requirement of ≥ 95% approval rating, attention check questions, and a reCAPTCHA task. However, they conducted a rigorous review of the remaining data after these protections were in place and identified further cases that were “likely invalid” due to nonsensical responses to open-ended questions, inconsistent reporting of age or gender, response time extremes, and inconsistencies across other data included in the study measures. They found that up to 90% of participants who provided informed consent (n = 3,143) were “likely invalid” and abandoned their original study. Their use of response times as a marker for validity is especially relevant to the present study. Specifically, the range of the present study included times as low as 788 seconds (approximately 13 minutes) and as high as 7,564 seconds (approximately two hours). Participants’ screens were locked for the entirety of the 10-minute intervention, meaning completion of all questionnaires occurred outside of this timeframe. This is concerning for participants whose total completion time was on the low end of the observed range. Consider a participant whose completion time was 788 seconds: With 600 seconds of non-response time for the assigned intervention, this leaves 188 seconds to read and complete 100 questionnaire items. This translates to less than 2 seconds per item without accounting for time spent reading the consent or any questionnaire directions. Whereas the present study did not establish an a priori “adequate” response time, these results raise further concerns regarding the validity of some of the results.
As such, it appears that even under the most rigid application of current best-practice recommendations for using MTurk, data quality likely suffers from a variety of factors. The present study implemented a relatively stringent set of precautions to protect data quality, beyond what Peer et al. (2014) recommended. Despite this, patterns observed within the data included for analysis in the present study—specifically, patterns identified as potentially problematic within the extant literature—necessitate careful consideration of the validity of the present study’s results. Additionally, the continued pattern of potentially problematic data calls into question whether crowdsourcing in psychological research, especially through the use of Amazon’s Mechanical Turk, remains a viable option for sound research practice.

Future Directions

Future research relevant to the current study should continue to investigate the relationship between incompleteness and harm avoidance, including their specificity to various symptoms of OCD. The existence of just one measure to explicitly assess both incompleteness and harm avoidance appears problematic, especially considering the often strongly intercorrelated subscales of the OC-TCDQ. As empirical research into the putative distinction between the two constructs is still in its relative infancy, the field likely would benefit from an expanded approach to their measurement. Although it is possible that a revision to the OC-TCDQ may yield a more consistent distinction between its two subscales, it may be necessary for future research to consider an alternative measurement approach in investigating the supposed distinction between incompleteness and harm avoidance.
In the event these constructs prove to be consistently and meaningfully distinct, it would be important to consider the most efficacious way to intervene for OCD symptoms driven by incompleteness beyond the traditional methods used to intervene with harm avoidance. Whereas ERP has been found to be effective for a wide range of symptoms, that symptoms of incompleteness do not respond as well as do symptoms of harm avoidance to ERP merits continued research into novel ways to augment intervention. Based on the theoretical relation of mindfulness to sensory-affective experiences, there remains the possibility that mindfulness in a nontraditional sense holds utility for acute instances of NJRE-related distress. Other forms of novel treatment such as transcranial magnetic stimulation have shown promise specifically for incompleteness-based OCD symptoms—especially when targeting neurological systems hypothesized to influence these sensory experiences (Mantovani et al., 2013).

Given the questionable nature of the quality of data collected through Amazon MTurk for the present study, taken in conjunction with the contrast of these results to previous research, future studies may consider investigating these issues with improved methodology. For example, it is possible that some hypotheses put forth may find support if investigated through more traditional means of in-person data collection. Alternatively, other crowdsourcing approaches may provide a different quality of data while allowing for more diverse sampling than typical college student sampling methods (e.g., Roulin, 2015). Although it is not immediately apparent why one form of crowdsourcing may be of a higher quality than another, Chandler et al. (2019) suggested this possibly may be due to MTurk workers’ low pay, repeated exposure to similar research materials, and general lack of diversity compared to the composition of the United States. For example, although with notable bias, Peer et al. (2022) found evidence to suggest the
platform Prolific significantly outperformed MTurk on a multitude of data quality indicators. As such, investigation of the current research questions through other means of crowdsourcing data collection may yield different results. Similarly, future research might further investigate the adaptation of the messy desk induction from in-person to an online format. It is possible that alterations to the task—such as making it possible to interact with the stimulus virtually—would increase the task’s salience and thus make it more amenable to an online administration. Should future research replicate problematic results from the present study, this would call into question whether this specific task is appropriate in a virtual format.
CHAPTER 5

CONCLUSION

This study was designed to be one of the first in published literature to explore the utility of a brief mindfulness-based intervention for acute NJRE-related distress. Unfortunately, study results were problematic for two key reasons. First, baseline symptom measures were strongly correlated beyond what was expected based on the extant literature. This precluded a realistic opportunity to observe support for several of the main study hypotheses. Second, the manipulation did not induce the intended NJRE-related distress. Therefore, the attempt to “treat” elevated distress was not a meaningful exercise across the three study conditions. Despite the current results—and acknowledging several potential limitations of the present study—it remains important to clarify the nature of relations between harm avoidance and incompleteness.

Previous research suggests that current gold-standard treatments (i.e., ERP) focus on treating OCD through a harm avoidance lens. To the degree that harm avoidance and incompleteness are determined to be meaningfully distinct from one another, it is important to adopt a nuanced approach to their measurement and treatment.
REFERENCES


APPENDIX A

DEMOGRAPHICS QUESTIONNAIRE
Demographics Questionnaire

1. What is your age? ________

2. What is your sex?
   1 = Male
   2 = Female
   3 = Other

3. What is your racial identification?
   1 = Black/African American
   2 = Asian/Asian American
   3 = White/European American
   4 = Native American
   5 = Multiracial
   6 = Other

4. What is your ethnicity?
   1 = Hispanic/Latino
   2 = Not Hispanic/Latino

5. Have you ever been formally diagnosed with Obsessive-Compulsive Disorder?
   1 = Yes
   2 = No

6. Have you ever been formally diagnosed with any other mental health disorder?
   1 = Yes ________________
   2 = No

7. What is your familiarity level with mindfulness?
   1 = None at all
   2 = I have tried it before, but do not engage regularly
   3 = I regularly practice mindfulness

8. What is your familiarity level with Progressive Muscle Relaxation?
   1 = None at all
   2 = I have tried it before, but do not engage regularly
   3 = I regularly practice PMR
APPENDIX B

OBSESSIVE-COMPULSIVE TRAIT CORE DIMENSIONS QUESTIONNAIRE
Obsessive-Compulsive Trait Core Dimensions Questionnaire
(OCTCDQ; Summerfeldt et al., 2001)

Please read each statement and decide how the statement applies to how you typically think, feel, and act.

- If the statement never applies, select N.
- If the statement rarely applies, select R.
- If the statement sometimes applies, select S.
- If the statement frequently applies, select F.
- If the statement always applies, select A.

Give your own opinion of yourself. Be sure to answer every statement. Erase completely any answer you wish to change. Begin with the first statement and respond to every statement.

1. I get a sense of apprehension, as though something bad might happen or may have already happened.
2. I feel I must do things in a “set way”, though I might have difficulty putting that set way into words.
3. Even if harm is very unlikely, I feel the need to prevent it at any cost.
4. I am bothered by the sense that things are imperfect (such as belongings, ideas, or tasks to be done).
5. There are things that I am afraid might happen if I don’t take certain steps to prevent them.
6. I must do things in a certain way or I will not feel right.
7. I get the impression that things are more threatening to me than to other people.
8. I feel driven to re-do or prolong activities or tasks until they feel “just right”.
9. There are specific things around me that could cause harm to me or to people I care about.
10. Routine activities take me longer than they should because they don’t seem perfectly completed.
11. There are certain consequences that I am more afraid of than most people.
12. I waste a lot of time trying to get things “just right”.
13. It seems like I am “on the lookout” for the dangers in situations.
14. There is nothing like the feeling I have when something is finally satisfactorily completed.
15. I have fears that I wish I could ignore, but can’t.
16. I am very particular about how things must appear or be done.
17. I cannot help but think about bad things that might happen.
18. It takes a long time for me to feel certain about things.
19. Situations or things seem so scary that I wish I could avoid them altogether.
20. I know I’ve done something right when I get a certain feeling inside.
APPENDIX C

NOT JUST RIGHT EXPERIENCES QUESTIONNAIRE
Not Just Right Experiences Questionnaire – Revised

(NJRE-QR; Coles et al., 2003)

We are interested in studying what are called “Not Just Right Experiences” (NJRE’S). These experiences can best be defined as times when you have the subjective sense that something isn’t just as it should be.

There are many different types of these experiences, and some examples are provided below to help you. Usually these experiences are time-limited, sometimes momentary and sometimes lasting just a little longer. These experiences all have their roots in YOU: feeling unsettled because of something in you, or because of YOUR perception that the world around you isn’t right.

Read through the examples below before continuing on to the questionnaire:

**Examples that ARE classified as “NJRE’s”:**
- Feeling that you might have forgotten something
- a strange physiological feeling that you don’t recognize
- the feeling that you get when you think you haven’t done something well enough
- feeling unsafe or vulnerable for no recognizable reason
- feeling that objects aren’t arranged in just the right away

This questionnaire presents a set of NJREs and then asks you to pick the one that has occurred most recently and to answer some questions about it. Please read the list of NJREs carefully and indicated by filling in the appropriate circle whether or not you have experienced each one in the past month.

Has this occurred in the past month? 0=NO; 1=YES

1. I have had the sensation after getting dressed that parts of my clothes (tags, collars, pant legs, etc.) didn’t feel just right.
2. When placing a book back onto a shelf, I have had the sensation that it did not look just right with the other books.
3. When locking the door to my house, I have had the sensation that the feel of the lock locking wasn’t just right.
4. I have had the sensation while folding my clothes that they did not look the way folded clothes should look.
5. I have had the sensation while writing something down that the words did not look just how I wanted them to look.
6. When talking to people, I have had the sensation that my words did not sound just right.
7. I have had the sensation while organizing my desk that my papers and other things didn’t look just right.
8. When putting a bill or letter into a mailbox, I have had the sensation that the way I placed the envelope in the mailbox and closed the door didn’t feel just right.

9. After washing my hands once, I have had the sensation that they did not feel just the way clean hands are supposed to feel.

10. When hanging a picture on the wall, I have had the sensation that it did not look just right.

11. The NJRE from the list above that occurred most recently is the following:

12. The last time it occurred was:
   1) Within the past few hours.
   2) Within the past day.
   3) Within the past week.
   4) Within the past month.

13. How frequently did you experience this NJRE?
   1) Never
   2)
   3) Within the past year
   4)
   5) Within the past month
   6)
   7) Within the past day

14. How intense was this NJRE?
   1) Not intense at all
   2)
   3)
   4) Moderately intense
   5)
   6)
   7) Extremely intense

15. To what degree did this NJRE bother you or cause you distress AT THE TIME?
   1) No distress at all
   2)
   3)
   4) Moderate distress
   5)
   6)
   7) Extremely intense
16. To what degree did this NJRE bother you or cause you distress LATER THAT SAME DAY?
   1) No distress at all
   2)
   3)
   4) Moderate distress
   5)
   6)
   7) Extremely intense

17. To what extent did you feel that you couldn’t get this NJRE out of your mind?
   1) Not difficult at all to get it out of my mind
   2)
   3)
   4) Moderately difficult to get it out of my mind
   5)
   6)
   7) Extremely difficult to get it out of my mind

18. To what extent did you have an urge to do something about this NJRE?
   1) No urge to do something
   2)
   3)
   4) Moderate urge to do something
   5)
   6)
   7) Extreme urge to do something

19. To what extent did you feel that it was your responsibility to do something about this NJRE?
   1) Not at all responsible
   2)
   3)
   4) Moderately responsible
   5)
   6)
   7) Extremely responsible
APPENDIX D

OBSESSIVE-COMPULSIVE INVENTORY-REVISED
Obsessive-Compulsive Inventory-Revised

(OCI-R; Foa et al., 2002)

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

Please use the following scale in your responses: 0=Not at all; 1=A little; 2=Moderately; 3=A lot; 4=Extremely

1. I have saved up so many things that they get in the way.
2. I check things more often than necessary.
3. I get upset if objects are not arranged properly.
4. I feel compelled to count while I am doing things.
5. I find it difficult to touch an object when I know it has been touched by strangers or certain people.
6. I find it difficult to control my own thoughts.
7. I collect things I don’t need.
8. I repeatedly check doors, windows, drawers, etc.
9. I get upset if others change the way I have arranged things.
10. I feel I have to repeat certain numbers.
11. I sometimes have to wash or clean myself simply because I feel contaminated.
12. I am upset by unpleasant thoughts that come into my mind against my will.
13. I avoid throwing things away because I am afraid I might need them later.
14. I repeatedly check gas and water taps and light switches after turning them off.
15. I need things to be arranged in a particular way.
16. I feel that there are good and bad numbers.
17. I wash my hands more often and longer than necessary.
18. I frequently get nasty thoughts and have difficulty in getting rid of them.
APPENDIX E

THE POSITIVE AND NEGATIVE AFFECT SCHEDULE –

NEGATIVE AFFECT SUBSCALE
The Positive and Negative Affect Schedule – Negative Affect Subscale

(PANAS; Watson et al., 1988)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then select the appropriate answer. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers.

1=Very slightly or not at all; 2=A little; 3=Moderately; 4=Quite a bit; 5=Extremely

1. Distressed
2. Upset
3. Guilty
4. Scared
5. Hostile
6. Irritable
7. Ashamed
8. Nervous
9. Jittery
10. Afraid
Post-NJRE Task Questions
(Summers et al., 2014)

Please respond to the following questions on a 0 (none) to 100 (extreme) scale.

1. How uncomfortable, tense, or ‘not just right’ do you feel right now?
2. How strong is your urge to arrange or straighten this table?
APPENDIX G

TREATMENT FIDELITY CHECK
Treatment Fidelity Check

Please respond to the following questions as honestly as possible.

1. I was actively engaged in the assigned breathing task.

   1 = Mostly false
   2 = Somewhat false
   3 = Neither true or false
   4 = Somewhat true
   5 = Mostly true