

ANXIETY SENSITIVITY IN ADULTS WITH BODY FOCUSED REPETITIVE BEHAVIORS

An Undergraduate Research Scholars Thesis

by

ABEL S. MATHEW

Submitted to the Undergraduate Research Scholars program
Texas A&M University
in partial fulfillment of the requirements for the designation as an

UNDERGRADUATE RESEARCH SCHOLAR

Approved by
Research Advisors:

Douglas Woods, Ph.D.
Steve Balsis, Ph.D.

May 2016

Major: Psychology

TABLE OF CONTENTS

	Page
ABSTRACT.....	1
ACKNOWLEDGEMENTS.....	2
NOMENCLATURE.....	3
CHAPTER	
I INTRODUCTION.....	4
Body Focused Repetitive Behaviors.....	4
Psychosocial and Physical Impairment.....	4
Classification of BFRBs.....	4
Emotional Regulation and BFRBs.....	5
Anxiety Sensitivity and BFRBs.....	6
Objective.....	6
II METHODS.....	8
Participants.....	8
Measures.....	9
Procedure.....	9
Analyses.....	9
III RESULTS.....	10
Anxiety Sensitivity Between Experimental Groups.....	11
Anxiety Sensitivity Severity and BFRB Severity.....	12
Anxiety Sensitivity Across BFRBs.....	12
IV DISCUSSION.....	15
REFERENCES.....	16
APPENDIX A.....	22
APPENDIX B.....	23
APPENDIX C.....	44

ABSTRACT

Anxiety Sensitivity in Adults with Body Focused Repetitive Behaviors

Abel S. Mathew
Department of Psychology
Texas A&M University

Research Advisors: Douglas Woods, Ph.D., & Steve Balsis, Ph.D.
Department of Psychology

Body focused repetitive behaviors (BFRBs) such as hair pulling, skin picking, and nail biting affect almost 4% of the general population (Rasmussen & Eisen, 1992), but the factors that predispose individuals to these behaviors are poorly understood. BFRBs are associated with maladaptive emotional regulation (Diefenbach, Tolin, Meunier, & Worhunsky, 2008; Roberts, O'Connor, & Bélanger, 2013), whereby symptoms serve to temporarily attenuate aversive affective experiences. One particular mechanism through which emotion dysregulation may manifest in persons with BFRBs is anxiety sensitivity, which is defined as the fear of one's own experiences (Reiss and McNally, 1985; Teng, Woods, Twohig, & Marcks, 2002). The current study aimed to determine whether anxiety sensitivity is elevated among adults with BFRBs compared to adults without BFRBs, and whether anxiety sensitivity severity is associated with BFRB symptom severity. Furthermore, anxiety sensitivity levels between different forms of BFRBs will be explored. Participants were recruited via BFRB patient advocacy websites and mailing lists (e.g. the Trichotillomania Learning Center; www.tlc.org) and completed online self-report surveys. Results indicated that clinical BFRBs had higher AS than the general population and that there were no significant differences in AS between persons with ExD and TTM. Future research should look into the underlying mechanisms of AS in BFRBs and how to treat it.

ACKNOWLEDGMENTS

I would like to thank Douglas Woods, for his mentorship and oversight throughout this process, as well as David Houghton, for guiding me and being an essential part of this project. I would also like to thank Steve Balsis, for agreeing to be my advisor for the remainder of this thesis.

NOMENCLATURE

AS	Anxiety Sensitivity
BFRB	Body Focused Repetitive Behavior
CBT	Cognitive-Behavior Therapy
DSM-5	Diagnostic and Statistical Manual 5 th Edition
ExD	Excoriation Disorder
OCD	Obsessive-Compulsive Disorder
SP	Skin Picking
TLC	Trichotillomania Learning Center

CHAPTER I

INTRODUCTION

Body Focused Repetitive Behaviors

Hair pulling, skin picking, and nail biting are symptoms of a group of disorders known as body focused repetitive behaviors (BFRBs) that affect up to 4% of the population (Odlaug & Chamberlain, 2014). Onset of BFRBs typically occurs during adolescence, with females of lower income being predominately affected (Stein, Flessner, Franklin, Keuthen, Lochner, & Woods, 2008). To be formally diagnosed with a BFRB disorder, individuals must endorse all of the following: a) repetitive symptoms of the BFRB resulting in physical consequences (e.g., hair loss, skin lesions) b) attempts to decrease or stop the BFRB, c) resulting distress or impairment, and d) the symptoms cannot be not accounted for by a medical condition or other psychiatric disorder (e.g., substance abuse) (American Psychiatric Association, 2013). Rates of BFRBs differ depending on which diagnostic criteria are applied, as studies have shown that subclinical presentations of BFRBs are more prevalent than clinical presentations. Indeed, Woods et al. (1996) surveyed college students who perform BFRBs, and found that occasional engagement in BFRBs was common (i.e. 3.2% for hair pulling and 10.1% for nail biting), but when a more stringent cutoff toward clinical classifications were placed on the behavior (i.e., engagement in behavior at least 5 times per day), the prevalence of BFRBs significantly decreased (Woods et al., 1996).

Psychosocial and Physical Impairment

When performed excessively, BFRBs result in physical and psychosocial impairment (Tucker et al., 2011; Woods et al., 2006). Patients with TTM, for example, suffer from thinning hair or bald spots on their head while skin pickers develop scars and open lesions (Keuthen et al., 2005).

Research has shown that there is a negative correlation between BFRB symptom severity and relationship satisfaction, perceived social support, and intimacy, and a positive correlation with social anxiety and perceived criticism (Falkenstein & Haaga, 2016). For example, patients with TTM tend to restrict the number of daily activities they participate in, conceal hair loss or open wounds, and develop extreme discomfort in public (Mansueto, 1997). Stemberger et al. (2000) found that most persons with TTM avoid participating in social and interpersonal activities such as being in well-lit areas, going outside, or participating in sexual intimacy. Individuals engaging in skin picking sometimes avoid formal events, group activities, and spend extra money on concealment products to hide lesions and scars (Flessner & Woods, 2006). Nail biters have reported dental complications, infections, and scars on the nail bed resulting in osteomyelitis (infection of the bone) or other physical consequences potentially requiring surgery (Bohne, Keuthen, and Wilhelm, 2005).

Classification of BFRBs

Though the etiological origin of BFRBs remains unclear, research has shown that BFRBs can present in various manifestations (i.e., hair pulling, skin picking, nail biting, cheek biting, etc.) but have similar functions. For instance, Snorrason et al. (2012) reported that hair pulling and skin picking have similar symptom presentation (e.g., removing various parts of the body when imperfections are found). Pulling, picking, and biting also tend to create similar consequences,

such as open wounds and sores that can lead to severe medical problems, including infections (Bohne et al., 2005). In addition, evidence indicates that BFRBs are characterized by similar affective precursors and consequences (e.g., tension prior to pulling/picking, guilt and anger after pulling/picking), related neurocognitive deficits (i.e., inhibitory control) (Snorrason et al., 2012), and shared genetic origins (Snorrason et al., 2012).

BFRBs are grouped under the anxiety spectrum and share many similarities with obsessive-compulsive disorder, and thus have been classified as obsessive-compulsive (OC) spectrum disorders (Stein et al., 2008). The classification of BFRBs as OC-spectrum disorders comes from research indicating high comorbidity between BFRBs and OCD (Richter et al., 2003), as well as similar phenomenology, onset, course, etiology, and response to pharmacological and behavioral treatments (Phillips et al., 2010; Stein et al., 2008). Indeed, like OCD, BFRBs are characterized by compulsive symptoms that are often performed in response to negative affective states and are difficult to resist despite harmful consequences (Keuthen et al., 2005).

Emotional Regulation and BFRBs

According to Mansueto et al. (1997), BFRBs can be conceptualized as learned behaviors that are maintained by various external and internal antecedents and consequences. External factors include settings (i.e., places where pulling occurs) and other contextual cues (i.e. tweezers and mirrors), whereas internal factors include cognitions, emotions, and sensations. Thus, BFRB performance typically follows a pattern of antecedent (i.e., experiencing an urge), engaging in the behavior, and consequences (i.e., relief, reduced anxiety, guilt). Antecedents associated with BFRBs make symptoms more likely to occur, and consequences reinforce symptom

performance. As such, one successful treatment for BFRBs involves interrupting the pathological BFRB reinforcement cycle through habit reversal training (HRT), which involves awareness training, competing response training, and social support (Keuthen, Bohne, Himle, & Woods, 2005). The goals of HRT are to decrease BFRB symptom performance by recognizing BFRB antecedents and developing competing actions that replace the harmful behavior (Keuthen et al., 2005).

Individuals tend to experience negative cognitions and affect prior to symptom performance, as well as feelings of relief while performing the behavior (Diefenbach et al., 2002, 2008; Diefenbach, Tolin, Hannan, Crocetto, & Worhunsky, 2005; Duke, Keeley, Geffken, & Storch, 2010; Hajcak, Franklin, Simmons, & Keuthen, 2006; Stanley et al., 1994; Shusterman et al., 2009). Thus, aversive emotions and negative mood may exacerbate BFRB severity, and BFRBs may function to regulate negative affect (Roberts et al., 2013; Snorrason et al., 2012). Moreover, research suggests that BFRBs are associated with maladaptive emotional regulation, whereby affected individuals tend to avoid aversive emotional experiences by engaging in symptoms (Diefenbach et al., 2008; Roberts et al., 2013; Woods et al., 2001).

Anxiety is one particular affective experience that has consistently been associated with BFRBs. Indeed, BFRBs have long been referred to as “nervous habits” (Woods & Miltenberger, 1996). However, while studies have suggested that while BFRBs are often performed to regulate anxiety, there is mixed evidence as to whether BFRBs are associated with overall increases in trait anxiety (Franklin et al., 2008; Stanley et al., 1992; Woods et al., 2006), meaning that persons with BFRBs might not be inherently anxious. To the contrary, one possibility that would

explain the anxiety-BFRB relationship is that individuals with BFRBs have trouble tolerating anxious experiences. This is supported by research showing that the severity of BFRBs fluctuates significantly around stressful life events (Bohne et al., 2005) and that when anxiety does arise, BFRB symptom performance results in anxiety reduction (Diefenbach, Mouton-Odum, & Stanley, 2002; Snorrason, Smari, & Olafsson, 2011). However, no research has specifically examined how individuals with BFRBs react to anxiety experiences in general.

Anxiety Sensitivity and BFRBs

According to Reiss and McNally's expectancy theory, a high level of anxiety sensitivity (AS), or a fear of one's own experiences, increases the risk for anxiety disorders (Taylor, Koch, & McNally, 1992). AS involves paranoid evaluations of subtle bodily sensations related to anxiety (i.e., increased heart rate, feeling tense), which can lead to amplified beliefs about anticipated motor and psychological consequences, such as a heart attack or negative social evaluation (Taylor et al., 2014). For example, an individual whose palms become sweaty may begin to fear that they may potentially undergo a panic attack, which increases their sympathetic nervous system arousal and thus exacerbates anxious sensations. In addition, anxiety sensitive individuals may focus on their social interactions with others, fearing that they may be humiliated (Taylor et al., 2014). Current treatment for AS involves the use of cognitive-behavior therapy (CBT) (Taylor, 2014). More specifically, the use of interoceptive exposure allows one with AS to acknowledge their bodily sensations under anxiety provoking situations, eventually training them to reduce their anxiety and improve functioning.

Research has shown that AS is significantly associated with symptoms of OCD, panic disorder, and PTSD (Calamari, Rector, Woodard, Cohen, & Chik, 2008; Taylor, 2014). Because BFRBs share similar characteristics with OCD and other anxiety disorders, and research supports the notion of a dysfunctional relationship between anxiety and BFRBs, AS might be a significant component of BFRB symptoms. However, an association between AS and BFRBs has never been examined. This research is important for several reasons. First, the treatment that is most effective for BFRBs, HRT combined with CBT (McGuire et al., 2014), involves techniques designed to help persons with BFRBs better manage their emotions, and could be improved with techniques aimed at AS. If, AS is a component of BFRB psychopathology, then techniques designed to alter the manner in which individuals with BFRBs conceptualize and react to anxiety might be warranted. Indeed, researchers have suggested that developing improved interoceptive awareness and mindfulness of anxiety might improve BFRB symptoms (Twohig, Hayes, & Masuda, 2006). Second, improved conceptualized of BFRB etiology can occur through an understanding of the relationship between AS and BFRB symptomology.

Objective

The objectives of the current study are three-fold: The first objective is to determine whether individuals with BFRBs have a higher rate of AS than those without BFRBs. The second objective is to determine whether AS severity is associated with the severity of BFRB symptoms. Finally, we aim to explore whether any significant differences in AS levels exist between different types of BFRBs. It is hypothesized that those with BFRBs will have a higher rate of AS than the general population, AS severity will correlate with BFRB severity, and there will be no significant differences in AS severity between types of BFRBs.

CHAPTER II

METHODS

Participants

1003 participants were recruited using website advertisements and mailing lists via the Trichotillomania Learning Center (TLC) and the campus-wide listserv at Texas A&M University. Participants were required to be 18-65 years of age and speak English. Exclusion criteria included a) alcohol or substance addiction, and b) certain psychiatric or neurological conditions (e.g., autism spectrum disorder, seizures, catalepsy, encephalitis, Huntington's disease, Parkinson's disease, multiple sclerosis, dementia, extrapyramidal disorders, cerebellar disorders and tremor, myoclonus, eye movement disorders, cranial neuropathies, or other sensory disorders). Of the 1003 individuals who started the study, five individuals were screened out because of exclusionary diagnoses: one for alcohol addiction, one for substance addiction, one for the presence of a psychotic disorder, and two for the presence of neurological disorders.

After exclusion criteria were applied, many participants dropped out of the study for unknown reasons (i.e., fatigue, boredom). A total of 517 persons were included in the study where 166 were healthy controls (did not endorse the presence of any BFRB), 133 were subclinical individuals (endorsed some diagnostic criteria), and 218 were clinical (endorsing all diagnostic criteria). The advertisement on the Trichotillomania Learning Center website and email newsletter stated the script found in Appendix B.

Measures

Participants provided demographic information and completed several self-report questionnaires including diagnostic criteria endorsement and medical history. The following measures were also used:

Anxiety Sensitivity Index-3 (ASI-3) (Taylor et al., 2007) is an 18-item questionnaire that measures fear of anxiety related sensations in three dimensions: physical, social, and cognitive. The responses are formed as levels of agreement with item statements, with each of the item scores ranging from 0 “very little” to 4 “very much”. Total scores range from 0 to 72 with higher scores representing higher levels of AS. Cronbach’s alpha for the total scale is 0.93, with subscales ranging from 0.80 to 0.90, which signifies adequate internal consistency (Taylor et al., 2007).

The Behavior and Symptom Identification Scale (BASIS-32) is a 32-item cross-cutting symptom questionnaire that assesses problems in life functioning and mental health. Each question is rated on a 0 to 4 scale, where 0 represents “no difficulty” and 4 represents “extreme difficulty”. The scores are totaled among 5 different areas involving relation to self/others, daily living, depression/anxiety, impulsive/addiction and psychosis. Test-retest reliability ranged from .65 to .81 for the five subscales (Eisen et al., 1997).

Massachusetts General Hospital-Hairpulling Scale (MGH-HS) (Keuthen et al., 1997) is a 7-item self-report measure for assessing hair pulling severity. The items are scored from a 0 to 4 scale and cover urges to pull, actual pulling, perceived control, and associated distress. A higher total

score reflects greater hair pulling severity. The scale has an internal consistency of 0.89 as well as moderate convergent validity (Keuthen et al., 1997). Modified versions of the MGH-HS were created for the current study to measure severity of nail biting, cheek biting, teeth grinding, and other BFRBs.

Skin Picking Severity Scale (SPS) (Keuthen et al., 2001) is a 6-item assessment of skin picking severity. Each question is rated on a 0 to 4 scale with a total score ranging from 0 to 24. The total of all the individual scores designates overall severity, and a sum higher than 7 represents severe or clinical skin pickers (Keuthen et al., 2001). Internal consistency was 0.80, and evidence shows that the scale possesses moderate convergent validity (Keuthen et al., 2001).

Obsessive Compulsive Inventory-Revised (OCI-R) (Foa et al., 1998) is an 18-item questionnaire of OCD severity that includes 6 subscales: checking, hoarding, neutralizing, obsessing, ordering, and washing. The items are scored on a 5-point scale with scores above 21 indicating the presence of OCD. The scale has good convergent validity, mixed evidence of internal consistency ($\alpha=0.59-0.96$), and adequate test-retest reliability ($r_s = .77-.97$) (Foa et al., 1998).

Procedures

Questionnaires were presented electronically via an online survey. Individuals that endorsed any of the exclusion criteria were screened out immediately. Subjects endorsing the presence of a BFRB were coded according to their endorsement of DSM-5 diagnostic criteria to determine whether they meet criteria for Trichotillomania, Excoriation, or another BFRB Disorder. Individuals assigned to the clinical group had to report engaging in BFRB behavior at least

multiple times during a week (Criterion A), physical consequences of the BFRB (Criterion A), repeated attempts to decrease the behavior (Criterion B), experiencing distress or psychosocial impairment as a result of the BFRB (Criterion C), and no general medical conditions or medications that explained symptoms (Criterion D). Individuals who endorsed the presence of a BFRB but did not endorse all diagnostic criteria were assigned to the subclinical group. Those who met none of the criteria or previously (i.e., more than 2 weeks ago) engaged in BFRB behavior were assigned to the healthy group. The purpose for including persons with subclinical BFRBs in the current study was to examine the relationship between AS and the full dimension of BFRB severity.

Analyses

In order to investigate the first objective, a series of one-way Analyses of Variance (ANOVAs) were conducted with the ASI-3 total score and subscale scores as dependent variables and the experimental group as independent variables. Bonferroni post-hoc tests were used to determine specific differences between the three groups. In addition, because AS is linked to the severity of general anxiety and OCD symptoms, additional one-way ANOVAs were performed with the “anxiety, fear, and panic” item from the BASIS-32 and the OCI-R total score entered as covariates. In order to investigate the second objective, Pearson’s correlations were calculated between the ASI-3 total score and subscale scores and measures of BFRB severity. Finally, in order to explore potential differences in AS between types of BFRBs, a series of independent-samples *t*-test were performed with the ASI-3 total score and subscale scores as dependent variables and presence of Trichotillomania or Excoriation Disorder as the independent variable. Because of limited sample sizes, differences in the other BFRB groups were not examined.

CHAPTER III

RESULTS

The sample consisted of 517 total participants, with 216 clinical individuals ($M_{age}=30.69$), 135 subclinical who endorsed some diagnostic criteria ($M_{age}=25.89$), and 166 healthy controls ($M_{age}=25.14$). Within the sample, 414 were females, 95 were males, and 8 identified as other or did not state a gender. Table 1 shows that a majority of participants identified as White, and the next most prevalent race was Hispanic/Latino. The BFRB most diagnosed in our participants was Hair Pulling at 51.8% of our clinical sample, with Skin Picking as the second most performed BFRB at 47.4%.

Anxiety Severity in Clinical, Subclinical, and Healthy Controls

As can be seen in Table 2, the mean ASI-3 total score obtained in this current study was significantly different between the groups. Post-hoc tests revealed that the clinical group had higher AS than the subclinical and healthy groups, and there was no significant difference between persons with subclinical BFRBs and healthy individuals. In addition, the same differences were observed for the physical, social, and cognitive subscales. These results support the hypothesis that AS is higher in individuals with clinical BFRBs than the general population.

However, to ensure that AS levels were not caused by general increases in overall anxiety and/or obsessive-compulsive symptoms, these constructs were entered into the analyses as covariates. The BASIS-32 item 20 (severity of fear, anxiety, and panic during the past few weeks) was used to ensure that anxiety severity correlated specifically with BFRBs. Results showed that the AS

was still higher among persons with BFRBs in the ASI total and in the cognitive subscale, but results on the social AS scale became marginally significant, and results on the physical ASI subscale became non-significant. This suggests that the presence of BFRB disorders accounts for a greater degree of variance in AS than overall anxiety levels, but only in overall AS and cognitive AS. We also used the OCI-R to determine whether the BFRB and AS relationship would still hold in individuals with comorbid OCD symptoms. Results indicate that cognitive and social AS remained significant, as well as ASI total, and differences in physical AS between experimental groups became marginally significant. As such, comorbid OCD symptoms might partially account for elevated levels of physical AS in persons with BFRBs.

AS Severity vs. BFRB Severity

Table 4 shows Pearson's correlations among the different types of BFRBs and AS levels. The total ASI-3 score correlated significantly with the severity of hair pulling, nail biting, and cheek biting. Physical factors correlated with hair pulling and cheek biting, while the cognitive subscale correlated only with nail biting. The social subscale correlated with hair pulling, skin picking, and nail biting. The results show that AS severity correlates in a nuanced manner with BFRB severity, providing mixed support for the second hypothesis.

AS Across BFRBs

We explored how AS functions amongst specific types of BFRBs by investigating differences between persons with hair pulling and skin picking. As shown in Table 5, results showed that persons with hair pulling and skin picking had no significant differences in total AS or any AS subscale. This represents tentative evidence for similar levels of AS across different types of

BFRBs.

CHAPTER IV

DISCUSSION

The current study investigated the association between AS and persons with BFRBs. Results showed that individuals with clinical BFRBs had higher AS than the general population, with subclinical and healthy individuals showing no distinct differences. In addition, AS severity correlated with BFRB severity, and there were no significant differences in AS between persons with TTM and skin picking.

The presence of comorbid anxiety and OCD did not account for the relationship between overall AS and BFRBs, but did account for significant variance among AS subscales. When the BASIS-32 item surveying fear, anxiety, and panic was entered as a covariate in the analysis, physical and social AS was no longer significantly associated with BFRBs. This suggests that individuals with BFRBs who suffer from comorbid anxiety disorders may have elevated AS in physical and social domains. However, BFRBs may be associated with maladaptive cognitive processes that lead to intolerance of anxiety-related thoughts. When the total OCI-R score was entered as a covariate, results indicated that the cognitive and social subscales remained significantly associated with BFRBs, but the physical subscale was not. There are no clear reasons why physical AS might be accounted for by comorbid OCD symptoms in persons with BFRBs while cognitive AS was not. The opposite might be expected given that OCD is characterized by obsessive thought patterns and not physical symptoms. However, the physical or cosmetic consequences of BFRBs might predispose individuals to social AS. For example, someone with

TTM who has bald spots on the scalp or thinning hair along the eyebrows or eyelashes may fear seeking help from healthcare providers or spending time in public due to fear of ridicule.

The correlation between the different BFRB measures and the AS scale had different areas of significance among the physical, social, and cognitive subscales. The correlation between Social AS and the Skin Picking Severity Scale (SPSS) may be due to the high number of questions about skin picking impairment on the SPSS as compared to the MGH and MGH modified scales. For example, the SPSS had questions such as “How often does picking interfere with social or work functioning?” or “Have you avoided doing anything, going any place, or being with anyone because of your skin picking?” while the MGH scales had more questions about severity of urges and symptoms. This suggests that social AS could be a byproduct of BFRB symptoms. Cognitive AS was associated with nail biting severity, suggesting that individuals with nail biting tend to bite their nails due to anxious thoughts associated with anxiety. The concept of “nervous habit” (Woods et al., 1996) could potentially be applied in this context whereby the individual regulates their cognitive anxiety through nail biting.

Similarities in SP and TTM, as shown through independent-samples *t*-tests, show that there are no differences in AS between these two BFRBs. This suggests that individuals with TTM and Skin Picking may have an underlying relationship that is as similar as previously thought (e.g., Snorrason et al., 2012). Perhaps there is an etiological explanation regarding the environment, genetics, or simply bodily grooming (Snorrason et al., 2012).

Certain methodological limitations were present in the current study that should be addressed in future studies. First, different modified versions of the MGH-HPS were used for hair pulling as well as the other BFRBs, while the SPSS was used for skin picking. The modified versions of the MGH-HPS were not psychometrically validated, but, to our knowledge, no self-report measures of nail biting, cheek biting, and teeth grinding exist. Consistency among these scales, or an overall BFRB severity scale would allow for more accurate measurement of the severity of BFRBs other than TTM and ExD. Second, only one item from the BASIS-32 was used to determine general overall increases in anxiety, while other items encompassing fear, anxiety, and panic could have been measured for reliability purposes. Finally, there was not an ideal way to account for comorbidity of BFRBs among clinical and subclinical individuals. There is a potential sampling issue when persons who have one subclinical BFRB and another clinical BFRB, making it difficult to operationalize overall BFRB severity.

Future research should look at the underlying mechanisms of AS in BFRBs to determine whether a causal relationship exists. Longitudinal research looking at developmental factors in children involving AS would give us a better understanding of the mechanism between etiological causes of AS on BFRBs. In addition, clinical trials should be conducted to test interoceptive exposure techniques involving exposure for anxiety provoking experiences, which aim to improve clients' understanding of their bodily sensations and promote psychological well-being. Furthermore, although this study suggests that physical, social, and cognitive AS is involved in BFRB symptomology, further research into these different underlying mechanisms can be used to enhance our understanding of these multifaceted disorders.

REFERENCES

- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental health Disorders (DSM-5 ®)*. American Psychiatric Pub.
- Bohne, A., Keuthen, N., & Wilhelm, S. (2005). Pathologic hairpulling, skin picking, and nail biting. *Annals of Clinical Psychiatry, 17*, 227-232.
- Calamari, J. E., Rector, N. A., Woodard, J. L., Cohen, R. J., & Chik, H. M. (2008). Anxiety sensitivity and obsessive—compulsive disorder. *Assessment, 15*, 351-363.
- Diefenbach, G. J., Mouton-Odum, S., & Stanley, M. A. (2002). Affective correlates of trichotillomania. *Behaviour Research and Therapy, 40*, 1305-1315.
- Diefenbach, G. J., Tolin, D. F., Meunier, S., & Worhunsky, P. (2008). Emotion regulation and trichotillomania: A comparison of clinical and nonclinical hair pulling. *Journal of Behavior Therapy and Experimental Psychiatry, 39*, 32-41.
- Duke, D. C., Keeley, M. L., Geffken, G. R., & Storch, E. A. (2010). Trichotillomania: a current review. *Clinical Psychology Review, 30*, 181-193.
- Falkenstein, M. J., & Haaga, D. A. (2016). Symptom accommodation, trichotillomania-by-proxy, and interpersonal functioning in trichotillomania (hair-pulling disorder). *Comprehensive psychiatry, 65*, 88-97.
- Franklin, M. E., Flessner, C. A., Woods, D. W., Keuthen, N. J., Piacentini, J. C., Moore, P., ... & Board, T. L. C. S. A. (2008). The child and adolescent trichotillomania impact project: descriptive psychopathology, comorbidity, functional impairment, and treatment utilization. *Journal of Developmental & Behavioral Pediatrics, 29*, 493-500.
- Flessner, C. A., & Woods, D. W. (2006). Phenomenological characteristics, social problems, and the economic impact associated with chronic skin picking. *Behavior Modification, 30*, 944-963.
- Hajcak, G., Franklin, M. E., Simons, R. F., & Keuthen, N. J. (2006). Hairpulling and skin picking in relation to affective distress and obsessive-compulsive symptoms. *Journal of Psychopathology and Behavioral Assessment, 28*, 177-185.
- Keuthen, N. J., O'Sullivan, R. L., Hayday, C. F., Peets, K. E., Jenike, M. A., & Baer, L. (1997). The relationship of menstrual cycle and pregnancy to compulsive hairpulling. *Psychotherapy and psychosomatics, 66*, 33-37.
- Keuthen, N. J., Wilhelm, S., Deckersbach, T., Engelhard, I. M., Forker, A. E., Baer, L., & Jenike, M. A. (2001). The Skin Picking Scale: scale construction and psychometric analyses.

- Journal of Psychosomatic Research*, 50, 337-341.
- Keuthen, N. J., Bohne, A., Himle, M., & Woods, D. W. (2005). Advances in the conceptualization and treatment of body-focused repetitive behaviors. *Obsessive Compulsive Disorder Research*, 1, 1-29.
- Mansueto, C. S., Stemberger, R. M. T., Thomas, A. M., & Golomb, R. G. (1997). Trichotillomania: A comprehensive behavioral model. *Clinical psychology review*, 17, 567-577.
- McGuire, J. F., Ung, D., Selles, R. R., Rahman, O., Lewin, A. B., Murphy, T. K., & Storch, E. A. (2014). Treating trichotillomania: A meta-analysis of treatment effects and moderators for behavior therapy and serotonin reuptake inhibitors. *Journal of psychiatric research*, 58, 76-83.
- Odlaug, B. L., Chamberlain, S. R., Derbyshire, K. L., Leppink, E. W., & Grant, J. E. (2014). Impaired response inhibition and excess cortical thickness as candidate endophenotypes for trichotillomania. *Journal of psychiatric research*, 59, 167-173.
- Phillips, K. A., Stein, D. J., Rauch, S. L., Hollander, E., Fallon, B. A., Barsky, A., ... & Wilhelm, S. (2010). Should an obsessive–compulsive spectrum grouping of disorders be included in DSM-V?. *Depression and anxiety*, 27, 528-555.
- Richter, M. A., Summerfeldt, L. J., Antony, M. M., & Swinson, R. P. (2003). Obsessive–compulsive spectrum conditions in obsessive-compulsive disorder and other anxiety disorders. *Depression and anxiety*, 18, 118-127.
- Roberts, S., O'Connor, K., & Bélanger, C. (2013). Emotion regulation and other psychological models for body-focused repetitive behaviors. *Clinical psychology review*, 33, 745-762.
- Snorrason, Í., Smári, J., & Ólafsson, R. P. (2011). Motor inhibition, reflection impulsivity, and trait impulsivity in pathological skin picking. *Behavior therapy*, 42, 521-532.
- Snorrason, I., Belleau, E. L., & Woods, D. W. (2012). How related are hair pulling disorder (trichotillomania) and skin picking disorder? A review of evidence for comorbidity, similarities and shared etiology. *Clinical Psychology Review*, 32, 618-629.
- Stanley, M. A., Swann, A. C., Bowers, T. C., Davis, M. L., & Taylor, D. J. (1992). A comparison of clinical features in trichotillomania and obsessive-compulsive disorder. *Behaviour Research and Therapy*, 30(1), 39-44.
- Stanley, M. A., Borden, J. W., Bell, G. E., & Wagner, A. L. (1994). Nonclinical hair pulling: phenomenology and related psychopathology. *Journal of Anxiety Disorders*, 8, 119-130.
- Shusterman, A., Feld, L., Baer, L., & Keuthen, N. (2009). Affective regulation in trichotillomania: evidence from a large-scale internet survey. *Behaviour Research and Therapy*, 47, 637–644.

- Stein, D. J., Flessner, C. A., Franklin, M., Keuthen, N. J., Lochner, C., & Woods, D. W. (2008). Is trichotillomania a stereotypic movement disorder? An analysis of body-focused repetitive behaviors in people with hair-pulling. *Annals of Clinical Psychiatry, 20*, 194-198.
- Stemberger, R. M. T., Thomas, A. M., Mansueto, C. S., & Carter, J. G. (2000). Personal toll of trichotillomania: Behavioral and interpersonal sequelae. *Journal of Anxiety Disorders, 14*, 97-104.
- Taylor, S., Koch, W. J., & McNally, R. J. (1992). How does anxiety sensitivity vary across the anxiety disorders?. *Journal of anxiety disorders, 6*(3), 249-259.
- Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., ... & Coles, M. (2007). Robust dimensions of anxiety sensitivity: development and initial validation of the Anxiety Sensitivity Index-3. *Psychological assessment, 19*, 176.
- Taylor, S. (2014). *Anxiety sensitivity: Theory, research, and treatment of the fear of anxiety*. Routledge.
- Tucker, B. T., Woods, D. W., Flessner, C. A., Franklin, S. A., & Franklin, M. E. (2011). The skin picking impact project: phenomenology, interference, and treatment utilization of pathological skin picking in a population-based sample. *Journal of Anxiety Disorders, 25*, 88-95.
- Twohig, M. P., Hayes, S. C., & Masuda, A. (2006). A preliminary investigation of acceptance and commitment therapy as a treatment for chronic skin picking. *Behaviour Research and Therapy, 44*, 1513-1522.
- Wetterneck, C. T., Woods, D. W., Norberg, M. M., & Begotka, A. M. (2006). The social and economic impact of trichotillomania: results from two nonreferred samples. *Behavioral Interventions, 21*, 97-109.
- Woods, D. W., & Miltenberger, R. G. (1996). Are persons with nervous habits nervous? A preliminary examination of habit function in a nonreferred population. *Journal of Applied Behavior Analysis, 29* 259-261.
- Woods, D. W., Wetterneck, C. T., & Flessner, C. A. (2006). A controlled evaluation of acceptance and commitment therapy plus habit reversal for trichotillomania. *Behaviour research and therapy, 44*, 639-656.

APPENDIX A

The advertisement on the Trichotillomania Learning Center website and email newsletter stated the following:

“Do you or your child suffer from Trichotillomania? Or, do you or your child engage in other body-focused repetitive behaviors (BFRBs) such as skin picking, nail biting, or cheek biting?”

The Department of Psychology at Texas A&M University is conducting an online psychology study that aims to better understand Trichotillomania, BFRBs, and related conditions. If you are an adult who has Trichotillomania or performs BFRBs, you can participate in the study. Or, if you have a child or adolescent who has Trichotillomania or performs BFRBs and is between the ages of 7-17, your child can participate in the study. Parents must be present in order to provide permission for their child to participate, and parents will be asked to fill out several questionnaires along with their children.”

APPENDIX B

I. Demographics

How Old Are You?

- 6 years old or less
- Between 7 and 17
- 18 years of age or older

What is your date of birth?

- Month
- Day
- Year

Are you fluent in English?

- Yes
- No

Are you addicted to alcohol?

- Yes
- No

Are you addicted to any drugs or medicines?

- Yes
- No

Have you been diagnosed with any of the following conditions?

- Autism Spectrum Disorder
- Psychotic Disorder (e.g. schizophrenia, delusional disorder)
- Any neurological disorder (e.g. autism spectrum disorder, seizures, catalepsy, encephalitis, Huntington's disease, Parkinson's disease, multiple sclerosis, dementia, extrapyramidal disorders, cerebellar disorders and tremor, myoclonus, eye movement disorders, cranial neuropathies, or other sensory disorders).
- If yes, please describe

What is your gender?

- Male
- Female
- Male to female transgender
- Female to male transgender
- Other (please specify)
- Gender nonconforming
- Not sure
- Prefer not to say

Do you consider yourself Hispanic or Latino?

- Yes
- No

What race do you consider yourself to be?

- White
- Black or African American
- American Indian or Alaska Native
- Native Hawaiian or Other Pacific Islander
- Other (please specify)

II. Diagnostic Criteria: Body-Focused Repetitive Behaviors

A body-focused repetitive behavior is a compulsive habit directed at one's body that causes physical injury or damage to physical appearance. Examples of body-focused repetitive behaviors include hair pulling, skin picking, nail biting, and cheek biting. The following section will determine whether you engage in any of these behaviors.

Please answer the following questions:

Do you ever pull or pluck hair for non-cosmetic reasons (or pull excessively for cosmetic reasons)? Yes No [If yes, route to hair pulling diagnostic criteria]

Do you ever pick or scratch at your skin (other than occasionally scratching an itch)?
Yes No [If yes, route to skin picking diagnostic criteria]

Do you ever bite your fingernails? Yes No [If yes, route to nail biting diagnostic criteria]

Do you ever bite repeatedly or chew on your mouth, lips, or cheeks? Yes No [If yes, route to cheek biting diagnostic criteria]

Do you ever grind your teeth while you are awake? Yes No [If yes, route to teeth grinding diagnostic criteria]

Do you ever perform any other body-focused repetitive behaviors, such as skin biting, nail picking, lip licking, or thumb sucking? Yes No [If yes on any, route to Other BFRB diagnostic criteria section]

If yes, which one?

Yes – Skin Biting

Yes – Nail Picking

Yes – Lip Licking

Yes – Thumb Sucking

Hair Pulling Diagnostic Criteria

Have you ever been diagnosed with Trichotillomania by a medical professional? Yes No

Where do you pull hair from? (Check all that apply)

Scalp, Eyelashes, Eyebrows, Pubic Hair, Mustache, Beard, Trunk, Armpits, Arms, Legs,
Other_____

How often do you pull your hair? (please choose the best answer, on average, for you)

Less than once a week Several times a week 1-4 times a day 5 or more times a day

Have you pulled out your hair to the point of experiencing hair loss (i.e., bald spots or thinning of the hair)? Yes No

How long have you been pulling your hair? < 1 month 1 month to 6 months 6 months to 1 year > 1 year

How old were you when you started pulling your hair? _____years

Does hair pulling cause you distress, anxiety, or embarrassment? Yes No

Does hair pulling negatively impact you physically, socially, occupationally, academically, at home, or in some other important way? Yes No

Have you attempted to decrease or stop pulling hair? Yes No

Does your hair pulling only occur while you are under the influence of a substance (e.g., medication or drugs) or is it performed in response to a dermatological condition? Yes No

Skin Picking Diagnostic Criteria

Have you ever been diagnosed with Excoriation disorder by a medical professional?

What areas of your body do you pick skin from?

Face, Arms, Shoulders, Back, Chest, Fingers, Legs, Toes, Stomach, Other_____

How often do you pick at your skin? (please choose the best answer, on average, for you)

Less than once a week Several times a week 1-4 times a day 5 or more times a day

Have you ever picked at your skin to the point of having skin lesions [irritation or bleeding]?
Yes No

How long have you been picking your skin? < 1 month 1 month to 6 months 6 months to 1 year > 1 year

How old were you when you started picking your skin? _____years

Does your skin picking cause you distress, anxiety, or embarrassment? Yes No

Does your skin picking negatively impact you physically, socially, occupationally, academically, at home, or in some other important way? Yes No

Have you attempted to decrease or stop your skin picking? Yes No

Does your skin picking only occur while you are under the influence of a substance (e.g., medication or drugs) or is it performed in response to a medical condition (e.g., scabies, eczema, psoriasis)? Yes No

Nail Biting Diagnostic Criteria

How often do you bite your nails? (please choose the best answer, on average, for you)

Less than once a week Several times a week 1-4 times a day 5 or more times a day

Have you ever bitten your nails to the point of experiencing physical damage (e.g., extremely short nails, bleeding, removed nails, infections, teeth problems)? Yes No

How long have you been biting your nails? < 1 month 1 month to 6 months 6 months to 1 year > 1 year

How old were you when you started biting your nails? _____years

Does nail biting cause you distress, anxiety, or embarrassment? Yes No

Does nail biting negatively impact you physically, socially, occupationally, academically, at home, or in some other important way? Yes No

Have you attempted to decrease or stop nail biting? Yes No

Does your nail biting only occur while you are under the influence of a substance (e.g., medication or drugs) or is it performed in response to a dermatological condition? Yes No

Cheek Biting Diagnostic Criteria

How often do you bite or chew on your cheeks? (please choose the best answer, on average, for you)

Less than once a week Several times a week 1-4 times a day 5 or more times a day

Have you ever bitten your cheek or lip to the point of injury (i.e., having bleeding or scar tissue develop)? Yes No

How long have you been biting your cheeks or lips? < 1 month 1 month to 6 months 6 months to 1 year > 1 year

How old were you when you started biting your cheeks/lips? _____years

Does cheek/lip biting cause you distress, anxiety, or embarrassment? Yes No

Does cheek/lip biting negatively impact you physically, socially, occupationally, academically, at home, or in some other important way? Yes No

Have you attempted to decrease or stop cheek/lip biting? Yes No

Does your cheek/lip biting only occur while you are under the influence of a substance (e.g., medication or drugs) or is it performed in response to a medical condition? Yes No

Teeth Grinding Diagnostic Criteria

How often do you grind your teeth? (please choose the best answer, on average, for you)

Less than once a week Several times a week 1-4 times a day 5 or more times a day

Have you ever ground your teeth to the point of experiencing physical consequences or pain (i.e., dental problems)? Yes No

How long have you been grinding your teeth? < 1 month 1 month to 6 months 6 months to 1 year > 1 year

How old were you when you started grinding your teeth? _____ years

Does teeth grinding cause you distress, anxiety, or embarrassment? Yes No

Does teeth grinding negatively impact you physically, socially, occupationally, academically, at home, or in some other important way? Yes No

Have you attempted to decrease or stop teeth grinding? Yes No

Does your teeth grinding only occur while you are under the influence of a substance (e.g., medication or drugs) or is it performed in response to a medical condition? Yes No

Other BFRB Diagnostic Criteria

Please answer the following questions for the other body-focused repetitive behavior (BFRB) in which you endorsed (e.g., skin biting, nail picking, lip licking, or thumb sucking). If you endorsed more than one, please answer for the one that is the most severe.

Which BFRB are you answering for?

Skin Biting

Nail Picking

Lip Licking

Thumb Sucking

Other: _____

How often do you perform this other BFRB? (please choose the best answer, on average, for you)

Less than once a week Several times a week 1-4 times a day 5 or more times a day

Have you ever performed this BFRB to the point of having physical consequences (i.e., bleeding, scarring, skin irritation)? Yes No

How long have you been performing this BFRB? < 1 month 1 month to 6 months 6 months to 1 year > 1 year

How old were you when you started performing this BFRB? _____years

Does this BFRB cause you distress, anxiety, or embarrassment? Yes No

Does this BFRB negatively impact you physically, socially, occupationally, academically, at home, or in some other important way? Yes No

Have you attempted to decrease or stop doing this BFRB? Yes No

Does this BFRB only occur while you are under the influence of a substance (e.g., medication or drugs) or is it performed in response to a medical condition? Yes No

III. MGH Hairpulling Scale

Instructions: For each question, pick the one statement in that group which best describes your behaviors and/or feelings over the past week. If you have been having ups and downs, try to estimate an average for the past week. Be sure to read all of the statements in each group before making your choice.

For the next three questions, rate only the urges to pull your hair.

1. Frequency of urges. On an average day, how often did you feel the urge to pull your hair?
 - 0 This week I felt no urges to pull my hair.
 - 1 This week I felt an occasional urge to pull my hair.
 - 2 This week I felt an urge to pull my hair often.
 - 3 This week I felt an urge to pull my hair very often.
 - 4 This week I felt near constant urges to pull my hair.
2. Intensity of urges. On an average day, how intense or 'strong' were the urges to pull your hair?
 - 0 This week I did not feel any urges to pull my hair
 - 1 This week I felt mild urges to pull my hair
 - 2 This week I felt moderate urges to pull my hair
 - 3 This week I felt severe urges to pull my hair.
 - 4 This week I felt extreme urges to pull my hair.
3. Ability to control the urges. On an average day, how much control do you have over the urges to pull your hair?
 - 0 This week I could always control the urges, or I did not feel urges to pull my hair.
 - 1 This week I was able to distract myself from the urges to pull my hair most of the time.
 - 2 This week I was able to distract myself from the urges to pull my hair some of the time.
 - 3 This week I was able to distract myself from the urges to pull my hair rarely.
 - 4 This week I was never able to distract myself from the urges to pull my hair.

For the next three questions, rate only the actual hairpulling

4. Frequency of hairpulling. On an average day, how often did you actually pull your hair?
 - 0 This week I did not pull my hair.
 - 1 This week I pulled my hair occasionally.

- 2 This week I pulled my hair often.
 - 3 This week I pulled my hair very often.
 - 4 This week I pulled my hair so often it felt like I was always doing it.
5. Attempts to resist hairpulling. On an average day, how often did you make an attempt to stop yourself from actually pulling your hair?
- 0 This week I felt no urges to pull my hair.
 - 1 This week I tried to resist the urge to pull my hair almost all of the time.
 - 2 This week I tried to resist the urge to pull my hair some of the time.
 - 3 This week I tried to resist the urge to pull my hair rarely.
 - 4 This week I never tried to resist the urge to pull my hair.
6. Control over hairpulling. On an average day, how often were you successful at actually stopping yourself from pulling your hair?
- 0 This week I did not pull my hair.
 - 1 This week I was able to resist pulling my hair almost all of the time
 - 2 This week I was able to resist pulling my hair most of the time.
 - 3 This week I was able to resist pulling my hair some of the time.
 - 4 This week I was rarely able to resist pulling my hair.

For the last question, rate the consequences of your hairpulling

7. Associated distress. Hairpulling can make some people feel moody, 'on edge', or sad. During the past week, how uncomfortable did your hairpulling make you feel?
- 0 This week I did not feel uncomfortable about my hairpulling.
 - 1 This week I felt vaguely uncomfortable about my hairpulling.
 - 2 This week I felt noticeably uncomfortable about my hairpulling.
 - 3 This week I felt significantly uncomfortable about my hairpulling.
 - 4 This week I felt intensely uncomfortable about my hairpulling.

IV. SPSS

For each item, pick the one answer which best describes the past week. If you have been having ups and downs, try to estimate an average for the past week. Please be sure to read all answer choices in each group before making circling your answer.

1. How often do you feel the urge to pick your skin?

- 0 No urges
- 1 Mild, occasionally experience urges to skin pick, less than 1hr/day
- 2 Moderate, often experience urges to skin picking, 1-3 hrs/day
- 3 Severe, very often experience urges to skin pick, greater than 3 and up to 8 hrs/day
- 4 Extreme, constantly or almost always have an urge to skin pick

2. How intense or “strong” are the urges to pick your skin?

- 0 Minimal or none
- 1 Mild
- 2 Moderate
- 3 Severe
- 4 Extreme

3. How much time do you spend picking your skin? How frequently does it occur? How much longer than most people does it take you to complete routine activities because of your picking?

- 0 None
- 1 Mild, spend less than 1 hr/day picking my skin, or occasional skin picking
- 2 Moderate, spend 1-3 hrs/day picking my skin, or frequent skin picking
- 3 Severe, spend more than 3 and up to 8 hrs/day picking my skin, or very frequent skin picking
- 4 Extreme, spend more than 8 hrs/day picking my skin, or near constant skin picking

4. How much does your skin picking interfere with your social or work (or role) functioning? (If currently not working determine how much your performance would be affected if you were employed.)

- 0 None
- 1 Mild, slight interference with social or occupational
- 2 Moderate, definite interference with social or occupational performance, but still manageable
- 3 Severe, causes substantial impairment in social or occupational performance
- 4 Extreme, incapacitating

5. How much distress do you experience as a result of your skin picking? How would you feel if prevented from picking your skin? How anxious would you become?

- 0 None
- 1 Mild, only slightly anxious if skin picking prevented, or only slight anxiety during skin picking
- 2 Moderate, anxiety would mount but remain manageable if skin picking prevented, or anxiety increases to manageable levels during skin picking
- 3 Severe, prominent and very disturbing increase in anxiety if skin picking is interrupted, or prominent and very disturbing increase in anxiety during skin picking
- 4 Extreme, incapacitating anxiety from any intervention aimed at modifying activity, or incapacitating anxiety develops during skin picking

6. Have you been avoiding doing anything, going any place, or being with anyone because of your skin picking? If yes, then how much do you avoid?

- 0 None
- 1 Mild, occasional avoidance in social or work settings
- 2 Moderate, frequent avoidance in social or work settings
- 3 Severe, very frequent avoidance in social or work settings
- 4 Extreme, avoid all social and work settings as a result of the skin picking

V. MGH-adapted Cheek Biting Scale

Instructions: For each question, pick the one statement in that group which best describes your behaviors and/or feelings over the past week. If you have been having ups and downs, try to estimate an average for the past week. Be sure to read all of the statements in each group before making your choice.

For the next three questions, rate only the urges to bite your cheek.

1. Frequency of urges. On an average day, how often did you feel the urge to bite your cheek?
 - 0 This week I felt no urges to bite my cheek.
 - 1 This week I felt an occasional urge to bite my cheek.
 - 2 This week I felt an urge to bite my cheek often.
 - 3 This week I felt an urge to bite my cheek very often.
 - 4 This week I felt near constant urges to bite my cheek.
2. Intensity of urges. ON an average day, how intense or 'strong' were the urges to bite your cheek?
 - 0 This week I did not feel any urges to bite my cheek.
 - 1 This week I felt mild urges to bite my cheek.
 - 2 This week I felt moderate urges to bite my cheek.
 - 3 This week I felt severe urges to bite my cheek.
 - 4 This week I felt extreme urges to bite my cheek.
3. Ability to control the urges. On an average day, how much control do you have over the urges to bite your cheek?
 - 0 This week I could always control the urges, or I did not feel urges to bite my cheek.
 - 1 This week I was able to distract myself from the urges to bite my cheek most of the time.
 - 2 This week I was able to distract myself from the urges to bite my cheek some of the time.
 - 3 This week I was able to distract myself from the urges to bite my cheek rarely.
 - 4 This week I was never able to distract myself from the urges to bite my cheek.

For the next three questions, rate only the actual cheek biting.

4. Frequency of cheek biting. On an average day, how often did you actually bite your cheek?
 - 0 This week I did not bite my cheek.
 - 1 This week I bit my cheek occasionally.
 - 2 This week I bit my cheek often.
 - 3 This week I bit my cheek very often.

- 4 This week I bit my cheek so often it felt like I was always doing it.
5. Attempts to resist cheek biting. On an average day, how often did you make an attempt to stop yourself from actually biting your cheek?
 - 0 This week I felt no urges to bite my cheek.
 - 1 This week I tried to resist the urge to bite my cheek almost all of the time.
 - 2 This week I tried to resist the urge to bite my cheek some of the time.
 - 3 This week I tried to resist the urge to bite my cheek rarely.
 - 4 This week I never tried to resist the urge to bite my cheek.
6. Control over cheek biting. On an average day, how often were you successful at actually stopping yourself from biting your cheek?
 - 0 This week I did not bite my cheek.
 - 1 This week I was able to resist biting my cheek almost all of the time
 - 2 This week I was able to resist biting my cheek most of the time.
 - 3 This week I was able to resist biting my cheek some of the time.
 - 4 This week I was rarely able to resist biting my cheek.

For the last question, rate the consequences of your cheek biting.

7. Associated distress. Cheek biting can make some people feel moody, 'on edge', or sad. During the past week, how uncomfortable did your cheek biting make you feel?
 - 0 This week I did not feel uncomfortable about my cheek biting.
 - 1 This week I felt vaguely uncomfortable about my cheek biting.
 - 2 This week I felt noticeably uncomfortable about my cheek biting.
 - 3 This week I felt significantly uncomfortable about my cheek biting.
 - 4 This week I felt intensely uncomfortable about my cheek biting.

VI. MGH-adapted Nail Biting Scale

Instructions: For each question, pick the one statement in that group which best describes your behaviors and/or feelings over the past week. If you have been having ups and downs, try to estimate an average for the past week. Be sure to read all of the statements in each group before making your choice.

For the next three questions, rate only the urges to bite your nails.

1. Frequency of urges. On an average day, how often did you feel the urge to bite your nails?
 - 0 This week I felt no urges to bite my nails.
 - 1 This week I felt an occasional urge to bite my nails.
 - 2 This week I felt an urge to bite my nails often.
 - 3 This week I felt an urge to bite my nails very often.
 - 4 This week I felt near constant urges to bite my nails.
2. Intensity of urges. ON an average day, how intense or 'strong' were the urges to bite your nails?
 - 0 This week I did not feel any urges to bite my nails.
 - 1 This week I felt mild urges to bite my nails.
 - 2 This week I felt moderate urges to bite my nails.
 - 3 This week I felt severe urges to bite my nails.
 - 4 This week I felt extreme urges to bite my nails.
3. Ability to control the urges. On an average day, how much control do you have over the urges to bite your nails?
 - 0 This week I could always control the urges, or I did not feel urges to bite my nails.
 - 1 This week I was able to distract myself from the urges to bite my nails most of the time.
 - 2 This week I was able to distract myself from the urges to bite my nails some of the time.
 - 3 This week I was able to distract myself from the urges to bite my nails rarely.
 - 4 This week I was never able to distract myself from the urges to bite my nails.

For the next three questions, rate only the actual nail biting.

4. Frequency of nail biting. On an average day, how often did you actually bite your nails?
 - 0 This week I did not bite my nails.
 - 1 This week I bit my nails occasionally.
 - 2 This week I bit my nails often.
 - 3 This week I bit my nails very often.
 - 4 This week I bit my nails so often it felt like I was always doing it.

5. Attempts to resist nail biting. On an average day, how often did you make an attempt to stop yourself from actually biting your nails?
 - 0 This week I felt no urges to bite my nails.
 - 1 This week I tried to resist the urge to bite my nails almost all of the time.
 - 2 This week I tried to resist the urge to bite my nails some of the time.
 - 3 This week I tried to resist the urge to bite my nails rarely.
 - 4 This week I never tried to resist the urge to bite my nails.
6. Control over nail biting. On an average day, how often were you successful at actually stopping yourself from biting your nails?
 - 0 This week I did not bite my nails.
 - 1 This week I was able to resist biting my nails almost all of the time
 - 2 This week I was able to resist biting my nails most of the time.
 - 3 This week I was able to resist biting my nails some of the time.
 - 4 This week I was rarely able to resist biting my nails.

For the last question, rate the consequences of your nail biting.

7. Associated distress. Nail biting can make some people feel moody, 'on edge', or sad. During the past week, how uncomfortable did your nail biting make you feel?
 - 0 This week I did not feel uncomfortable about my nail biting.
 - 1 This week I felt vaguely uncomfortable about my nail biting.
 - 2 This week I felt noticeably uncomfortable about my nail biting.
 - 3 This week I felt significantly uncomfortable about my nail biting.
 - 4 This week I felt intensely uncomfortable about my nail biting.

VII. MGH-adapted Other BFRB scale

Instructions: For each question, pick the one statement in that group which best describes your behaviors and/or feelings over the past week. If you have been having ups and downs, try to estimate an average for the past week. Be sure to read all of the statements in each group before making your choice.

What is your body focused repetitive behavior? _____

For the next three questions, rate only the urges to perform this behavior.

1. Frequency of urges. On an average day, how often did you feel the urge to do this behavior?
 - 0 This week I felt no urges to do this behavior.
 - 1 This week I felt an occasional urge to do this behavior.
 - 2 This week I felt an urge to do this behavior often.
 - 3 This week I felt an urge to do this behavior very often.
 - 4 This week I felt near constant urges to do this behavior.
2. Intensity of urges. ON an average day, how intense or 'strong' were the urges to do this behavior?
 - 0 This week I did not feel any urges to do this behavior.
 - 1 This week I felt mild urges to do this behavior.
 - 2 This week I felt moderate urges to do this behavior.
 - 3 This week I felt severe urges to do this behavior.
 - 4 This week I felt extreme urges to do this behavior.
3. Ability to control the urges. On an average day, how much control do you have over the urges to do this behavior?
 - 0 This week I could always control the urges, or I did not feel urges to do this behavior.
 - 1 This week I was able to distract myself from the urges to do this behavior most of the time.
 - 2 This week I was able to distract myself from the urges to do this behavior some of the time.
 - 3 This week I was able to distract myself from the urges to do this behavior rarely.
 - 4 This week I was never able to distract myself from the urges to do this behavior.

For the next three questions, rate only the actual behavior.

4. Frequency of the behavior. On an average day, how often did you actually do this behavior?
 - 0 This week I did not do this behavior.
 - 1 This week I did this behavior occasionally.

- 2 This week I did this behavior often.
 - 3 This week I did this behavior very often.
 - 4 This week I did this behavior so often it felt like I was always doing it.
5. Attempts to resist doing the behavior. On an average day, how often did you make an attempt to stop yourself from actually doing this behavior?
- 0 This week I felt no urges to do this behavior.
 - 1 This week I tried to resist the urge to do this behavior almost all of the time.
 - 2 This week I tried to resist the urge to do this behavior some of the time.
 - 3 This week I tried to resist the urge to do this behavior rarely.
 - 4 This week I never tried to resist the urge to do this behavior.
6. Control over the behavior. On an average day, how often were you successful at actually stopping yourself from doing this behavior?
- 0 This week I did not do this behavior.
 - 1 This week I was able to resist doing this behavior almost all of the time
 - 2 This week I was able to resist doing this behavior most of the time.
 - 3 This week I was able to resist doing this behavior some of the time.
 - 4 This week I was rarely able to resist doing this behavior.

For the last question, rate the consequences of your behavior.

7. Associated distress. Body focused repetitive behaviors can make some people feel moody, 'on edge', or sad. During the past week, how uncomfortable did your behavior make you feel?
- 0 This week I did not feel uncomfortable about my behavior.
 - 1 This week I felt vaguely uncomfortable about my behavior.
 - 2 This week I felt noticeably uncomfortable about my behavior.
 - 3 This week I felt significantly uncomfortable about my behavior.
 - 4 This week I felt intensely uncomfortable about my behavior.

VIII. Anxiety Sensitivity Index-3

ASI

Below you will find a list of statements. Please indicate how concerned you are about each possible situation happening in your daily life.



	Circle one number on each line
	Very little.....Very much
It is important for me not to appear nervous	0 ___ 1 ___ 2 ___ 3 ___ 4
When I cannot keep my mind on task, I worry that I might be going crazy	0 ___ 1 ___ 2 ___ 3 ___ 4
It scares me when my heart beats rapidly	0 ___ 1 ___ 2 ___ 3 ___ 4
When my stomach is upset, I worry that I might be seriously ill	0 ___ 1 ___ 2 ___ 3 ___ 4
It scares me when I am unable to keep my mind on a task	0 ___ 1 ___ 2 ___ 3 ___ 4
When I tremble in the presence of others, I fear what people might think of me	0 ___ 1 ___ 2 ___ 3 ___ 4
When my chest feels tight, I get scared that I won't be able to breathe properly	0 ___ 1 ___ 2 ___ 3 ___ 4
When I feel pain in my chest, I worry that I'm going to have a heart attack	0 ___ 1 ___ 2 ___ 3 ___ 4
I worry that other people will notice my anxiety	0 ___ 1 ___ 2 ___ 3 ___ 4
When I feel "spacey" or spaced out I worry that I may be mentally ill	0 ___ 1 ___ 2 ___ 3 ___ 4
It scares me when I blush in front of people	0 ___ 1 ___ 2 ___ 3 ___ 4
When I notice my heart skipping a beat, I worry that there is something seriously wrong with me	0 ___ 1 ___ 2 ___ 3 ___ 4
When I begin to sweat in a social situation, I fear people will think negatively of me	0 ___ 1 ___ 2 ___ 3 ___ 4
When my thoughts seem to speed up, I worry that I might be going crazy	0 ___ 1 ___ 2 ___ 3 ___ 4
When my throat feels tight, I worry that I could choke to death	0 ___ 1 ___ 2 ___ 3 ___ 4
When I have trouble thinking clearly, I worry that there is something wrong with me	0 ___ 1 ___ 2 ___ 3 ___ 4
I think it would be horrible for me to faint in public	0 ___ 1 ___ 2 ___ 3 ___ 4
When my mind goes blank, I worry there is something terribly wrong with me	0 ___ 1 ___ 2 ___ 3 ___ 4

IX. Behavior and Symptom Identification Scale

|BASIS-32

Below is a list of problems and areas of life functioning in which some people experience difficulties. Using the scale below, fill in the line with the answer that best describes how much difficulty you have been having in each area **DURING THE PAST WEEK**.

0-----1-----2-----3-----4

No Difficulty A Little Difficulty Moderate Difficulty Quite a Bit of Difficulty Extreme Difficulty

Please answer each item. **Do not leave any blank.**

IN THE PAST WEEK, how much difficulty have you been having in the area of:

____ 1) Managing day-to-day life. (For example, getting places on time, handling money, making everyday decisions)

____ 2) Household responsibilities. (For example, shopping, cooking, laundry, cleaning, other chores)

____ 3) Work. (For example, completing tasks, performance level, finding/keeping a job)

____ 4) School. (For example, academic performance, completing assignments, attendance)

____ 5) Leisure time or recreational activities.

____ 6) Adjusting to major life stresses. (For example, separation, divorce, moving, new job, new school, a death)

____ 7) Relationships with family members.

____ 8) Getting along with people outside of the family.

____ 9) Isolation or feelings of loneliness.

____ 10) Being able to feel close to others.

____ 11) Being realistic about yourself or others.

____ 12) Recognizing and expressing emotions appropriately.

____ 13) Developing independence, autonomy.

____ 14) Goals or direction in life.

____ 15) Lack of self-confidence, feeling bad about yourself.

____ 16) Apathy, lack of interest in things.

____ 17) Depression, hopelessness.

____ 18) Suicidal feelings or behavior.

- _____ 19) Physical symptoms (For example, headaches, aches and pains, sleep disturbances, stomach aches, dizziness)
- _____ 20) Fear, anxiety, or panic.
- _____ 21) Confusion, concentration, memory.
- _____ 22) Disturbing or unreal thoughts or beliefs.
- _____ 23) Hearing voices, seeing things.
- _____ 24) Manic, bizarre behavior.
- _____ 25) Mood swings, unstable moods.
- _____ 26) Uncontrollable, compulsive behavior (For example, eating disorder, hand-washing, hurting yourself)
- _____ 27) Sexual activity or preoccupation.
- _____ 28) Drinking alcoholic beverages.
- _____ 29) Taking illegal drugs, misusing drugs.
- _____ 30) Controlling temper, outbursts of anger, violence.
- _____ 31) Impulsive, illegal, or reckless behavior.
- _____ 32) Feeling satisfaction with your life.

X. Obsessive Compulsive Inventory-Revised

OCI-R

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

	0 Not at all	1 A little	2 Moderately	3 A lot	4 Extremely
1. I have saved up so many things that they get in the way.					0 1 2 3 4
2. I check things more often than necessary.					0 1 2 3 4
3. I get upset if objects are not arranged properly.					0 1 2 3 4
4. I feel compelled to count while I am doing things.					0 1 2 3 4
5. I find it difficult to touch an object when I know it has been touched by strangers or certain people.					0 1 2 3 4
6. I find it difficult to control my own thoughts.					0 1 2 3 4
7. I collect things I don't need.					0 1 2 3 4
8. I repeatedly check doors, windows, drawers, etc.					0 1 2 3 4
9. I get upset if others change the way I have arranged things.					0 1 2 3 4
10. I feel I have to repeat certain numbers.					0 1 2 3 4
11. I sometimes have to wash or clean myself simply because I feel contaminated.					0 1 2 3 4
12. I am upset by unpleasant thoughts that come into my mind against my will.					0 1 2 3 4
13. I avoid throwing things away because I am afraid I might need them later.					0 1 2 3 4
14. I repeatedly check gas and water taps and light switches after turning them off.					0 1 2 3 4
15. I need things to be arranged in a particular way.					0 1 2 3 4
16. I feel that there are good and bad numbers.					0 1 2 3 4
17. I wash my hands more often and longer than necessary.					0 1 2 3 4
18. I frequently get nasty thoughts and have difficulty in getting rid of them.					0 1 2 3 4

APPENDIX C

Table 1: Participant Demographic Information

Factor	Healthy	Subclinical	Clinical
n	166	133	218
Age			
Mean	25.14	25.89	30.69
Gender			
% Male	30.7	22.6	6.4
% Female	61.8	75.9	91.7
% Other	1.2	0.8	0.9
Race			
% Hispanic/Latino	15.7	15.8	7.8
% White	69.3	78.2	90.8
% African American	3	2.3	2.8
% Asian	22.3	7.5	1.4
% Native American	0	0.8	0.9
% Other	4.8	7.5	3.7

Table 2: BFRB Endorsement Within Subclinical and Clinical Groups

Diagnostic Group	Subclinical (%)	Clinical (%)
Hair Pulling	10.5	59.2
Skin Picking	21.8	65.1
Nail Biting	41.4	33.9
Cheek Biting	46.6	44
Teeth Grinding	9.8	18.3
Other BFRB	15	35.8

Table 3: Anxiety Sensitivity in Healthy, Subclinical, and Clinical Populations

Measure	Healthy	Subclinical	Clinical	F-test	p-value	η_p^2
ASI Total	37.43	39.95	48.68	22.16	0	0.1
ASI Physical	11.41	12.86	14.51	10.67	0	0.05
ASI Cognitive	10.54	11.13	15.43	26.29	0	0.12
ASI Social	15.5	16.09	18.72	13.18	0	0.06

Table 4: Anxiety Sensitivity Severity and BFRB Severity

Analyses	Hair Pulling	Skin Picking	Nail Biting	Cheek Biting	Teeth Grinding	Other BFRB
<u>ASI Total</u>						
Correlation	0.218*	0.166	.262*	.185*	-0.036	0.132
Sig (2-tailed)	0.022	0.06	0.01	0.042	0.837	0.261
Number	111	129	95	122	35	74
<u>ASI Physical</u>						
Correlation	.198*	0.127	0.142	.194*	-0.055	0.121
Sig (2-tailed)	0.037	0.144	0.167	0.032	0.752	0.299
Number	111	134	96	123	36	76
<u>ASI Cognitive</u>						
Correlation	0.155	0.152	.247*	0.125	-0.098	0.078
Sig (2-tailed)	0.103	0.081	0.016	0.169	0.574	0.499
Number	111	132	95	123	35	77
<u>ASI Social</u>						
Correlation	.201*	.178*	.271**	0.162	0.068	0.098
Sig (2-tailed)	0.034	0.041	0.008	0.074	0.694	0.56
Number	111	133	96	122	35	38

** Correlation is significant at the 0.01 (2-tailed)

* Correlation is significant the 0.05 level (2-tailed)

Table 5: Differences in AS Between Hair Pulling and Skin Picking

<u>t-test for Equality of Means</u>			
<u>t</u>	<u>df</u>	<u>Sig (2-tailed)</u>	<u>M</u>
		<u>ASI Total</u>	
-0.172	131	0.864	-0.487
		<u>ASI Physical</u>	
-0.895	136	0.372	-0.9141
		<u>ASI Cognitive</u>	
0.054	134	0.957	0.068
		<u>ASI Social</u>	
0.402	135	0.688	0.398