Thought-Action Fusion: Comparative Relationship with Symptoms of Obsessive-Compulsive Disorder and Eating Disorders

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There are many similarities between the presentations of individuals with Obsessive-compulsive disorder (OCD) and individuals with eating pathology. These include similar obsessive thoughts, repetitive actions, and shared personality characteristics, such as perfectionism. However, similarities may extend beyond that of DSM-based symptomatology to include an important cognitive process called thought-action fusion (TAF). Thought-action fusion is a construct derived from the OCD literature wherein individuals feel that there may be a connection between their thoughts and real-world outcomes. There has been considerable research illustrating the impact TAF has on individuals with OCD, both in terms of development and maintenance of obsessions and compulsions. Studies have illustrated that the experience of TAF is not limited to individuals with OCD. In this context, individuals who present with eating disorders offer an interesting – and perhaps important – population to study. The current study sought to examine the degree to which TAF relates to both OCD symptoms and eating disorder symptoms, using an explicitly dimensional/correlational approach.
Seventy undergraduate students from Northern Illinois University were recruited for this in-person study. Participants completed a number of questionnaires as well as the Sentence Task that is thought to be a behavioral induction of TAF. Per self-report symptom questionnaires, there was no significant relationship between TAF and symptoms of eating disorders (p = .05), whereas there were significant correlations between the TAFS and symptoms of OCD and symptoms of depression. The Sentence Task did significantly increase self-reported state anxiety levels from pre- to post-Task, but no symptom scores—including the TAFS—were able to significantly predict the magnitude of that change, calling into question the construct validity of the task. Limitations of the present study are considered as well as implications for future research.
ACKNOWLEDGEMENTS

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CHAPTER 1
INTRODUCTION

Thought-action fusion (TAF) is a psychological process involving the belief that one’s thoughts have an impact on real-world events and also hold moral implications (Shafran et al. 1996). This construct is primarily associated with obsessive-compulsive disorder (OCD), but studies have shown that TAF is not specific to OCD (e.g., Bailey et al., 2014). Whereas individuals with OCD exhibit comparatively higher levels of TAF, research has found TAF is elevated in individuals diagnosed with a variety of disorders, including generalized anxiety disorder, panic disorder, and depression (Abramowitz et al., 2003). Thought-shape fusion (TSF), a variant of TAF, first was proposed by Shafran et al. (1999) as a cognitive distortion involving the belief that merely thinking about certain foods can have a real-life impact on a person’s weight and body image or have moral implications. In experimental investigations into how TSF may be related to eating disorders, researchers have used similar methodology as is used in the TAF literature, including measures with similar wording and similar behavioral inductions (Radomsky et al., 2002; Shafran et al., 1999).

Although TSF is proposed to be specific to eating pathology, the original TAF concept has not been widely studied in the context of eating disorders. Levels of TAF have been examined in the context of other conditions, but eating disorders primarily have been studied alongside TSF (Shafran & Rachman, 2004). Few studies have specifically examined levels of TAF in individuals with eating disorders. Cross-study results suggest that individuals with eating disorders may score similarly to individuals with OCD on TAF measures (Abramowitz et al., 2003; Radomsky et al., 2002). This suggests the possibility that individuals with eating disorders experience comparably high levels of TAF as individuals with OCD. However,
comparing results across different studies and labs does not allow for a direct comparison of results (Shafran & Rachman, 2004). Further, the majority of studies have been conducted using screened samples which, in addition to other concerns, requires careful consideration of comorbidity to accurately assess findings (McKay & Neziroglu, 2009).

The current study seeks to examine the extent to which OCD symptoms and eating disorder symptoms are related to symptoms of TAF. The findings of this study will contribute to an understanding of the relationship between OCD and eating disorders, their potential for having shared psychological processes, and what the nature of their diagnostic relationship may be in future iterations of the DSM.

**OCD Overview**

Obsessive-compulsive disorder (OCD) is characterized by the presence of either obsessions or compulsions or both (American Psychiatric Association [APA], 2013). Obsessions are persistent and recurrent intrusive or unwanted impulses or images that cause an individual distress. Typically, individuals experiencing obsessions will try to either ignore them or neutralize them through the use of compulsions. Compulsions are repetitive behaviors or mental acts performed in an attempt to reduce or limit anxiety caused by obsessions. Obsessions commonly 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 rituals directly related to the obsessions, including counting, ordering, checking, cleaning, and washing, but also can include rituals ostensibly unrelated to the obsessions, such as counting aimed at preventing an intrusive thought about harm of a loved one (Abramowitz et al., 2009).
Recent History of OCD Classification

Through DSM-IV-TR (APA, 2000), OCD was included in the chapter on anxiety disorders. In 2013, DSM-5 removed OCD from the chapter on anxiety disorders and made it the flagship disorder of a new chapter titled “Obsessive-Compulsive and Related Disorders (OCRDs).” This new chapter—created primarily to group disorders that feature obsessions and/or compulsions—includes OCD, body dysmorphic disorder (BDD), hoarding disorder, skin-picking disorder, and hair-pulling disorder (APA, 2013).

Although there is consensus that OCD shares characteristics with certain anxiety-related disorders, there was enough evidence regarding differences in functionality and treatment outcomes to warrant a separate chapter. Evidence for similarities in the aforementioned disorders was seen as sufficient for the grouping of the OCRD chapter by the DSM-5 task force, but there was—and continues to be—disagreement among researchers as to what evidence is sufficient for inclusion (Abramowitz & Jacoby, 2014).

Part of this disagreement regarding inclusionary evidence lies in a fundamental debate over what makes a disorder an “obsessive-compulsive spectrum disorder” and which disorders share obsessive-compulsive features but are not part of that spectrum. A spectrum of obsessive-compulsive and related disorders previously was proposed and met with moderate support (Hollander & Wong, 1995). Research suggested similar phenomenology and neurobiology of the proposed disorders, which commonly include OCD, BDD, anorexia nervosa (AN), hair pulling, tic disorders, and pathological gambling, although there has been some variation as to what is included in such a spectrum (Hollander & Benzaquen, 1997). Research typically suggests three main clusters: impulsive disorders, disorders with a presence of preoccupation with body sensations or appearance, and neurologically based disorders (Hollander, 2005). Further research supported this categorization of OC spectrum disorders.
through factor analysis (e.g., Mataix-Cols et al., 2005) and cluster analysis (e.g., Lochner et al., 2005). This research noted that adopting a dimensional view of obsessive-compulsive symptomatology would enhance understanding of OCD and related disorders. However, Lochner and Stein (2006) opined that an obsessive-compulsive spectrum may not be as straightforward as previously suggested, with multiple facets likely contributing to the explanation of any potential spectrum. An OC spectrum that has both empirical evidence and practical value would need to consider at least the following: impulsiveness, somatic concerns, cognitive symptoms, and reward deficiency. According to Lochner and Stein (2006), any spectrum that singularly uses compulsivity and impulsivity as opposite extremes misses crucial components that differentiate obsessive-compulsive and related disorders.

Sareen et al. (2008) were careful to point out that reliance on comorbidity, as some models of obsessive-compulsive spectrums have done in the past, is problematic. This is in part because some research suggests that OCD has higher lifetime comorbidity with depression (15%) and the traditional anxiety disorders (e.g., 14% with social anxiety disorder) than with proposed obsessive-compulsive spectrum disorders such as BDD (9% lifetime; Lochner et al., 2014; Okasha, 2001). Although an obsessive-compulsive spectrum has sparked considerable academic research, more investigation must be done to further explore this concept and its potential clinical utility. Others have agreed, stating that research methodology must improve before making empirically based decisions on what to consider an obsessive-compulsive spectrum disorder (e.g., McKay & Neziroglu, 2009). McKay and Neziroglu (2009) stated that similarities in disorders mainly are observed when studies produce null findings through ANOVA. However, McKay and Neziroglu (2009) suggested that research on common factors that underlie disorders might be more beneficial. Such studies would not need to screen participants in order to target between-groups comparisons, but rather would be able to assess the associations among variables / symptoms using broader, more diverse samples. Using this approach, research would be able to investigate a wide range of factors in an
effort to determine which ones are specially related to each other. They contend that such an approach may be more fruitful in that it recognizes symptoms (and relevant experiences) as continuous/dimensional in nature rather than categorical/binary. As such, correlational designs would be viewed as appropriate and potentially highly useful.

Nonetheless, meaningful consideration of research on an obsessive-compulsive spectrum went into the development of DSM-5 (Hollander et al., 2011). The leadership of APA attempted to promote collaboration across disciplines when determining the best structure of OCD and related disorders in the new DSM. Although APA leadership acknowledges the work-in-progress nature of the OCRD chapter, joint efforts by APA, the World Health Organization, and the U.S. National Institutes of Health converged on support for an obsessive-compulsive spectrum of disorders (Hollander et al., 2011).

Despite this convergence and a growing body of supportive literature, there was noted disagreement among OCD experts as to what should be included in the new chapter prior to the release of the DSM-5. In a survey of 187 experts, which included primarily psychiatrists and psychologists, only two disorders beyond OCD reached a 70% or higher consensus level for inclusion in a then-potential new OCD chapter: BDD and Trichotillomania. There were mixed opinions on obsessive-compulsive personality disorder (OCPD), tic disorders, and hypochondriasis (Mataix-Cols et al., 2007).

The eventual release of DSM-5 and its introduction of the new OCRD chapter brought marked criticism from some of the field’s top researchers. For example, Abramowitz and Jacoby (2014) questioned what evidence was considered in the formulation of the OCRD chapter. They suggested only BDD shares a significant overlap with OCD in terms of onset, clinical features, and effective treatment (Abramowitz & Jacoby, 2014). Their review of the research concluded that the new OCRD chapter does not make empirical sense.

Abramowitz and Jacoby (2015) expanded on these concerns. They argued that if the OCRD chapter includes disorders in which repetitive thoughts or behaviors are the hallmark
symptoms, then bulimia nervosa (BN) and salmonella poisoning warrant consideration on the basis that they include repetitive behaviors (i.e., vomiting). Additionally, they asserted that research since the release of the DSM-5 chapter has attempted to justify its contents post hoc rather than provide a valid basis for the chapter’s creation. Perhaps most importantly, Abramowitz and Jacoby (2015) reiterated that OCD and BDD do share important overlap, but this is not true regarding the rest of the DSM-5 OCRDs.

In the conclusion of their review, Abramowitz and Jacoby (2015) indicated the OCRD chapter is not based on shared psychological processes or responses, but rather superficial symptomatology. Research is needed to explore potential OCRDs that may be more similar to OCD than the current set of disorders in the DSM-5, with bases in psychological processes as well as treatment approaches and outcomes rather than simple symptomatology.

**Eating Disorders as a Possible OCRD**

Before discussing the possibility of eating disorders as an OCRD, it first is important to discuss the nature of eating disorders themselves. Although the DSM historically has separated eating disorders into different types (i.e., AN, BN, eating disorder not otherwise specified [ED-NOS]), there has been a recent move to consider eating disorders as a singular diagnosis with fluid subtypes. In 2005, Milos et al. examined a sample of 192 women who had been diagnosed with AN, BN, or ED-NOS. Over a period of 30 months, the researchers found relative stability in a broad eating disorder diagnosis, but considerable instability in the specific eating disorder diagnoses. Only 29% of individuals retained their original specific diagnosis. This pattern of instability was relatively similar among all eating disorder types, with the least common transition being from BN to AN, which still comprised 6.5% of the original BN sample. Just over 16% of individuals who began the study with an AN
diagnosis transitioned to BN, whereas 18% of both original AN and BN groups migrated to the ED-NOS category. These sizeable amounts show that inconsistencies across diagnoses span across each major eating disorder.

Other research has found similar instability in specific eating disorder diagnoses. Tozzi et al. (2005) utilized a sample of individuals with BN, as well as these individuals' relatives who had either BN or AN, to examine the crossover rates from AN to BN and BN to AN. The study found that 36% of the AN sample crossed over and were best diagnosed with BN, and 27% of the BN sample became most accurately described through a diagnosis of AN. Likewise, Eddy et al. (2008) followed individuals with AN and BN over a period of seven years. From the initial screening, 48% of individuals with AN moved fluidly between AN subtypes of restricting and binge eating/purging. Additionally, 34% of individuals with AN crossed over to a primary diagnosis of BN. Although not as common, individuals with BN also experienced diagnostic instability in this study: 14% of individuals crossed over from BN to AN during the 7-year period. Similarly, Castellini et al. (2011) ran a 6-year study of individuals with eating disorders to assess diagnostic crossover and found substantial crossover among their sample. Of individuals initially diagnosed with AN, 27% crossed over to BN. Similar to Eddy et al. (2008), Castellini et al. (2011) found that diagnostic crossover from BN to AN was less common, but still occurred in approximately 9% of the sample (for studies with similar results, see also Ackard et al., 2011; Fairburn & Harrison, 2003; Guinzbourg, 2011).

Another study compared individuals with AN, individuals with BN, and individuals with ED-NOS, investigating how they scored on measures of anorexic dietary cognitions and behaviors as well as bulimic dietary cognitions and behaviors (Allan & Goss, 2014). Although there were significant differences between the AN and BN groups in terms of severity of symptoms reported, the ability to distinguish between them clinically was not straightforward. About 82% of individuals with AN and 96% of individuals with BN scored
above the clinical cutoff on the Stirling Eating Disorders Scale (SEDS) subscale of bulimic cognitions. Furthermore, approximately 97% of individuals with AN and 98% of individuals with BN reported scores above the clinical cutoff on the SEDS subscale of anorexic cognitions. Such research has led to some calling for the adoption of a transdiagnostic or dimensional approach to inform treatment planning in eating disorders (Allan & Goss, 2014; Fairburn & Cooper, 2014; Wilfley et al., 2007). The significant overlap in symptomatology, plus the identified fluidity with which some individuals move between the specific diagnoses, may make it more effective to treat eating disorders as the same disorder with different subtypes, rather than to treat it in as the same chapter with different disorders. It is for these reasons that this paper discusses eating disorders as one diagnosis with different subtypes rather than adhering to the DSM-5 approach to the eating disorders chapter.

Eating disorders long have been thought to be related to OCD (e.g., Beumont et al., 1977; DuBois, 1949; Palmer & Jones, 1939; Waller et al., 1940). Not only do they share similar symptoms, but research also has identified similarities between the two regarding personality traits, underlying cognitive belief systems, approaches to neutralization, high comorbidity rates, and treatment.

**Recent History of OCD and Eating Disorder Comparisons**

One of the first papers to acknowledge symptom similarities between OCD and eating disorders was published 80 years ago. Palmer and Jones (1939) observed that both OCD and eating disorders were characterized by an obsessive neurosis and a compulsive neurosis, meaning that eating disorders have both cognitive and behavioral components. Similarly, Waller et al. (1940) observed two individuals with eating disorders and characterized their
actions with and toward food as “compulsive obsessive.” DuBois (1949) also noted what he observed as marked obsessive thoughts and compulsive reactions in AN.

Smart et al. (1976) compared women diagnosed with AN \((n = 22)\), individuals with obsessional neurosis \((n = 17)\), and “normal” controls with no recent psychiatric illness or treatment \((n = 60)\). Individuals with AN scored significantly \((p < .001)\) higher than the control group on a self-report measure of obsessionality (the Leyton Obsessional Inventory [LOI] total score and all four of its subscales). Of particular note, their scores were not statistically significantly different from those of the group with obsessional neurosis on two of the four subscales.

The Smart et al. (1976) findings prompted a series of exploratory studies that expanded on similarities between the disorders. Solyom et al. (1982) compared a group of women with AN \((n = 15)\) to a group of women with OCD \((n = 14)\) on the LOI, psychiatrists’ ratings of obsessionality, and the Maudsley Personality Inventory (MPI) – a self-report measure of neuroticism and extraversion. The study found that individuals in both groups scored similarly on measures of cognitive obsessionality, neuroticism, and anxiety, with low scores on extraversion. Three of the four factors of the LOI were found to not differ significantly between the two groups, with similar symptom and trait obsessionality scores as well as similar scores of resistance (severity of symptoms) across groups. Furthermore, neither the MPI Neuroticism subscale nor the MPI Extraversion subscale was significantly different \((p > .05)\) between the two groups. These data suggest that individuals with OCD and individuals with eating disorders may share similar levels of obsessive-related traits and symptoms. However, one potential limitation of this study is small sample size. With no report of a power estimate nor effect size, it is impossible to know if the study was underpowered or if the effect size was small. However, the small sample \((n = 29)\) of this study makes it possible that the study was in fact underpowered. Another limitation of this study is the use of only two groups, as such a design does not allow for an analysis of
the convergent/discriminant relations among these variables. Without comparison groups, it stands to reason that obsessive traits and symptoms may be similarly elevated in many areas of psychopathology.

To address these limitations, Solyom et al. (1983) compared individuals with AN, BN, OCD, social phobia, agoraphobia, and specific phobia. Looking at levels of obsessionality, neuroticism, and ritualistic behaviors, the researchers observed more similarities among the eating disorders and OCD than any of the other groups. Specifically, Solyom et al. (1983) found that psychiatrists’ ratings of both rumination and horrific temptations – a type of intrusive thought – did not differ significantly between individuals with eating disorders \((n = 58)\) and individuals with OCD \((n = 65)\) at the \(p < .05\) level. All other groups included in the study – individuals with agoraphobia \((n = 53)\), individuals with social phobia \((n = 18)\), and individuals with specific phobia \((n = 40)\) – did differ significantly \((p < .05)\) from the eating disorder groups. This study also supported the findings of Solyom et al. (1982) that suggested that high obsessional personality traits and high neuroticism were indicative of both OCD and eating disorders.

These early observations and preliminary studies into the overlap of OCD and eating disorders set the foundation for what is an expanding literature on the extent to which OCD and eating disorders are similar. These similarities appear not only with respect to symptomatology but also in psychological processes, personality characteristics, and treatment approaches and outcomes.

**Contemporary Empirical Research in OCD and Eating Disorder Similarities**

What follows is a review of research that illustrates how eating disorders may be similar to OCD using a comparable approach as for the DSM-5 OC RDs, a standard which Abramowitz
and Jacoby (2015) called “superficial symptomatology.” Furthermore, the following review begins to illustrate that eating disorders may hold similarities with OCD that go beyond symptom overlap, with shared underlying characteristics impacting both individuals with OCD and individuals with eating disorders.

**Comorbidity Rates**

Eating disorders and OCD co-occur at a high rate, with some studies suggesting that up to 37% of individuals with eating disorders have a comorbid OCD disorder (Thornton & Russell, 1997). According to Pallanti et al. (2011), this number is higher than the comorbidity rate between OCD and generalized anxiety disorder (GAD; 30%). This is especially noteworthy because GAD was once thought to be so similar to OCD that research was conducted to determine whether or not the two might be collapsed into one disorder in future iterations of the DSM (Brown et al., 1993). The comorbidity numbers between OCD and eating disorders put forth by Thornton and Russell (1997) also are higher than those between OCD and major depressive disorder (33%; Pallanti et al., 2011). This is similarly important in that measures of OCD have been shown to be significantly correlated ($p < .05$) with measures of depression, suggesting that depression and OCD share an important relational overlap. In fact, Richter et al. (1994) went so far as to recommend that a measure of depression should always be used when studying OCD to control for overlapping mood symptoms. Within such a context, the comorbidity between OCD and eating disorders cannot be dismissed easily.
Genetics

Not only do OCD and eating disorders have high rates of comorbidity, but family studies suggest that there may be a similar genetic component to both disorders. Bellodi et al. (2001) compared a group of 136 females with an eating disorder diagnosis to a control group of 72 females who sought rehabilitation services for their knees. The researchers interviewed 436 first-degree relatives of the females with an eating disorder and 358 relatives of individuals in the control group using the Diagnostic Interview Schedule. The results showed significant differences in the first-degree relatives of the groups. Almost 10% of relatives from the eating disorders group presented with what the study referred to as an OC spectrum disorder – which here included OCD and tic disorders – compared to 0% of the relatives from the control group (Bellodi et al., 2001).

Other research has found similar familial patterns that would suggest that OCD and eating disorders are related at a rate significantly greater than chance. Altman and Shankman (2009) conducted a review of literature on OCD and eating disorders and found 19 studies which identify an etiological relationship between OCD and eating disorders, meaning that similar factors influence the development of OCD and eating disorders.

Thoughts

Both OCD and eating disorders share similar cognitive factors that are either required by or support a diagnosis. Obsessions, the hallmark symptom of OCD, involve the persistent, intrusive thoughts that an individual struggles to move past. Eating disorders often involve preoccupations and fears similar to these obsessions, both characteristics of obsessions in OCD. Among individuals with eating disorders, the preoccupations and fears are most
commonly food related (APA, 2013). Further, the DSM-5 states that obsessive-compulsive features, both related and unrelated to food, are often prominent” as part of features that may support a diagnosis of anorexia nervosa (APA, 2013, p. 341).

Importantly, the preoccupations and fears in eating disorders are similar to those of OCD. Halmi et al. (2003) compared AN-Restricting ($n = 99$) and AN-Binging/Purging ($n = 140$) samples with an OCD sample ($n = 116$) using the Yale-Brown Obsessive Compulsive Scale (Y-BOCS). Although the AN groups did differ significantly ($p < .01$) from the OCD group in some respects, such as aggressive obsessions, contamination obsessions, and cleaning compulsions, researchers found that neither of the AN groups differed significantly from the OCD group ($p > .01$) with respect to symmetry obsessions (with and without magical thoughts) or somatic obsessions. However, it is worth noting that the validity of the Y-BOCS in non-OCD samples has been questioned. Wu et al. (2007) noted that the items of the original Y-BOCS interview and symptom checklist are of a forced-choice format designed to assess the severity of symptoms in individuals who already have been diagnosed with OCD. Strictly speaking, its items are not appropriate for determining symptom severity in an individual who does not endorse the experience of obsessions and compulsions. However, other studies have similarly found that individuals with eating disorders have elevated levels of obsessive beliefs, such as inflated responsibility, importance of thoughts, intolerance of uncertainty, and perfectionism (e.g., Roncero et al., 2011), often scoring near or above individuals with OCD on measures of obsessionality. For example, Lavender et al. (2006) compared scores on the Obsessive Beliefs Questionnaire (OBQ) across diagnostic groups including individuals with eating disorders ($n = 120$), individuals with OCD ($n = 248$), and individuals with anxiety disorders ($n = 105$). Participants with eating disorders scored significantly higher than individuals with OCD and individuals with anxiety on the OBQ subscales of perfectionism ($p < .01$), intolerance of uncertainty ($p < .05$), threat estimation ($p < .05$), and importance of thoughts ($p < .01$). There were no differences between individuals with eating
disorders and individuals with OCD or anxiety disorders on the OBQ subscale measuring control of thoughts. Individuals with eating disorders did differ significantly \((p < .05)\) from the individuals with anxiety, but not from individuals with OCD, on the OBQ Responsibility subscale.

Additionally, OCD and eating disorders share other cognitive beliefs. Intolerance of uncertainty (IU) is a cognitive bias which involves a tendency to react negatively in situations where the outcome is uncertain. Intolerance of uncertainty originates from the literature on anxiety disorders (Steketee et al., 1998), and some studies suggest that it is specific to GAD (e.g., Dugas et al., 2001). Conversely, research suggests that IU has relevance to OCD. Specifically, there is a growing body of research to suggest that IU is present in different symptom presentations of OCD. Research by Tolin et al. (2003) suggested that individuals with OCD, specifically those whose compulsions involved checking \((n = 43)\), scored significantly higher \((p < .001)\) on the Intolerance of Uncertainty Scale (IUS) than those who were in the non-anxious control condition \((n = 14)\) as well as individuals with OCD who were non-checkers. Similarly, the Obsessive Compulsive Cognitions Working Group (2003) observed nonsignificant differences between a group of individuals with OCD \((n = 284)\) and a group of non-obsessional anxious individuals \((n = 105)\). These and other results (e.g., Faleer et al., 2017) suggest that IU is a construct with specific relevance to OCD.

Similarly, IU seems to play a role in eating disorders. In one study, a group of individuals with AN \((n = 37)\) and a group of individuals with BN \((n = 22)\) exhibited significantly higher levels \((p < .001)\) of IU than a healthy control condition \((n = 39)\) of individuals who had never had an eating disorder (Sternheim et al., 2011). In fact, the last decade has provided many empirical studies that suggest there is a substantial relationship between IU and eating disorder symptoms (Kesby et al., 2017). In one such study, groups with OCD \((n = 79)\) and eating disorders \((n = 177)\) did not differ significantly in their scores on the IUS, \(t(254) = 1.361, p = .175\) (Garcia-Soriano et al., 2014).
Further, not only do individuals with OCD and individuals with eating disorders have similar types of intrusive ideas surrounding uncertainty, but the frequency at which they experience them is also similar. Comparing a group of individuals with OCD against a group of individuals with eating disorders, Garcia-Soriano et al. (2014) found nonsignificant results in reported frequency of these intrusive symptoms and unwanted thoughts, \( p = .962 \). This study is not without limitations, which include the use of Spanish translations for all measures as well as only assessing for obsessional intrusions in the OCD group and only assessing for eating-related intrusions in the eating disorder group. Cautiously considered, this study offers further evidence that individuals with OCD and individuals with eating disorders may share similar relations to IU.

**Behaviors**

In addition to various cognitive symptom similarities, OCD and eating disorder presentations also share behavioral similarities. The DSM-5 lists compulsions, defined as repetitive and time-consuming behaviors, as one of the primary criteria for a diagnosis of OCD. The DSM-5 eating disorders all involve a repetitive behavioral aspect, which may include binging and/or purging (APA, 2013). In fact, the adjective “obsessive” is used to describe the measuring of body parts within the diagnostic features section of DSM-5 Anorexia Nervosa (APA, 2013, p. 340). Some scholars have suggested that these repetitive behaviors are similar to compulsions experienced in OCD (Bastiani et al., 1996; Hamli et al., 2003). Bastiani et al. (1996) found that individuals with AN and individuals with OCD reported a similar magnitude of impairment from compulsions on the Y-BOCS \( p < .05 \). Despite the limitation of the Y-BOCS in non-OCD samples raised by Wu et al. (2007), this finding may be worth consideration in conjunction with other studies. Other research using the Y-BOCS
has illustrated that the lifetime prevalence of DSM-defined compulsions, specifically ordering and hoarding, is similar across individuals with eating disorders and individuals with OCD. Hamli et al. (2003) used the Y-BOCS symptom checklist to assess for current and past compulsive symptoms and created a composite score of lifetime compulsive symptomatology. The results illustrated that the lifetime prevalence of these symptoms do not differ significantly \((p < .05)\) across AN and OCD samples (Hamli et al., 2003). The question then is whether these behaviors reach the severity of compulsions as defined by the DSM.

Several studies have examined whether the compulsion-like behaviors of individuals with eating disorders are similar to the compulsions experienced by individuals with OCD. For example, Bastiani et al. (1996) found that individuals with eating disorders did not differ significantly from individuals with OCD on Y-BOCS-measured ordering and arranging compulsions, excessive cleaning, or counting compulsions. This appears to be a consistent finding in research on compulsions among individuals with eating disorders. Hamli et al. (2003) compared Y-BOCS scores of individuals with AN and individuals with OCD and also found that the two groups did not differ significantly in ordering compulsions. Further, Hamli et al. (2003) also found that the two groups did not differ significantly in their hoarding compulsions scores – a category of compulsions that now have their own diagnostic category within the DSM-5 (Hoarding Disorder; APA, 2013). The findings across these studies, both of which used the well-known Y-BOCS, suggest that there is some consistent overlap in compulsivity between individuals with OCD and those with eating disorders. However, the limitations of using the Y-BOCS in non-OCD samples again must be recognized (Wu et al., 2007). Nevertheless, it is notable that these findings illustrate nonsignificant differences across AN and OCD groups. This is importantly different from illustrating that individuals with OCD and individuals AN both exhibit OC-related symptoms, but that individuals with OCD score higher. The latter would illustrate some overlap in symptoms, which may be expected whereas, the former would illustrate similarities in the degree of symptoms.
Subsequent studies have expanded on this early work regarding compulsions in eating disorders. In Naylor et al. (2011), a clinical sample of individuals with eating disorders completed a variety of self-report questionnaires regarding obsessive beliefs, eating pathology, and exercise beliefs and habits. This study utilized the Compulsive Exercise Test (CET), which is a measure that assesses maintenance behaviors related to compulsive exercise (Taranis et al., 2011). Naylor et al. (2011) found significant correlations between scores on the EDE-Q and the CET ($r = .51, p < .001$). These findings on compulsions, in addition to the research on obsessions, indicate moderate relationships between eating disorders and OCD. Although this may be little more than what Abramowitz and Jacoby (2015) termed “superficial symptomatology,” these data provide another layer on the foundation of investigations into the relationship of eating disorders and OCD.

**Personality Traits**

In addition to an overlap in both cognitive and behavior-related symptomatology, research shows that the overlap between OCD and eating disorders extends into the domain of personality as well, with the major overlap involving the trait of perfectionism. Definitions of perfectionism have been elusive, but there are two main conceptualizations. Hewitt and Flett (2007) suggest perfectionism is a term that encompasses perfectionistic traits, perfectionistic self-representation, and perfectionistic cognitions. Frost et al. (1990) assert that it is a multidimensional cognitive construct that includes high personal standards and concern over personal mistakes, as well as concern regarding parental expectations.

Perfectionism as defined by Frost et al. (1990) has been shown to be relevant to OCD and elevated obsessive and compulsive symptoms. Frost and Steketee (1997) found significant differences between individuals with OCD and a random sample of employees with no current
pathology on the Frost Multidimensional Perfectionism Scale (FMPS; \( p < .05 \)). Coles et al. (2003) similarly found significant relationships between the Obsessive-Compulsive Inventory and “not just right experiences” (NJRE; all \( r > .45 \)), a construct similar to perfectionism. Both subscales of the NJRE Questionnaire – Number and Severity – are also correlated with all subscales and the total score of the OBQ (all \( p < .001 \); Belloch et al., 2016). Specifically, the OBQ Perfectionism/Uncertainty subscale is significantly correlated with the NJRE Severity subscale, \( r = .430, p < .001 \) (Belloch et al., 2016). Other studies like Wetterneck et al. (2011) also support correlations between perfectionism and OCD symptom measures. Wetterneck et al. (2011) found significant correlations between the revised version of the Obsessive-Compulsive Inventory and subscales of the FMPS (all \( p < .05 \)). These studies are representative of the broader field of research regarding perfectionism and OCD, which consistently finds significant associations \( (p < .05) \) between perfectionism and OCD (e.g., Julien et al., 2006; Manos et al., 2010).

In a review of personality-related traits in eating disorder research, Cassin and von Ranson (2005) looked at research primarily from the 1990s and early 2000s and found that there was reason to believe perfectionism may be related to eating disorders. Specifically, Cassin and von Ranson (2005) found multiple studies to suggest that elevated trait perfectionism positively predicts eating disorders and that certain elements of this perfectionism diminish with eating disorder remission (e.g., Bastiani et al., 1995), but they noted that more research needed to be conducted in order to determine the nature of this relationship. Bardone-Cone et al. (2007) agreed, stating that although early evidence suggests a relationship between perfectionism and disordered eating, the methodology and rigor of relevant studies required improvement before the field could make significant strides in understanding how the two pieces interact.

Since then, studies have expanded the literature on perfectionism and eating disorders. Not only do individuals with eating disorders exhibit higher levels of perfectionism compared
to control groups, but they often score at similar levels of perfectionism as individuals with OCD (Boisseau et al., 2013). Other studies have suggested that not only is perfectionism similarly elevated in OCD and eating, but this perfectionism may moderate the relationship between certain symptoms of the two disorders. In a study by Pollack and Forbush (2013), individuals completed the Schedule of Compulsions, Obsessions, and Pathological Impulses (SCOPI), the EDE-Q, and the Big Five Inventory. Researchers found significant zero-order correlations between OCD symptomatology, such as checking, cleaning, and other compulsive rituals, and eating disorder symptoms, including body dissatisfaction, binge eating, and restraint. Of note, however, additional analyses found that the combination of perfectionism and neuroticism moderated the associations between OCD symptoms and body dissatisfaction and fully mediated the relationship between OCD symptoms and restraint (Pollack & Forbush, 2013).

Another personality trait associated with both OCD and eating disorders is neuroticism. High levels of neuroticism are consistently found in individuals with OCD (e.g., Bergin et al., 2014). Pollack and Forbush (2013) found high rates of neuroticism in individuals with elevated OC symptoms and elevated eating disorder symptoms. Furthermore, neuroticism moderated the relationship between OCD symptomatology and eating disorder symptoms (Pollack & Forbush, 2013). Other studies have also found similar results, suggesting an overlapping presence of high levels of neuroticism in both OCD and eating disorders (Cassin & von Ranson, 2005).

**Treatment**

Research in the 1980s and 1990s also suggested that there may be overlap in the treatment of OCD and certain types of eating disorders, namely BN. In a review of the literature, Bulik
(1995) noted that there is some evidence to suggest that exposure and response prevention (ERP), a gold-standard intervention for OCD, also may be effective in the treatment of BN. Bulik et al., (1998) conducted a randomized clinical trial with 135 women diagnosed with BN. All participants received cognitive-behavioral therapy (CBT) and were randomized into one of three supplemental treatment conditions: relaxation training, exposure to pre-binging cues, and exposure to pre-purging cues. They found that individuals who were exposed to pre-binging cues through ERP experienced significantly lower amounts of distress compared to the other two conditions when exposed to potential trigger foods. At a 12-month follow-up, those in the pre-binging cues ERP condition reported significantly less food restriction than those in the other two conditions. These individuals also displayed significantly higher clinician-rated global functioning than those in other conditions. Whereas those in the pre-binging cues condition, compared to the relaxation control, seemed to experience positive impacts from the exposure treatment, individuals in the pre-purging cues group did not. However, at a five-year follow-up, individuals in both ERP groups had higher rates of abstinence from binging and lower rates of purging compared to the relaxation training control group.

Although BN is the most studied eating disorder with regard to ERP, there is a small but promising literature that suggests ERP also may be an appropriate treatment for individuals with AN (Hildebrandt et al., 2012; Koskina et al., 2013). The goal of ERP in treating AN is to reduce avoidance of certain foods and help individuals manage the anxiety they experience with certain foods (Steinglass et al., 2007). In one small clinical trial, a group of individuals with AN underwent a series of exposure meals, drinking a shake with high-caloric values (Steinglass et al., 2007). At the end of the study, all participants were allowed to choose when to stop drinking the shake. This study compared to a group of individuals with AN who underwent “treatment as normal,” which was not defined further in the article nor in cited sources. Steinglass et al. (2007) found that individuals who had undergone
the exposure meals significantly increased their caloric intake from pre- to post-exposure meals \( (p = .001) \), whereas there was no significant difference for the treatment-as-normal group across these timepoints. Furthermore, the group receiving exposure also experienced a significant decrease in post-meal fear of weight gain, \( p < .05 \). Another study utilized a manualized version of ERP adapted from the OCD (Steinglass et al., 2012). Researchers found that, after 12 ERP sessions, individuals with AN \( (n = 17) \) experienced decreased pre-meal anxiety and changes in distress scores and had higher caloric intake than they had prior to ERP treatment.

Although the literature on ERP is nowhere near as conclusive for eating disorders as it is for OCD, studies are beginning to show effectiveness in both BN and AN. Whereas more research has been conducted on BN samples, there are positive findings for multiple types of eating disorders using the most empirically backed OCD treatment. This pattern of results further suggests important overlap between the two disorders that goes beyond superficial symptoms and therefore merits continued research to explore the extent of this overlap.

**BDD and OCD**

Although not formally an eating disorder, BDD shares certain characteristics with eating disorders. These include preoccupations with body image and body-related issues (APA, 2013). Historically, BDD has been classified as a somatoform disorder by both the DSM and the International Classification of Diseases (ICD; Phillips et al., 2010). Eating disorders and BDD empirically have been found to share similarities in etiology and treatment. For example, AN and BDD are highly comorbid conditions: 25-40% of individuals with AN also have comorbid BDD (Hartmann et al., 2013). Furthermore, Hartmann et al. (2013) note that they share similar ages of onset, typically middle to late adolescence. The same extent
of similarities may be said of OCD and BDD (e.g., Malcolm et al., 2018; Phillips & Kaye, 2007). Indeed, as previously discussed, the most significant overlap in the DSM-5’s new OCRD chapter is between OCD and BDD, both in terms of etiology of the disorders as well as their treatment (Abramowitz & Jacoby, 2015). Whereas no direct chain of relationships between OCD and eating disorders can be made from this connection, it is worth mentioning that among the OCRDs currently listed in the DSM-5, the condition viewed as most similar to OCD is a disorder that shows important overlap with the eating disorders.

**Limitations of OCD and Eating Disorder Comparison Literature**

Whereas the literature suggests important potential overlaps between OCD and eating disorders, a glaring limitation is the lack of studies that go beyond comparing just these two disorders against one another. Although direct comparisons, nonsignificant differences, and similar elevations on measures do provide some support for a potential relationship, studies that include only these two groups are inherently limited. These studies cannot determine that OCD and eating disorders are specially related in any way as, in the absence of a third (or more) group, discriminant validity cannot be established.

**Thought-Action Fusion**

Thus far, amidst debate regarding what should be included in the DSM-5’s OCRD chapter, it is clear that there is overlap between OCD and eating disorders in terms of symptomatology, underlying personality characteristics, and treatment response. At the very least, what has been presented is similar to Abramowitz and Jacoby’s (2015) description of the current inclusionary criteria for DSM-5’s OCRD chapter – “superficial” similarities with
OCD. However, the similarities between OCD and eating disorders may extend beyond that of shared symptoms. A cognitive bias known as thought-action fusion (TAF) may underlie the development of obsessional concerns not just in OCD but also in eating disorders.

**What Is Thought-Action Fusion?**

Thought-action fusion (TAF) was first suggested by Rachman (1993) as an inflated feeling of responsibility for one’s own thoughts that could lead to fusion—or the blurring of obsessions and real life. Individuals may become concerned that their thoughts hold real-life consequences, including harm to self or others. Furthermore, this fusion also may be applied to one’s moral or religious standing. Rachman (1993) hypothesized that individuals with elevated TAF are able to rationally acknowledge that having thoughts does not actually lead to real-world outcomes, but on an emotional level they feel this is possible. In the first study, Rachman et al. (1995) developed the 36-item Responsibility Appraisal Questionnaire (RAQ), a measure with five subscales of responsibility: for property damage, for harm to others, in social contexts, outlook on responsibility, and TAF. After retaining 18 items and four subscales (Harm, Social, Outlook, and TAF), Rachman et al. (1995) ran a second study in which individuals completed the revised RAQ, the Maudsley Obsessional Compulsive Inventory (MOCI), the Beck Depression Inventory (BDI), the Guilt Inventory, and the Inventory of Beliefs Related to Obsessionality (IBRO). Results illustrated that the TAF subscale of the RAQ was significantly correlated with three of the four MOCI subscales (all rs.26, p < .001), the MOCI total score (r = .45, p < .001), the BDI (r = .38, p < .001), the IBRO (r = .50, p < .001), and two of the three subscales on the Guilt Inventory (both rs.34, p < .001). These results provided initial support for the TAF hypothesis.
**Development of the TAFS**

Shafran, Thordarson, and Rachman (1996) introduced the Thought-Action Fusion Scale (TAFS), a questionnaire purported to measure TAF. In their first study, Shafran et al. (1996) piloted a 34-item TAF scale with subscales for morality, likelihood of a friend or relative experiencing a negative event, likelihood of oneself experiencing a negative event, likelihood of something positive happening to a friend, and likelihood of something positive happening to oneself. Individuals with elevated OCD symptoms, as well as a student sample, completed the preliminary TAFS, the MOCI, and the BDI. A factor analysis revealed a three-factor structure in the student sample (Moral, Likelihood-Self, Likelihood-Other), but only two factors in the clinical sample, with the two likelihood factors from the student sample merged into one. The clinical sample scored higher on two of the three TAFS factors (Moral, Likelihood-Other) as well as the MOCI and the BDI. In a second study, Shafran et al. (1996) gave a revised TAFS, the MOCI, and the BDI to samples of students, community members, and a group with elevated OCD symptoms. In addition to significant group effects for all three subscales of the TAFS, the elevated OC group scored significantly higher than the community sample on all three subscales, and the consistency was strong across all groups (all αs > .85).

Other studies have supported the construct validity of the TAFS. Rassin et al. (2001) explored both the reliability and validity of the TAFS. For this study, 285 undergraduate women completed a Dutch version of the TAFS, the MOCI, Padua Inventory (PI), BDI, and Creative Experiences Questionnaire (CEQ). The TAFS again showed adequate or better internal consistency, with Cronbach’s alpha levels ranging from .75 to .89. Furthermore, there were significant correlations between the TAFS and the MOCI ($r = .21, p < .01$) as well as between the TAFS and the PI ($r = .32, p < .01$). The correlation between the
TAFS and the BDI was not significant, $r = .15, p > .05$ (Rassin et al., 2001). Statistical significance aside, it is important to note that these are modest convergent correlations and that the specificity of TAF (or of the TAFS) should be examined further. Nonetheless, these findings suggest that the TAFS may be a reliable and construct-valid option for measuring the construct of TAF.

**Behavioral Induction of TAF**

In addition to using the TAFS, one of the most common ways researchers study TAF is through the Sentence Task developed by Rachman et al. (1996). In the initial study, 63 students with a history of TAF (broadly defined) were instructed to write, “I hope (blank) is in a car accident,” filling in the blank with the name of a loved one. Results showed that the impact of the task significantly increased anxiety levels for all participants as rated using verbal analogue scales ranging from 1-100: $M(\text{before}) = 14.6$ and $M(\text{after}) = 67.4$. These results suggest the Sentence Task has utility in TAF induction.

However, empirical evidence is inconclusive in determining the construct validity of the Sentence Task. That is, the relationship between the TAFS and the task is unclear. Research by Van den Hout et al. (2001) found no significance in correlations between the TAFS and post-task anxiety rates ($r < .15, p > .19$). Conversely, Berman, Abramowitz, Wheaton, Pardue, and Fabricant (2011) found that both self-reported anxiety and self-reported likelihood following completion of the Sentence Task significantly correlated with scores on the TAFS ($r$ values ranging from $.26-.37, p < .01$). The Sentence Task has been used in many studies of TAF since the initial study by Rachman et al. (1996), producing results similar to those of the initial study, but it is unclear the exact relationship between the Sentence Task and the TAFS, which measures what the task purportedly induces. Overall, data suggest that this
behavioral manipulation may successfully, if only modestly, produce TAF-like experiences for a wide variety of individuals (Shafran & Rachman, 2004).

**Specificity of TAF to OCD**

Whereas it is clear that individuals with OCD symptoms experience elevated TAF, it also is important to understand what precise role TAF plays in the development of those symptoms. To explore this relationship, Rassin et al. (2000) examined the relationship of TAF and thought suppression—two distinct constructs—on obsessive-compulsive symptomatology. Using structural equation modeling, researchers determined that the best fit model for the relationship between TAF, thought suppression, and OC symptoms was one in which TAF influenced more attempts of thought suppression, and higher thought suppression actually increased the likelihood of OC symptomatology. Rassin et al. (2000) concluded that these findings suggest that TAF may play a more central (and in fact elementary) role in the development of OC symptomatology than does thought suppression. In a follow-up study, Rassin et al. (2001) found that, after completing the Sentence Task, individuals who were instructed to suppress their feelings about the task experienced the same amount of intrusive thoughts and anxiety as those in the non-suppression group who were allowed to experience feelings and neutralize as necessary. First, this finding reaffirms the findings of Rassin et al. (2000), which found that the relationship of TAF and OC symptomatology is stronger than the relationship of thought suppression and OC symptomatology. Second, and perhaps more importantly, the sample used in Rassin et al. (2001) was an unscreened nonclinical sample. This suggests that there are at least elements of TAF that are not specific to individuals diagnosed with OCD and can be instilled behaviorally in a random sample of undergraduate students with varying levels of OC symptoms.
Given this information, in addition to the fact that individuals with disorders other than OCD experience certain levels of obsessive-compulsive symptoms (e.g., Lavender et al., 2006), TAF may not be OCD specific. To compare scores on each of the TAFS subscales, Abramowitz et al. (2003) recruited individuals diagnosed with either OCD, generalized anxiety disorder (GAD), panic disorder (PD), social phobia (SP), or major depressive disorder (MDD) and also a no-diagnosis control sample. All participants completed the TAFS, and each group’s subscales were compared against those of the OCD group. No significant mean-level differences were found on the TAFS Moral subscale. On the Likelihood-Self and Likelihood-Other subscales, the OCD group differed from each of the other groups. However, Abramowitz et al. (2003) then set a \( p \) value of .01 in order to maintain a family-wise \( p \) value of .05 owing to the large number of comparisons being made. Once this adjustment was made, the OCD group differed among the following groups (\( p < .01 \)): SP, MDD, and control. This study suggests that individuals with other diagnoses exhibit elevated levels of TAF compared to a control group of nonclinical participants. This study also supports the notion that individuals with OCD typically score significantly higher on TAF subscale scores than do other diagnostic groups, though there is some evidence negative affect plays a mediating role (Abramowitz et al., 2003).

In 2005, a review of literature supported the idea that elevated levels of TAF are common in disorders other than OCD (Berle & Starcevic, 2005). However, two additional findings from that review are worth noting. First, Berle and Starcevic acknowledged that the relationship between TAF and non-OCD disorders is not clear. Through Berle and Starcevic’s review (2005), research had provided moderate support for the idea that TAF functions more prominently in OCD than in other disorders. Second, Berle and Starcevic noted that research on the presence of TAF in eating disorders was relatively sparse, with the exception of the TAF variant thought-shape fusion (TSF). However, TAF and TSF may be the same, and direct comparisons of TAF to eating disorders were not included in the review.
Thought-Shape Fusion

The concept of TSF first was proposed by Shafran et al. (1999) as a cognitive distortion similar to TAF with specificity to eating disorders. This idea of TSF included three main tenets: first, individuals believe that any thoughts of food considered forbidden may lead to weight or shape change; second, having such thoughts is considered immoral; third, individuals believe that having thoughts about off-limits food can lead to a person feeling fat or overweight. Shafran et al. (1999) ran two studies to explore the proposed TSF. In the first study, researchers found that a TSF questionnaire, with subscales for likelihood, moral, and emotional/feeling, was significantly correlated with the EDE-Q (r values ranging from .51-.61, \( p < .001 \)), suggesting sufficient construct validity of TSF. Further, these correlations appear to be stronger than the parallel values exhibited by TAF and measures of OCD (rs= .21 – .32; e.g., Rassin et al., 2001), though both sets of correlations are significant at the \( p < .01 \) level. The second study utilized an altered Sentence Task similar to that of Rachman et al. (1996). Individuals who reported elevated levels of TSF were instructed to write, “I am eating (blank),” filling in the blank with what they perceived to be an unhealthy or fattening food. Results showed that 87% of the sample believed writing this sentence had caused some type of weight gain. Additionally, 80% reported that it was immoral to have such thoughts. Finally, 100% reported alterations in the way they felt about their body following task completion. Further, levels of anxiety increased significantly from pre- to post-task completion (Shafran et al., 1999).

Radomsky et al. (2002) expanded on the work by Shafran et al. (1999) by analyzing a clinical sample of individuals with eating disorders. Following a procedure similar to Shafran et al. (1999), they found that completing the Sentence Task raised anxiety levels as well as the belief that individuals weighed more than prior to the task. This supports the findings
by Shafran et al. (1999) that TSF is a valid construct and is meaningfully related to eating disorders. Furthermore, Radomsky et al. (2002) found a near-significant correlation between TAF and TSF ($r = .43$), suggesting that TAF and TSF, although not the same constructs, are related in a potentially meaningful manner. Other studies have supported the relevance of TSF in eating pathology. Shafran and Robinson (2004) found significant elevations ($p < .05$) of TSF among individuals with eating disorders ($n = 42$) compared to a nonclinical control group ($n = 42$). Again, scores on the EDE-Q were significantly correlated with the TSF scale, further affirming construct validity both of the construct itself as well as the measure of TSF.

In examining the specificity of TSF, Coelho et al. (2012) compared levels of TSF across groups of individuals with eating disorders, OCD, and no diagnosis. Individuals with eating disorders exhibited higher levels of TSF than the two comparison groups, but individuals with OCD did not differ from the control group. This suggests that whereas TAF may play a role in disorders other than OCD, TSF does not generalize across diagnoses in a similar manner—that is, TSF appears to be specific to eating disorders. Further, Coelho et al. (2012) found that correlations between TAF and TSF were near significance but did not meet the $p < .05$ threshold, adding to the findings of Radomsky et al. (2002) of an undetermined relationship between the two purportedly similar constructs.

Still, Coelho et al. (2015) further investigated the relations among eating disorders, TSF, and TAF by analyzing a sample of women with eating disorders compared to women with no diagnosis. Utilizing a repeated-measures design, participants in each group completed three sentence tasks: a TSF Sentence Task, a TAF Sentence Task, and a neutral Sentence Task. With at least one day between each task, participants completed these tasks in a random order. Subsequent analyses of TAF and TSF measures indicated that the eating disorders group was more generally susceptible to both TAF and TSF than were the control groups. That is, individuals with eating disorders had higher total scores on the TAFS and a TSF scale.
Furthermore, measures of distress after each induction showed that emotional/behavioral stress responses were significantly higher \((p < .05)\) following TAF induction for both groups. These findings again show that although TAF—and to a lesser extent TSF—may be found in both disordered and nondisordered populations, the former is likely to have a stronger response.

Although research is not clear on the exact relationship between TAF and TSF – with many studies finding non-significant correlations between the two – there are considerable face-level content similarities between the two. It is clear that individuals with eating disorders illustrate higher levels of TSF than noneating disorder samples. However, the majority of TAF-related research performed in populations with eating disorders has been in exploration of TSF rather than TAF. As the two are not the same, there is a gap in the research looking into TAF levels in individuals with eating disorders.

**TAF in Eating Disorders**

A review of the literature through 2004 suggested that TAF is not OCD specific and that elevated TAF levels can be found in other disorders (Shafran & Rachman, 2004). This review also made note that only one study had ever measured levels of TAF in a sample of individuals with elevated eating pathology. Radomsky et al. (2002) found that individuals with eating disorders had a mean score of 39.2 on the TAFS, but this number was not compared against anything in that study. However, this score of 39.2 is higher than the mean score of individuals with OCD found in other studies (e.g., Abramowitz et al., 2003).

Since then, more studies have been conducted to investigate relationships between eating disorders and OC symptomatology, specifically in relation to TAF. Roncero et al. (2011) studied individuals with eating disorders without an OCD comorbidity, analyzing scores on
the TAFS. Compared to a community control sample \((n = 50)\), individuals with eating disorders \((n = 79)\) scored significantly higher on the TAFS subscales \((p < .05)\), suggesting that individuals with eating disorders experience elevated TAF in a manner similar to other non-OCD disorder diagnoses.

In 2014, Garcia-Soriano et al. compared a group of individuals with OCD to individuals with eating disorders in what is believed to be the first study to directly compare TAF scores across these two groups. The study did not use the TAFS, but utilized a Spanish inventory with subscales TAF-Likelihood and TAF-Moral. Garcia-Soriano et al. (2014) found that individuals with OCD \((n = 79)\) and individuals with eating disorders \((n = 177)\) did not differ at a statistically significant level on the TAF-Likelihood subscale \((p = .661)\) but did differ significantly on the TAF-Moral subscale \((p = .011)\), though this significant difference did not hold up after Bonferroni corrections were applied to the analyses. As the results of the first such comparison indicate potential TAF similarities across OCD and eating disorders, it is important to consider what this finding may mean. First, it is notable that this comparison was not the primary aim of the study but occurred as part of a larger research investigation. Therefore, considerations for this portion of the study may not have been as stringent as if this hypothesis was the main thrust of the inquiry. Second, this study was conducted in Spain, and the DSM-5 notes cultural variation in the attitude and presentation of eating disorders across cultures (APA, 2013). Third, considering points one and two, Garcia-Soriano et al. (2014) provide preliminary evidence to suggest that, whereas OCD and other disorders vary in their reported levels of TAF, individuals with OCD and individuals with eating disorders may experience similar levels of TAF.
The Current Study

With considerable debate taking place on the future of the OCRD chapter in the DSM, Abramowitz and Jacoby (2015) urged the field to investigate relationships between OCD and other disorders beyond “superficial symptomatology.” The reviewed literature suggests that eating disorders are candidates for inclusion in such a classification. This suggestion is based on findings that 1) eating disorders and OCD are comorbid at moderate to high rates (e.g., Thornton & Russell, 1997), 2) both exhibit elevated obsessional beliefs (e.g., Roncero et al., 2011), 3) they share similar repetitive behaviors aimed at alleviating anxiety (e.g., Hamli et al., 2003), and 4) individuals with these diagnoses may share similar personality traits (e.g., Pollack & Forbush, 2013).

The primary aim of the current study was to explore relations between OCD and eating disorders beyond the current literature, namely, by targeting the construct of thought-action fusion (TAF). Previous research primarily has utilized clinical (or analogue clinical) groups of individuals with specific disorders. Between-groups comparisons present challenges in terms of controlling for comorbidity and therefore are limited, such as with respect to the ability to isolate specific variables of interest. The current study investigated the extent to which TAF-relevant outcomes are related to OC symptoms and eating disorder symptoms, regardless of diagnostic standing (as suggested by McKay & Neziroglu, 2009).

Hypotheses

Given the substantial body of research that identifies similarities between OCD and eating disorders, as well as the established relationship between anxiety and depression, the first set of hypotheses was as follows:
Hypothesis 1a

Self-reported obsessive-compulsive symptoms and self-reported eating disorder symptoms will be significantly \( p < .05 \) positively correlated at the zero-order level.

Hypothesis 1b

Self-reported obsessive-compulsive symptoms and self-reported depression symptoms will be significantly \( p < .05 \) positively correlated at the zero-order level.

Hypothesis 1c

Self-reported eating disorder symptoms and self-reported depression symptoms will be significantly \( p < .05 \) positively correlated at the zero-order level.

Previous research has examined the direct relationship between certain non-OCD disorders and levels of TAF (e.g., Abramowitz et al., 2003) and found significant differences between OCD and other diagnostic groups. However, this research has not included eating pathology. The relationship between eating disorders and TSF (Shafran et al., 1999) is the closest that research has come to examining TAF in eating disorders. Thought-shape fusion appears to be similar in process to TAF, but whereas some studies have found significant relationships between measures of the two (e.g., Shafran et al., 1999), others have found nonsignificance (Coelho et al., 2012; Radomsky et al., 2002). Therefore, there was a need to explore the specific relationship between TAF and eating disorders. The only previous study to do so found preliminary evidence to suggest that TAF may be a relevant factor
for individuals with eating disorders as well as individuals with OCD. However, there were limitations to that study, which make it difficult to draw firm conclusions (Garcia-Soriano et al., 2014). Similarly, studies have found that individuals with OCD score significantly higher on the TAFS than individuals with depression (e.g., Abramowitz et al., 2003). Furthermore, measures of depression are not significantly correlated with the TAFS total score (Rassin et al., 2001). To date, most research on TAF has utilized between-groups designs, where comorbidity is a major consideration. To my knowledge, no study has investigated these issues regarding TAF using the English version of the TAFS with a correlational approach. This study utilized an unscreened sample of participants and focused on correlational analyses; doing so allowed for an examination of symptoms from a dimensional rather than a binary perspective (per McKay & Neziroglu, 2009). Thus, the second set of hypotheses was as follows:

**Hypothesis 2a**

Self-reported thought-action fusion will be significantly \( (p < .05) \) positively correlated with obsessive-compulsive symptoms at the zero-order level.

**Hypothesis 2b**

Self-reported thought-action fusion will be significantly \( (p < .05) \) positively correlated with eating disorder symptoms at the zero-order level.
Hypothesis 2c

Self-reported thought-action fusion will not be significantly ($p > .05$) correlated with depression symptoms at the zero-order level.

Hypothesis 2d

The zero-order correlation between thought-action fusion and obsessive-compulsive symptoms will be significantly ($p < .05$) stronger than the zero-order correlation between thought-action fusion and depression symptoms.

Hypothesis 2e

The zero-order correlation between thought-action fusion and eating disorder symptoms will be significantly ($p < .05$) stronger than the zero-order correlation between thought-action fusion and depression symptoms.

Hypothesis 2f

The zero-order correlation between thought-action fusion and obsessive-compulsive symptoms will not be significantly ($p > .05$) stronger than the zero-order correlation between thought-action fusion and eating disorder symptoms.

Several studies have shown that measures of OCD are significantly correlated with measures of TAF (e.g., Rassin et al., 2001; Shafran et al., 1996). Research also has demonstrated...
that individuals with OCD do not differ significantly from individuals with eating disorders on a Spanish translation of the TAFS, the only known comparison of these two groups on the TAFS (Garcia-Soriano et al., 2014). However, OCD groups do score significantly higher than individuals with depression (Abramowitz et al., 2003). Research suggests that the Sentence Task effectively increases anxiety in participants regardless of diagnostic category (Rachman et al., 1996). However, the Sentence Task originally was developed for use in samples with elevated OC symptom scores (Rachman et al., 1996). Thus, the third set of hypotheses was as follows:

**Hypothesis 3a**

Obsessive-compulsive symptoms will be significantly \( (p < .05) \) positively correlated with the change in score between self-reported pre- and post-task anxiety at the zero-order level.

**Hypothesis 3b**

Eating disorder symptoms will be significantly \( (p < .05) \) positively correlated with the change in score between self-reported pre- and post-task anxiety at the zero-order level.

**Hypothesis 3c**

Depression symptoms will not be significantly \( (p > .05) \) correlated with the change in score between self-reported pre- and post-task anxiety at the zero-order level.
**Hypothesis 3d**

The zero-order correlation between obsessive-compulsive symptoms and change in pre-to post-task anxiety will be significantly \( p < .05 \) stronger than the zero-order correlation between depression symptoms and change in pre- to post-task anxiety.

**Hypothesis 3e**

The zero-order correlation between eating disorder symptoms and change in pre- to post-task anxiety will be significantly \( p < .05 \) stronger than the zero-order correlation between depression symptoms and change in pre- to post-task anxiety.

**Hypothesis 3f**

The zero-order correlation between obsessive-compulsive symptoms and change in pre- to post-task anxiety will not be significantly \( p > .05 \) stronger than the zero-order correlation between eating disorder symptoms and change in pre- to post-task anxiety.

Research on the relationship between the Sentence Task (Rachman et al., 1996) and the TAFS (Shafran et al., 1996) has produced inconclusive results. Some research has found that post-task anxiety ratings are not significantly correlated with TAFS scores (e.g., Van den Hout et al., 2001). Others have found significant relationships between these measures (e.g., Berman et al., 2011). This literature suggested that an exploratory question is most appropriate.
Exploratory Hypothesis 4

The current study explored the relationship between self-reported TAF (i.e., TAFS scores) and state anxiety in the context of a TAF behavioral task (i.e., change in self-reported pre- to post-Sentence Task anxiety). A significant zero-order correlation would support the construct validity of the Sentence Task, as a moderate positive correlation would be expected. This finding will reflect convergent (monotrait multimethod) validity (Campbell & Fiske, 1959).
CHAPTER 2
METHODS

Participants

Due to a lack of methodologically similar research, there was no specific, published effect size that appeared appropriate to use as an estimate for running a power analysis (e.g., G*Power; Faul et al., 2007). Using the closest relevant figure, the relationship between a Dutch version of the TAFS and the Padua Inventory ($r = .32$; Rassin et al., 2001), suggested a total sample size of 56 would be sufficient to find a significant relationship between the TAFS and a measure of OCD. However, the translation of the measures to Dutch, the differences between the Padua Inventory and the DOCS, and the differences between Rassin et al. (2001) and the current study all provided concerns for using this measured relationship as an accurate estimate. Instead, this study aimed to run 100 participants. Although data collection was on pace to exceed that goal, the global COVID-19 pandemic effectively ceased in-person data collection.

Participants self-selected from introductory psychology courses at Northern Illinois University. Whereas previous research has limited similar designs to females only, both males and females were allowed to participate in the present study. A total of 76 English-speaking participants at least 18 years of age were recruited. Of these 76 participants, six were excluded from analyses: one failed the instructional validity check questions, one showed inconsistent response patterns (i.e., illustrated a pattern of choosing the same option for all questions of a questionnaire—all 1’s for one measure, all 5’s for the next), and four did not complete the Sentence Task. Of the 70 remaining participants, 63% identified as fe-
male with an average age of 19.5 years. The sample was 51.4% White/European American, 24.3% Black/African American, 8.6% Asian/Asian American, 4.3% multiracial, and 11.4% “Other.” Further, 20.0% identified as Hispanic/Latino. Of the 70 participants included in analyses, one self-reported a diagnosis of OCD, three with MDD, five with GAD, and two with ADD/ADHD.¹

Measures

Demographics Questionnaire

Participants completed a demographics questionnaire after consenting to complete the study. The questionnaire included age, sex, and race as well as a question asking if the participant ever had been diagnosed with OCD, an eating disorder, or MDD.

Dimensional Obsessive-Compulsive Scale (DOCS; Abramowitz et al., 2010)

The DOCS is a 20-item self-report questionnaire designed to measure four symptom dimensions of OCD: Contamination, Responsibility for Harm and Mistakes, Incompleteness, and Unacceptable Thoughts. Designed to address limitations of previous OCD symptom measures, the DOCS asks respondents to indicate responses on different 0-4 scales. Each choice has an associated text response, with 0 indicating no relevant symptoms and 4 indicating the most extreme symptoms. Cutoff scores on the DOCS have not yet been empirically validated to determine sensitivity and specificity of the measure (Abramowitz et al., 2010).

¹One participant reported comorbid OCD, MDD, and GAD. One participant reported comorbid MDD and GAD. The overall psychopathology rate (8 of 70 participants) was 11%.
The DOCS has illustrated psychometric adequacy in both clinical and nonclinical samples. For example, Abramowitz et al. (2010) found that the instrument has adequate or better internal consistency in clinical and nonclinical participants (all values > .89). Further, factor analysis confirmed its four-factor structure. Abramowitz et al. (2010) also found evidence of convergent validity via correlation between the DOCS total score and the Obsessive-Compulsive Inventory ($r = .69, p < .01$). Finally, Abramowitz et al. (2010) illustrated that the DOCS total score has adequate discriminant validity, correlating more weakly with the Beck Anxiety Inventory ($r = .33, p < .01$) and the Beck Depression Inventory ($r = .38, p < .01$).

**Eating Attitudes Test-26 (EAT-26; Garner et al., 1982)**

The EAT-26 is a self-report questionnaire that consists of three subscales: Dieting (13 items), which refers to avoiding certain foods and having a relatively stable preoccupation with being thin; Bulimia and Food Preoccupation (6 items), which reflects obsessive thoughts about food as well as thoughts related to BN symptoms; and Oral Control (7 items), which identifies symptoms of self-control as well as perceptions of external pressure to gain weight. Respondents are asked to rate Items 1-25 on the following scale: always (3), usually (2), often (1), sometimes (0), rarely (0), never (0). For Item 26, the scoring is reversed. Scores above 20 typically are considered to be clinically significant.

The EAT-26 has been found to have adequate to good psychometric properties. Garner et al. (1982) found good internal consistency ($\alpha = .90$) in clinical groups. Berland et al. (1986) suggested that the measure’s total score shows strong convergent validity with other well-validated eating disorder measures such as the Eating Inventory ($r = .66, p < .001$). Garner and Garfinkel (1979) established that the measure has adequate discriminant validity,
correlating relatively weakly with the Restraint Scale ($r = .28, p > .05$), a measure meant to explore dietary behaviors and not eating pathology per se.

**Mood and Anxiety Symptom Questionnaire – Anhedonic Depression Subscale**  
(MASQ-AD; Watson, Clark, et al., 1995; Watson, Weber, et al., 1995)

The Anhedonic Depression subscale from the MASQ is a 22-item self-report measure of depression symptoms related to anhedonia. The 22 items have been found to reliably map onto two distinct factors within the MASQ-AD: depression (MASQ-AD-D, 8 items) and positive affect (14 items; Nitschke et al., 2001; Watson, Clark, et al., 1995). Respondents indicate how frequently they have experienced each item in the past week on a scale that ranges from 1 (*not at all*) to 5 (*extremely*). The possible range for this subscale of the MASQ-AD score is 8-40, with higher scores reflecting higher symptoms of depression related to anhedonia.

Research has suggested that an eight-item subset of the MASQ-AD items can accurately assess for DSM-defined depression (e.g., Bredemeier et al., 2010). The eight-item subscale has illustrated strong internal consistency ($\alpha = .94$). Further, through receiver-operator characteristic analyses (ROC) via area under the curve (AUC) estimates, the eight-item subscale significantly ($p < .05$) outperformed other screening measures of depression, including the full MASQ-AD and the Neuroticism scale of the NEO Five Factor Inventory, in predicting depression diagnoses (Bredemeier et al., 2010). Bredemeier et al. (2010) noted that the AUC values were comparable to those of the BDI, a commonly used self-report measure of depression symptoms. Bredemeier and colleagues (2010) concluded that the MASQ-AD is appropriate for studies in both clinical and nonclinical samples.
Thought-Action Fusion Scale (TAFS; Shafran et al., 1996)

The TAFS is a 19-item self-report questionnaire designed to measure three domains of thought-action fusion: Moral, Likelihood-Other, and Likelihood-Self. Respondents rate each item on a scale that ranges from 0 (strongly disagree) to 4 (strongly agree). The possible range for the total score is 0-76, with higher scores reflecting higher standing on TAF.

Research suggests that the TAFS has modest psychometric properties. Shafran et al. (1996) found adequate internal consistency (all values .85). Rassin et al. (2001) noted that a Dutch version of the measure significantly correlated with measures of obsessional problems, including the Maudsley Obsessive-Compulsive Inventory (MOCI; \(r = .21, p < .01\)) and the Padua Inventory (\(r = .32, p < .01\)), but does not correlate significantly with theoretically unrelated measures such as the BDI (\(r = .15, p > .05\)). These data, in conjunction with conflicting findings of both significant (e.g., Van den Hout et al., 2001) and non significant (e.g., Berman et al., 2011) correlations between TAFS scores and post-Sentence Task anxiety, suggest modest construct validity of the TAFS.

Verbal Analogue Scales (VAS; Rachman et al., 1996)

The verbal analogue scales used by Rachman et al. (1996) consist of seven questions meant to specifically assess the impact of the Sentence Task developed in the same study. Participants are asked to rate their responses to the following questions on a scale ranging from 0 (not at all) to 100 (extremely high): 1) How much anxiety do you feel right now? 2) How much guilt do you feel right now? 3) What is the likelihood of the (original) event occurring in the next 24 hr? 4) How much control do you have over the (original) event occurring? 5) How responsible would you feel if the (original) event did occur in the next
24 hr? 6) How morally wrong was it to write out the sentence? 7) How strong is your urge to reduce or cancel (further) the effects of writing the sentence?

These questions have been used numerous times in the literature regarding Rachman et al.’s (1996) Sentence Task and generally are considered to be an adequate gauge of a general anxiety response to the task, as well as a gauge of self-reported TAF that may be associated with the task (e.g., Berman et al., 2011; Van den Hout et al., 2001). The verbal analogue scales have not been specifically targeted for reliability or validity checks, as they are meant to provide supplemental subjective information in tandem with other measures. Only Question 1 was used to test the current study’s hypotheses.

The Sentence Task (Rachman et al., 1996)

For more than two decades, researchers have used the Sentence Task developed by Rachman et al. (1996) as a way to study TAF. There are different variations of the task; the specific version of the task used in the current study is the most common version seen in the published OCD literature. Participants are asked to write the name of a living friend or loved one on a notecard. They are then prompted to write the following sentence, filling in the blank with the name from the notecard: “I hope _____ is in a car accident.” Upon completion, participants typically are given the opportunity to neutralize to alleviate anxiety and subsequently asked to respond to the verbal analogue scales from Rachman et al. (1996).
Positive Mood Induction

At the end of a study wherein participants might experience negative emotions, research has shown that a positive mood induction can reduce subsequent worry and rumination (Bahrami et al., 2012). Such positive mood inductions can vary from videos of animals playing to reading humorous jokes. For this study, participants underwent a positive mood induction by reading comical proverbs that were finished by children. The purpose of this study element was to attempt to minimize relevant risk to participants. No hypotheses about the positive mood induction were offered, and this element was not seen as central to the study.

Procedure

Participants self-selected from introductory psychology courses and were eligible if they were 18 years of age or older. Upon arrival to the lab, participants were provided with a printed informed consent document, time to read the document, and the opportunity to ask any questions they may have had prior to providing written informed consent and beginning the study. Next, using a computer, participants completed the demographics questionnaire and then the DOCS, EAT-26, BDI-II, and TAFS in a counterbalanced order. Three instructional validity check questions (available in Appendix I) were embedded within the measures, checking whether or not participants were paying attention. Participants then were asked to respond to Question 1 of the verbal analogue scale to establish a pre-task baseline measure of anxiety.

Upon completion of these measures, participants were asked to complete the Sentence Task as described above. Upon completion, they were asked to respond to items from the
verbal analogue scale prior to having a chance to neutralize. This was done to capture accurate ratings of anxiety. Following this, participants were given the opportunity to neutralize in any manner they chose. Next, participants were led through a positive mood induction exercise in an attempt to negate any distress (Bahrami et al., 2012). Finally, participants were debriefed and provided with access to a list of local counseling resources.
CHAPTER 3

RESULTS

Data Cleaning

Prior to main analyses, the data were cleaned in a systematic manner. Individuals were excluded from the dataset if they showed invalid responses on two out of three validity questions embedded within the questionnaires. One participant failed this validity check, answering two out of the three questions incorrectly. Another participant chose the same response for an entire questionnaire, a different but still uniform response for the entirety of the next questionnaire, and so on. Such responding was interpreted as invalid and the participant was excluded from the main analyses.

Participant cases missing more than 5% of data on a given questionnaire were to be excluded from analyses involving that questionnaire (Schafer, 1999); no participants met this criterion. Four individuals who opted not to complete the Sentence Task were excluded from all analyses. Little’s (1988) MCAR test was used to identify patterns of missingness among the variables, with results suggesting the data were missing completely at random, $\chi^2(853) = 32.87, p = .99$. For missing data from individuals who both completed the Task and had less than 5% of data missing from any given questionnaire, multiple imputation was performed. This approach estimates multiple likely values and then averages them in a pooled dataset (Rubin, 1987). In total, 11 data points (0.12% of all data) were imputed, and all analyses then were carried out on the pooled, or averaged, dataset.

Next, the data were screened for outliers by analyzing total scores for all measured variables and subscales, with absolute standardized values greater than 3.29 being deemed
as outliers (Tabachnick & Fidell, 2013). There were 14 data points (0.15% of all data) that met this criterion to identify statistical outliers. These values were winsorized to a score 3.0 SD from the local mean (Field, 2009).

The data subsequently were examined for normality using both the Kolmogorov-Smirnov and Shapiro-Wilk tests, with the former sometimes deemed more appropriate for sample sizes greater than 50 (Yap & Sim, 2011). These tests are sensitive to violations of normality, and as such, an alpha level of .01 was chosen a priori to identify significant nonnormality. As seen in Table 1, both normality tests indicated that the TAFS total score was normally distributed, whereas the DOCS, MASQ-AD-D, and EAT-26 total scores were not. The change score measuring the difference between Pre-Task anxiety and Post-Task anxiety also was not normally distributed per both normality tests.

To further investigate the distribution of the variables, skew and kurtosis of the data were examined. These were considered significant if the absolute standardized value was greater than 2.58 (Field, 2009). The raw and standardized values appear in Table 2. Results suggest that the DOCS and EAT-26 total score variables, as well as the VAS Anxiety change score variable, were positively skewed. The only variable found to be significantly kurtotic was the EAT-26 total score.

Whereas transformations may be appropriate for some variables that are nonnormally distributed, no transformations were made on the current dataset. This decision was made for the following reasons. First, in previous research the EAT-26 has exhibited a pattern wherein it is not normally distributed among nonclinical populations (e.g., Gitau et al., 2014; Orbietello et al., 2006; Richardson et al., 2015; Rouzitalab et al., 2019). This likely is due to its scoring method: 6-point scale is used, but the three lowest values are scored “0” and the three highest values assigned 1, 2, or 3 (with 3 indicating extreme severity). Thus, the pattern of nonnormally distributed scores on the EAT-26 is not unexpected. Excluding the EAT-26, the skewness and kurtosis of the variables either was not significant or was
Table 1

*Normality Tests*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Kolmogorov-Smirnov</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( F )</td>
<td>( df )</td>
</tr>
<tr>
<td>DOCS Total</td>
<td>.160</td>
<td>70</td>
</tr>
<tr>
<td>MASQ-AD-D</td>
<td>.208</td>
<td>70</td>
</tr>
<tr>
<td>EAT-26 Total</td>
<td>.229</td>
<td>70</td>
</tr>
<tr>
<td>TAFS Total</td>
<td>.071</td>
<td>70</td>
</tr>
<tr>
<td>VAS Anxiety 12 Change</td>
<td>.205</td>
<td>70</td>
</tr>
</tbody>
</table>

*Note.* All Analyses \( N = 70 \). DOCS = Dimensional Obsessive Compulsive Scale. MASQ-AD-D = Mood and Anxiety Symptom Questionnaire Anhedonic Depression 8-item subscale. EAT-26 = Eating Attitudes Test. TAFS = Thought-Action Fusion Scale. VAS = Verbal Analogue Scale.
Table 2

*Skew and Kurtosis*

<table>
<thead>
<tr>
<th></th>
<th>Skew</th>
<th>Skew S.E.</th>
<th>Std. Skew</th>
<th>Kurtosis</th>
<th>Kurtosis S.E.</th>
<th>Std. Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOCS Total</td>
<td>1.027</td>
<td>.287</td>
<td>3.58</td>
<td>0.739</td>
<td>.566</td>
<td>1.31</td>
</tr>
<tr>
<td>MASQ-AD-D</td>
<td>0.722</td>
<td>.287</td>
<td>2.52</td>
<td>-0.417</td>
<td>.566</td>
<td>-0.74</td>
</tr>
<tr>
<td>EAT-26 Total</td>
<td>1.798</td>
<td>.287</td>
<td>6.26</td>
<td>2.685</td>
<td>.566</td>
<td>4.74</td>
</tr>
<tr>
<td>TAFS Total</td>
<td>0.058</td>
<td>.287</td>
<td>0.20</td>
<td>-0.832</td>
<td>.566</td>
<td>-1.47</td>
</tr>
<tr>
<td>VAS Anxiety 12 Change</td>
<td>1.212</td>
<td>.287</td>
<td>4.22</td>
<td>0.584</td>
<td>.566</td>
<td>1.03</td>
</tr>
</tbody>
</table>

significant but not extreme. Importantly, normality is not considered to be an assumption of a Pearson correlation (Schober et al., 2018). Therefore, that the data were not normally distributed is not necessarily indicative of a need to either transform the data or change analytic methodology for the proposed correlations. However, the nonnormality of VAS Anxiety change score from Pre-task to Post-task is a violation of the assumptions of a dependent \( t \)-test (Field, 2009), which was the planned analysis for one of the hypotheses. As a result, the nonparametric Wilcoxon signed-rank test—robust against nonnormally distributed data—was used for the relevant analyses.

Next, descriptive statistics were calculated for all measures. See Table 3 for means and standard deviations as well as the internal consistency estimate (operationalized as coefficient alpha) for each measure and its subscales. Importantly, anxiety ratings increased significantly from pre- to post-Sentence Task, \( Z = 5.72, p < .001 \), meaning that the VAS Anxiety change score, on average, represented a significant increase in anxiety change score. Of the 70 participants, 43 (61%) showed a net increase (range of increase was from 2 to 80) in anxiety from pre- to post-task anxiety. The remaining 27 participants showed no change in pre- to post-task anxiety. With regard to the impact of the positive mood induction, there was a significant decrease in anxiety from post-task to post-positive mood induction, \( Z = 5.81, p < .001 \). Forty-seven participants (67%) reported a net decrease in anxiety (range of decrease was from 2 to 100). Interestingly, three participants (4%) reported a net increase in anxiety (range of increase was from 5 to 15). Twenty participants reported no change. Finally, there was no significant difference between self-reported anxiety prior to the Sentence Task and following the positive mood induction, \( Z = .07, p = .95 \).
Table 3

**Means, Standard Deviations, and Internal Consistency**

<table>
<thead>
<tr>
<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>
</tr>
</thead>
<tbody>
<tr>
<td>DOCS Total (20)</td>
<td>13.40</td>
<td>10.97</td>
<td>0-80</td>
<td>0-47</td>
<td>.92</td>
<td>.38</td>
</tr>
<tr>
<td>Contamination (5)</td>
<td>3.56</td>
<td>3.49</td>
<td>0-20</td>
<td>0-14</td>
<td>.85</td>
<td>.52</td>
</tr>
<tr>
<td>Responsibility for Harm (5)</td>
<td>3.19</td>
<td>2.86</td>
<td>0-20</td>
<td>0-12</td>
<td>.82</td>
<td>.50</td>
</tr>
<tr>
<td>Unacceptable Thoughts (5)</td>
<td>3.13</td>
<td>3.45</td>
<td>0-20</td>
<td>0-13</td>
<td>.92</td>
<td>.71</td>
</tr>
<tr>
<td>Incompleteness (5)</td>
<td>3.53</td>
<td>4.02</td>
<td>0-20</td>
<td>0-16</td>
<td>.85</td>
<td>.54</td>
</tr>
<tr>
<td>MASQ-AD-D (8)</td>
<td>16.41</td>
<td>6.24</td>
<td>8-40</td>
<td>8-32</td>
<td>.79</td>
<td>.30</td>
</tr>
<tr>
<td>EAT-26 Total</td>
<td>6.13</td>
<td>6.47</td>
<td>0-78</td>
<td>0-27</td>
<td>.80 (.88)a</td>
<td>.16</td>
</tr>
<tr>
<td>Dieting</td>
<td>3.57</td>
<td>4.29</td>
<td>0-39</td>
<td>0-18</td>
<td>.77 (.88)a</td>
<td>.27</td>
</tr>
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<td>.76 (.79)a</td>
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<td>Oral Control</td>
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<td>.79</td>
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<td>Moral</td>
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<td>VAS T1 Anxiety</td>
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<td>0-100</td>
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<td>-</td>
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<tr>
<td>VAS T3 Anxiety</td>
<td>24.84</td>
<td>30.11</td>
<td>0-100</td>
<td>0-100</td>
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<td>-</td>
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<tr>
<td>VAS Anxiety 12 Change</td>
<td>18.20</td>
<td>22.08</td>
<td>(-100)-100</td>
<td>0-80</td>
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<td>VAS Anxiety 13 Change</td>
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<td>17.87</td>
<td>(-100)-100</td>
<td>(-70)-50</td>
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</table>

*Note.* All analyses $N = 70$. DOCS = Dimensional Obsessive Compulsive Scale. MASQ-AD-D = Mood and Anxiety Symptom Questionnaire Anhedonic Depression 8-item subscale. EAT-26 = Eating Attitudes Test. TAFS = Thought-Action Fusion Scale. VAS = Verbal Analogue Scale.

*EAT-26 Total and subscale alpha coefficients for variables prior to recode listed in parentheses.
Primary Analyses

Hypothesis 1

Hypotheses 1a, 1b, and 1c were that there would be significant positive correlations between (1a) OC symptoms and eating pathology, (1b) OC symptoms and depression symptoms, and (1c) eating pathology and depression symptoms. To test these hypotheses, zero-order bivariate Pearson correlations were computed involving the total scores for all three pairings of the DOCS, EAT-26, and MASQ-AD. As seen in Table 4, there was a significant correlation between the DOCS total score and the EAT-26 total score, $r(68) = .31, p < .01$. There also was a significant correlation between the DOCS total score and the MASQ-AD-D, $r(68) = .42, p < .01$. Further, there was a significant correlation between the EAT-26 and the MASQ-AD-D, $r(68) = .32, p < .01$. These results were consistent with all parts of Hypothesis 1.

Hypothesis 2

Hypotheses 2a, 2b, and 2c were that there would be significant positive correlations between (2a) TAFS total score and OC symptoms and (2b) TAFS total score and eating pathology but not (2c) TAFS total score and depression symptoms. To test these hypotheses, zero-order bivariate Pearson correlations were computed involving the TAFS total score and each of the DOCS, EAT-26, and MASQ-AD-D. Consistent with the hypothesis, there was a significant relationship between the TAFS total score and the DOCS total score, $r(68) = .41, p < .01$. However, inconsistent with the hypothesis, there was not a significant
Table 4

**Summary of Symptom Correlations**

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<td>1 DOCS Total</td>
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<tr>
<td>2 MASQ-AD-D</td>
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<td>-</td>
<td></td>
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<td></td>
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<td>3 EAT-26 Total</td>
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<td>.32**</td>
<td>-</td>
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<tr>
<td>4 TAFS Total</td>
<td>.41**</td>
<td>.49**</td>
<td>.24</td>
<td>-</td>
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<tr>
<td>5 TAFS Likelihood-Self</td>
<td>.26*</td>
<td>.54**</td>
<td>.37**</td>
<td>.63**</td>
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<tr>
<td>6 TAFS Likelihood-Other</td>
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<td>.58**</td>
<td>.14</td>
<td>.72**</td>
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<td>7 TAFS Moral Wrongness</td>
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<td>.29*</td>
<td>.15</td>
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<td>.13</td>
<td>.25*</td>
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<td>.18</td>
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<td>9 VAS T2 Anxiety</td>
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<tr>
<td>10 VAS T3 Anxiety</td>
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<td>.35**</td>
<td>.19</td>
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<td>.77**</td>
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<td>11 VAS Anxiety 12 Change</td>
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<td>.10</td>
<td>.12</td>
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<td>-.08</td>
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<td>-.26</td>
<td>.02</td>
<td>.34**</td>
<td>.39**</td>
<td>.42**</td>
</tr>
</tbody>
</table>

*Note.* All Analyses N = 70. DOCS = Dimensional Obsessive Compulsive Scale. MASQ-AD-D = Mood and Anxiety Symptom Questionnaire Anhedonic Depression 8-item subscale. EAT-26 = Eating Attitudes Test. TAFS = Thought-Action Fusion Scale. VAS = Verbal Analogue Scale.

*Correlation significant at p < .05 (2-tailed).

**Correlation significant at p < .01 (2-tailed).
correlation between the TAFS total score and the EAT-26 total score, \( r(68) = .24, p < .10 \). Also inconsistent with the hypothesis, there was a significant correlation between the TAFS total score and the MASQ-AD-D, \( r(68) = .49, p < .01 \).

Hypotheses 2d, 2e, and 2f were that (2d) the correlation between TAFS and OC symptoms would be significantly stronger than the correlation between TAFS and depression symptoms, (2e) the correlation between TAFS and eating pathology would be significantly stronger than the correlation between TAFS and depression symptoms, and (2f) the correlation between TAFS and OC symptoms would not be significantly stronger than the correlation between TAFS and eating pathology. Given the pattern of findings with regard to Hypotheses 2a, 2b, and 2c—specifically, the unexpected finding that the TAFS correlated numerically higher with the MASQ-AD-D than it did with either the DOCS or the EAT-26—these analyses were not performed.

**Hypothesis 3**

Hypotheses 3a, 3b, and 3c were that self-reported change in pre- to post-Task VAS Anxiety scores would be significantly positively correlated with (3a) OC symptoms and (3b) eating pathology, but not with (3c) depression symptoms. To test these hypotheses, zero-order bivariate Pearson correlations were computed involving pre- to post-Task VAS Anxiety change score and each of the DOCS, EAT-26, and MASQ-AD-D. Results are shown in Table 4. Consistent with the hypothesis, there was no significant correlation between the MASQ-AD-D and the VAS Anxiety change score, \( r(68) = .11, p = .38 \). However, inconsistent with the hypothesis, there also was no significant correlation between the DOCS and the VAS Anxiety change score, \( r(68) = -.14, p = .24 \). Further, there was no significant correlation between the EAT-26 and the VAS Anxiety change score, \( r(68) = .10, p = .40 \).
Hypotheses 3d, 3e, and 3f were that (3d) the correlation between change in pre- to post-Task VAS Anxiety scores and OC symptoms would be significantly stronger than the correlation between change in pre- to post-Task VAS Anxiety scores and depression symptoms, (3e) the correlation between change in pre- to post-Task VAS Anxiety scores and eating pathology would be significantly stronger than the correlation between change in pre- to post-Task VAS Anxiety scores and depression symptoms, and (3f) the correlation between change in pre- to post-Task VAS Anxiety scores and OC symptoms would not be significantly stronger than the correlation between change in pre- to post-Task VAS Anxiety scores and eating pathology. Given the pattern of findings with regard to Hypotheses 3a, 3b, and 3c—specifically, that the VAS Anxiety change score was not statistically significantly correlated with any of the three symptom measures—these analyses were not performed.

**Hypothesis 4**

Hypothesis 4, which was an exploratory hypothesis, sought to investigate the relationship between self-reported TAF and the Sentence Task. To explore this relationship, zero-order bivariate Pearson correlations were computed between the TAFS total score and the change score (the change in pre- to post-Task Anxiety scores), the TAFS Likelihood subscales and the change score, and the TAFS Moral subscale and the change score. As seen in Table 4, there was a significant correlation between the TAFS total score and the pre-Task VAS Anxiety score, $r(68) = .25, p < .05$, as well as between the TAFS total score and the post-Task VAS Anxiety score, $r(68) = .28, p < .05$. However, there was not a significant correlation between the TAFS total score and the VAS Anxiety change score, $r(68) = .12, p = .34$. 
CHAPTER 4
DISCUSSION

The purpose of this study was to expand research on similarities and differences between OCD symptoms and eating disorder symptoms. I did this by investigating the relationship between TAF and both symptoms of OCD and symptoms of eating disorders, using a correlational approach. Whereas previous research has indicated a significant positive relationship between TAF and OCD symptoms (e.g., Abramowitz et al., 2003; Rassin et al., 2001) as well as between TAF and eating disorder symptoms (Garcia-Soriano et al., 2014)—with Garcia-Soriano et al. (2014) suggesting a similar statistical relationship between each pairing—this research has been sparse, with studies mostly utilizing clinical, analogue-clinical, or non-English-speaking samples. To my knowledge, this was the first study to examine these relationships using an unscreened sample, allowing for a broad investigation into possible underlying symptoms across categories of psychopathology (as suggested by McKay & Neziroglu, 2009). This was also the first study to comprehensively examine these relationships using an English-speaking sample.

Symptom Score Correlations

As expected, there were significant correlations between each pairing of the DOCS, the EAT-26, and the MASQ-AD-D. This is consistent with previous research, which has shown considerable overlap between OCD and depression (e.g., Pallanti et al., 2011; Richter et al., 1994), as well as overlap between OCD and eating disorders (e.g., Hamli et al., 2003; Kesby et al., 2017; Thornton & Russell, 1997). Similarly, the TAFS was significantly correlated with
the DOCS, also consistent with previous research (e.g., Abramowitz et al., 2003). Notably, the correlation between the DOCS and the MASQ-AD-D ($r = .42$) was stronger than the correlation between the DOCS and the EAT-26 ($r = .31$) as well as the correlation between the EAT-26 and the MASQ-AD-D ($r = .32$).

However, whereas previous research found a significant relationship between the TAFS and measures of eating disorder symptoms (i.e., Garcia-Soriano et al., 2014), the present study found no significant relationship between the TAFS and the EAT-26. One possibility for this discrepancy is the failure of the present study to reach the targeted sample size, thus making it possible that the present study was underpowered—an issue addressed at length in the Limitations section. As the relevant correlation was near significance, $r(68) = .24, p = .05$, it is likely that increased power would lead to the predicted significant relationship between the TAFS and the EAT-26. Conversely, given the presence of just one study previously suggesting a relationship between the TAFS and eating pathology ($r$ values ranging from .32-.39)—which was conducted on Spanish translations—it is plausible that methodological differences contributed to inconsistent findings.

The current study found a significant relationship between symptoms of depression and the TAFS, which is inconsistent with previous research that also used correlational methods and found no significant relationship (Rassin et al., 2001). The present study found that symptoms of depression as measured by the MASQ-AD-D were correlated with the TAFS ($r = .49, p < .01$), whereas Rassin et al. (2001) found no significant relationship between symptoms of depression as measured by the BDI and the TAFS ($r = .15, p > .05$). This discrepancy may be attributable in part to the method used to assess for symptoms of depression in the present study. Although previous research has suggested that the eight depression-specific items from the MASQ-AD subscale are appropriate to assess for DSM-defined depression (Bredemeier et al., 2010), it is possible these eight items are representative of a construct appropriate for diagnosis of depression in a clinical setting but too narrow
to use as representative of depressive symptoms in research applications. In fact, when using the entire MASQ-AD subscale, which includes 14 items measuring positive affect in addition to the eight depression items, to represent depressive symptoms (as supported by Bredemeier et al., 2010), the results of the present study begin to look closer to the original hypotheses. That is, the full MASQ-AD subscale was significantly correlated ($p < .01$) with the TAFS total score, but the correlation ($r = .31$) remained smaller in absolute terms than the correlation between the MASQ-AD-D and TAFS total score ($r = .49$). Plus, this value still is larger than what Rassin et al. (2001) observed between the BDI and TAFS ($r = .15$). Therefore, though speculative, it is possible that the combination of an underpowered analysis and assessment of depressive symptoms via the MASQ-AD contributed to the discrepancy between previous research and the present study regarding the relationship between symptoms of depression and the TAFS total score. Additionally, it is possible the theory behind this study’s hypotheses—that OCD and eating disorders share similar levels of TAF—is not accurate and that depression (as measured by the MASQ-AD-D) is more similar to OCD than are eating disorders similar to OCD.

**The Sentence Task**

That self-reported anxiety increased significantly from pre- to post-Sentence Task is important, as it illustrates the efficacy of the task to induce discomfort in a significant way. The task has been used in a number of studies regarding thought-action fusion (e.g., Berman et al., 2011; Rachman et al., 1996; Van den Hout et al., 2001) and is thought to behaviorally induce TAF. Given the relationship between the TAFS and measures of psychopathology symptoms, I expected a pattern to emerge such that the DOCS and the EAT-26 would both be significantly correlated with the anxiety change score (VAS Change12; Time 2 minus Time
1), whereas the MASQ-AD-D would not be significantly correlated with the change score. However, the current study found no significant correlation between the VAS Change12 and any of the symptom measures. For context, the DOCS total score correlated significantly with Time 1 VAS Anxiety (r = .47) and Time 2 VAS Anxiety (r = .31). Similarly, the MASQ-AD-D correlated significantly with Time 1 VAS Snxiety (r = .40) and Time 2 VAS Snxiety (r = .41). The EAT-26 was not significantly correlated with VAS Snxiety at any timepoint. Post hoc analyses show the TAFS illustrated a similar pattern as the DOCS total score and MASQ-AD-D, such that TAFS total score was correlated significantly with both Time 1 VAS Anxiety (r = .25) and Time 2 VAS Anxiety (r = .28), but not with VAS Change12.

These results illustrate a disconnect from previous research and theory surrounding the Sentence Task. That a pattern emerged in the current study wherein symptom measures—including the TAFS—correlate with both Time 1 and Time 2 VAS Anxiety, but not the magnitude of that change, may indicate a divergence between the TAFS and the behavioral task thought to induce state TAF. This would not be a novel finding, per se, but would serve to bolster previous evidence that has called into question the construct validity of the Sentence Task as a behavioral induction of TAF. Van den Hout et al. (2001) found that none of the TAFS scores—neither total nor subscale—correlated significantly with the increase in anxiety from baseline to post-task for participants. In the present study, with the TAFS, DOCS, and MASQ-AD-D all correlating with the experience of state anxiety within the task, but not the magnitude of that change, it is possible that anxiety created by the task is not due specifically to TAF, but rather an anxiety nonspecific to TAF—perhaps instead induced in relation to the personal nature of the task. That is, writing a sentence wherein one wishes that the loved one previously named is in a car accident may tap more into general distress as opposed to TAF-related distress. If this is the case, this would suggest that the Sentence Task is not an appropriate behavioral induction of TAF.
Limitations

As the main findings largely were null or inconsistent with previous research, the limitations of the present study will be discussed in the context provided by Cronbach and Meehl (1955). That is, Cronbach and Meehl (1955) suggested that there are three primary reasons why hypothesis testing may yield null findings: (1) incorrect use of measures for the construct of interest, (2) incorrect or incomplete theoretical framework, and/or (3) poor experimental design.

Measuring Constructs of Interest

The observed relationship between symptoms of depression and other variables included in the present study may be due to the use of the MASQ-AD-D as representative of symptoms of depression. Although research has suggested the use of the “depression” items from the MASQ-AD subscale is appropriate for accurately screening for depression (Bredemeier et al., 2010), the exclusion of the “positive affect” items that comprise the rest of the MASQ-AD subscale may have had an impact on results. This is especially important given previous findings that symptoms of depression are significantly correlated with symptoms of OCD (i.e., Richter et al., 1994); it is possible that the narrowing of the depression symptoms removed some of the content that would otherwise help distinguish DOCS scores from a measure of depression. The MASQ was developed based on a tripartite structure (e.g., Clark & Watson, 1991) of anxiety and depression, such that anxiety and depression share a general distress component of elevated negative affect, depression uniquely experiences low positive affect, and anxiety uniquely experiences high physiological arousal. By omitting the positive affect items, it is conceptually possible that the MASQ-AD-D was unable to
successfully differentiate depression symptoms from OCD symptoms. However, when the analyses were rerun with the full MASQ-AD subscale, including the positive affect items, the outcome of the results did not change. Scores on the MASQ-AD still were significantly correlated with the TAFS ($r = .36, p < .01$), a correlation higher than that between the EAT-26 and the TAFS ($r = .24$). Therefore, inclusion of the positive affect items did better align the results of the present study to those of previous research, although this still does not fully support the hypotheses from the present study.

Alternatively, using a different measure of depression that often is used in research (e.g., the BDI)—which contains a broader assessment of symptoms of depression—may be necessary to replicate previous findings. Indeed, the BDI was used in Abramowitz et al. (2003), which found, using mean-level comparisons, that individuals with OCD score significantly higher on the TAFS than individuals with depression. However, it is not clear how the BDI would perform meaningfully different in correlational research than the MASQ-AD, as the two share significant overlap ($r = .60, p < .001$; Nitschke et al., 2001). As such, it is possible the instrument used to measure symptoms of depression is not responsible for the relevant findings of the present study.

The VAS scales used to assess anxiety have been used in studies involving the Sentence Task since Rachman et al.’s (1996) original study (e.g., Berman et al., 2011; Van den Hout et al., 2001). To my knowledge, these specific questions have not been vetted with regard to their empirical validity. Whereas VAS scales are used in a wide range of literatures, the specific questions used by Rachman et al. (1996)—especially, “How much anxiety do you feel right now”—may be too broad or lack context necessary to accurately gauge a person’s anxiety as a result of completing the Sentence Task. Further, it is possible that the ratings themselves, specifically the Time 2 ratings, hold such a high level of face validity that participants are able to induce the purpose (i.e., that anxiety is expected to increase as a result of completing the Sentence Task) and answer in a way they believe to be desirable.
Future studies may consider collecting measures of anxiety through alternate methodology that is less susceptible to response bias, including physiological responses of anxiety.

Further, consideration must be given to the use of a change score. The present study calculated the change from pre-Task VAS anxiety to post-Task VAS anxiety, utilizing the magnitude of change as an indication of anxiety induced by completion of the Sentence Task. Cronbach and Furby (1970) called into question the utility of change scores from both statistical and practical standpoints. Specifically, Cronbach and Furby (1970) summarized the statistical inconsistency within change scores and recommended that researchers use alternative methods when possible. Gardner and Neufeld (1987) echoed these concerns and stated that although it is difficult to use change scores within research, it can be appropriately applied. The authors opined that if the elements that underlie the change score are carefully considered, change scores—specifically when used in correlational research—can be used to explain processes that underlie the difference in a given measure over time. It is important to consider, however, that the current study used a change score in conjunction with the VAS scales from Rachman et al. (1996). In addition to the lack of empirical validation raised previously, the VAS scales themselves may suffer from floor and/or ceiling effects. For example, if a participant reports a high value at Time 1, this may substantially limit the range of possible movement in the predicted upward direction from Time 1 to Time 2. Such an effect may render the comparison of change scores across participants—or between individual differences—as ambiguous or even fully inappropriate. Therefore, the change scores reported in the current study should be interpreted with caution and with a recognition of the complex nature behind the variable itself.

Given that the TAFS total score has considerable empirical support as a representation of TAF (e.g., Bailey et al., 2014; Rassin et al., 2001; Shafran et al., 1996), it was concerning from the standpoint of construct validity to find that it was significantly correlated with pre- and post-task anxiety but was not correlated significantly with the change score. Specifically, that
other measures of psychopathology symptoms illustrated a similar pattern of relationships with the Sentence Task suggests that the anxiety induced by completion of the Sentence Task may not be specifically related to TAF. For example, there was a significant increase in anxiety from pre- to post-Sentence Task and the DOCS, MASQ-AD-D, and TAFS all were significantly related to pre-task anxiety as well as post-task anxiety. However, none of these variables was significantly correlated with the change score from pre- to post-task anxiety. That the TAFS was related to both pre- and post-task anxiety, but not the anxiety change score—a pattern of results illustrated by other non-TAF measures—suggests that the anxiety induced as a product of the task may not be specifically due to TAF.

**Theoretical Framework**

Thought-action fusion as a construct was developed with the belief that it was uniquely tied to symptoms of OCD (e.g., Rachman et al., 1995; Shafran et al., 1996). Whereas many studies have explored the relationship between OCD and TAF, as well as the possible relationship between symptoms of depression and TAF, the current study was one of the first to explore the relationship between eating disorders and TAF. Based on previous literature suggesting several similarities between OCD and eating disorders, it was hypothesized that the correlation between EAT-26 scores and TAF scores would be similar to the correlation between DOCS scores and TAF scores. Although it is possible that the results of the present study failed to identify this relationship due to other limitations, it also is possible that the correlation between TAF and symptoms of eating disorders simply is not as high as the correlation between TAF and OCD symptoms. Thus, based on the results of previous studies as well as the present study—keeping in mind the correlation between the full MASQ-AD
and TAFS—it is possible that a variety of symptoms are related to TAF but that OCD holds a uniquely strong empirical relationship with the construct.

Similarly, previous research has found that the correlation between measures of depression symptoms and the TAFS total score is not significant (e.g., Rassin et al., 2001). Other research suggests that there are no significant differences between TAFS subscale scores across clinical groups of individuals with OCD and individuals with depression, which would suggest a meaningful relationship exists between TAF and depression symptoms at a similar level to that of TAF and OC symptoms (i.e., Abramowitz et al., 2003). These findings, in conjunction with results from the present study, call for further investigation into the relationship between these variables in order to add clarity to this issue. Further studies should look to explore these constructs in both nonclinical and clinical populations and utilizing consistent methodology, as current literature makes use of different measures, varying study designs, and a wide range of sample sizes, making direct comparison difficult.

**Experimental Design**

The design of the current study and the collection of the data may explain the results of the current study’s finding or, at the very least, provide context for the findings. The current study planned to collect a sample of at least 100 participants. However, only 76 participants completed the study. Data collection was planned to take place through May 2020, but the COVID-19 pandemic effectively shut down in-person collection of any data for the foreseeable future. Thus, some analyses in the study may suffer from inadequate power. For example, results such as the correlation between the TAFS total score and the EAT-26 total score, \( r(68) = .24, p = .05 \), are in the expected direction and near significance, with an observed power for this analysis of 0.65. Had the study reached the targeted sample size, it
is possible that near-significant results such as this would have been statistically significant. However, this would not explain the unanticipated results regarding the correlations between depression and other relevant variables in the study, which would suggest possible theoretical or measurement reasons for these unexpected results.

Additionally, it is possible that the sample—unscreened undergraduates from a university in the Midwest of the United States—was not representative of enough of the distribution to accurately gauge the relationship between the included constructs. Specifically, Table 3 illustrates both the possible minimum and maximum values for each measure as well as the observed values. In many instances, the present study observed values at the low end of possible ranges but failed to observe scores at the high end of possible ranges. However, research suggests that analogue (e.g., Abramowitz et al., 2014) and unscreened (e.g., McKay & Neziroglu, 2009) samples are appropriate for studies pertaining to clinical matters, and therefore it is unlikely that this consideration alone led to the unexpected findings. Still, that the DOCS, EAT-26, and change in anxiety from Time 1 to Time 2 all were positively skewed illustrates that the sample did not provide a full distribution of scores (e.g., Wright, 2006). Although the statistical analyses used do not require normality of data, the results of the study may change if conducted with a sample that showed more scores at the higher end of the distributions of the current measures.

**Future Directions**

Future research should investigate the relationship between the TAFS and the baseline variables included in the study. A number of unexpected findings in the present study, including the relationship between the TAFS and each of the EAT-26 and the MASQ-AD-D, in conjunction with existing literature, make it unclear to what extent TAF plays a role or
is prevalent in individuals who experience other symptoms of psychopathology. It may be necessary to include different measures of baseline psychopathology symptoms, such as the BDI, to gain a more accurate understanding of these relationships. Further, conducting such studies in a variety of populations—clinical and nonclinical—may aid in the specificity of our understanding of such relationships.

It also is important to further investigate the extent to which the anxiety produced by the Sentence Task is specific to TAF or rather a result of an anxiety specific to the personal nature of the subject matter. Although the Sentence Task has been used in a number of previous studies as a behavioral induction of TAF, the results of the current study call into question whether or not the task is in fact specific to TAF. Most critically, the results of the current study challenge the notion that the magnitude of anxiety induced by the task is strongly related to—or even directly caused by—trait levels of TAF. Should the present findings be replicated, future research may consider how to alter the Sentence Task to make it more TAF specific and therefore a better representation of what true TAF is.

Finally, given the overlap between the presentation of OCD and eating disorders, future research should continue to explore the exact nature of this overlap. Whereas the results of the current study suggest that TAF—specifically, the magnitude of TAFS scores—may not be an area of strong similarity between OCD and eating disorders, it is important moving forward for future research to clarify the extent to which OCD and eating disorders are similar in terms of prevalence, experience, and clinical presentation. Moving forward, research may consider using the methodology suggested by McKay and Neziroglu (2009), which specifically allows researchers to identify common factors that underlie disorders, rather than focusing on what Abramowitz and Jacoby (2015) termed “superficial symptomology.”
CHAPTER 5
CONCLUSION

This study was one of the first to examine the relationship between symptoms of OCD, eating disorders, and depression and TAF. It sought to examine these relationships using methodology that allowed for a broad understanding of symptoms that underlie multiple disorders. Despite the notable limitations of the present study, it offers evidence for significant relationships between the TAFS and each of the DOCS and the MASQ-AD-D, but did not support the hypothesis that the TAFS is significantly related to the EAT-26. Further, the present study calls into question the relationship between the TAFS and the Sentence Task, thought to be a behavioral induction of TAF. These variables should continue to be investigated in relation to one another in order to clarify their empirical association.
REFERENCES


APPENDIX A

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 an eating disorder?
   1 = Yes
2 = No

7. Have you ever been formally diagnosed with Major Depressive Disorder?
   1 = Yes
   2 = No

8. Have you ever been formally diagnosed with any other mental health disorder?
   1 = Yes _____
   2 = No
APPENDIX B

DIMENSIONAL OBSESSIVE-COMPULSIVE SCALE (DOCS; ABRAMOWITZ ET AL., 2010)
This questionnaire asks you about 4 different types of concerns that you might or might not experience. For each type there is a description of the kinds of thoughts (sometimes called obsessions) and behaviors (sometimes called rituals or compulsions) that are typical of that particular concern, followed by 5 questions about your experiences with these thoughts and behaviors. Please read each description carefully and answer the questions for each category based on your experiences in the last month.

Category 1: Concerns about Germs and Contamination

Examples...

- Thoughts or feelings that you are contaminated because you came into contact with (or were nearby) a certain object or person.

- The feeling of being contaminated because you were in a certain place (such as a bathroom).

- Thoughts about germs, sickness, or the possibility of spreading contamination.

- Washing your hands, using hand sanitizer gels, showering, changing your clothes, or cleaning objects because of concerns about contamination.

- Following a certain routine (e.g., in the bathroom, getting dressed) because of contamination – Avoiding certain people, objects, or places because of contamination.

The next questions ask about your experiences with thoughts and behaviors related to contamination over the last month. Keep in mind that your experiences might be different than the examples listed above. Please select the number next to your answer:

1. About how much time have you spent each day thinking about contamination and engaging in washing or cleaning behaviors because of contamination?
2. To what extent have you avoided situations in order to prevent concerns with contamination or having to spend time washing, cleaning, or showering?

0 None at all
1 A little avoidance
2 A moderate amount of avoidance
3 A great deal of avoidance
4 Extreme avoidance of nearly all things

3. If you had thoughts about contamination but could not wash, clean, or shower (or otherwise remove the contamination), how distressed or anxious did you become?

0 Not at all distressed/anxious
1 Mildly distressed/anxious
2 Moderately distressed/anxious
3 Severely distressed/anxious
4 Extremely distressed/anxious
4. To what extent has your daily routine (work, school, self-care, social life) been disrupted by contamination concerns and excessive washing, showering, cleaning, or avoidance behaviors?

0 No disruption at all.
1 A little disruption, but I mostly function well.
2 Many things are disrupted, but I can still manage.
3 My life is disrupted in many ways and I have trouble managing.
4 My life is completely disrupted and I cannot function at all.

5. How difficult is it for you to disregard thoughts about contamination and refrain from behaviors such as washing, showering, cleaning, and other decontamination routines when you try to do so?

0 Not at all difficult
1 A little difficult
2 Moderately difficult
3 Very difficult
4 Extremely difficult

Category 2: Concerns about being Responsible for Harm, Injury, or Bad Luck

Examples...

- A doubt that you might have made a mistake that could cause something awful or harmful to happen.

- The thought that a terrible accident, disaster, injury, or other bad luck might have occurred and you weren’t careful enough to prevent it.
• The thought that you could prevent harm or bad luck by doing things in a certain way, counting to certain numbers, or by avoiding certain “bad” numbers or words.

• Thought of losing something important that you are unlikely to lose (e.g., wallet, identify theft, papers).

• Checking things such as locks, switches, your wallet, etc. more often than is necessary.

• Repeatedly asking or checking for reassurance that something bad did not (or will not) happen.

• Mentally reviewing past events to make sure you didn’t do anything wrong.

• The need to follow a special routine because it will prevent harm or disasters from occurring.

• The need to count to certain numbers, or avoid certain bad numbers, due to the fear of harm.

The next questions ask about your experiences with thoughts and behaviors related to harm and disasters over the last month. Keep in mind that your experiences might be slightly different than the examples listed above. Please select the number next to your answer:

1. About how much time have you spent each day thinking about the possibility of harm or disasters and engaging in checking or efforts to get reassurance that such things do not (or did not) occur?

   0 None at all
   1 Less than 1 hour each day
   2 Between 1 and 3 hours each day
   3 Between 3 and 8 hours each day
2. To what extent have you avoided situations so that you did not have to check for
danger or worry about possible harm or disasters?

0 None at all
1 A little avoidance
2 A moderate amount of avoidance
3 A great deal of avoidance
4 Extreme avoidance of nearly all things

3. When you think about the possibility of harm or disasters, or if you cannot check or
get reassurance about these things, how distressed or anxious did you become?

0 Not at all distressed/anxious
1 Mildly distressed/anxious
2 Moderately distressed/anxious
3 Severely distressed/anxious
4 Extremely distressed/anxious

4. To what extent has your daily routine (work, school, self-care, social life) been disrupted
by thoughts about harm or disasters and excessive checking or asking for reassurance?

0 No disruption at all.
1 A little disruption, but I mostly function well.
2 Many things are disrupted, but I can still manage.
3 My life is disrupted in many ways and I have trouble managing.
4 My life is completely disrupted and I cannot function at all.

5. How difficult is it for you to disregard thoughts about possible harm or disasters and refrain from checking or reassurance-seeking behaviors when you try to do so?

0 Not at all difficult
1 A little difficult
2 Moderately difficult
3 Very difficult
4 Extremely difficult

Category 3: Unacceptable Thoughts

Examples...

- Unpleasant thoughts about sex, immorality, or violence that come to mind against your will.

- Thoughts about doing awful, improper, or embarrassing things that you don’t really want to do.

- Repeating an action or following a special routine because of a bad thought.

- Mentally performing an action or saying prayers to get rid of an unwanted or unpleasant thought.

- Avoidance of certain people, places, situations or other triggers of unwanted or unpleasant thoughts

The next questions ask about your experiences with unwanted thoughts that come to mind against your will and behaviors designed to deal with these kinds of thoughts over
the last month. Keep in mind that your experiences might be slightly different than the examples listed above. Please select the number next to your answer:

1. About how much time have you spent each day with unwanted unpleasant thoughts and with behavioral or mental actions to deal with them?
   
   0 None at all
   1 Less than 1 hour each day
   2 Between 1 and 3 hours each day
   3 Between 3 and 8 hours each day
   4 8 hours or more each day

2. To what extent have you been avoiding situations, places, objects and other reminders (e.g., numbers, people) that trigger unwanted or unpleasant thoughts?
   
   0 None at all
   1 A little avoidance
   2 A moderate amount of avoidance
   3 A great deal of avoidance
   4 Extreme avoidance of nearly all things

3. When unwanted or unpleasant thoughts come to mind against your will how distressed or anxious did you become?
   
   0 Not at all distressed/anxious
   1 Mildly distressed/anxious
   2 Moderately distressed/anxious
   3 Severely distressed/anxious
4 Extremely distressed/anxious

4. To what extent has your daily routine (work, school, self-care, social life) been disrupted by unwanted and unpleasant thoughts and efforts to avoid or deal with such thoughts?

0 No disruption at all.
1 A little disruption, but I mostly function well.
2 Many things are disrupted, but I can still manage.
3 My life is disrupted in many ways and I have trouble managing.
4 My life is completely disrupted and I cannot function at all.

5. How difficult is it for you to disregard unwanted or unpleasant thoughts and refrain from using behavioral or mental acts to deal with them when you try to do so?

0 Not at all difficult
1 A little difficult
2 Moderately difficult
3 Very difficult
4 Extremely difficult

Category 4: Concerns about Symmetry, Completeness, and the Need for Things to be “Just Right” Examples...

- The need for symmetry, evenness, balance, or exactness.
- Feelings that something isn’t “just right.”
- Repeating a routine action until it feels “just right” or “balanced.”
• Counting senseless things (e.g., ceiling tiles, words in a sentence).

• Unnecessarily arranging things in “order.”

• Having to say something over and over in the same way until it feels “just right.”

The next questions ask about your experiences with feelings that something is not “just right” and behaviors designed to achieve order, symmetry, or balance over the last month. Keep in mind that your experiences might be slightly different than the examples listed above. Please select the number next to your answer:

1. About how much time have you spent each day with unwanted thoughts about symmetry, order, or balance and with behaviors intended to achieve symmetry, order or balance?
   0 None at all
   1 Less than 1 hour each day
   2 Between 1 and 3 hours each day
   3 Between 3 and 8 hours each day
   4 8 hours or more each day

2. To what extent have you been avoiding situations, places or objects associated with feelings that something is not symmetrical or “just right?”
   0 None at all
   1 A little avoidance
   2 A moderate amount of avoidance
   3 A great deal of avoidance
   4 Extreme avoidance of nearly all things
3. When you have the feeling of something being “not just right,” how distressed or anxious did you become?

0 Not at all distressed/anxious
1 Mildly distressed/anxious
2 Moderately distressed/anxious
3 Severely distressed/anxious
4 Extremely distressed/anxious

4. To what extent has your daily routine (work, school, self-care, social life) been disrupted by the feeling of things being “not just right,” and efforts to put things in order or make them feel right?

0 No disruption at all.
1 A little disruption, but I mostly function well.
2 Many things are disrupted, but I can still manage.
3 My life is disrupted in many ways and I have trouble managing.
4 My life is completely disrupted and I cannot function at all.

5. How difficult is it for you to disregard thoughts about the lack of symmetry and order, and refrain from urges to arrange things in order or repeat certain behaviors when you try to do so?

0 Not at all difficult
1 A little difficult
2 Moderately difficult
3 Very difficult
4 Extremely difficult
APPENDIX C

EATING ATTITUDES TEST (EAT-26; GARNER, OLMSTED, BOHR, GARFINKEL, 1982)
Instructions: This is a screening measure to help you determine whether you might have an eating disorder that needs professional attention. This screening measure is not designed to make a diagnosis of an eating disorder or take the place of a professional consultation. Please fill out the below form as accurately, honestly and completely as possible. There are no right or wrong answers.

Please indicate how often you have these experiences using the following key: 0=never; 1=rarely; 2=sometimes; 3=often; 4=usually; 5=often.

1. Am terrified about being overweight.

2. Avoid eating when I am hungry.

3. Find myself preoccupied with food.

4. Have gone on eating binges where I feel that I may not be able to stop.

5. Cut my food into small pieces.

6. Aware of the calorie content of foods that I eat.

7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)

8. Feel that others would prefer if I ate more.

9. Vomit after I have eaten.

10. Feel extremely guilty after eating.

11. Am preoccupied with a desire to be thinner.

12. Think about burning up calories when I exercise.
13. Other people think that I am too thin.

14. Am preoccupied with the thought of having fat on my body.

15. Take longer than others to eat my meals.

16. Avoid foods with sugar in them.

17. Eat diet foods.

18. Feel that food controls my life.

19. Display self-control around food.

20. Feel that others pressure me to eat.

21. Give too much time and thought to food.

22. Feel uncomfortable after eating sweets.

23. Engage in dieting behavior.

24. Like my stomach to be empty.

25. Have the impulse to vomit after meals.

APPENDIX D

MOOD AND ANXIETY SYMPTOM QUESTIONNAIRE
(MASQ-SF; WATSON, CLARK, ET AL., 1995; WATSON, WEBER, ET AL., 1995)
Below is a list of feelings, sensations, problems, and experiences that people sometimes have. Read each item and then choose the response that best describes how much you have felt or experienced things this way during the past week, including today.

Use the following scale when answering: 1=not at all; 2=a little bit; 3=moderately; 4=quite a bit; 5=extremely.

1. Felt sad
2. Startled easily
3. Felt cheerful
4. Felt afraid
5. Felt discouraged
6. Hands were shaky
7. Felt optimistic
8. Had diarrhea
9. Felt worthless
10. Felt really happy
11. Felt nervous
12. Felt depressed
13. Was short of breath
14. Felt uneasy
15. Was proud of myself
16. Had a lump in my throat
17. Felt faint
18. Felt unattractive
19. Had hot or cold spells
20. Had an upset stomach
21. Felt like a failure
22. Felt like I was having a lot of fun
23. Blamed myself for a lot of things
24. Hands were cold or sweaty
25. Felt withdrawn from other people
26. Felt keyed up, ”on edge”
27. Felt like I had a lot of energy
28. Was trembling or shaking
29. Felt inferior to others
30. Had trouble swallowing
31. Felt like crying
32. Was unable to relax
33. Felt really slowed down
34. Was disappointed in myself
35. Felt nauseous
36. Felt hopeless
37. Felt dizzy or lightheaded
38. Felt sluggish or tired
39. Felt really "up" or lively
40. Had pain in my chest
41. Felt really bored
42. Felt like I was choking
43. Looked forward to things with enjoyment
44. Muscles twitched or trembled
45. Felt pessimistic about the future
46. Had a very dry mouth
47. Felt like I had a lot of interesting things to do
48. Was afraid I was going to die
49. Felt like I had accomplished a lot
50. Felt like it took extra effort to get started
51. Felt like nothing was very enjoyable
52. Heart was racing or pounding
53. Felt like I had a lot to look forward to
54. Felt numbness or tingling in my body

55. Felt tense or "high-strung"

56. Felt hopeful about the future

57. Felt like there wasn’t anything interesting or fun to do

58. Seemed to move quickly and easily

59. Muscles were tense or sore

60. Felt really good about myself

61. Thought about death or suicide

62. Had to urinate frequently
APPENDIX E

THOUGHT-ACTION FUSION SCALE (TAFS; SHAFRAN, THORDARSON, RACHMAN, 1996)
Indicate below the degree to which you agree with each statement. Use the following scale to guide your decision.

0=Strongly Disagree; 1=Disagree; 2=Neutral; 3=Agree; 4=Strongly Agree.

1. Thinking of making an extremely critical remark to a friend is almost as unacceptable to me as actually saying it.

2. Having a blasphemous thought is almost as sinful to me as a blasphemous action.

3. Thinking about swearing at someone else is almost as unacceptable to me as actually swearing.

4. When I have a nasty thought about someone else, it is almost as bad as carrying out a nasty action.

5. Having violent thoughts are almost as unacceptable to me as violent acts.

6. When I think about making an obscene remark or gesture in church, it is almost as sinful as actually doing it.

7. If I wish harm on someone, it is almost as bad as doing harm.

8. If I think about making an obscene gesture to someone else, it is almost as bad as doing it.

9. When I think unkindly about a friend, it is almost as disloyal as doing an unkind act.

10. If I have a jealous thought, it is almost the same as making a jealous remark.

11. Thinking of cheating in a personal relationship is almost as immoral to me as actually cheating.

12. Having obscene thoughts in a church is unacceptable to me.
13. If I think of a relative/friend losing their job, this increases the risk that they will lose their job.

14. If I think of a relative/friend being in a car accident, this increases the risk that he/she will have a car accident.

15. If I think of a friend/relative being injured in a fall, this increases the risk that he/she will have a fall and be injured.

16. If I think of a relative/friend falling ill this increases the risk that he/she will fall ill.

17. If I think of myself being injured in a fall, this increases the risk that I will have a fall and be injured.

18. If I think of myself being in a car accident, this increases the risk that I will have a car accident.

19. If I think of myself falling ill, this increases the risk that I will fall ill.
APPENDIX F

VERBAL ANALOGUE SCALES (VAS; RACHMAN ET AL., 1996)
Please rate your responses to the following questions on a scale ranging from 0 (not at all) to 100 (extremely high):

1. How much anxiety do you feel right now?

2. How much guilt do you feel right now?

3. What is the likelihood of the (original) event occurring in the next 24 hr?

4. How much control do you have over the (original) event occurring?

5. How responsible would you feel if the (original) event did occur in the next 24 hr?

6. How morally wrong was it to write out the sentence?

7. How strong is your urge to reduce or cancel (further) the effects of writing the sentence?
APPENDIX G

THE SENTENCE TASK (RACHMAN ET AL., 1996)
Keeping in mind a friend or relative who is close to you, I would like you to write out the following sentence on this piece of paper, inserting the name of the person in the blank.

I hope _____ is in a car accident.
APPENDIX H

POSITIVE MOOD INDUCTION
A 1st grade teacher gave her kids the beginning of well-known proverbs and instructed them to finish each one. The following were some of the answers.

1. Don’t change horses – until they stop running.
2. Strike while the – bug is close.
3. It’s always darkest before – Daylight Savings Time.
5. You can lead a horse to water but – how?
6. Don’t bite the hand that – looks dirty.
7. No news is – impossible.
8. A miss is as good as a – Mr.
10. If you lie down with dogs, you’ll – stink in the morning.
11. Love all, trust – me.
12. The pen is mightier than the – pigs.
13. An idle mind is – the best way to relax.
14. Where there’s smoke there’s – pollution.
15. Happy the bride who – gets all the presents.
16. A penny saved is – not much.
17. Two’s company, three’s – the Musketeers.
18. Don’t put off till tomorrow what – you put on to go to bed.

19. Laugh and the whole world laughs with you; cry and – you have to blow your nose.

20. There are none so blind as – Stevie Wonder

21. Children should be seen and not – spanked or grounded.

22. If at first you don’t succeed – get new batteries.

23. You get out of something only what you – see in the picture on the box.

24. When the blind lead the blind – get out of the way.

25. A bird in the hand – is going to poop on you.

APPENDIX I

INSTRUCTIONAL VALIDITY CHECK QUESTIONS
1. Please choose the answer of three plus three:

- Two
- Three
- Four
- Five
- Six
- Prefer not to respond

2. I have experienced a fatal heart attack while watching television.

- 0 = Do not select this answer
- 1 = False
- 2 = Do not select this answer
- 3 = True
- 4 = Do not select this answer
- Prefer not to respond

3. If you are paying attention right now, choose “8” as your answer.

- 1
- 4
- 8
- 11
- 17
- Prefer not to respond