Obsessive Compulsive Disorder and Thought Action Fusion:

Relationships with Eating Disorder Outcomes

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Abstract

Obsessive Compulsive Disorder (OCD) is among the most common psychiatric comorbidities with eating disorders (EDs) and most studies have only examined this relationship at a diagnostic level. More research is needed to determine whether specific symptom domains and cognitive patterns commonly observed in OCD are most salient among individuals with clinically significant EDs, and whether these symptoms appear to change and/or influence treatment outcomes. Thought Action Fusion (TAF) is one cognitive pattern that may underlie OCD-ED comorbidity. The current study assessed 112 adolescent and adult female patients at a residential ED treatment facility on levels of ED severity, OCD symptom severity, and TAF at pre- and post-treatment. All OCD symptom dimensions were positively correlated with ED severity at pretreatment, with Obsessing, Neutralizing and Ordering OCD symptoms being most elevated. TAF was also positively correlated with ED severity at pre-treatment, and higher levels of TAF at pretreatment significantly predicted greater ED severity at post-treatment after controlling for all other OCD symptoms. Improvements in TAF specific to thoughts about others also predicted improvements in ED severity after controlling for changes in OCD symptoms. Clinically, these results indicate that efforts targeting specific OCD symptom dimensions and TAF in addition to ED-focused treatment as usual may be beneficial for enhancing overall treatment outcomes.

**Key Words:** Eating Disorders; Treatment; Obsessive Compulsive Disorder; Comorbidity; Thought Action Fusion

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Psychiatric comorbidities are incredibly common among individuals with eating disorders (EDs), with current research indicating that between 43% and 95% of individuals also meet criteria for at least one other psychiatric illness at the time of their ED diagnosis (Blinder, Cumella, & Sanathara, 2006; Grilo, White, & Masheb, 2009; Ulfvebrand, Birgegård, Norring, Högdahl, & von Hausswolff-Juhlin, 2015). While several mood disorders, anxiety disorders, and substance-related disorders have shown increased prevalence among individuals diagnosed with an ED at some point in their lifetime (Ulfvebrand et al., 2015), Obsessive Compulsive Disorder (OCD) has consistently been identified as one of the most commonly occurring comorbidities (Godart, Flament, Perdereau, & Jeammet, 2002; Ulfvebrand et al., 2015). When compared to non-clinical samples, the prevalence of OCD tends to be much higher in samples of individuals with EDs (approximately 1%–-3% vs. approximately 16–%-69% respectively; Kaye et al., 2004; Tyagi et al., 2015).

Most studies that have examined the relationship between EDs and OCD have approached it at a diagnostic level, focusing on comorbidity prevalence rates (e.g. Kaye et al., 2004; Ulfvebrand et al., 2015). The combined results of these studies generally indicate that rates of both anorexia nervosa/OCD and bulimia nervosa/OCD are considerably higher than if they were to occur by chance (Altman & Shankman, 2009). Altman & Shankman (2009) summarized the longitudinal study of ED/OCD comorbidity illustrating a pattern of evidence, which largely supports an overlapping underlying etiological relationship between the two. Cederlöf et al. (2015) expanded upon this hypothesis, finding that individuals diagnosed with OCD had a 16-37 times greater likelihood of having a comorbid diagnosis of anorexia nervosa. Further, longitudinal analyses indicated that individuals diagnosed with only OCD or anorexia nervosa were at significantly greater risk for developing the other later in life and that first- and second-degree relatives of probands with OCD were significantly more likely of being diagnosed with anorexia, with the magnitude of this risk increasing as the degree of genetic relatedness increased (Cederlof et al., 2015). More recent research has also examined the underlying genetic bases of both disorders and denotes high genetic correlation between anorexia and OCD and significant SNP-based heritability (i.e. estimated heritability based on the genetic and phenotypic variation among unrelated individuals of mixed ethnic backgrounds) for the cross-disorder phenotype (Yilmaz et al., 2018). Taken together, this research suggests a strong link between the genetic etiology and maintenance of OCD and EDs, which may have implications for our clinical understanding and treatment of both disorders.

While much of the existent data supports a common etiological relationship between EDs and OCD, our understanding of the exact nature of this relationship beyond common genetic markers is much more limited. Thus, research efforts have begun to examine possible commonalities across behavioral, cognitive, personality, and maintenance factors of both EDs and OCD to identify potential core disease processes and/or mechanisms of maintenance (Altman & Shankman, 2009). Overlapping core personality traits have been identified as characteristic of individuals diagnosed with either OCD or an ED such as perfectionism, neuroticism, conscientiousness, and impulsivity (e.g. Anderluh, Tchanturia, Rabe-Hesketh, & Treasure, 2003; Benatti, Dell’Osso, Arici, Hollander, & Altamura, 2014; Halmi et al., 2005). Neuroticism and perfectionism traits have also been found to mediate associations between OCD checking and cleaning symptoms and eating restraint or binge eating behaviors (Pollack & Forbush, 2013). Finally, a recent study examining the core dimensions of anorexia nervosa and OCD in relation to psychological and personality factors previously implicated in both disorders found that concern over mistakes appears to be a transdiagnostic factor associated with all core dimensions of both anorexia and OCD (i.e. body dissatisfaction, drive for thinness, obsessions, and compulsions; Levinson et al., 2019). While such preliminary evidence supports the idea that EDs and OCD share common etiological and maintenance factors, continued efforts to expand our understanding of this relationship are crucial and may possess both diagnostic and treatment implications.

A large body of research denotes that OCD symptomology is highly heterogeneous across patients and the validity of different symptom dimensions which may or may not be present, in varying degree, for any given patient (Huppert et al., 2007; Mataix‐Cols, Baer, Rauch, & Jenike, 2000). For example, a commonly utilized assessment of OCD symptom severity, the Obsessive-Compulsive Inventory – Revised (OCI-R; Foa et al., 2002) categorizes symptoms into six different dimensions: obsessing, checking, ordering, washing, hoarding, and neutralizing. Obsessions are characterized by recurrent unwanted thoughts, images, or impulses that cause an individual anxiety (e.g., thoughts or images about being contaminated, committing acts of violence, or making mistakes). In response to obsessions individuals with OCD engage in one or more compulsive rituals to resist or neutralize their anxiety: checking (e.g., ensuring one has not made a mistake); ordering (e.g., organizing or arranging in a specific way); washing (e.g., cleaning one’s self or one’s surroundings); hoarding (e.g., accumulating or saving unneeded items), and/or neutralizing (e.g., mentally analyzing, praying, or mentally “replacing” unwanted thoughts). One aspect of the potentially common etiology underlying OCD and EDs in need of further exploration is whether some or all of these specific OCD symptom dimensions may be differentially associated with ED pathologies and/or differentially influence ED treatment outcomes. Early work in this regard has found that EDs appear to be uniquely associated with specific obsessive-compulsive characteristics such as ordering, symmetry, and contamination (Davies, Liao, Campbell, & Tchanturia, 2009; Hasler et al., 2005). By further examining this relationship in a more dimensional way, we can broaden our current understanding of ED/OCD etiology, which may have important implications for the diagnosis and more targeted treatment of OCD and EDs. Specifically, identifying whether core OCD symptomology differentially relates to varying ED presentations can provide insight for specific treatment targets or symptomology that may be interfering with current ED-specific treatment approaches.

An additional cognitive construct relevant to the unwanted, intrusive thoughts that are a central feature of OCD is thought action fusion (TAF). TAF is a cognitive phenomenon in which individuals believe that the existence of their obsessional thoughts can influence the actual occurrence of events in the world (Shafran & Rachman, 2004). Two forms of this cognitive distortion have emerged within empirical research: Likelihood-TAF and Moral-TAF. Likelihood-TAF refers to the belief that having a thought about something increases the likelihood of it actually happening and is commonly differentiated in terms of beliefs about events related to one’s self (i.e. “Likelihood-Self”) or beliefs about events involving someone else (i.e. “Likelihood-Other”; Shafran & Rachman, 2004). Moral-TAF however, refers to beliefs that having a thought is morally equivalent to actually engaging in the content of the thought.

TAF illustrates a salient cognitive pattern present among individuals who experience obsessional symptoms, such as those with OCD. TAF has also been theorized to similarly relate to the thinking patterns of individuals high in weight and shape concerns such that these individuals form connections between unwanted, intrusive thoughts about their body and their truth or likelihood to occur (Rachman & Shafran, 1999). For example, individuals with high levels of TAF and weight and shape concern may have the belief that just thinking about eating a ‘forbidden’ food has increased the likelihood that they have gained weight (Rachman & Shafran, 1999). This variation has been described as “thought-shape fusion” and has been found to be significantly associated with ED pathology (Shafran & Robinson, 2004, Coelho et al, 2008). While TAF has been examined in relation to both OCD and ED samples independently, TAF as a possible etiological factor underlying high ED/OCD comorbidity has yet to be explored.

This study aimed to examine potential relationships between ED severity, OCD symptoms and TAF. Due to lack of prior data on these topics, the hypotheses were exploratory and broad in nature. First, we hypothesized that different ED diagnoses would differentially be associated with OCD symptom dimensionality and TAF. Second, we hypothesized that pretreatment OCD symptom severity and TAF would predict ED severity at posttreatment. Third, we hypothesized that changes in OCD symptom severity and TAF levels occur over the course of residential ED-focused treatment and sought to explore whether observed changes in these symptoms would predict changes in ED severity from pre to post treatment.

**Method**

**Participants**

Participants included 112 female inpatients at a residential ED treatment facility. All participants were diagnosed with an ED as defined by the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV; American Psychiatric Association, 2000). Participant diagnoses included anorexia nervosa (50.9%, n = 57), bulimia nervosa (17.9%, n = 20), and ED not otherwise specified (31.3%, n = 35). Participants were split between the adolescent and adult treatment facilities (56.3%, n = 63 and 43.8%, n = 49, respectively) and had a mean age of 18.90 (*SD* = 5.67, range 12–45).

**Procedures**

Avalon Hills Eating Disorder Specialists is a for-profit residential treatment facility that consists of separate adolescent (11 to 17 years) and adult (18 and older) programs. Treatment is transtheoretical and includes forms of cognitive-behavioral, psychodynamic, and attachment-based therapies, applied neuroscience and supplemental interventions and activities, such as recreation, equine therapy, yoga, art, and body image challenges. Participants engage in daily process oriented and didactic group therapies, twice-weekly individual therapy, and a weekly family therapy session.

All aspects of the current study were approved by a university institutional review board. All clients were informed about the opportunity to participate in research while receiving treatment at Avalon Hills at the time of intake and were given details regarding what their participation would entail if they chose to do so. All individuals were informed that participation in the study was voluntary, and whether or not they chose to participate would have no impact on their individual treatment at the facility. Individuals who agreed to participate completed an assessment battery within the first three days following their intake, and then completed the same battery when discharging residential treatment. The battery covered demographic information and assessment of a variety of psychological disorders, processes, and treatment outcome. The current study used a subset of these measures to explore relationships between ED severity, OCD, and TAF.

**Measures**

**Eating Disorder Inventory-3** (EDI-3; Garner, 2004). The EDI-3 is a self-report ED assessment that covers a wide range of ED symptoms and pathology. It consists of 91 items that are rated on a 6-point Likert-type scale (0 = *never* to 6 = *always*). The current study used only the *eating disorders risk composite* portion of the assessment. The ED risk composite provides a global measure of ED severity that is total score of the Drive for Thinness, Bulimia, and Body Dissatisfaction subscale’s *T*-scores. Higher scores denote greater ED severity. It is commonly used as a measure of ED severity and has been shown to predict the development of disordered eating behavior (Garner, 2004). The ED risk composite has demonstrated excellent psychometric properties, including test-retest reliability and convergent and discriminant validity (Garner, 2004) and displayed excellent internal consistency in the current study (*α* = .93).

**Obsessive Compulsive Inventory-Revised** (OCI-R; Foa et al., 2002). The OCI-R is a self-report measure of OCD symptoms. It measures six symptom subscales: checking, ordering, obsessing, washing, neutralizing, and hoarding. The OCI-R consists of 18 items that are rated on a 5-point Likert-type scale (0 = *not at all* to 4 = *extremely*). Items are summed into a total score (0–72), with higher scores denoting greater OCD severity. A cutoff score of 21 has been established as optimally distinguishing those with OCD from non-anxious individuals (Foa et al., 2002). The OCI-R has demonstrated good psychometric properties, including test-retest reliability and convergent and discriminant validity (Abramowitz & Deacon, 2006; Hajcak, Huppert, Simons, & Foa, 2004). The OCI-R displayed good internal consistency in the current study (*α*s: Total = .93, Checking = .80, Hoarding = .80, Neutralizing = .84, Obsessing = .84, Ordering = .91, Washing = .87).

**Thought Action Fusion Questionnaire** (TAF; Shafran, Thordarson, & Rachman, 1996). The TAF is a self-report measure of TAF. It measures three subscales: Moral (e.g., blasphemous thought is equal to blasphemous action), Others (e.g., thoughts about harm happening to others increase the likelihood of harm occurring to others), and Self (e.g., thoughts about harm happening to oneself increase the likelihood of that harm occurring). The TAF consists of 19 items that are rated on a 5-point Likert-type scale (0 = *disagree strongly* to 4 = *agree strongly*). Scores are totaled for each subscale with higher scores indicating greater levels of TAF (Moral: 12 items, range = 0–48; Others: 4 items, range = 0–16; Self: 3 items, range = 0–12). The TAF has demonstrated good psychometric properties in multiple studies (Rassin, Merckelbach, Muris, & Schmidt, 2001; Shafran et al., 1996). The TAF displayed good internal consistency in the current study (*α*s: Total = .96, Moral = .93, Others = .83, Self = .84)

**Data Analytic Plan**

Data were analyzed using Jamovi ("Jamovi project," 2018) and R studio (Team, 2015) based on R statistical software (R Development Core Team, 2016) and the following packages: jmv (Selker, Love, & Dropmann, 2017) and tidyverse (Wickham, 2017). Cronbach’s alpha was calculated for all measures to assess internal consistency. Means and standard deviations were calculated for all measures and subscales for all participants and by ED diagnostic category. ANOVAs with Tukey’s post hoc comparisons were used to examine potential differences between diagnostic categories with regard to each measure. Pearson’s correlations were then calculated between all measures and subscales using scores at intake as well as change scores from pretreatment to posttreatment. Next, hierarchical multiple regressions were used to further examine these relationships, controlling for ED severity at pretreatment. The first hierarchical multiple regression predicted ED risk scores at posttreatment using OCI-R and TAF scores at pretreatment. The second predicted changes in ED risk scores using changes in OCI-R and TAF scores from pretreatment to posttreatment. Both regression models controlled for age and then entered OCI-R scores in one step, followed by TAF scores to examine potential incremental variance explained by TAF scores above OCI-R scores alone. The data were examined and met the required assumptions for these types of analyses, including linearity, homoscedasticity, multicollinearity, and normality, and there were no detected outliers.

**Results**

Pretreatment scores for each of the measures are displayed in Table 1. On average, participants reported levels of OCD symptomology (OCI-R total score = 21.53) below patients with OCD (28.01), but above non-anxious controls (18.82; Foa et al., 2002). The current sample demonstrated significantly lower OCD symptomology than the normed OCD sample, *t*(228) = 3.35, *p* < .001, and nonsignificant differences compared to the normed non-anxious controls, *t*(228) = 1.51, *p* = .132. On average, the sample’s OCI-R scores were above the clinical cutoff for OCD of 21. Moreover, nearly half (45.5%) of the participants in the sample met the cutoff for OCD. With regard to specific OCD symptoms, three subscales appeared to be elevated on average. These included Obsessing (5.25), Neutralizing (3.06), and Ordering (4.79) that were well above non-anxious controls (2.86, 1.82, and 4.40, respectively) and at or near patients with OCD (7.23, 3.18, and 4.76, respectively; Foa et al., 2002). On average, participants reported levels of TAF (Moral = 18.09, Likelihood-Others = 3.49, Likelihood-Self = 2.97) well above a community sample of adults (Moral = 12.74, Others = 1.03, Self = 2.09) and below that of a sample of participants with OCD (Moral = 20.03, Likelihood-Others = 4.77, Likelihood-Self = 4.41; Shafran et al., 1996).

From pre to posttreatment, participants demonstrated statistically significant reduction in OCI-R, *t*(110) = 7.11, *p* < .001 and ED severity, *t*(110) = 10.06, *p* < .001. With regard to TAF subscales, participant TAF-Moral, *t*(110) = 3.78, *p* < .001 and TAF-Self, *t*(110) = 2.43, *p* = .017 scores reduced significantly over the course of treatment. TAF-Others scores did not significantly change from pre to posttreatment, *t*(110) = 1.99, *p* = .05..

Comparisons were made between participant ED diagnostic categories to examine potential differences in ED severity, OCD symptomology, and TAF. No differences were found between diagnoses for meeting OCD cutoff criteria, ED risk, or any of the TAF subscales, indicating that the diagnoses categories endorsed similar levels of TAF. With regard to OCD symptomology, only the OCI-R Ordering subscale demonstrated a statistically significant difference between groups. Participants with a diagnosis of bulimia indicated significantly fewer ordering-related OCD symptoms than those diagnosed with anorexia (*η²* = .07, *p* = .017).

Participants above the OCI-R cutoff for OCD demonstrated significantly higher levels of ED severity at pretreatment (61.24) compared to participants below the cutoff (44.33), *t*(110) = 3.92, *p* < .001, *d* = .74). Despite differences in ED symptom severity between the groups, on average both groups responded to treatment with the OCD group demonstrating a 27.25 point decrease in ED severity scores and the non-OCD group demonstrating an average decrease of 18.67 points. Changes in ED severity over the course of treatment were not statistically significant between participants above and below the OCI-R cutoff, *t*(110) = 1.98, *p* = .050, *d* = .38), however, the small to moderate effect size indicates a potentially clinically significant difference. At posttreatment, participants above the OCI-R cutoff for OCD reported somewhat similar levels of OCD (33.98) compared to those below the cutoff (25.66), *t*(110) = 1.97, *p* = .051, *d* = .37). It appears that participants with higher levels of OCD entered treatment with significantly higher levels of ED severity and left treatment with higher levels of ED severity, however at post-treatment this difference was no longer statistically significant.

Pearson’s correlations were calculated to examine relationships between ED and OCD symptoms and TAF at pretreatment and from pre to posttreatment. Results are presented in Table 2. At pretreatment statistically significant, positive, moderate correlations were demonstrated between ED risk scores and all symptom subscales of the OCI-R (*r*s = .24–.49, *p*s < .05) and all subscales of the TAF scale (*r*s = .20–.25, *p*s < .05). Analysis of change scores from pre- to post-treatment demonstrated moderate correlations between ED risk and the subscales of the OCI-R (*r*s = .20–.55, *p*s < .05). However, with regard to the TAF subscales, only the Others subscale change score demonstrated a statistically significant relationship with the ED risk change score (*r* = .31, *p* < .01). Associations between OCI-R and TAF pretreatment scores and ED risk change scores from pre- to post-treatment were next examined. The OCI-R Obsessing subscale was the only variable at pretreatment to be significantly correlated with changes in ED risk from pre- to post-treatment (*r* = .38, *p* < .01).

These relationships were then examined further using hierarchical multiple regressions. Table 3 displays the results of the first regression that tested posttreatment ED risk scores as the outcome variable. *R*2 changes were significant following the first and second steps which controlled for pretreatment ED risk scores and age. Pretreatment OCI-R subscales were added at step three, resulting in no significant change in *R*2 and no individual OCD symptom subscale significantly contributing to the explained variance. Finally, pretreatment TAF subscales were added at step four, resulting in a significant change in *R*2 that contributed an additional approximately 7% of explained variance. Only the TAF Self subscale was statistically significant, indicating that levels of TAF related to self at pretreatment contribute a significant amount of variation in ED risk scores at posttreatment. The findings of this analysis indicate that pretreatment levels of OCD did not significantly predict ED treatment outcome. However, greater levels of self-focused TAF scores at pretreatment significantly predicted greater ED symptom severity at post-treatment.

Changes in these variables were then examined using an additional hierarchical multiple regression. Table 4 displays this model that tested changes in ED risk scores as the outcome variable. Step one consisted of OCI-R subscale change scores, which contributed to a significant amount of explained variance (*R*2 = .32, *p* < .001). The obsessing subscale was the only statistically significant symptom dimension. Step two added the TAF subscale change scores, which were statistically significant and explained an additional approximately 3% of variance beyond changes in OCD symptomology alone. Changes in the Others subscale was the only TAF subscale to significantly contribute to variance in ED risk change scores (*p* = .008). The findings of this analysis indicate that decreases in OCI-R obsessing scores, and to a lesser degree decreases in others-focused TAF scores, significantly predicted better ED treatment outcome.

**Discussion**

This study aimed to examine potential relationships between ED severity, OCD symptoms and TAF, as well as the potential influence OCD symptoms and TAF may have on ED treatment outcomes. Obsessing, neutralizing, and ordering were the most elevated and commonly experienced OCD symptoms among our sample of individuals with diagnosed EDs, and scores on all OCD subscales were largely consistent between various ED diagnoses. Additionally, all forms of TAF examined were elevated above the norms observed in non-clinical samples suggesting that TAF is a salient experience for individuals in treatment for an ED.

Our findings also suggest a strong relationship between ED and OCD symptom severity. The significant positive correlation between ED symptom severity and OCD symptom severity as a whole, as well as all six symptom clusters individually, suggests that clients struggling with more severe symptoms related to one disorder tend to display more severe symptomology related to the other, and therefore present with an overall more severe clinical profile. One possible explanation for this is that there is a synergistic effect of ED/OCD symptoms such that the simultaneous presentation of both disorders exacerbates overall clinical severity beyond that which might be observed if only one symptom profile was present. Additionally, it is possible that there are one or more underlying maintenance mechanisms that are particularly salient within individuals who have a comorbid ED and OCD symptoms. While surprisingly little research has been done in relation to the bidirectionality of symptom severity in this way among other common psychiatric comorbidities with ED, there is also initial research suggesting that comorbid depression and/or anxiety diagnoses are similarly associated with increased ED symptom severity (Brand-Gothelf, Leor, Apter, & Fennig, 2014; Spindler & Milos, 2007). Notably however, these studies have not looked at whether the severity of the comorbid disorder’s symptom profile also appears exacerbated above and beyond those of individuals without a comorbid ED as was observed between EDs and OCD in our study. It is therefore essential that more comprehensive research is conducted to determine the exact nature of these comorbid psychiatric relationships among individuals with EDs to better understand how best to prioritize and target symptoms of comorbid diagnoses to improve overall treatment outcomes among this population.

Despite treatment being primarily targeted at decreasing ED symptoms, OCD symptoms also decreased significantly on average across patients and changes in ED severity and OCD symptom severity were strongly associated. Despite generally entering treatment with greater ED severity, participants who met OCI-R cutoff criteria for OCD saw similar overall treatment improvements as those who did not meet the cutoff, relative to their incoming symptom severity. However, these relative changes in ED severity also demonstrate that, on average, those entering treatment with higher levels of OCD are seeing similar overall improvements as their peers without severe OCD symptoms but are still leaving treatment with greater levels of ED symptoms.

Consistent with previous findings, changes in OCD symptom severity also predicted changes in ED severity (Olatunji, Tart, Shewmaker, Wall, & Smits, 2010) suggesting that ED-focused treatment appears to also provide therapeutic benefits for OCD symptomology, and that improvements in the symptoms of one disorder are associated with improvements in the other. This suggests that, despite initial benefits observed in both ED and OCD symptoms following residential ED-focused treatment, additional efforts targeting specific OCD symptoms in addition to ED-focused treatment among this population may be beneficial for enhancing overall treatment outcomes.

All types of TAF were associated with greater ED severity at pretreatment. Moreover, levels of TAF related to one’s self at pretreatment significantly contributed to the variation in ED severity following treatment such that higher pretreatment self-oriented TAF predicted poorer treatment outcome. Changes in TAF when oriented to others across treatment were significantly predictive of changes in ED severity; however, this was not the case for changes in TAF oriented to oneself. These findings may be indicative of changes among individual’s interpersonal awareness and interpersonal interaction styles across treatment. Throughout residential treatment the use of social support is encouraged and facilitated through the implementation of group therapy and family member integration, and there is evidence suggesting that interpersonal and family-based psychotherapies are efficacious in the treatment of EDs, particularly when working with adolescents (Couturier, Kimber, & Szatmari, 2013; Murphy, Straebler, Basden, Cooper, & Fairburn, 2012). Thus, it is possible that ED patients entering residential treatment place a stronger emphasis on self-oriented TAF, but throughout treatment increase their awareness and perceived importance of others and the impact their disorder may have on them. While this is one possible explanation for our results, additional research in this regard is necessary.

It is also possible that TAF is a transdiagnostic factor that is more closely related to the underlying personality characteristics of individuals at increased risk for/diagnosed with EDs, OCD, and similar disorders. A review of the literature on TAF in this regard suggests the possibility that TAF represents a “tendency or way of thinking” that may transcend the specificity of specific disorder symptomology (Berle & Starcevic, 2005). However, our finding that TAF appeared to decrease in response to treatment, even when it was not a specified treatment target, supports the indication that TAF is less likely to be a personality “trait” unlikely to change over time, and thus may be an appropriate target of therapeutic intervention. While our preliminary findings provide further support that TAF is prevalent among individuals with EDs, future research exploring its relationship to personality characteristics such as neuroticism and perfectionism, as well as its relationship with other common comorbid diagnoses and symptoms such as depression, anxiety disorders, guilt, and shame within this population are needed to specify and appropriately target TAF in treatments.

When considering the implications of our results, limitations of the current study should be acknowledged. Data collection only occurring at pre- and post-treatment precludes our ability to identify directionality or potential causality between treatment processes. More explicitly, it remains unclear whether changes in OCD and TAF levels occur simultaneously, before, or after changes in ED symptoms. Without the ability to determine this temporal precedence, it is also therefore uncertain whether changes in OCD and/or TAF are causally predictive of changes in ED severity and future research continuing to explore the temporal timeline of such changes is needed. Additionally, the measures used in this study to assess OCD and TAF were created from an OCD-focused orientation, thus they may not be fully representative of how similar behavioral patterns manifest for individuals with EDs (Shafran, Teachman, Kerry, & Rachman, 1999). Thus, future research utilizing measures of behavioral and cognitive processes based on an OCD symptom dimension framework, but adapted to ED specific thoughts and behaviors, such as the Thought-shape Fusion Questionnaire (Shafran et al., 1999) may provide further insight into the prevalence and impact these processes have within ED populations. Finally, our study specifically highlighted the comorbid relationship between OCD and EDs, however there is a significant amount of research indicating that other psychiatric comorbidities including depression and anxiety disorders are also frequently common within this population. It is possible that individuals within our sample also had one or more additional comorbidities not evaluated in this study, and that symptoms of these disorders may have influenced ED and/or OCD symptom severity in some way.

Overall, our results provide additional insights into the relationship between comorbid OCD and ED symptoms and possess implications for future treatment implementation and research. It appears that obsessing, neutralizing, and ordering OCD symptom dimensions may be particularly prevalent among individuals with EDs, and it therefore may be beneficial to incorporate treatment processes specifically targeting these symptoms within OCD-focused treatments as additional processes within current ED treatment approaches. Further, it appears that although symptoms of both EDs and OCD significantly decreased following residential ED-focused treatment, there may be synergistic effects when ED/OCD comorbidity is present such that overall symptom severity is exacerbated and remains at clinically significant levels for many individuals at post treatment. TAF also appears elevated among individuals with EDs, and appears to be impacted throughout residential treatment despite the fact that it is not specifically defined as a treatment target. Importantly, it appears that pretreatment levels of TAF (in particular Likelihood-Self TAF) and changes in TAF throughout treatment (particularly Likelihood-Others TAF) appear to predict overall treatment outcomes. It is therefore possible that by specifically including TAF as a targeted treatment component for individuals with EDs may be influential in improving overall treatment outcomes. However, additional research replicating and expanding upon our initial findings to better understand the specific role this construct plays in the maintenance and treatment of ED symptoms is essential to effectively address TAF in this way. Similarly, research specifically evaluating the inclusion of specific treatment components targeting OCD symptoms, as well as the possible influence of comorbid ED/OCD pathology on treatment efficacy is necessary in order to improve overall treatment outcomes for these individuals.

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| Table 1  *Pretreatment total scores, standard deviations, and ANOVA or chi square test statistics between eating disorder diagnoses* | | | | | | | | |
|  | Anorexia (n = 57) | Bulimia  (n = 20) | EDNOS  (n = 35) | All  (n = 112) | *F* or *χ*2 | *p* | *η²* | Tukey’s post hoc |
| Met cutoff for OCD | 30  (52.6%) | 7  (35.0%) | 14  (40.0) | 51  (45.5%) | 2.48 | .289 | - | - |
| EDRC | 50.16  (22.18) | 62.20  (24.04) | 49.26  (26.39) | 52.03  (24.15) | 2.22 | .113 | .04 | - |
| OCI-R |  |  |  |  |  |  |  |  |
| Total | 23.65  (15.48) | 17.00  (14.27) | 20.66  (16.98) | 21.53  (15.82) | 1.39 | .252 | .02 | - |
| Washing | 2.95  (3.44) | 2.45  (3.41) | 2.43  (3.23) | 2.70  (3.35) | .32 | .725 | .01 | - |
| Obsessing | 5.40  (3.55) | 5.55  (3.63) | 4.83  (3.76) | 5.25  (3.61) | .35 | .702 | .01 | - |
| Neutralizing | 3.40  (3.97) | 2.35  (3.08) | 2.91  (3.84) | 3.06  (3.78) | .61 | .545 | .01 | - |
| Ordering | 5.51  (4.02) | 2.60  (2.93) | 4.86  (3.98) | 4.79  (3.95) | 4.26\* | .017 | .07 | AN>BN (*p*=.012) |
| Hoarding | 2.98  (3.11) | 2.20  (2.46) | 3.06  (3.32) | 2.87  (3.06) | .58 | .563 | .01 | - |
| Checking | 3.40  (2.95) | 1.85  (2.32) | 2.57  (3.00) | 2.87  (2.90) | 2.45 | .091 | .04 | - |
| TAF |  |  |  |  |  |  |  |  |
| Moral | 19.30  (13.56) | 16.75  (13.88) | 16.89  (13.04) | 18.09  (13.40) | .47 | .627 | .01 | - |
| Others | 4.07  (4.59) | 3.00  (4.09) | 2.83  (3.70) | 3.49  (4.24) | 1.09 | .339 | .02 | - |
| Self | 3.32  (3.63) | 2.45  (3.14) | 2.71  (3.17) | 2.97  (3.39) | .63 | .537 | .01 | - |
| *Note.* AN = anorexia; BN = bulimia; EDNOS = eating disorder not otherwise specified; EDRC = EDI-3 Eating Disorder Risk Composite; OCI-R = Obsessive-Compulsive Inventory-Revised; TAF = Thought Action Fusion. | | | | | | | | |

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| Table 2  *Pearson’s correlations between change scores and pretreatment EDRC, OCI-R, and TAF scores* | | | | |
| Variable | EDRC  pretreatment | *p* | EDRC  change score | *p* |
| EDRC pre | - | - | .54\*\*\* | <.001 |
| OCI-R |  |  |  |  |
| Total pre | .43\*\*\* | <.001 | .24\*\* | .011 |
| Washing pre | .27\*\* | .005 | .17 | .078 |
| Obsessing pre | .49\*\*\* | <.001 | .38\*\*\* | <.001 |
| Neutralizing pre | .32\*\*\* | <.001 | .14 | .141 |
| Ordering pre | .38\*\*\* | <.001 | .12 | .207 |
| Hoarding pre | .24\* | .010 | .16 | .085 |
| Checking pre | .24\* | .011 | .12 | .214 |
| TAF |  |  |  |  |
| Moral pre | .20\* | .033 | -.04 | .690 |
| Others pre | .23\* | .015 | .08 | .391 |
| Self pre | .25\*\* | .008 | -.03 | .763 |
|  |  |  |  |  |
| OCI-R |  |  |  |  |
| Total change |  |  | .41\*\*\* | <.001 |
| Washing change |  |  | .24\* | .011 |
| Obsessing change |  |  | .55\*\*\* | <.001 |
| Neutralizing change |  |  | .28\*\* | .002 |
| Ordering change |  |  | .20\* | .31 |
| Hoarding change |  |  | .23\* | .016 |
| Checking change |  |  | .21\* | .027 |
| TAF |  |  |  |  |
| Moral change |  |  | .13 | .169 |
| Others change |  |  | .31\*\*\* | <.001 |
| Self change |  |  | .07 | .444 |
| *Note.* Change = change scores from pre to posttreatment; EDRC = EDI-3 Eating Disorder Risk Composite; OCI-R = Obsessive-Compulsive Inventory-Revised; pre = pretreatment; TAF = Thought Action Fusion. | | | | |

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| Table 3  *Hierarchical multiple regressions predicting EDRC scores at posttreatment from OCI-R and TAF scores at pretreatment* | | | | | | |
| Variable | *B* | *β* | *p* | *R*2 | Δ*R*2 | *F* |
| Step 1 |  |  |  |  |  |  |
| EDRC pre | .48\*\*\* | .51\*\*\* | <.001 |  |  |  |
|  |  |  | <.001 | .26 | .26\*\*\* | 39.23\*\*\* |
| Step 2 |  |  |  |  |  |  |
| EDRC pre | .42\*\*\* | .45\*\*\* | <.001 |  |  |  |
| Age | -39.70\* | -.20\* | .018 |  |  |  |
|  |  |  | .018 | .30 | .04\* | 23.36\* |
| Step 3 |  |  |  |  |  |  |
| EDRC pre | .43\*\*\* | .46\*\*\* | <.001 |  |  |  |
| Age | -39.89\* | -.20\* | .018 |  |  |  |
| OCI-R Neutralizing pre | .96 | .16 | .173 |  |  |  |
| OCI-R Checking pre | -.95 | -.12 | .373 |  |  |  |
| OCI-R Ordering pre | 1.16 | .20 | .116 |  |  |  |
| OCI-R Hoarding pre | -.27 | -.04 | .720 |  |  |  |
| OCI-R Obsessing pre | -1.32 | -.21 | .050 |  |  |  |
| OCI-R Washing pre | -.39 | -.06 | .570 |  |  |  |
|  |  |  | .360 | .34 | .04 | 6.71 |
| Step 4 |  |  |  |  |  |  |
| EDRC pre | .45\*\*\* | .48\*\*\* | <.001 |  |  |  |
| Age | -25.14 | -.13 | .144 |  |  |  |
| OCI-R Neutralizing pre | 1.19 | .20 | .083 |  |  |  |
| OCI-R Checking pre | -1.50 | -.19 | .151 |  |  |  |
| OCI-R Ordering pre | .98 | .17 | .169 |  |  |  |
| OCI-R Hoarding pre | -.70 | -.09 | .343 |  |  |  |
| OCI-R Obsessing pre | -1.37\* | -.22\* | .037 |  |  |  |
| OCI-R Washing pre | -.47 | -.07 | .480 |  |  |  |
| TAF Self pre | 2.50\*\* | .38\*\* | .008 |  |  |  |
| TAF Others pre | -1.36 | -.26 | .057 |  |  |  |
| TAF Moral pre | .21 | .13 | .184 |  |  |  |
|  |  |  | .016 | .41 | .07\* | 6.23\* |
| *Note.* EDRC = EDI-3 Eating Disorder Risk Composite; OCI-R = Obsessive-Compulsive Inventory-Revised; pre = pretreatment; TAF = Thought Action Fusion. | | | | | | |

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| Table 4  *Hierarchical multiple regressions predicting EDRC changes scores from OCI-R and TAF change scores* | | | | | | |
| Variable | *B* | *β* | *p* | *R*2 | Δ*R*2 | *F* |
| Step 1 |  |  |  |  |  |  |
| Age | -.06 | -.01 | .885 | .001 | .001 | .02 |
| Step 2 |  |  |  |  |  |  |
| Age | .20 | .05 | .561 |  |  |  |
| OCI-R Neutralizing change | 1.08 | .13 | .159 |  |  |  |
| OCI-R Checking change | -.82 | -.08 | .531 |  |  |  |
| OCI-R Ordering change | .04 | .01 | .958 |  |  |  |
| OCI-R Hoarding change | .37 | .04 | .688 |  |  |  |
| OCI-R Obsessing change | 3.66\*\*\* | .54\*\*\* | <.001 |  |  |  |
| OCI-R Washing change | -.41 | -.04 | .691 |  |  |  |
|  |  |  | <.001 | .32 | .32\*\*\* | 8.14\*\*\* |
| Step 3 |  |  |  |  |  |  |
| Age | .19 | .05 | .584 |  |  |  |
| OCI-R Neutralizing change | .94 | .11 | .217 |  |  |  |
| OCI-R Checking change | -.81 | -.07 | .549 |  |  |  |
| OCI-R Ordering change | -.04 | -.01 | .959 |  |  |  |
| OCI-R Hoarding change | .33 | .04 | .731 |  |  |  |
| OCI-R Obsessing change | 3.34\*\*\* | .50\*\*\* | <.001 |  |  |  |
| OCI-R Washing change | -.28 | -.03 | .785 |  |  |  |
| TAF Self change | -1.01 | -.13 | .226 |  |  |  |
| TAF Others change | 1.51\* | .24\* | .026 |  |  |  |
| TAF Moral change | .00 | .00 | .989 |  |  |  |
|  |  |  | <.001 | .35 | .03 | 1.80 |
| *Note.* Change = change scores from pre to posttreatment; EDRC = EDI-3 Eating Disorder Risk Composite; OCI-R = Obsessive-Compulsive Inventory-Revised; TAF = Thought Action Fusion. | | | | | | |