

4-1-2017

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Clarifying the Relationship Between Trichotillomania and Anxiety

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Abstract

Although research has consistently linked unidimensional anxiety with [Trichotillomania](#) (TTM) severity, the relationships between TTM severity and anxiety dimensions (e.g., cognitive and somatic anxiety) are unknown. This knowledge gap limits current TTM conceptualization and treatment. The present study examined these relationships with data collected from ninety-one adults who participated in a [randomized clinical trial](#) for TTM treatment. Based on prior research, it was hypothesized that TTM severity would be related to the cognitive anxiety dimension and that psychological inflexibility would mediate the association. Hypotheses were not made regarding the relationship between TTM severity and [somatic anxiety](#). Regression analyses indicated that only cognitive dimensions of anxiety predicted TTM severity and that psychological inflexibility mediated this relationship. Implications for the conceptualization and treatment of TTM are discussed.

Keywords

Trichotillomania, Cognitive anxiety, Somatic anxiety, Psychological inflexibility

1. Clarifying the relationship between Trichotillomania and anxiety

[Trichotillomania](#) (TTM; also referred to as Hair Pulling Disorder) is a debilitating condition defined by recurrent hair pulling despite repeated attempts to stop ([American Psychiatric Association \[APA\], 2013](#)). Based on research suggesting that negative affect, particularly anxiety, contributes to disorder duration and severity ([Christenson et al., 1991](#), [Christenson and Mansueto, 1999](#), [Hajcak et al., 2006](#), [Mansueto et al., 1997](#); [Roberts, O'Connor, & Bélanger, 2013](#); [Stanley, Borden, Bell, & Wagner, 1994](#)), various TTM treatment models augment traditionally effective behavioral treatments (e.g., Habit Reversal Therapy; [Azrin & Nunn, 1973](#)) with anxiety-targeting techniques. However, different TTM treatment models target different anxiety components. For instance, comprehensive behavioral treatment models tend to target physiological symptoms of anxiety via techniques like deep breathing ([Azrin, Nunn, & Frantz, 1980](#)); cognitive-behavioral treatment (CBT) models target [anxiogenic](#) cognitions and feelings via techniques like cognitive restructuring ([Lerner, Franklin, Meadows, Hembree, & Foa, 1999](#)); and third-wave behavioral treatment models target meta-cognitions about experiencing anxiety via techniques like [mindfulness](#) ([Keuthen et al., 2010](#), [Woods and Twohig, 2008](#)). Unfortunately, there is currently little empirical basis for targeting any one component of anxiety over another, as the specific nature of the relationship between anxiety and TTM is unknown. Developing a better understanding of how the various components of anxiety relate to TTM is necessary for developing a better understanding of the disorder and its treatment.

TTM research has predominantly treated anxiety as a unidimensional construct (e.g., [Diefenbach, Mouton-Odum, & Stanley, 2002](#); [Diefenbach, Tolin, Hannan, Crocetto, & Worhunsky, 2005](#); [Diefenbach, Tolin, Meunier, & Worhunsky, 2008](#); [Duke, Bodzin, Tavers, Geffken, & Storch, 2009](#); [Houghton et al., 2014](#); [Shusterman, Feld, Baer, & Keuthen, 2009](#); [Stanley et al., 1994](#)). However, anxiety researchers recognize anxiety as a multidimensional

construct consisting of cognitive (sometimes referred to as subjective anxiety; e.g., fear and worry) and [somatic](#) (e.g., physiological arousal and panic) dimensions ([Clark and Watson, 1991](#), [Nitschke et al., 2001](#), [Ree et al., 2008](#)). Conceptualizing anxiety in such a way is clinically meaningful, as research suggests that cognitive and [somatic anxiety](#) symptoms may respond best to different treatments ([Norton and Johnson, 1983](#), [Ree et al., 2008](#), [Schwartz et al., 1978](#), [Tamaren et al., 1985](#)). Specifically, some research suggests that cognitive anxiety may be most responsive to treatments like cognitive restructuring and meditation, while somatic anxiety may be most responsive to diaphragmatic breathing exercises and [progressive muscle relaxation](#) ([Norton and Johnson, 1983](#), [Ree et al., 2008](#), [Schwartz et al., 1978](#), [Tamaren et al., 1985](#)). Accordingly, to develop treatments that effectively target anxiety associated with TTM, it is important to understand the relationships between the different dimensions of anxiety and TTM severity.

The few studies that have examined the relationships between TTM severity and the cognitive and somatic anxiety dimensions have not been conclusive. Some evidence suggests that TTM severity is related to aspects of cognitive anxiety, such as worry ([Hajcak et al., 2006](#)), and other evidence suggests TTM is related to fear of negative evaluation ([Norberg, Wetterneck, Woods, & Conelea, 2007](#)). Still, other evidence suggests that while TTM-affected persons demonstrate higher levels of cognitive and somatic anxiety than unaffected persons, TTM severity may not be related to either anxiety dimension ([Wetterneck, Lee, Flessner, Leonard, & Woods, 2016](#)). However, this study was limited by a small sample size that may have precluded power to detect such relationships. Overall, research appears to suggest that TTM severity may be related to cognitive aspects of anxiety, but it is unclear whether TTM severity is related to somatic anxiety.

In addition to understanding how particular aspects of anxiety are related to TTM symptoms, researchers have also examined how anxiety symptoms are perceived and acted upon by persons with TTM. To this end, a growing body of research focuses on the role of psychological inflexibility in TTM. Psychological inflexibility refers to the propensity to prioritize the mitigation of undesirable private experiences over the pursuit of adaptive goals ([Bond et al., 2011](#)). Generally, the most frequently discussed form of psychological inflexibility is experiential avoidance, which refers to the propensity to engage in behaviors that facilitate disengagement from undesirable experiences ([Bond et al., 2011](#)). Studies that have examined the role of psychological inflexibility in TTM have found that psychological inflexibility mediates the relationships between hair pulling severity and unidimensional measures of anxiety ([Houghton et al., 2014](#)) as well as between hair pulling severity and certain cognitive aspects of anxiety (i.e., apprehension/anxious thoughts about being negatively evaluated by others; [Norberg et al., 2007](#)). However, it is unclear whether psychological inflexibility mediates the relationship between TTM severity and the broader cognitive anxiety dimension. Further, no study has examined whether psychological inflexibility mediates the relationship between TTM severity and somatic aspects of anxiety.

Since the introduction of “psychological inflexibility” as a construct, it has been implied that different psychiatric disorders are characterized by different manifestations of psychological inflexibility. That is, the manner in which psychological inflexibility manifests in [social anxiety disorder](#) may differ from the manner in which psychological inflexibility manifests in TTM.

Accordingly, it has been proposed that using disorder-specific measures of psychological inflexibility may yield more precise information about the manner in which psychological inflexibility is involved in that disorder ([Houghton et al., 2014](#), [MacKenzie and Kocovski, 2010](#), [Sandoz et al., 2013](#)). Although such a measure has been created to measure psychological inflexibility descriptive of TTM, the Acceptance and Action Questionnaire-Trichotillomania (AAQ-TTM; [Houghton et al., 2014](#)), no study has examined whether TTM-specific psychological inflexibility mediates the relationships between TTM severity and the cognitive and somatic dimensions of anxiety.

The current study was intended to explore the anxiety-TTM relationship. Using the same data set utilized by [Houghton et al. \(2014\)](#), the current study examined whether TTM severity (assessed via self-report and clinician rating) is differentially related to different anxiety dimensions (i.e., cognitive and somatic). In addition, the current study examined whether TTM-specific psychological inflexibility mediated the relationship between these anxiety dimensions and TTM severity.

Based on the findings of [Hajcak et al. \(2006\)](#) and [Norberg et al. \(2007\)](#), we hypothesized that the cognitive domain of anxiety would be significantly related to TTM severity. In addition, consistent with findings from [Norberg et al. \(2007\)](#), we hypothesized that TTM-specific psychological inflexibility would mediate the relationship between cognitive anxiety and TTM severity. Based on prior research showing no relationship between somatic forms of anxiety and TTM ([Wetterneck et al., 2016](#)), we did not anticipate finding an association between TTM severity and the somatic dimension of anxiety in the current study.

2. Method

2.1. Participants

Data were collected as part of a [randomized clinical trial](#) for TTM treatment. Information about the sample and recruitment can be found in [Houghton et al. \(2016\)](#).

Ninety-one participants (92% female; 8% male) were included in the current study. Seventy-six participants identified as European American (84%), eleven identified as African American (12%), one identified as Asian American (1%), and three identified as multiracial or did not disclose their race (3%). In addition, one participant identified as Hispanic or Latino (1%). Participants had a mean age of 35.04 years ($SD=12.68$).

2.2. Measures

2.2.1. Cognitive and somatic anxiety

The [Beck Anxiety Inventory](#) (BAI; [Beck, Epstein, Brown, & Steer, 1988](#)) is a 21-item self-report measure of clinical anxiety that assesses both [somatic](#) and cognitive symptoms of anxiety. Each item on the BAI is ranked on a 0-3 scale. Thus, raw scores range from 0–63, with higher scores indicating higher levels of anxiety. Although the BAI total score is frequently used in research, several studies suggest that the BAI consists of multiple factors. Two studies ([Beck and Steer, 1991](#), [Steer et al., 1993](#)) exploring the factor structure of the BAI in clinically

anxious samples concluded that the BAI consists of four factors: subjective anxiety, neurophysiological anxiety, autonomic anxiety, and panic anxiety. These same researchers hypothesized that raw scores on the subjective anxiety factor assessed cognitive anxiety and raw scores on the neurophysiological, autonomic, and panic anxiety factors assessed [somatic anxiety](#) (Steer, Rissmiller, Ranieri, & Beck, 1993).

We calculated all four of the BAI factors observed by [Steer, Ranieri et al. \(1993\)](#) using data from the current sample. To examine whether the [Steer, Ranieri et al. \(1993\)](#) BAI factors were adequate in the current sample, we analyzed these factors' internal consistencies. This analysis indicated that the subjective anxiety ($\alpha=.86$), neurophysiological anxiety ($\alpha=.88$), and autonomic anxiety ($\alpha=.80$) factors each demonstrated acceptable internal consistency. The panic anxiety factor demonstrated poor internal consistency ($\alpha=.54$). Therefore, only the [Steer, Ranieri et al.'s \(1993\)](#) subjective, neurophysiological, and autonomic anxiety factors were analyzed in the current study. As proposed by [Steer, Rissimiller et al. \(1993\)](#), the subjective anxiety factor measured cognitive anxiety and the neurophysiological and autonomic anxiety factors measured somatic anxiety. Correlations between cognitive anxiety and the two forms of somatic anxiety (i.e., neurophysiological and autonomic) are presented in [Table 1](#).

Table 1. Pearson's Correlations between BAI Factors.

Factors	1	2	3
1.Cognitive Anxiety	-		
2.Neurophysiological Anxiety	.61**	-	
3.Autonomic Anxiety	.54**	.51**	-

** $p<.001$.

2.2.2. TTM severity

The *Massachusetts General Hospital Hairpulling Scale* (MGH-HS; [Keuthen et al., 1995](#)) is a seven-item self-report measure of hair pulling and hair pulling urge severity. Total scores on the MGH-HS range from 0–28, and higher scores indicate greater hair pulling severity. Research suggests the MGH-HS is reliable and valid in TTM samples ([Keuthen et al., 2007](#), [O'Sullivan et al., 1995](#)).

The *NIMH-Trichotillomania Severity Scale* (NIMH-TSS; [Swedo, Rapoport, Leonard, Lenane, & Cheslow, 1989](#)) is a five-item clinician rated measure of TTM severity. Total scores range from 0–25, with higher scores indicating greater TTM severity. Research suggests the NIMH-TSS demonstrates acceptable reliability and validity in TTM samples ([Diefenbach et al., 2005](#), [Swedo et al., 1989](#)).

2.2.3. TTM-specific psychological inflexibility

Based on the revised version of the Acceptance and Action Questionnaire (AAQ-II; [Bond et al., 2011](#)), which measures general psychological inflexibility, the Acceptance and Action Questionnaire *Trichotillomania* (AAQ-TTM; [Houghton et al., 2014](#)) is a nine-item self-report measure of TTM-specific psychological inflexibility. That is, the AAQ-TTM measures

respondents' tendencies to engage in TTM-related behaviors (e.g., hair pulling), at the expense of engaging in more adaptive behaviors, when experiencing unwanted experiences (e.g., urges to hair pull). Higher scores indicate greater TTM-specific psychological flexibility (i.e., greater ability to resist hair pulling when distressed by thoughts/urges related to hair pulling), while lower scores indicate greater TTM-specific psychological inflexibility (i.e., greater tendency to engage in hair pulling when experiencing thoughts/urges related to hair pulling). Preliminary research suggests that the AAQ-TTM has satisfactory validity and reliability in clinical TTM samples ([Houghton et al., 2014](#)).

2.3. Procedure

Information about the procedures used in the [randomized, controlled trial](#) can be found in [Houghton et al. \(2016\)](#). Only data from the baseline visit were used. During the baseline visit, participants completed the BAI, MGH-HS, and AAQ-TTM and were evaluated with the NIMH-TSS.

3. Results

Correlational analyses were used to examine the relationship between each of the anxiety factors, hair pulling severity, and TTM-specific psychological inflexibility (see [Table 2](#) for correlation coefficients). Results indicated that only cognitive anxiety factor was significantly correlated with TTM severity. Cognitive anxiety and the two forms of [somatic anxiety](#) (i.e., neurophysiological and autonomic) were correlated with TTM-specific psychological inflexibility.

Table 2. Pearson's Correlations between BAI Factors and Measures of TTM Severity and Psychological Inflexibility.

	MGH-HS	NIMH-TSS	AAQ-TTM
1. Cognitive Anxiety	.23*	.22*	-.45**
2. Neurophysiological Anxiety	.11	.13	-.30**
3. Autonomic Anxiety	.03	.11	-.13

Note. AAQ-TTM = Acceptance and Action Questionnaire [Trichotillomania](#); MGH-HS = Massachusetts General Hospital Hairpulling Scale; NIMH-TSS = National Institute of Mental Health Trichotillomania Severity Scale.

* $p < .05$,

** $p \leq .001$.

Because the cognitive anxiety factor was the only anxiety factor significantly correlated with TTM severity, only this relationship was explored further. The [Baron and Kenny \(1986\)](#) approach was used to examine whether TTM-specific psychological inflexibility mediated the relationship between cognitive anxiety and TTM severity. Results indicated that TTM-specific psychological inflexibility fully mediated the relationships between cognitive anxiety and both

self-reported TTM severity and clinician-rated TTM severity. The mediation analyses are summarized in [Fig. 1](#), [Fig. 2](#).

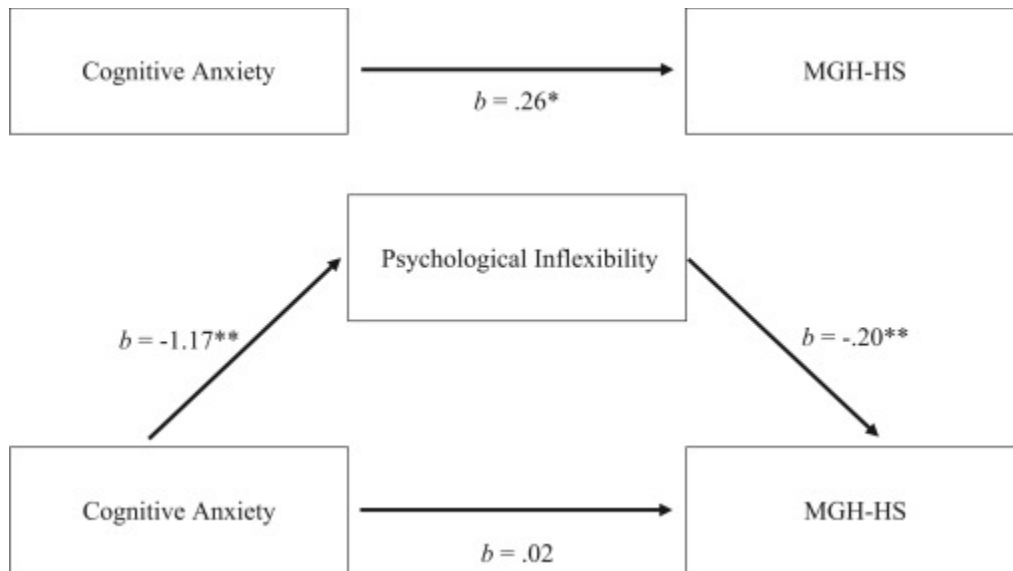


Fig. 1. Regression coefficients for the relationship between cognitive anxiety and MGH-HS as mediated by TTM-Specific experiential avoidance. MGH-HS = Massachusetts General Hospital Hairpulling Scale. $*p < .05$, $**p \leq .001$.

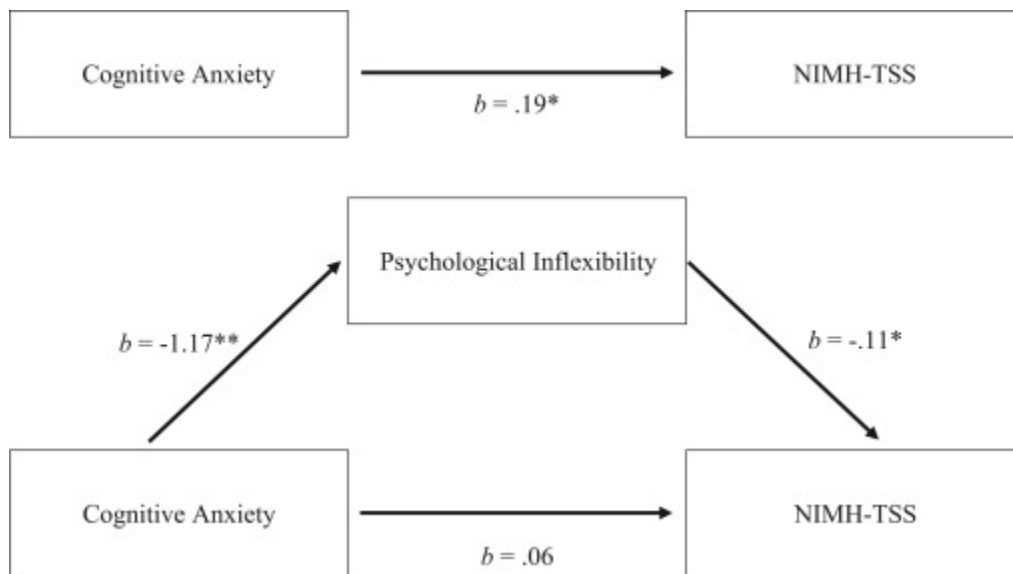


Fig. 2. Regression coefficients for the relationship between cognitive anxiety and NIMH-TSS as mediated by TTM-Specific experiential avoidance. NIMH-TSS = National Institute of Mental Health [Trichotillomania](#) Severity Scale. $*p < .05$, $**p \leq .001$.

4. Discussion

Research demonstrates that anxiety is associated with TTM, but the nuances of this relationship are relatively unknown. Accordingly, we explored the relationship between dimensions of anxiety (i.e., cognitive and [somatic](#) anxiety) and TTM severity. We also explored whether TTM-specific psychological flexibility mediated the relationships between anxiety dimensions and TTM severity. Based on research suggesting that hair pulling severity is related to cognitive aspects of anxiety ([Hajcak et al., 2006](#), [Norberg et al., 2007](#)) and that psychological inflexibility mediates this relationship ([Norberg et al., 2007](#)), we hypothesized that cognitive anxiety would be related to TTM severity and that TTM-specific psychological inflexibility would mediate this relationship. We also conducted analyses looking at whether somatic domains of anxiety were related to TTM severity.

The current results confirmed the hypothesis that greater cognitive anxiety was associated with greater TTM severity, whereas the two dimensions of [somatic anxiety](#) analyzed in the current study (i.e., neurophysiological and autonomic symptoms) were not associated with TTM severity. Further, the current results demonstrated that TTM-specific psychological inflexibility fully mediated the relationship between cognitive anxiety and TTM severity, suggesting that when an individual with TTM experiences cognitive anxiety, his or her pulling severity is primarily a function of his or her TTM-specific psychological flexibility. TTM-affected individuals with greater intolerance of thoughts and urges related to hair pulling will be significantly more likely to pull when cognitive anxiety is present; conversely, those who are more tolerable of thoughts and urges related to hair pulling will be able to resist pulling in the presence of cognitive anxiety.

Such findings have significant treatment implications. The current results suggest that reducing TTM-affected individuals' cognitive anxiety may lead to reductions in hair pulling severity. Accordingly, such results appear to provide support for supplementing traditional TTM [behavioral therapy](#) with techniques that target cognitive anxiety (e.g., cognitive restructuring and meditation; [Ree et al., 2008](#); [Schwartz et al., 1978](#); [Tamaren et al., 1985](#)). However, given that the current results suggest that cognitive and somatic anxiety are highly related, it is possible that TTM-affected individuals will also derive some therapeutic benefit from techniques that target somatic anxiety. Moreover, as results suggest TTM-specific psychological inflexibility mediates the relationship between cognitive anxiety and TTM severity, the current study supports the use of TTM treatment programs that target TTM-specific psychological inflexibility, such as ACT-enhanced behavior therapy (AEBT; [Woods & Twohig, 2008](#)), or dialectical behavior therapy-enhanced behavior therapy ([Keuthen et al., 2010](#)).

The current study did have limitations. One methodological limitation was the relatively small sample size. Nevertheless, given that TTM is a low-prevalence condition, this was a relatively large sample that was also well-characterized. An additional theoretical limitation was that the current study only considered the relationship between anxiety and TTM severity. Future research may also benefit from examining the relationship between other forms of negative affect and TTM severity.

In addition to providing further support for findings from [Haicak et al. \(2006\)](#) and [Norberg et al. \(2007\)](#), the current study suggests that TTM severity is differentially related to anxiety dimensions. Future research should continue to explore the relationship between anxiety dimensions and other variables relevant to TTM (e.g., disorder duration, quality of life, TTM disorder-related impairment, comorbidity, etc.). Future research may also benefit from examining the relationship between TTM severity and variables related to the experience of anxiety (e.g., anxiety sensitivity, affect regulation, and neural activation).

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