

Florida State University Libraries

Electronic Theses, Treatises and Dissertations

The Graduate School

Effects of Safety Behavior Fading on Appearance Concerns and Related Symptoms

Natalie L. (Natalie Lauren) Wilver

FLORIDA STATE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES

EFFECTS OF SAFETY BEHAVIOR FADING ON APPEARANCE CONCERNS AND
RELATED SYMPTOMS

By

NATALIE L. WILVER

A Dissertation submitted to the
Department of Psychology
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

2019

Natalie L. Wilver defended this dissertation on April 11, 2019.

The members of the supervisory committee were:

Jesse R. Cogle
Professor Directing Dissertation

Heather Flynn
University Representative

Colleen Kelley
Committee Member

Alexandria Meyer
Committee Member

Norman B. Schmidt
Committee Member

The Graduate School has verified and approved the above-named committee members and certifies that the dissertation has been approved in accordance with university requirements.

TABLE OF CONTENTS

List of Tables	iv
List of Figures	v
Abstract	vi
1. INTRODUCTION	1
Appearance-Related SBs	4
Current Study	8
2. METHODS	10
Participants	10
Procedures	11
Measures	15
Data Analytic Plan	21
3. RESULTS	25
Preliminary Analyses	25
Hypothesis #1: Primary Analyses	27
Hypothesis #2: Effect of Manipulation on <i>In Vivo</i> Stressor Task	31
Exploratory Analyses	32
4. DISCUSSION	35
Limitations and Future Directions	42
Conclusions	44
APPENDICES	45
A. Tables and Figures	45
B. Appearance Behavior Checklist	50
C. IRB Human Subjects Approval, Re-approval, and Consent Forms	52
REFERENCES	56
BIOGRAPHICAL SKETCH	63

LIST OF TABLES

1.	Attrition and Clinical Characteristics for the Full Sample and by Group	45
2.	Descriptive Statistics and Zero-Order Correlations at Baseline	46
3.	Descriptive Statistics of Study Variables Across Conditions	47
4.	Indirect Effects of Condition on Appearance Concerns Through Beliefs About the Importance of Appearance.....	48
5.	Indirect Effects of Condition on Appearance Concerns Through Safety Behavior Use	48

LIST OF FIGURES

1. Interaction between condition (safety behavior fading vs. no instructions control) and pre-manipulation BDD symptom scores (high vs. low) in predicting post-manipulation BDD symptoms49
2. Interaction between condition (safety behavior fading vs. no instructions control) and pre-manipulation social anxiety symptom scores (high vs. low) in predicting post-manipulation social anxiety symptoms49

ABSTRACT

Extant research suggests that safety behaviors (SBs) may be relevant to the development and maintenance of anxiety and obsessive-compulsive psychopathology; yet, their contribution to other forms of psychopathology, such as disorders of body image and appearance, has been relatively understudied. The proposed project aimed to extend upon previous research efforts by exploring the experimental effects of reducing the use of appearance-related SBs on subsequent appearance concerns and related symptoms. Specifically, this study examined the effects of SB fading over a two-week manipulation period in undergraduate female students with elevated appearance concerns (64.0% of whom met criteria for a psychiatric disorder involving social evaluative concerns relevant to appearance). Study variables of interest (e.g., body dysmorphic disorder [BDD] symptoms, social anxiety symptoms, body dissatisfaction) were assessed at the baseline, mid-manipulation, post-manipulation, and 2-week follow-up assessments. Compared to a no instructions control group, the SB fading group exhibited significantly lower BDD symptoms, social anxiety symptoms, body dissatisfaction, and maladaptive cognitions beliefs about appearance at the post and follow-up assessments. They also showed less reactivity to an *in vivo* appearance-related stressor. Exploratory analyses revealed that beliefs about appearance and SB use at the post-assessment each mediated the effects of condition on BDD symptoms at post. Furthermore, baseline BDD and social anxiety symptom severity separately moderated the relationship between condition and respective post-assessment symptom severity, such that SB fading had stronger effects on BDD and social anxiety symptoms among those high in baseline BDD and social anxiety symptoms, respectively. This study better our understanding the role of SBs in BDD and other disorders characterized by body image disturbances and provides preliminary evidence for the potential clinical utility of decreasing appearance-related SBs.

CHAPTER ONE

INTRODUCTION

Safety behaviors (SBs) are defined as behavioral strategies deemed necessary for preventing or minimizing feared outcomes and/or the experience of unpleasant feelings and can emerge in response to both external (e.g., situations) or internal (e.g., thoughts) cues (Helbig-Lang & Petermann, 2010; Salkovskis, 1991). In the presence of a real threat, the use of SBs may be considered adaptive (e.g., wearing a helmet while riding a bike); however, in the absence of a threat or when threat is overestimated, the use of SBs aimed at preventing feared outcomes that are unlikely to happen can be problematic (e.g., visiting a doctor frequently for health check-ups, despite an absence of an identified medical issue). SBs are posited to vary in both function and strategy. Regarding the former, it has been posited that SBs may serve a preventative (i.e., performed to prevent a future distressing response) or restorative (i.e., performed to prevent a negative emotional response when in the context of a feared situation) function. Furthermore, SBs may be behavioral (e.g., situational avoidance) or cognitive (e.g., distraction) in nature (Helbig-Lang & Petermann, 2010). Examples of behavioral strategies related to obsessive-compulsive symptomatology may include checking the stove excessively prior to leaving home (preventative) or washing excessively after being potentially exposed to a contaminant (restorative). On the other hand, examples of cognitive strategies may include excessive preparation (preventative) or praying when a mistake is made (restorative). Notably, the use of SBs has been identified as emotion regulation strategy common across several disorders, though the specific strategy employed may vary based upon the disorder (e.g., excessive checking in obsessive-compulsive disorder, avoidance of eye contact in social anxiety disorder, frequent monitoring of vitals in hypochondriasis, refusal to go certain places without a companion in

panic disorder; Barlow, Allen, & Choate, 2004). SBs are relevant to a range of anxiety and compulsive psychopathology and are thought to not only maintain symptoms but also contribute to the exacerbation or development of symptoms (e.g., American Psychiatric Association [APA], 2013; Clark, 1999; McManus, Sacadura, & Clark, 2008; Rachman, Radomsky, & Shafran, 2008; Salkovskis, 1991; Wells et al., 1995).

While researchers generally agree that SBs maintain psychopathology, differing theories have been developed to explain how SBs contribute to the maintenance of symptoms. Generally, several theoretical conceptualizations suggest that SBs maintain symptoms by preventing the disconfirmation of threat. For example, researchers have posited that the use of SBs in a threatening situation leads to the false attribution that safety was achieved due to the use of SBs, rather than the absence or overestimation of threat. Ultimately, this pattern facilitates the recurrence and persistence of anxiety over time (e.g., Clark, 1999; Salkovskis, 1991). For instance, an individual with obsessive-compulsive disorder may attribute the fact that they did not contract a rare disease to their use of hand sanitizer. On the other hand, another theory suggests that the use of SBs diverts attentional resources away from evidence that would serve to disconfirm the threat, thus similarly resulting in recurrence and persistence of symptoms over time (Powers, Smits, & Telch, 2004; Sloan & Telch, 2002).

SBs are also thought to be relevant to the exacerbation and/or development of psychopathology. For example, frequent self-monitoring among patients with panic disorder may increase awareness of the frequency of (likely harmless) fluctuations in bodily symptoms such as heart rate, perhaps amplifying or worsening fear (e.g., Ehlers & Breuer, 1992). Similarly, for individuals with hypochondriasis, constantly checking the body may result in increased health anxiety (e.g., Abramowitz, Schwartz, & Whiteside, 2002). A recent study demonstrated that even

among mentally healthy individuals, the problematic use of SBs led to greater threat expectations in an objectively safe situation (Engelhard, van Uijen, van Seters, & Velu, 2015).

Furthermore, recent research has also explored the possibility that SBs exert a causal role in the development of psychopathology. For example, Deacon and Maack (2008) found that after being instructed to engage in an array of contamination-related SBs (e.g., excessively washing hands) for one week, undergraduates both high and low in contamination fear exhibited greater threat overestimation and contamination fear symptoms. Extending upon this research to include a control group, Olatunji and colleagues (2011) found that mentally healthy individuals who were instructed to increase health-related SBs (e.g., carrying hand sanitizer) over the course of one week exhibited greater increases in health anxiety and contamination fear following the manipulation, compared to a SB monitoring group. Similarly, van Uijen and Toffolo (2015), found that undergraduates who were instructed to actively engage in checking behavior on a daily basis exhibited greater checking-related cognitions related to the severity of threat following the manipulation, compared to a SB monitoring group and no instructions control group. Interestingly, the behavior monitoring group exhibited decreases in the number of items they checked daily, and a decrease in cognitions about the importance of checking, compared to the control group, demonstrating the potential benefits of self-monitoring of SBs. Collectively, evidence from these studies does in fact support the causal role of SBs in the development of anxiety and obsessive-compulsive symptomatology (Deacon & Maack, 2008; Olatunji et al., 2011; van Uijen & Toffolo, 2015).

Importantly, SBs are also relevant to clinical outcomes, as the presence or continued use of SBs has been found to limit the efficacy of exposure, a technique commonly used in the treatment of anxiety and related disorders (e.g., Kamphuis & Telch, 2000; Powers et al., 2004;

Schmidt, Richey, Maner, & Woolaway-Bickel, 2006; Sloan & Telch, 2002). For example, in studies examining social anxiety, superior outcomes were identified when participants were instructed not to use SBs during different social tasks (Kim, 2005; Wells et al., 1995). Similar effects have also been demonstrated for panic disorder (Salkovskis, Clark, Hackmann, Wells, & Gelder, 1999). While some have argued that judicious use of SBs in treatment may be beneficial (Rachman et al., 2008), it has also been suggested that SBs should be identified and abandoned throughout therapy (Helbig-Lang & Petermann, 2010). In fact, empirical evidence supports the utility of fading SBs in treatment. A treatment focused specifically on fading SBs has demonstrated efficacy in treating anxiety psychopathology among individuals with a range of anxiety disorders, including panic disorder, social anxiety disorder, and generalized anxiety disorder (Schmidt et al., 2012).

Overall, research suggests that SBs are relevant to the maintenance, exacerbation, and development of anxiety and compulsive psychopathology and demonstrates that these behaviors may also play a causal role in the development of symptoms. Furthermore, SBs are relevant to clinical outcomes and may serve as an important target of treatment.

Appearance-Related SBs

While the relevance of SBs to anxiety and obsessive-compulsive psychopathology has been extensively explored, their contribution to other forms of psychopathology has been relatively understudied. For example, theoretical accounts suggest that SBs may be relevant to disorders of body image and appearance (e.g., Veale, 2004), though few experimental studies exploring this relationship exist.

Body image concerns are common; however, for some individuals, concerns related to appearance reach pathological levels that result in interference in daily life as well as significant

distress (Castle, Rossell, & Kyrios, 2006). One such disorder, characterized by an excessive preoccupation with a perceived or slight defect in flaw in appearance, is body dysmorphic disorder (BDD; APA, 2013). This preoccupation with appearance is time-consuming; many individuals with BDD report thinking about their appearance between three to eight hours per day (Phillips, 1998). Common areas of concern include skin, hair, and facial features (Phillips & Diaz, 1997; Phillips, Menard, Fay, & Pagano, 2005). BDD is relatively common; the point prevalence of BDD is estimated to be between 1.7%-2.4%, and the disorder affects women at a slightly higher rate than men (Buhlmann et al., 2010; Koran, Abujaoude, Large, & Serpe, 2008; Rief, Buhlmann, Wilhelm, Borkenhagen, & Brähler, 2006). The cognitive model of BDD suggests that individuals with BDD react to negative thoughts about appearance in a biased manner, resulting in maladaptive interpretations (e.g., regarding the importance of their appearance) and selective attention and over focus on certain aspects of their appearance. Such negative interpretations trigger negative and distressing emotions such as shame, sadness or anxiety. In an effort to regulate negative emotions, the individual may engage in SBs or coping strategies such as mirror checking, excessive grooming, reassurance seeking, comparing one's appearance to that of others, or avoidance (Veale, 2004; Wilhelm, 2006).

Appearance concerns and dysfunctional appearance-related SBs are also relevant to a number of other disorders, including eating disorder pathology and social anxiety (Legenbauer et al., 2017; Levinson et al., 2013), suggesting that dysfunctional appearance-related SBs may also have transdiagnostic importance. For example, eating disorders share the hallmark feature of body image disturbance, though eating disorders are further characterized by eating pathology (e.g., binge eating, restricting, purging) perhaps related to a dissatisfaction with one's weight or shape (APA, 2013). Eating disorders are also associated with dysfunctional body-related

behaviors such as body checking and behavioral avoidance (Legenbauer et al., 2017). Such behaviors may include repeatedly inspecting one's body, camouflaging appearance with clothing, reassurance-seeking from friends and family members, and avoiding mirrors. Similar to appearance-related SBs in BDD, these behaviors are theorized to maintain symptoms (Fairburn, Cooper, & Shafran, 2003; Legenbauer et al., 2017; Shafran, Fairburn, Robinson, & Lask, 2004; Vossbeck-Elsebusch et al., 2015; Williamson, White, York-Crowe, & Stewart, 2004).

Furthermore, research suggests that appearance concerns are also common among individuals with social anxiety, a disorder characterized by a marked fear of social interactions and negative evaluation (APA, 2013). This is perhaps unsurprising given research demonstrating the similarities between BDD and social anxiety, such as a tendency to interpret ambiguous information as negative or threatening and evidence from cross-cultural data suggesting that BDD is considered to be a subtype of social anxiety in eastern cultures (Fang & Hofmann, 2010; Levinson et al., 2013). In fact, one model suggests that physical appearance is considered a core concern in social anxiety and posits that physical appearance concerns in social anxiety may lead to problematic behavioral patterns, including the use of SBs (Moscovitch, 2009; Moscovitch et al., 2013; Moscovitch & Huyder, 2011). While not all SBs associated with social anxiety are appearance-related (e.g., using substances to feel less anxious before a social situation), others may be appearance-related in nature, such as averting eye contact, applying make-up to conceal blushing, or wearing neutral clothing to avoid drawing attention to oneself.

While little research has explored the role of SBs in appearance-related symptomatology, a recent study found that appearance-related SBs (e.g., mirror checking, reassurance seeking) may be involved in the development of symptoms associated with disorders characterized by or sharing the common feature of problematic appearance concerns (e.g., BDD, social anxiety,

eating disorders). Summers and Cogle (2018) recruited undergraduate females with subthreshold appearance concerns, and participants were randomized to one week of: (1) increasing the frequency/duration of appearance-related SBs (SB+); (2) decreasing/fading out these behaviors (SB-); or (3) a control in which they increased their academic studying behaviors. Generally, participants in the SB+ group demonstrated greater BDD symptoms, social anxiety symptoms, body dissatisfaction, beliefs about the importance of appearance, and reactivity to an *in vivo* appearance-related task following the manipulation, while participants in the other two conditions largely did not differ from one another in these outcomes. Interestingly, while significant differences in these symptom areas following the manipulation were not observed between those in the SB- or control conditions, both groups exhibited within-group reductions in symptoms. The authors posited that the lack of group differences may have been due to floor effects (i.e., given that only participants with elevated symptoms were excluded, they may have had little room to improve in the SB- condition) or perhaps resulted from unintended positive consequences of the control group (i.e., increased self-efficacy resulting from an increase in academic studying behaviors or shifting attentional resources away from negative appearance-related thoughts and behaviors). Thus, it was suggested that future studies consider utilizing a group design that requires less time and is therefore less likely to distract participants from other daily activities, such as a no instructions control group. Notably, participants in the SB- condition showed significant reductions in both anxiety and depression compared to the control group, demonstrating the potentially beneficial effects of reducing those behaviors, and suggesting generalization of effects beyond just appearance-related outcomes. This study is the first to experimentally demonstrate the role of appearance-related SBs in the development and exacerbation of BDD-related symptoms, cognitions (e.g., beliefs about the

importance of appearance), and related symptoms, such as anxiety and depression. Interestingly, findings also indicated that engagement in appearance-related SBs influenced symptoms such as social anxiety and body dissatisfaction related to weight and shape. Given the relevance of appearance concerns to social anxiety and eating disorders, these findings also highlight the transdiagnostic relevance of appearance-related SBs. Furthermore, these findings provide hopeful preliminary evidence for the potential utility of SB fading in reducing symptoms.

Current Study

Using an experimental design, the proposed project aims to extend upon previous research efforts by exploring the impact of decreased use of appearance-related SBs on appearance concerns and related symptoms (e.g., social anxiety, body dissatisfaction related to weight and shape) among undergraduate women with elevated appearance concerns. Only female participants were included in the current study because extant research on BDD-related SBs suggests slight differences in frequency and expression of these behaviors between men and women (Phillips, Menard, & Fay, 2006). This decision is also consistent with Summers and Cogle's protocol (2018). We chose to utilize a sample with elevated appearance concerns so that we would have the ability to explore the therapeutic effects of SB fading, without the potential for floor effects that were likely observed in the Summers and Cogle (2018) protocol.

Participants were randomized to one of two groups: 1) a SB fading condition or 2) a no instructions control condition. For a period of two weeks, participants in the SB fading condition were instructed to intentionally decrease/fade out the frequency/duration of appearance-related SBs. Daily reminders to follow these instructions were provided throughout the manipulation period and participants in this group tracked their SB use on a checklist outlining a number of appearance-related SBs. Participants in the no instructions control group received no instructions

for the manipulation period. All participants were assessed at four time-points: 1) prior to the manipulation period (baseline), 2) midway through the manipulation period (mid-assessment), following the manipulation period (post-assessment), and two-weeks after the post-assessment (two-week follow-up).

We hypothesized that following the manipulation, participants in the SB fading condition would evidence decreased severity of BDD symptoms, social anxiety symptoms, body dissatisfaction related to weight and shape, negative beliefs about the importance of appearance, anxiety symptoms, and depressive symptoms, compared to participants in the no instructions control condition. Furthermore, we hypothesized that the SB fading group would exhibit less reactivity to an *in vivo* appearance-related stressor, compared to the control condition, at the post-assessment.

CHAPTER TWO

METHODS

Participants

Potential participants were recruited from the Florida State University (FSU) undergraduate subject pool and invited to participate in this study. A total of 122 undergraduate female participants attended an initial baseline appointment and were screened to participate. Of those participants, 32 did not meet criteria for participation (inclusion and exclusion criteria are detailed below). Of the remaining 90 participants, one participant was lost to follow up after the baseline appointment and did not complete any remaining assessments. As a result, their data were not included in our analyses. Thus, a total of eighty-nine participants were enrolled. Participant age ranged from 18 to 38 ($M = 19.24$, $SD = 2.78$) and the racial make-up of the overall sample was 79.8% White, 9.0% African American or Black, 7.9% multiracial, and 2.2% Asian. Twenty participants (22.5%) identified as Hispanic or Latino. Of the total sample, 64.0% of participants met criteria for at least one psychiatric disorder involving social evaluative concerns relevant to appearance (i.e., BDD, social anxiety disorder, anorexia nervosa, and/or bulimia nervosa; See Table 1 for additional details).

All participants reported elevated appearance concerns, as measured by the self-report version of the Yale-Brown Obsessive-Compulsive Scale modified for BDD (BDD-YBOCS; adapted from Phillips, Hollander, Rasmussen, & Aronowitz, 1997). Research from our lab examining self-reported BDD-YBOCS scores in undergraduate women ($N = 233$) has indicated an average score of 11.17 (25th percentile score = 4; 75th percentile = 16) on this measure (Summers & Cogle, 2018). Thus, cut-scores for inclusion were determined as those at the 75th percentile or above on the self-report version of the BDD-YBOCS (i.e., a score of 16 or higher).

Inclusion criteria included: 1) female participants and 2) a score of 16 or higher on the 10-item BDD-YBOCS self-report. Exclusion criteria included: 1) unstable psychotropic medication status (i.e., changes in psychotropic medication status in the last four weeks) and 2) participation in current ongoing psychotherapy.

Eligible participants were randomly assigned to one of the two conditions: an appearance-related SB fading condition (N = 44) or a no instructions control group (N = 45). As compensation, student participants were offered course credit for their participation in the baseline, mid-, and post-manipulation assessments (i.e., up to 3.5 credits for full participation). Participants who completed the two-week follow-up assessment were entered into a raffle for a chance to win one of four \$25 Amazon gift cards.

Procedures

Eligible participants completed four different assessments: 1) a baseline assessment completed in the laboratory, 2) a mid-manipulation assessment completed from their home computers, 3) a post-manipulation assessment completed in the laboratory, and 4) a two-week follow-up assessment completed from their home computers. Additionally, participants in the SB fading group participated in daily behavior tracking (for a total of 14 days) which included instructions to decrease their engagement in appearance-related SBs. A detailed outline of these assessments and manipulation instructions are provided below.

Baseline assessment. Prospective female participants who endorsed elevated appearance concerns on the first three items of the BDD-YBOCS (i.e., a score of 4 or higher) in the mass screening survey administered to the undergraduate subject pool were invited for an in-person visit to the lab to undergo additional screening for eligibility. During the consent procedure, participants were informed that the study was designed to examine certain appearance-related

behaviors. Following the completion of consent, to confirm eligibility, participants completed a short screener survey consisting of the first 10 items of the BDD-YBOCS self-report as well as questions related to other relevant inclusion criteria (e.g., psychotherapy and psychotropic medication status). Participants who reported a score of 16 or higher on this measure and who met the remaining inclusion criteria were enrolled in the study. Ineligible participants were awarded 0.5 credits for their participation.

Next, eligible participants completed a short interview (see Interview section below) with either the principal investigator or a trained undergraduate research assistant assessing for a number of psychiatric diagnoses relevant to the study aims (i.e., BDD, social anxiety disorder, anorexia nervosa, bulimia nervosa). Following the interview, participants completed the remainder of the questionnaire battery assessing appearance-related SBs, social anxiety symptoms, body dissatisfaction related to weight and shape, beliefs about the importance of appearance, and general depressive and anxiety symptoms (see Self-report measures section below). Once the questionnaire battery was complete, participants were block randomized to condition (i.e., SB fading or no instructions control) and introduced to instructions corresponding to their condition (see below). Prior to their dismissal, the researcher scheduled a date for participants to complete their mid-manipulation assessment (from home), post-manipulation assessment (in-person), and two-week follow-up assessment (from home).

Participants in the SB fading condition were introduced to the Appearance Behaviors Checklist (Summers & Cogle, 2018; see Appendix) and told that the researcher was interested in the extent to which people can engage in these behaviors *less than they normally do* on a daily basis, for two weeks. Specifically, they were told: “Over the next 14 days, we want to see if you can do these behaviors LESS than your typical routine. You can do this in a couple different

ways: 1) If there is something on the list that you already do, you can decrease the frequency by either decreasing the number of times you do it in a day OR, you can do the behavior over a shorter period of time than your typical routine. 2) On the other hand, if there is something on the list that you rarely (or never) do, you can continue *not* to engage in those behaviors that are not typically part of your routine.” Next, each item of the checklist was reviewed in its entirety, to ensure that the participant understood each item as well as when and how they could decrease each behavior. These instructions are consistent with those utilized by Summers and Cogle (2018) for the SB- group. Participants were instructed that each day they would receive a text message with a reminder of study instructions as well as a link to the checklist to complete. In an effort to increase participant compliance, participants signed a contract indicating that had opportunity to ask the experimenter questions, felt confident that they understood each item, and agreed to study instructions.

Participants in the no instructions control group received no additional instructions once the self-report battery was complete. Rather, they were told that no additional information was needed at that time and dismissed following the scheduling of their mid-, post-, and follow-up assessments.

Manipulation period. During the two-week manipulation period, participants in the SB fading condition received daily text messages each evening reminding them of study instructions (i.e., “This is your reminder to do LESS of the activities on your checklist”). This daily text message reminder included a link to an online version of the Appearance Behaviors Checklist and participants were instructed to submit their checklist responses prior to going to bed. If needed, participants were provided with one additional reminder to complete their checklist, which was sent via email. On this checklist, participants reported whether or not they engaged in

each behavior during the past 24 hours, and if yes, whether they engaged in the behavior less, the same, or more than their usual routine (see Appendix B). Participants in the no instructions control group were not contacted outside of the scheduled assessments, detailed below.

Mid-manipulation assessment. One-week following the baseline appointment, participants were prompted via email to complete the mid-manipulation questionnaire battery from their home computers. Participants in the SB fading group were asked to report on compliance with their contract using a visual analogue scale (VAS) from 0 (*Not at all*) to 100 (*Totally*) and on a 0-100% VAS, what percentage of the behavior they filled out on the checklists best reflected their actual behavior over the course of the last week. All participants completed a number of questionnaires related to appearance concerns and related symptoms. Notably, participants completed the Appearance Behaviors Checklist, anchored to the past-week, during this assessment (Summers & Cogle, 2018; see description in Measures section below). Once the questionnaire battery was complete, participants were reminded of their upcoming post-manipulation assessment appointment, and participants in the SB fading group were instructed to continue with behavior reduction, per their study contract, for the remaining week.

Post-manipulation assessment. The post-manipulation assessment took place one week following the mid-assessment; all participants received a reminder email several days prior to the appointment to confirm. For this assessment, participants returned to the laboratory to complete the post-manipulation questionnaire battery. For participants in the SB fading group, the battery also included the VAS scales detailed above. All participants also completed an *in vivo* stressor task meant to elicit appearance concerns (described below). At the end of the assessment, participants in the fading group were told that they were no longer required to fade their

behaviors. Prior to their dismissal, the researcher reminded participants of the date they were expected to complete their two-week follow-up assessment (from home).

Two-week follow-up assessment. Two-weeks following the post-manipulation assessment, participants were prompted via email to complete the two-week follow-up questionnaire battery from their home computers. At the end of the questionnaire battery, participants were asked a short series of questions to assess their understanding of the study. More specifically, they were asked to provide their thoughts or reactions to the experiment and to guess what they thought was the purpose of the study now that they have completed it. Once they were able to provide a guess about the purpose of the study, participants were presented with additional information about the study and SBs more generally. After reading this information, participants were asked if they had ever heard of SBs prior to their participation in the study. Once the questionnaire battery was complete, participants were provided with debriefing information regarding the research question/hypothesis and were entered into a raffle for a chance to win a one of four \$25 Amazon gift cards. Participants who did not complete the two-week follow-up assessment were sent debriefing information via email. The final page of the debriefing survey included a listing of mental health resources should participants opt to utilize them once the study was complete.

Measures

Interview. Either the principal investigator or a trained undergraduate research assistant completed the following interviews with all eligible participants. Of note, the principal investigator thoroughly trained the undergraduate research assistants prior to them administering any interviews to participants and regularly reviewed questions related to symptom assessment throughout the semester, as needed. Furthermore, the principal investigator reviewed a random

sample of audio recordings and provided feedback as needed. The interview was included for descriptive purposes to determine what percentage of the sample endorsed symptoms consistent with diagnoses characterized by appearance concerns (i.e., BDD, social anxiety disorder, anorexia nervosa, bulimia nervosa).

Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 2006). The MINI is a short, diagnostic structured interview used to assess for DSM-IV disorders. The MINI was administered during the baseline assessment to determine whether participants endorsed symptoms consistent with a diagnosis of social anxiety disorder, anorexia nervosa, or bulimia nervosa. Research suggests that sensitivity, specificity, and inter-rater reliability were good for the various diagnoses (Lecrubier et al., 1997).

Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders-5 (SCID-5; First, Williams, Karg, & Spitzer, 2015). The SCID-5 is a semi-structured diagnostic clinical interview. The BDD module of the SCID-5 was administered at baseline to each participant in order to assess for the presence of BDD. The SCID-5 has demonstrated good psychometric properties, including internal consistency, test-retest reliability, and predictive validity (Shankman et al., 2018).

Self-report measures. Participants completed the following questionnaires in Qualtrics, an electronic data capturing system. Unless otherwise specified, the following measures were administered to all participants at all assessment time-points (i.e., baseline, mid-manipulation, post-manipulation, and 2 week-follow-up assessments).

Socio-demographic variables. During the baseline assessment, participants provided information regarding relevant demographic variables (e.g., age, ethnicity).

Yale-Brown Obsessive Compulsive Scale modified for BDD-Self Report (BDD-YBOCS; adapted from Phillips et al., 1997). The BDD-YBOCS was developed to assess the severity of past-week symptoms of BDD and is a modified version of the Yale-Brown Obsessive-Compulsive Scale (YBOCS; Goodman et al., 1989). The original, clinician-administered 12-item version of the BDD-YBOCS, which has demonstrated strong psychometric properties, is administered as a semi-structured interview and examines the individual's thoughts and behaviors associated with their appearance concerns (Phillips, Hart, & Menard, 2014; Phillips et al., 1997). Each item is rated on a 5-point Likert type scale ranging from 0 to 4, with higher ratings indicating more severe symptomatology. In a number of studies, the BDD-YBOCS has been administered in a self-report format, consisting of the first 10-items of this measure, with good internal consistency (e.g., Marques, Weingarden, LeBlanc, & Wilhelm, 2011; Summers & Cogle, 2016). The 10-item self-report version of the BDD-YBOCS was administered as a measure of the severity of past-week appearance concerns and served as a screener for inclusion criteria at baseline. The internal consistencies for the 10-item BDD-YBOCS self-report were good to excellent, with the exception of the baseline assessment¹ (baseline $\alpha = .65$; mid $\alpha = .86$; post $\alpha = .90$; follow-up $\alpha = .92$).

Social Phobia Inventory (SPIN; Connor et al., 2000). The SPIN is a 17-item questionnaire that measures the severity of social anxiety symptoms. Items are rated using a 5-point Likert type scale ranging from 0 (“*Not at all*”) to 4 (“*Extremely*”), with higher scores indicating more severe social anxiety symptoms. The SPIN has strong psychometric properties, including good sensitivity, test-retest reliability, internal consistency, convergent validity, and

¹ In the full sample of participants screened for the study ($N = 122$), this measure showed good internal consistency ($\alpha = .83$).

divergent validity (Antony, Coons, McCabe, Ashbaugh, & Swinson, 2006; Connor et al., 2000). The SPIN was administered to assess the impact of condition on social anxiety symptoms. The internal consistencies for the SPIN in the current study were excellent (baseline $\alpha = .92$; mid $\alpha = .92$; post $\alpha = .94$; follow-up $\alpha = .95$).

Eating Disorder Inventory – Body Dissatisfaction Subscale (EDI; Garner, Olmstead, & Polivy, 1983). The EDI is a 64-item self-report measure used to assess psychological and behavioral traits common among eating disorder symptomatology. Items are rated using a 6-point Likert type scale ranging from 1 (*Never*) to 6 (*Always*), with higher scores being reflective of more severe eating disorder pathology. Research exploring the psychometric properties of the EDI has demonstrated good test-retest reliability, internal consistency, convergent validity, and discriminant validity (Garner et al., 1983; Nevoenen, Clinton, & Norring, 2006; Thiel & Paul, 2006). For the present study, the body dissatisfaction subscale of the EDI was utilized to assess attitudes associated with concerns about body weight/shape. Internal consistencies for the body dissatisfaction subscale of the EDI were good (baseline $\alpha = .84$; mid $\alpha = .87$; post $\alpha = .89$; follow-up $\alpha = .86$).

Beliefs About Appearance Scale (BAAS; Spangler & Stice, 2001). The BAAS is a 20-item questionnaire that measures dysfunctional attitudes about the consequences of bodily appearance on relationships, achievement/performance, and feelings towards to self (e.g., “The opportunities that are available to me depend upon how I look”). Items are rated using a 5-point Likert scale ranging from 0 (*Not at all*) to 4 (*Extremely*). This measured is associated with good psychometric properties including good internal consistency as well as convergent and discriminant validity (Spangler & Stice, 2001). The BAAS was administered as an additional measure used to assess the impact of condition on appearance-related outcomes. Internal

consistencies for the BAAS in the present study were excellent (baseline $\alpha = .93$; mid $\alpha = .95$; post $\alpha = .96$; follow-up $\alpha = .97$).

Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). The BAI is a 21-item self-report questionnaire that measures past-week anxiety and focuses primarily on somatic symptoms. Items are rated using a 4-point Likert type scale ranging from 0 to 3, with higher scores indicating greater anxiety. The measure has demonstrated good psychometric properties (Beck et al., 1988; Fydrich, Dowdall, & Chambless, 1992), and was administered to assess the impact of condition on anxiety symptoms. Internal consistencies for the BAI in the current study were excellent (baseline $\alpha = .90$; mid $\alpha = .93$; post $\alpha = .94$; follow-up $\alpha = .95$).

Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a 20-item measure that assesses frequency of past-week depressive symptoms. Items are rated using a 4-point Likert type scale ranging from 0 (“Rarely or none of the time [less than one day]”) to 3 (“Most or all of the time [5-7 days]”), with higher total scores indicating greater frequency of depressive symptoms. The CES-D has demonstrated excellent internal consistency and test-retest reliability (e.g., Miller, Anton, & Townson, 2008) and was administered to assess the impact of condition on depressive symptoms. Internal consistencies for the CES-D in the present study ranged from good to excellent (baseline $\alpha = .85$; mid $\alpha = .90$; post $\alpha = .93$; follow-up $\alpha = .94$).

Manipulation-related measure. The *Appearance Behavior Checklist* (Summers & Cogle, 2018; see Appendix B) is a 14-item measure that assesses a number of appearance-related behaviors including mirror checking, excessive grooming (e.g., combing hair, washing face, picking skin), camouflaging (e.g., with makeup, clothing, hair or body positioning), appearance-related research, and appearance-related avoidance. Behaviors on the checklist were

originally selected based on research indicating the areas of concern and appearance-related behaviors most commonly reported in individuals with BDD (Phillips, McElroy, Keck, Pope, & Hudson, 1993; Phillips & Diaz, 1997). The checklist was completed daily by participants in the SB fading group during the manipulation period (14 consecutive days). Participants were instructed to decrease their use of these behaviors. Each day during the manipulation period, participants in this group were sent a text message reminder of study instructions and a link to an electronic version of the checklist to complete. Participants reported their level of engagement in the behavior in last 24 hours by indicating one of the following response options: “N/A,” “No,” “Yes, LESS than usual,” “Yes, SAME as usual,” “Yes, MORE than usual.”

In addition to use over the course of the manipulation by the SB fading group, participants in both groups were administered this checklist at each of the four assessment timepoints. Instead of anchoring behaviors to the past 24 hours, items were anchored to the past week, and participants were asked to indicate on a 0 (*Never*) to 10 (*All the time*) Likert-type scale the frequency with which they engaged in each behavior within the last week. Internal consistencies for the Appearance Behaviors Checklist ranged from good to excellent (baseline $\alpha = .81$; mid $\alpha = .93$; post $\alpha = .95$; follow-up $\alpha = .95$).

In-vivo stressor (picture) task. All participants completed an *in-vivo* stressor task meant to assess BDD-related concerns at the post-manipulation assessment. Previous research from our lab has demonstrated moderate positive relationships between the 10-item BDD-YBOCS self-report and picture task ratings, suggesting that this task may serve as an additional measure of BDD-related concerns/symptoms (Summers & Coughle, 2016). Instructions read to participants for this task were: “In this next part of the study, we will be taking a few pictures. The purpose of this is to get an idea of your comfort level, so please pay attention to your emotions during this

task. We will first take a picture of your entire body from the front, then a picture from the back, and finally a picture of your face from the shoulders up.” Once informed of the task, but prior to having their picture taken, participants were then asked to rate their *fear*, *urge to check appearance*, *urge to seek reassurance* about appearance, and *perceived threat* on a 0 to 10 scale, with higher scores indicating greater fear, urge to check/seek reassurance, or perceived threat. Once participants’ photographs were taken, they were also asked to rate their *peak fear* during the task on the same 0 to 10 scale described above.

Data Analytic Plan

Unless otherwise specified, the following analyses were conducted using SPSS v. 23.0.0 (IBM Corp., Armonk, New York, United States).

Power analysis. Primary analyses were conducted using mixed-model analysis of variance (ANOVA). Values of $f = 0.10$, $f = 0.25$, and $f = 0.40$ equate to small, medium, and large effect sizes, respectively, for F-tests for ANOVA (Cohen, 1988; 1992). Thus, a small-to-medium effect is indicated by $f = 0.175$ (i.e., the halfway point between pre-determined small ($f = 0.10$) to medium ($f = 0.25$) effect size). For the present study, small-medium effect sizes were expected based on past research utilizing similar paradigms (e.g., Summers & Cogle, 2019; van Uijen & Toffolo, 2015). A priori power analyses revealed that in order to observe a small to medium effect size ($f = 0.175$; Cohen, 1992) with $\alpha = 0.05$ and power = .80, a total sample size of 46 participants (23 per condition) would be sufficient (G*Power; Faul, Erdfelder, Buchner, & Lang, 2009). To observe a small effect size ($f = 0.10$; Cohen, 1992), a sample size of 138 would be needed. In an effort to ensure adequate power to detect small-medium effects and to increase power for our exploratory analyses, we opted to recruit a larger sample size ($N = 89$).

Preliminary analyses. One-way ANOVA and chi-square tests were conducted to assess for potential group differences in demographics and outcome variables of interest between the two groups at baseline. Furthermore, descriptive statistics were examined to determine overall checklist and contract compliance. As a manipulation check, a 2 (condition) X 4 (pre-, mid-, post-assessment and follow-up) mixed model ANOVA was conducted to examine whether groups differed in their frequency of engagement in appearance-related SBs, as measured by the Appearance Behaviors Checklist, anchored to the past-week. Finally, additional analyses related to debriefing variables (e.g., whether participants correctly guessed the study purpose, whether participants reported having heard of SBs prior to the study) were conducted.

Hypothesis #1: Following the manipulation, participants in the SB fading condition will evidence lower symptoms on all outcome measures compared to participants in the control condition: A series of 2 (condition) X 4 (pre-, mid-, post-assessment, and follow-up) mixed model repeated measures ANOVAs were utilized to assess whether the two groups differed from one another with regard to BDD symptoms, social anxiety symptoms, body dissatisfaction, negative beliefs about the importance of appearance, anxiety, and depressive symptoms. Significant interactions were followed up with ANCOVAs (controlling for corresponding pre-manipulation variables) to compare group means at the mid-manipulation, post-manipulation, and follow-up assessments and paired *t*-tests were used to examine within-group change. For ANOVA/ANCOVA analyses, partial eta-squared values were calculated as a measure of effect size (small = .01, medium = .06, large = .14; Cohen, 1988). For significant paired *t*-tests, Cohen's *d* values were calculated to represent effect size (small = 0.20, medium = 0.50 large = 0.80; Cohen, 1988).

Hypothesis #2: Following the manipulation, participants in the SB fading condition will exhibit less reactivity to an *in vivo* appearance-related stressor compared to participants in the control condition: A 2 (condition) X 1 (post-assessment) ANOVA assessed group differences in reactivity to the *in vivo* appearance-related picture task at the post-manipulation assessment. Partial eta-squared values were calculated as a measure of effect size.

Exploratory analyses. A number of exploratory analyses were conducted to test plausible mediators (i.e., beliefs about appearance, SB use) and moderators (i.e., pre-manipulation symptom severity) of outcomes. Mediation analyses using were conducted using the PROCESS macro (5,000 bootstrap samples, Model 4; Hayes, 2017) to explore the indirect effect of our proposed mediators on the relationship between condition and BDD symptom severity, as measured by the BDD-YBOCS, at the post-assessment. Two primary mediators (i.e., post-assessment beliefs about appearance as measured by the BAAS and post-assessment SB use as measured by the Appearance Behaviors Checklist) and one competing mediator (i.e., post-assessment anxiety as measured by the BAI) were examined. In each of these models, we controlled for baseline symptoms (i.e., BDD-YBOCS and BAAS, Appearance Behavior Checklist, or BAI scores). Indirect effects are significant and indicate mediation if their 95% confidence interval does not include zero. Significant mediators were then entered as parallel mediators into a single model, and pairwise contrasts were conducted to examine the relative strength of each mediator. Similarly, pairwise contrasts are considered significant if their 95% confidence interval did not cross zero.

To examine the potential moderating effects of pre-manipulation symptom severity, linear regression analyses were conducted with centered interaction terms added to the model, consistent with standard practice (Preacher, Curran, & Bauer, 2006). Significant interactions

were followed up by analyses of simple effects of condition among those high and low in the particular outcome variable relevant to that model ($\pm 1 SD$ from the mean).

CHAPTER THREE

RESULTS

Preliminary Analyses

Data were screened for violations of assumptions prior to analysis. To assess for normality, skewness and kurtosis values were examined for all variables. Values between -2 to 2 indicated normal distribution for all variables of interest. No extreme outliers were identified. Group comparisons revealed no significant differences between groups at baseline with regard to demographic or outcome variables of interest (all $ps > .148$). Attrition and clinical characteristics (i.e., diagnoses) are presented in Table 1. Notably, there were no significant differences between groups with regard to attrition or percentage of the sample that met criteria for the diagnoses assessed via the MINI or SCID-5 (all $ps > .081$). Baseline zero-order correlations and descriptive statistics for self-report measures of interest are presented in Table 2. Means and standard deviations between groups on outcome variables at baseline, mid-manipulation, post-manipulation, and two-week follow-up are presented in Table 3.

Checklist compliance. Participants in the SB fading group ($N = 44$) completed an average of 13.91 checklists, suggesting high compliance for checklist completion. At the mid- and post- assessments, participants were asked to rate the extent to which they followed contract instructions over the past week on a 0 (*Not at all*) to 100 (*Totally*) scale (mid-assessment: $M = 82.18$, $SD = 14.55$, $Range = 51-100$; post-assessment: $M = 84.41$, $SD = 14.72$, $Range = 46-100$). Participants were also asked to rate what percentage of the behavior they filled out on the checklists best reflected their actual behavior over the course of the last week from 0% to 100% (mid-assessment: $M = 92.84$, $SD = 12.16$, $Range = 29-100$; post-assessment: $M = 92.41$, $SD =$

11.06, *Range* = 38–100). These data suggest that participants reported relatively high compliance with contract instructions, overall.

Manipulation check. As a manipulation check, we examined whether the groups differed in their frequency of engagement in appearance-related SBs, as measured by the Appearance Behaviors Checklist, anchored to the past-week. Because Mauchly's test of sphericity indicated that the assumption of sphericity was not met; the Greenhouse-Geiser correction was used for the following analyses. Analyses revealed a significant main effect of condition ($F(1, 82) = 69.35, p < .001, \eta_p^2 = .46$) and time ($F(2.43, 199.53) = 62.14, p < .001, \eta_p^2 = .43$), as well as a statistically significant interaction between condition and time ($F(2.43, 205.01) = 46.62, p < .001, \eta_p^2 = .36$).

ANCOVA analyses examining appearance-related SBs at each of the assessment time points revealed an effect of condition at the mid- ($F(1, 81) = 123.27, p < .001, \eta_p^2 = .60$), post- ($F(1, 81) = 146.30, p < .001, \eta_p^2 = .64$), and follow-up ($F(1, 81) = 34.27, p < .001, \eta_p^2 = .30$) assessments, with the SB group reporting significantly decreased engagement in appearance-related SBs compared to the no instructions control group.

Paired samples t-tests examining within group change from the pre-assessment showed a significant decrease in engagement in appearance-related SBs for the fading condition at the mid-, ($t(40) = 11.80, p < .001, d = 1.84$), post- ($t(40) = 13.77, p < .001, d = 2.15$), and follow-up ($t(40) = 9.33, p < .001, d = 1.46$) assessments. There was no significant decrease in engagement in appearance-related SBs for the control condition at the mid- or post-assessments (all $ps > .337$); however, a significant pre to follow-up decrease in engagement in these behaviors was noted ($t(42) = 2.21, p = .032, d = 0.34$). Notably, however, effect sizes for the fading group were

much larger than those for the control group. Changes for the control from pre- to follow-up were small and may be attributable to regression to the mean.

Descriptive debriefing analyses. For descriptive purposes, we examined some variables assessed during the debriefing exit interview. First, when exploring whether participants correctly guessed the purpose of the study, we found that within the control group, only one participant correctly guessed the study purpose. Among the SB fading group, nine participants (20.5%) accurately guessed the purpose of the study. This is perhaps unsurprising, given that participants may have been easily able to make a connection between symptom improvement and behavior change over the course of the study. Notably, when participants who accurately guessed the nature of the study were excluded from our primary analyses, the overall pattern of results remained generally the same (i.e., significant effects of condition on outcomes remained significant at the post-assessment). Among the full sample, a total of five participants (5.6%) reported having previously heard of SBs prior to their participation in the study.

Hypothesis #1: Primary Analyses

We tested the effect of the manipulation on outcome measures of BDD symptoms, social anxiety, body dissatisfaction, maladaptive beliefs about the importance of appearance, anxiety, and depressive symptoms. For the following analyses, in instances where the assumption of sphericity was not met, the Greenhouse-Geiser correction was utilized.

BDD symptoms. First, we examined the effect of the manipulation on BDD symptoms, as measured by the BDD-YBOCS. Analyses revealed a significant main effect of condition ($F(1, 82) = 15.43, p < .001, \eta_p^2 = .16$) and time ($F(2.38, 195.28) = 47.52, p < .001, \eta_p^2 = .37$) as well as a statistically significant interaction between these variables ($F(2.38, 195.28) = 16.27, p < .001, \eta_p^2 = .17$).

ANCOVA analyses examining BDD symptoms at each of the assessment time points revealed an effect of condition at the mid-, ($F(1, 81) = 27.16, p < .001, \eta_p^2 = .25$), post- ($F(1, 81) = 33.97, p < .001, \eta_p^2 = .30$), and two-week follow-up assessments ($F(1, 81) = 18.57, p < .001, \eta_p^2 = .19$), with the SB fading group reporting lower BDD symptoms relative to control group at each timepoint.

Paired samples t-tests examining within-group change from the pre-assessment showed a significant decrease in BDD symptoms for the SB fading group at the mid- ($t(40) = 8.08, p < .001, d = 1.26$), post- ($t(40) = 10.03, p < .001, d = 1.57$), and follow-up assessments ($t(40) = 8.33, p < .001, d = 1.30$). There was a significant decrease in BDD symptoms for the no instructions control group at the post- ($t(42) = 2.60, p = .013, d = 0.40$) and follow-up assessments ($t(42) = 3.00, p = .005, d = 0.46$), but not the mid-assessment ($p = .074$).

Social anxiety symptoms. Next, we examined the effect of the manipulation on social anxiety symptoms, as measured by the SPIN. While there was no main effect of condition ($p = .115$), analyses revealed a significant main effect of time ($F(3, 246) = 23.12, p < .001, \eta_p^2 = .22$) as well as a statistically significant interaction between condition and time ($F(3, 246) = 7.06, p < .001, \eta_p^2 = .08$).

ANCOVA analyses examining social anxiety symptoms at each of the assessment timepoints revealed a significant effect of condition at the mid- ($F(1, 81) = 9.57, p = .003, \eta_p^2 = .11$), post- ($F(1, 81) = 19.00, p < .001, \eta_p^2 = .19$), and follow-up ($F(1, 81) = 5.21, p = .025, \eta_p^2 = .06$) assessments, with the SB fading group reporting lower social anxiety symptoms relative to the control group.

Paired samples t-tests examining within group change from the pre-assessment showed a significant decrease in social anxiety symptoms for the SB fading group at the mid- ($t(40) = 4.19,$

$p < .001$, $d = 0.65$), post- ($t(40) = 6.59$, $p < .001$, $d = 1.03$), and follow-up ($t(40) = 6.12$, $p < .001$, $d = 0.96$) assessments. For the no instructions control group, there was a significant decrease in social anxiety symptoms at the follow-up assessment ($t(42) = 3.22$, $p = .002$, $d = 0.49$), but not the mid- or post- assessments (all $ps > .116$).

Body dissatisfaction. Next, we examined the effect of the manipulation on symptoms of body dissatisfaction, as measured by the body dissatisfaction subscale of the EDI. While there was no main effect of condition ($p = .678$), analyses revealed a significant main effect of time ($F(2.50, 205.08) = 9.30$, $p < .001$, $\eta_p^2 = .10$) as well as a statistically significant interaction between condition and time ($F(2.50, 205.08) = 9.26$, $p < .001$, $\eta_p^2 = .10$).

ANCOVA analyses examining symptoms of body dissatisfaction at each of the assessment time-points revealed an effect of condition at the mid- ($F(1, 81) = 7.57$, $p = .007$, $\eta_p^2 = .09$), post- ($F(1, 81) = 16.05$, $p < .001$, $\eta_p^2 = .17$), and follow-up ($F(1, 81) = 10.40$, $p = .002$, $\eta_p^2 = .11$) assessments, with the SB fading group reporting lower body dissatisfaction relative to the control group.

Paired samples t-tests examining within group change from the pre-assessment showed a significant decrease in body dissatisfaction for the SB fading condition at the mid- ($t(40) = 4.41$, $p < .001$, $d = 0.70$), post- ($t(40) = 5.15$, $p < .001$, $d = 0.80$), and follow-up ($t(40) = 3.90$, $p < .001$, $d = 0.61$) assessments. There were no significant decreases in body dissatisfaction scores at any of the assessment timepoints for the no instructions control group (all $ps > .248$).

Beliefs about the importance of appearance. Next, we examined the effect of the manipulation on beliefs about appearance, as measured by the BAAS. Analyses revealed a significant main effect of condition ($F(1, 81) = 12.32$, $p = .001$, $\eta_p^2 = .13$) and time ($F(2.46,$

199.39) = 15.49, $p < .001$, $\eta_p^2 = .16$), as well as a statistically significant interaction between these variables ($F(2.46, 199.39) = 6.60$, $p = .001$, $\eta_p^2 = .08$).

ANCOVA analyses examining beliefs about the importance of appearance at each of the assessment time-points revealed an effect of condition at the mid- ($F(1, 80) = 11.81$, $p = .001$, $\eta_p^2 = .13$), post- ($F(1, 81) = 22.45$, $p < .001$, $\eta_p^2 = .22$), and follow-up ($F(1, 81) = 7.19$, $p = .009$, $\eta_p^2 = .08$) assessments, with the SB group reporting lower maladaptive cognitions about the importance of appearance at each time point compared to the no instructions control group.

Paired samples t-tests examining within group change from the pre-assessment showed a significant decrease in maladaptive beliefs about the importance of appearance for the SB fading condition at the mid- ($t(40) = 4.10$, $p < .001$, $d = 0.64$), post- ($t(40) = 6.47$, $p < .001$, $d = 1.01$), and follow-up ($t(40) = 6.15$, $p < .001$, $d = 0.96$) assessments. There were no significant decreases in maladaptive beliefs about the importance of appearance at any of the assessment timepoints for the no instructions control group (all $ps > .070$).

Anxiety symptoms. Next, we examined the effect of the manipulation on anxiety, as measured by the BAI. Analyses revealed a significant main effect of time ($F(2.62, 212.01) = 15.61$, $p < .001$, $\eta_p^2 = .16$); however, there was no main effect of condition ($p = .403$). Similarly, the interaction between condition and time was not significant ($p = .073$); thus, follow-up analyses were not conducted.

Depressive symptoms. Finally, we examined the effect of the manipulation on depressive symptoms, as measured by the CES-D. While there was no main effect of condition ($p = .111$), analyses revealed a significant main effect of time ($F(2.62, 214.47) = 11.05$, $p < .001$, $\eta_p^2 = .12$) as well as a statistically significant interaction between condition and time ($F(2.62, 214.47) = 5.32$, $p = .002$, $\eta_p^2 = .06$).

ANCOVA analyses examining depression at each of the assessment time-points revealed an effect of condition at the mid- ($F(1, 81) = 4.54, p = .036, \eta_p^2 = .05$) and post- ($F(1, 81) = 14.56, p < .001, \eta_p^2 = .15$) assessments, with the SB group reporting less depressive symptoms than the no instructions control group at each time point. There was no effect of condition at the follow-up assessment ($p = .383$).

Paired samples t-tests examining within group change from the pre-assessment showed a significant decrease in depressive symptoms for the SB fading condition at the mid- ($t(40) = 3.70, p = .001, d = 0.58$), post- ($t(40) = 5.46, p < .001, d = 0.85$), and follow-up ($t(40) = 3.59, p = .001, d = 0.56$) assessments. For the no instructions control group, there was a significant decrease in depressive symptoms at the follow-up assessment ($t(42) = 2.66, p = .011, d = 0.41$), but not the mid- or post- assessments (all $ps > .184$)

Hypothesis #2: Effect of Manipulation on *In Vivo* Stressor Task

A series 2 (condition) X 1 (post-assessment) ANOVAs were used to assess group differences in reactivity to the *in vivo* appearance-related picture task at the post-manipulation assessment. Specifically, we examined group differences in *fear*, *urge to check appearance*, *urge to seek reassurance*, and *perceived threat* prior to the picture task, but after informed of the task directions, as well as *peak fear* experienced during the task itself.

Analyses revealed a significant difference between groups with regard to pre-task *urge to check appearance* ($F(1, 87) = 10.47, p = .002, \eta_p^2 = .11$) and post-task *peak fear* ($F(1,87) = 6.10, p = .015, \eta_p^2 = .07$), such that participants in the SB fading group reported less of an urge to check their appearance and less fear during the task. No group differences were observed for pre-task *fear*, *urge to seek reassurance about appearance*, or *perceived threat* (all $ps > .075$).

Exploratory Analyses

Mediation analyses. First, we examined the indirect effect of condition on BDD symptoms at post, as measured by the BDD-YBOCS, through beliefs about the importance of appearance at post, as measured by the BAAS. Pre-manipulation BDD-YBOCS and BAAS scores were included in the model as covariates. Post-manipulation beliefs about appearance predicted post-manipulation BDD symptoms, such that decreases in maladaptive beliefs about appearance were associated with decreases in BDD symptoms. The pattern of significance for the indirect effect demonstrated that there was a significant indirect effect of condition on BDD symptoms at post through beliefs about the importance of appearance. See Table 4 for detailed statistics.

Next, we examined the indirect effect of condition on BDD symptoms at post through SB use, as measured by the Appearance Behaviors Checklist, again controlling for pre-manipulation BDD-YBOCS and BAAS scores. The pattern of significance was similar. Post-manipulation SB use predicted post-manipulation BDD symptoms, such that decreases in SB use were associated with decreases in BDD symptoms. Again, there was a significant indirect effect of condition on BDD symptoms at post through SB use. See Table 5 for detailed statistics.

In an effort to explore competing mediators, we examined anxiety, as measured by the BAI, as a separate possible mediator of these outcomes. There was a significant indirect effect of condition on BDD symptoms at post through BAI symptoms at post ($b = -.72$, 95% CI [-1.62, -0.09]), suggesting that BAI symptoms also mediated this relationship. Thus, to determine the relative strength of these significant mediators (i.e., beliefs about the importance of appearance, SB use, and anxiety), they were entered as parallel mediators into a single model, and pairwise contrasts were conducted. Only beliefs about appearance ($b = -1.43$, 95% CI [-3.09, -0.29]) and

SB use ($b = -3.46$, 95% CI [-5.84, -0.98]) remained significant mediators. Furthermore, pairwise comparisons revealed that there was no significant difference in the relative strength of these mediating effects (95% CI [-0.82, 4.62]).

Moderator analyses. For our exploratory moderator analyses, we tested the moderating effect of baseline symptom severity on the relationship between condition and the corresponding primary outcome (i.e., BDD symptoms, social anxiety symptoms, and body dissatisfaction). All moderators were explored by conducting linear regression analyses with interaction terms. Significant interaction terms were followed up by probing at high and low levels of symptoms (i.e., 1 *SD* above or below the mean).

Pre-manipulation BDD symptoms as a moderator of post-manipulation BDD symptom severity. There was a significant main effect of condition ($\beta = -.47$, $p < .001$) and pre-manipulation BDD-YBOCS score ($\beta = .50$, $p < .001$) in predicting post-manipulation BDD symptoms. Similarly, the interaction between condition and pre-manipulation BDD-YBOCS score was significant ($\beta = -.19$, $p = .011$). Upon probing the interaction term, we found that individuals in the SB fading group exhibited less severe BDD symptoms at the post-assessment than the no instructions control group at both high ($\beta = -.67$, $p < .001$) and low ($\beta = -.28$, $p = .009$) levels of pre-manipulation BDD-YBOCS scores. Notably, the effect was stronger among individuals with higher pre-manipulation symptom severity (See Figure 1). BDD diagnosis did not interact with condition to predict outcomes ($p = .787$).

Pre-manipulation social anxiety symptoms as a moderator of post-manipulation social anxiety symptom severity. There was a significant main effect of condition ($\beta = -.29$, $p < .001$) and pre-manipulation SPIN score ($\beta = .76$, $p < .001$) in predicting post-manipulation social anxiety symptoms. Similarly, the interaction between condition and pre-manipulation SPIN score

was significant ($\beta = -.13, p = .045$). Upon probing the interaction term, we found that individuals in the SB fading group exhibited less severe social anxiety symptoms at the post-manipulation than the no instructions control group at high levels of pre-manipulation SPIN scores ($\beta = -.42, p < .001$). There was no significant difference between groups for those individuals with low pre-manipulation social anxiety symptom severity ($p = .087$; See Figure 2). Social anxiety disorder diagnosis did not interact with condition to predict outcomes ($p = .432$).

Pre-manipulation body dissatisfaction symptoms as a moderator of post-manipulation body dissatisfaction symptoms. There was a significant main effect of condition ($\beta = -.24, p < .001$) and pre-manipulation body dissatisfaction score ($\beta = .82, p < .001$) in predicting post-manipulation body dissatisfaction symptoms. However, the interaction between condition and pre-manipulation body dissatisfaction score was not significant ($p = .396$). Thus, the interaction was not probed.

CHAPTER FOUR

DISCUSSION

The present study aimed to expand upon previous efforts by exploring the experimental effects of reducing the use of appearance-related SBs on appearance concerns and related symptoms. Eighty-nine female participants with elevated appearance concerns were randomized to either a SB fading group or a no instructions control group. Approximately two-thirds (64.0%) of the sample met criteria for a psychiatric disorder involving social evaluative concerns related to appearance (i.e., BDD, social anxiety disorder, anorexia nervosa, and/or bulimia nervosa). In addition to completing study assessments, participants in the SB fading group were instructed to reduce their engagement in appearance-related SBs over a two-week manipulation period, during which they were sent daily reminders to decrease their use of these SBs and track their daily SB use. Participants in the no instructions control group were only required to participate in the study assessments. We hypothesized that, compared to the control group, the SB fading group would exhibit decreased severity of a range of symptoms, including those related to appearance (i.e., BDD, social anxiety, body dissatisfaction), maladaptive cognitions related to the importance of appearance, and broader symptom categories (i.e., depression and anxiety). Furthermore, we predicted that at the post-assessment, participants in the SB fading group would exhibit less reactivity to the *in-vivo* appearance-related stressor task.

Consistent with our hypotheses, the manipulation impacted symptoms relevant to disorders characterized by appearance concerns, including BDD symptoms, social anxiety symptoms, and body dissatisfaction related to shape and weight, with minor differences in the pattern and strength of results. With regard to BDD symptoms, as measured by the BDD-YBOCS, participants in the SB fading group exhibited decreased appearance concerns compared

to the control group, at the mid-, post-, and follow-up assessments, with large effect sizes observed. A similar pattern of results emerged with regard to social anxiety symptoms, as measured by the SPIN. Again, there was a significant effect of condition at all time-points, with the SB fading group exhibiting less severe social anxiety symptoms compared to the control group. Finally, with regard to body dissatisfaction related to weight and shape, as measured by the EDI, there was a significant effect of condition at all assessment timepoints, again with the SB fading group exhibiting less severe body dissatisfaction compared to the control group.

Overall, the pattern of results suggests that the SB fading manipulation impacted a broad range of symptoms related to appearance concerns (i.e., BDD symptoms, social anxiety symptoms, and body dissatisfaction related to overall weight/shape). In general, effects were greater at the post-assessment compared to the mid-assessment suggesting that the second week of the manipulation was useful for continued symptom improvement. While some within-group change was observed for the no instructions control group, these effects were modest compared to the SB fading group and may be attributable to repeated assessment or regression to the mean.

We also examined the effect of the manipulation on maladaptive cognitions related to appearance (e.g., the idea that appearance is integral to future success). Similar to the other appearance related symptoms detailed above, results revealed that the manipulation impacted participant's beliefs about the importance of appearance. Again, there was a significant effect of condition at all three assessments, such that the SB group exhibited less maladaptive cognitions about the importance of appearance at the mid-, post-, and follow-up assessments. Overall, these findings suggest that the manipulation generalized beyond appearance concerns and related symptoms to more global maladaptive cognitions related to these symptoms. Summers and Cogle (2018) posited that observed effects related to beliefs about appearance within their study

may have been the artifact of cognitive dissonance (e.g., spending time on appearance suggests that it must be important). The fact that beliefs about the importance of appearance were impacted by SB fading and accounted for the effects of SB fading on symptom outcomes suggests that this mechanism may also be relevant in the current study's findings. By spending less time on appearance, participants may realize that appearance is indeed not as important as originally thought, thereby challenging their previously held beliefs. Indeed, anecdotally, during the debriefing session, a few participants in the safety behavior group commented on how their thoughts changed over the course of the study (e.g., felt like their appearance "mattered less").

In an effort to examine the generalizability of the manipulation effects, we included measures of anxiety and depressive symptoms. Interestingly, the manipulation did not significantly impact anxiety symptoms, as measured by the BAI. Importantly, baseline analyses revealed a weak, non-significant, relationship between anxiety symptoms and appearance concerns, as measured by the BDD-YBOCS ($r = .06$). Thus, it is perhaps unsurprising that the manipulation did not impact these symptoms, given that the BDD-YBOCS served as our primary screening measure. The BAI focuses primarily on somatic symptoms of anxiety (e.g., heart palpitations, sweating); thus, future studies may consider including a measure that assesses anxiety symptoms more broadly, beyond somatic complaints, such as the State-Trait Inventory for Cognitive and Somatic Anxiety (Ree, French, MacLeod, & Locke, 2008). On the other hand, the manipulation significantly impacted depressive symptoms, albeit to a lesser extent than it did more appearance-specific symptoms. There was a significant effect of condition at the mid- and post- assessments, such that the SB group exhibited less severe depressive symptoms compared to the control group. This is consistent with Summers and Cogle's (2018) findings that decreasing SBs resulted in lower depressive symptoms at post. Notably, however, there was no

effect of condition at the follow-up assessment, suggesting that participants in the control group “caught up” with the active group over the follow-up period. Overall, while some effects were observed for depression, these effects were modest compared to our other findings. This pattern of findings suggests that the effects of the manipulation were stronger for broad appearance-related symptom categories versus more generalized symptoms, such as anxiety and depression.

We also assessed the impact of the manipulation on reactivity to an *in-vivo* appearance-related stressor task, developed by Summers and Cogle (2016), where participants had their picture taken from various angles. The task was intended to elicit appearance concerns and was administered at the post-assessment only in an effort to provide a richer assessment of differences between the groups following the manipulation period. We found that the SB fading group evidenced lower pre-task urge to check their appearance and post-task peak fear ratings compared to the no instructions control group. No group differences were observed in participants’ pre-task ratings of fear, urge to seek reassurance about their appearance, or perceived threat. Summers and Cogle (2018) similarly observed group differences with regard to task reactivity, albeit in the negative direction (i.e., increased SB use led to increased task reactivity). When considering possible explanations for the lack of effects on pre-task fear, urge to seek reassurance, or perceived threat, the design of the task may have contributed to the lack of differences. For instance, while the threat of having one’s picture taken by a relative stranger may be anxiety provoking, participants were aware that the photographs would not be shared with anyone outside the research team. Thus, this may have mitigated the intensity of the perceived threat or fear associated with the task, initially. Perhaps if participants were told that the pictures would be shared with and/or rated by another group of individuals, the task would

have been perceived as more threatening, and subsequently may have led to greater differences between the two groups.

Finally, we conducted a number of exploratory analyses in an effort to explore potential mechanisms of change. First, we explored several plausible mediators of outcomes, including maladaptive cognitions about the importance of appearance as well as SB use. Both beliefs about appearance and SB use mediated the relationship between condition and post-assessment appearance concerns, as measured by the BDD-YBOCS. We also explored a potential competing mediator that we did not necessarily expect to mediate outcomes (i.e., anxiety symptoms). Interestingly, anxiety also emerged as a significant mediator of this relationship. Thus, all three significant mediators were entered into the same model to explore the relative strength of these variables. Findings demonstrated that when entered into the same model, anxiety was no longer a significant mediator, but beliefs about appearance and SB use remained significant. Pairwise comparisons revealed that there were no significant differences in the strength of these mediators, suggesting that both may be important mechanisms relevant to manipulation outcomes.

We also explored baseline symptom severity (i.e., BDD symptoms, social anxiety, body dissatisfaction) as a moderator of respective outcomes at the post-assessment. Findings suggest that baseline BDD symptom severity moderated the effect of condition on post-assessment BDD symptom severity. More specifically, SB fading had stronger effects on BDD symptoms among those high in baseline BDD symptoms compared to those low in BDD symptoms. Baseline social anxiety also moderated the effects of condition in that SB fading led to lower social anxiety only among those with high baseline social anxiety. Neither BDD diagnosis nor social anxiety diagnosis moderated the effect of condition on outcomes. Overall, findings suggest that

the manipulation was more effective for individuals with more severe BDD and social anxiety symptoms at baseline. This is plausible given that these participants may have had more “room to improve” compared to those individuals with less severe symptoms at baseline. However, these findings may have important clinical implications, given that they suggest the manipulation may be particularly useful for those individuals with more severe symptom profiles. Notably, while we were adequately powered to observe effects for our primary analyses, we may have been underpowered for some of our exploratory analyses. Thus, replication of these findings within a larger sample size is needed.

This study has a number of strengths that make it a novel contribution to the literature. Notably, we observed low drop-out and high compliance to study procedures. In addition, while Summers and Cogle (2018) explored the impact of SB fading among a group of undergraduates with mild symptoms, this study is the first to our knowledge to explore the effects of decreasing appearance-related SBs on symptoms among individuals with *elevated* symptom presentations, which allowed for a stronger test of the potential therapeutic effects of SB fading. While additional research is needed, findings from this study contribute to our understanding of the role of appearance-related SBs across disorders characterized by body image disturbances. For example, the cognitive model of BDD (Veale, 2004) suggests that SBs serve to maintain symptoms. Summers and Cogle’s (2018) findings provided initial empirical evidence of the direct role of appearance-related SBs in the development and exacerbation of BDD symptoms and related sequelae. These findings bolster those of Summers and Cogle (2018) and suggest that when this proposed maintaining factor (i.e., SBs) is specifically targeted, improvements in appearance-related symptoms may follow.

These findings have important and exciting implications for treatment. While other studies have explored the impact of SB fading among clinical samples, this was done within the context of more intensive intervention (Schmidt et al., 2012). This study was experimental in nature and did not include any therapist interaction. Rather, participants were simply reminded to decrease their engagement in these behaviors via text message. Findings highlight the potential for fairly robust improvements via a simple, easy-to-use format in a relatively short period of time (14 days). Furthermore, because the manipulation impacted not only BDD symptoms, but also other symptoms areas characterized by appearance concerns (e.g., social anxiety and body dissatisfaction), findings provide preliminary support for the notion that targeting appearance-related SBs is an effective transdiagnostic treatment strategy. Future studies may consider exploring the potential utility of this manipulation as a transdiagnostic intervention technique for problematic appearance concerns, as a standalone intervention, or perhaps adjunctively alongside cognitive-behavior treatment approaches. Given that this study was experimental in nature, the exact nature of the study was hidden from participants. It would be interesting to determine whether the inclusion of psychoeducation prior to the manipulation would result in more significant improvements.

Results from our exploratory analyses also provide a richer conceptualization of the potential clinical applications of this manipulation. For example, our findings suggest that SB use and beliefs about appearance may be important mechanisms of change that warrant targeting in the context of treatment. Indeed, a recent study exploring an exposure-based treatment for eating disorders identified appearance-related SBs as an important mechanism of action for exposure-based treatment (Farrell et al., 2019). More specifically, these researchers found that reduced body-checking and avoidance behaviors were associated with lower eating disorder

symptom severity at discharge. This is also consistent with theoretical conceptualizations of body image pathology (i.e., eating disorders, BDD) that suggest that maladaptive beliefs about the importance of appearance maintain and/or exacerbate symptoms (Spangler, 2002; Veale, 2004; Wilhelm, 2006). Further, dysfunctional beliefs about the importance of appearance, specifically, have also been hypothesized to be an important mechanism of change within cognitive-behavioral treatments for eating disorder pathology (Spangler, 2002; Spangler, Baldwin, & Agras, 2004). Overall, our findings contribute to the body of evidence that appearance-related SBs and beliefs about the importance of appearance may be important targets for treatment. Furthermore, our moderator analyses suggest that the manipulation is possibly even more effective for those individuals with more severe BDD symptoms or social anxiety, further highlighting its potential use as an intervention technique.

Limitations and Future Directions

Some limitations provide directions for future research. First, the use of a female student sample restricts the generalizability of our findings. In addition, given the nature of our recruitment strategies, our sample was primarily White and relatively young. Future studies may consider recruiting a more representative community sample to determine whether the effects of the manipulation would generalize to a sample of individuals of various genders, age ranges, and cultural backgrounds, where problematic appearance concerns may also be relevant (Harris & Carr, 2001).

Second, while we included various assessments of appearance concerns (i.e., self-report and *in-vivo* task), the *in-vivo* stressor task was only administered at one of the assessment time-points. This was done given concerns related to potential practice effects associated with the task; however, inclusion of the *in-vivo* task or a similar task at multiple assessments would have

enhanced our ability to explore the impacts of the manipulation on measures beyond just self-report. Future studies may consider including the task at multiple time-points or including additional measures of symptoms at each assessment, such as clinician-rated assessments of functioning.

Third, while efforts were made to mask the purpose of the study from participants, several participants were able to guess the purpose of the study. Notably, though, when participants who accurately guessed the purpose of the study were eliminated from the analyses, the overall pattern and significance of the results remained generally consistent. However, should future studies of a similar nature use an experimental design where the purpose of the study is masked, researchers may consider assessing participants' perceptions about the purpose of the study at the baseline *and* post-study assessments. This would help to parse apart whether participants were initially aware of the study purpose or whether they simply “put the pieces together” over the course of their participation in the study.

Fourth, in an effort to explore the effects of the manipulation of various symptom areas, a large number of analyses were conducted. Unfortunately, this has the potential to increase the risk for Type I error. Notably, however, findings were robust, and the pattern of results was highly consistent; thus, it is unlikely that findings are due to random error. Regardless, it is important that future studies aim to replicate these findings in an effort to fully address reliability of these effects.

Lastly, while approximately two-thirds of our sample met criteria for a diagnosis of BDD, social anxiety, anorexia nervosa, or bulimia nervosa, recruitment of a fully clinical sample would allow us to determine whether the manipulation would indeed be useful among individuals with clinically significant symptom presentations. Furthermore, while the current

study design allowed us to determine whether the manipulation was superior to repeated assessment and/or the passage of time, inclusion of an alternative and/or active control group, comparable to other studies using similar paradigms (Deacon & Maack, 2008; Olatunji et al., 2011; Summers & Cogle, 2018; van Uijen & Toffolo, 2015), would enhance our understanding of the strength of this manipulation compared to other strategies.

Conclusions

In conclusion, the present study offers some important contributions to the literature. First and foremost, our findings provide preliminary evidence for the utility of SB fading as a means for decreasing appearance concerns and a number of related symptoms (e.g., social anxiety, body dissatisfaction, beliefs about the importance of appearance). Furthermore, several potentially important mediators and moderators of outcomes were identified. More specifically, we found that both SB use and beliefs about appearance were significant mediators of the relationship between condition and appearance concerns at the post-assessment, which highlights the potential importance of these constructs to symptom improvement. Furthermore, moderator analyses suggested that the manipulation may be especially useful for individuals with more severe BDD and social anxiety symptoms. This is promising when considering the potential clinical applications of this manipulation. While additional research is needed, overall, these findings contribute to our understanding of SBs in the context of appearance-related psychopathology and provide some preliminary evidence for the clinical utility of SB fading as a transdiagnostic intervention strategy. Given how common appearance concerns are in the general population (Harris & Carr, 2001), findings may be potentially relevant to a wide range of individuals.

APPENDIX A

TABLES AND FIGURES

Table 1.

Attrition and Clinical Characteristics for the Full Sample and by Group

	Full Sample (N = 89)	SB Fade (N = 44)	Control (N = 45)
Attrition Characteristics			
Completed mid-assessment N (%)	89 (100%)	44 (100%)	45 (100%)
Completed post-assessment N (%)	89 (100%)	44 (100%)	45 (100%)
Completed follow-up N (%)	84 (94.4%)	41 (93.2%)	43 (95.6%)
Clinical Characteristics			
Diagnosis Met N (%)			
Body Dysmorphic Disorder	34 (38.2%)	16 (36.4%)	18 (40.0%)
Social Anxiety Disorder	28 (31.5%)	12 (27.3%)	16 (35.6%)
Anorexia Nervosa	3 (3.4%)	0 (0.0%)	3 (6.7%)
Bulimia Nervosa	13 (14.6%)	9 (20.5%)	4 (8.9%)

Note: SB Fade = Appearance-related safety behavior fading group; Control = No instructions control group.

Table 2.
Descriptive Statistics and Zero-Order Correlations at Baseline (N = 89)

	1	2	3	4	5	6	7
1. BDD-YBOCS	--						
2. App. Behav. Checklist	.23*	--					
3. SPIN	.17	.25*	--				
4. EDI – Body Diss.	.24*	.23*	.37**	--			
5. BAAS	.43**	.45**	.51**	.38**	--		
6. BAI	.06	.22*	.53**	.27*	.19	--	
7. CES-D	.38**	.37**	.50**	.44**	.57**	.61**	--
<i>Mean</i>	21.33	93.76	34.94	37.70	48.77	20.60	25.16
<i>SD</i>	3.32	19.39	13.11	7.96	14.22	10.85	8.80
<i>Range</i>	16—32	38—132	6—64	17—54	15—76	0—53	7—52
<i>Skew</i>	.69	-.48	.05	-.43	-.02	.44	.36
<i>Kurtosis</i>	.46	-.01	-.70	-.15	-.64	.17	-.11

Note: BDD-YBOCS = 10-item Yale-Brown Obsessive-Compulsive Scale Modified for BDD – Self-Report Version; App. Behav. Checklist = Appearance Behavior Checklist; SPIN = Social Phobia Inventory; EDI – Body Diss. = Eating Disorders Inventory Body Dissatisfaction Subscale; BAAS = Beliefs About Appearance Scale; BAI = Beck Anxiety Inventory; CES-D = Center for Epidemiologic Studies Depression Scale. * $p < .05$, ** $p < .01$

Table 3.
Descriptive Statistics of Study Variables Across Conditions

	Baseline		Mid-manipulation		Post-manipulation		Two-week Follow-up	
	SB Fade (N = 44)	Control (N = 45)	SB Fade (N = 44)	Control (N = 45)	SB Fade (N = 44)	Control (N = 45)	SB Fade (N = 41)	Control (N = 43)
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Self-report measures								
BDD-YBOCS	21.27 (3.11)	21.40 (3.54)	16.70 (4.40)	20.62 (5.13)	14.18 (4.49)	19.84 (5.78)	14.44 (5.79)	19.33 (6.08)
App. Behav. Checklist	90.75 (21.50)	96.71 (16.81)	51.77 (20.07)	95.13 (18.80)	42.89 (18.54)	94.16 (21.31)	54.61 (27.44)	89.40 (27.41)
SPIN	34.70 (13.95)	35.18 (12.39)	28.80 (12.01)	34.18 (13.47)	24.59 (13.28)	33.24 (14.47)	25.37 (15.99)	29.98 (14.21)
EDI – Body Diss.	38.57 (8.13)	36.84 (7.79)	35.57 (8.04)	36.20 (8.37)	34.34 (8.62)	36.87 (8.42)	34.90 (8.40)	36.72 (8.42)
BAAS	46.64 (16.64)	50.87 (11.18)	39.43 (17.44)	50.80 (13.56)	34.77 (17.97)	49.98 (14.92)	34.66 (18.64)	46.86 (17.30)
BAI	20.39 (10.87)	20.82 (10.95)	14.91 (8.17)	19.73 (14.17)	13.02 (10.47)	18.56 (13.70)	14.05 (12.50)	15.23 (13.75)
CES-D	24.68 (9.12)	25.62 (8.57)	20.07 (10.02)	24.29 (10.58)	17.70 (10.63)	25.40 (11.55)	19.12 (12.24)	21.35 (12.33)
<i>In-vivo</i> stressor task								
Fear	--	--	--	--	3.84 (2.89)	4.98 (3.06)	--	--
Urge to check	--	--	--	--	5.55 (3.57)	7.62 (2.39)	--	--
Urge to seek reassur.	--	--	--	--	3.98 (3.37)	5.00 (3.17)	--	--
Perceived threat	--	--	--	--	3.98 (3.22)	4.73 (3.05)	--	--
Peak fear	--	--	--	--	4.61 (2.90)	6.16 (2.98)	--	--

Note: SB Fade = Appearance-related safety behavior fading group; Control = No instructions control group; BDD-YBOCS = 10-item Yale-Brown Obsessive-Compulsive Scale Modified for BDD – Self-Report Version; App. Behav. Checklist = Appearance Behavior Checklist; SPIN = Social Phobia Inventory; EDI – Body Diss. = Eating Disorders Inventory Body Dissatisfaction Subscale; BAAS = Beliefs About Appearance Scale; BAI = Beck Anxiety Inventory; CES-D = Center for Epidemiologic Studies Depression Scale; Reassur. = reassurance.

Table 4.

Indirect Effects of Condition on Appearance Concerns Through Beliefs About the Importance of Appearance

	Post BDD-YBOCS		
	B (SE)	95% CI	
		L	U
Condition	-3.01 (.88)	-4.76	-1.25
Post BAAS	.20 (.04)	.13	.27
Indirect Effect	-2.30 (.77)	-4.05	-1.06

Note: Model includes baseline appearance concerns and beliefs about appearance as covariates in the model. For condition 0 = No instruction control group, 1 = Safety behavior fading group.

Post = Post-assessment, CI = Confidence Interval, L = Lower, U = Upper. BDD-YBOCS = Yale Brown Obsessive Compulsive Scale Modified for Body Dysmorphic Disorder (BDD); BAAS = Beliefs About Appearance Scale. Significant effects in bold.

Table 5.

Indirect Effects of Condition on Appearance Concerns Through Safety Behavior Use

	Post BDD-YBOCS		
	B (SE)	95% CI	
		L	U
Condition	-.53 (1.38)	-3.27	2.21
Post ABC	.10 (.02)	.05	.15
Indirect Effect	-4.78 (1.32)	-7.44	-2.26

Note: Model includes baseline appearance concerns and safety behavior use as covariates in the model. For condition 0 = No instruction control group, 1 = Safety behavior fading group.

Post = Post-assessment, CI = Confidence Interval, L = Lower, U = Upper. BDD-YBOCS = Yale Brown Obsessive Compulsive Scale Modified for Body Dysmorphic Disorder (BDD); ABC = Appearance Behaviors Checklist. Significant effects in bold.

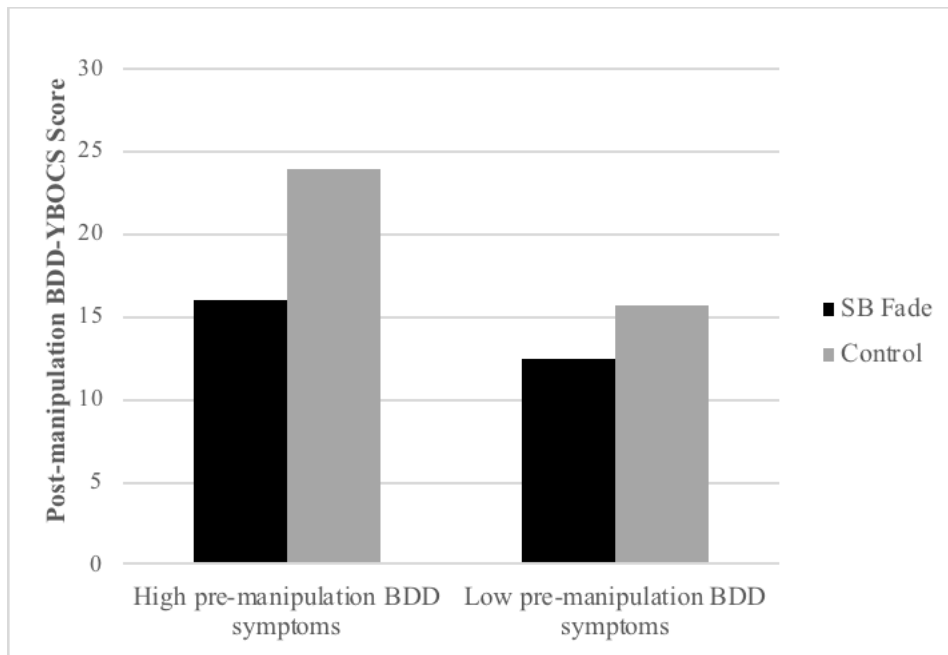


Figure 1. Interaction between condition (safety behavior fading vs. no instructions control) and pre-manipulation BDD symptom scores (high vs. low) in predicting post-manipulation BDD symptoms. BDD-YBOCS = Yale Brown Obsessive Compulsive Scale Modified for Body Dysmorphic Disorder (BDD).

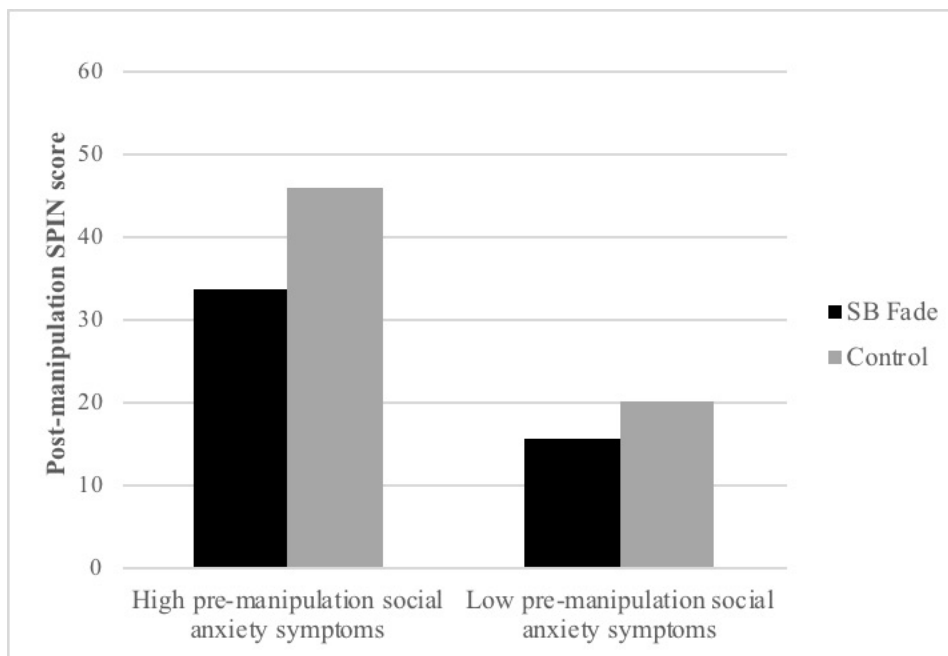


Figure 2. Interaction between condition (safety behavior fading vs. no instructions control) and pre-manipulation social anxiety symptom scores (high vs. low) in predicting post-manipulation social anxiety symptoms. SPIN = Social phobia inventory.

APPENDIX B

APPEARANCE BEHAVIOR CHECKLIST

We would like to know if you have performed the following behaviors **in the last 24 hours**.

- “N/A” = If you were *not* in the situation (i.e., no opportunity) to perform the behavior.
- “NO” = If you were in the situation to perform the behavior (i.e., had opportunity), but you did not.
- “YES” = If you DID perform the behavior, please indicate if you did it less than your usual routine, the same as your usual routine, or more than your usual routine.

	N/A	NO	YES		
			Less than usual	Same as usual	More than usual
1. Check your appearance in <u>reflective surfaces</u> throughout the day (e.g., mirrors, windows, camera on phone).					
2. Closely examine your <u>facial features</u> (e.g., proportion, size, shape, alignment of eyes, nose, mouth, forehead, cheeks, chin).					
3. Closely examine your <u>skin</u> (e.g., texture, color, pores, blemishes).					
4. Closely examine your <u>hair</u> (e.g., texture, color, fullness, hairline, facial hair).					
5. Closely examine your <u>upper body</u> (e.g., proportion and muscularity of shoulders, neck, arms, chest; wrists, hands, fingers).					
6. Closely examine your <u>lower body</u> (e.g., proportion and muscularity of legs; ankles, feet).					
7. Touch, feel, or measure features throughout the day (e.g., feel for moles, bumps, blemishes on skin; touch hair to check it; measure facial and body features).					
8. Groom your hair (e.g., brushing, styling, applying product, comb fingers through).					
9. Groom your skin (e.g., washing, exfoliating, tweezing stray hairs, picking at blemishes/dry skin).					

<p>10. Cover up/camouflage an aspect of your appearance so it is less noticeable using <u>makeup</u> (e.g., foundation, contouring), <u>hair</u> (e.g., covering face or neck/shoulders with hair), <u>clothing</u> (e.g., wearing hat, scarf, hooded jacket, baggy clothes, closed-toed shoes), and/or <u>body positioning</u> (e.g., standing up straight, purposely angling yourself away from or towards the light, holding your hand up to your face).</p>					
<p>11. Avoid situations/activities in which your body will be exposed for an extended period of time (e.g., break eye-contact or look away periodically during long face-to-face conversations; cover up when going swimming).</p>					
<p>12. Ask others (e.g., family, friends) to comment on how you look (e.g., if something about your face or body is normal/looks okay).</p>					
<p>13. Compare your appearance to others' (e.g., friends, people on TV or in magazines, passersby, etc.).</p>					
<p>14. Search online for ways to manage, conceal, or alter/improve appearance (e.g., product reviews, exercise or styling tips, forums, Pinterest, YouTube tutorials; dermatological/cosmetic procedures such as microdermabrasion, breast implants, rhinoplasty, etc.).</p>					

APPENDIX C

FSU IRB HUMAN SUBJECTS APPROVAL AND CONSENT FORMS

Original Approval Notice (2018)

The Florida State University
Office of the Vice President For Research
Human Subjects Committee

APPROVAL MEMORANDUM

Date: 5/7/2018

To: Natalie Wilver

Dept.: PSYCHOLOGY DEPARTMENT

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Experimental effects of safety behavior fading on appearance concerns and related symptoms

The application that you submitted to this office in regard to the use of human subjects in the research proposal referenced above has been reviewed by the Human Subjects Committee at its meeting on 04/11/2018. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 4/10/2019 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is FWA00000168/IRB number IRB00000446. Cc: Jesse Cogle, Advisor. HSC No. 2018.23564

Renewal Notice (2019)

The Florida State University
Office of the Vice President For Research
Human Subjects Committee

RE-APPROVAL MEMORANDUM

Date: 3/7/2019

To: Natalie Wilver

Department: PSYCHOLOGY DEPARTMENT

From: Florida State University Institutional Review Board (IRB)

Re: Continuing Review Application
Experimental effects of safety behavior fading on appearance concerns and related symptoms

Your request to continue the research project listed above involving human subjects has been approved by the Florida State University Institutional Review Board. If your project has not been completed by 2/28/2020, you must request a renewal from the IRB.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

You are advised that any change in protocol for this project must be reviewed and approved by the IRB prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the IRB. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to ensure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protections. The Assurance Number is FWA00000168/IRB number IRB00000446. Cc: Jesse Cogle, Advisor. HSC No. 2019.26919

Informed Consent Form

INFORMED CONSENT FORM BEHAVIOR MONITORING STUDY

Thank you for considering participating in this research study. We ask that you read this form and speak to the research assistant or contact the Principal Investigator regarding any questions you may have before agreeing to be in the study. Contact information is provided below.

PLEASE NOTE: Once you complete this form, we will be asking you to complete a short screen for this study. If you are not eligible you will receive 0.5 credits for your time.

Background Information and Procedures for Research:

This study is designed to examine certain appearance-related behaviors. If you meet study criteria and agree to participate, you will be asked to participate in a total of 4 assessments, either in the lab or from home. You may also be asked to complete daily logging sheets of specific behaviors for a period of two weeks. Study assessments will take between 30 minutes to 1 hour to complete. If you are asked to complete daily logs, they will take 5 to 10 minutes each day to complete. Additional details regarding the study assessments and requirements are provided below.

- **Eligibility/Baseline Visit & Description of Study Expectations:** Study eligibility will be determined by self-report surveys. If you are deemed eligible and choose to participate, you will be randomly assigned to one of two conditions involving either intentionally reducing behaviors related to appearance or a no instructions control group. You will then complete a short interview as well as additional self-report surveys about your appearance, behaviors, thoughts, feelings and psychiatric symptoms. In addition, you will receive specific instructions from a research assistant for the following two weeks of the study and may be asked to sign a contract with the experimenter regarding the expectations of your study participation. Depending upon your assigned condition, you may be asked to participate in daily logging of specific behaviors related to appearance over the next 14 days. To remind you to complete these logs, you may receive daily text messages or emails.
- **Mid-study Assessment:** One week following the baseline visit, participants will be emailed a set of self-report surveys to complete from their home computer.
- **Post-Assessment:** Two weeks following the baseline visit, you will return to the lab to complete self-report measures. You will also be asked to participate in a task where you will have your picture taken and rate your reaction to the task.
- **2-Week Follow-up Assessment:** Two weeks following the post-assessment, you will be emailed a set of self-report surveys to complete from your home computer.

Compensation:

Florida State University students who sign up for the study via the Psychology Experiment SignUp Portal will receive extra/class credit in accordance with guidelines established by the FSU Psychology Department for their participation in the eligibility/baseline visit, mid-study assessment, post-study assessment, and daily behavior logging (if applicable). Typically, students receive 1 credit for each hour of study participation. The estimated total duration for these study components is 3.5 hours. Therefore, students may expect to receive 3.5 credits for full participation. Furthermore, students who complete the 2-week follow-up assessment will be entered into a raffle for a chance to win a \$25 Amazon gift card. If participants are deemed ineligible for the current study, they will be awarded 0.5 credits.

Potential Risks Benefits of Being in the Study:

There is minimal risk involved in this study. The study will be asking about sensitive personal topics, including mental health symptoms. Some individuals may be uncomfortable describing their thoughts and behaviors or having their photo taken and may become emotionally upset when completing tasks and questionnaires. If this occurs and you wish to discuss it, you may contact the Principal Investigator, Natalie Wilver, to speak about any such concerns that might arise. In the unusual event that any discomfort you might experience cannot be addressed adequately by the Principal Investigator, or if Natalie Wilver is unavailable for any reason and your concerns are urgent, you can call the national suicide prevention hotline at 1-800-273-TALK for immediate assistance 24 hours a day. Additional local and national mental health resources are provided on the last page of this document.

You are not guaranteed any benefit from your participation in the study. Completing self-assessments may increase your awareness of your thoughts, feelings and behaviors. Participation in this study may also provide an educational benefit, as

FSU Human Subjects Committee approved on 07/12/2018, void after 04/10/2019, HSC#2018-24975

you will be given the opportunity to develop a better understanding of research methodology and will be providing researchers with valuable insight. You will also be provided with referrals to appropriate clinical services if you seek them.

Confidentiality:

Study records will be kept private and confidential to the extent permitted by law. All the answers to the questions you are asked as well as any photos taken during the study will be stored on a password-protected database and only study staff will have access to the records. To ensure your confidentiality upon enrolling in this study, you will be assigned a numerical identification number, which will be used in place of your name on any study materials including online questionnaires. Your name will not appear on any of the results and only group findings will be reported. If at any time during the study you reveal that you are a threat either to yourself or others, the experimenter will respond to ensure your safety and relevant information may need to be released in order to provide appropriate protection.

Voluntary Nature of the Study:

Participation in this study is entirely voluntary. You have the right to refuse or discontinue participation at any time. Your decision whether or not to participate will not affect your current or future relations with Florida State University. If you decide to participate, you are free to refuse to answer any question or withdraw at any time. If you decline to participate or withdraw early, credit will be prorated based on time spent in this study.

Contact and Questions:

The Principal Investigator is Natalie Wilver. If you have any questions now or later, you are encouraged to contact Natalie Wilver [REDACTED]. You may also contact the Faculty Advisor for this study, Dr. Jesse Cogle, at [REDACTED].

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the FSU Institutional Review Board [REDACTED], or by email at [REDACTED].

Comprehension Questions:

Please read the following questions and verbally give your answer to the investigator. All answers can be found in the consent form throughout the previous pages.

1. From what I have said and what the consent form states, what is your understanding of what you will be doing during this study?
2. What are the risks of participating in this study, from your point of view?
3. What are the benefits of participating in this study, from your point of view?
4. Do you have questions about what we will be doing in this study?
5. Do you have questions about your rights?
6. Do you have any other questions?

Statement of Consent:

By signing below, you are acknowledging that you:

1. Have read the above information
2. Have had the opportunity to ask questions and, if appropriate, have received answers
3. Understand the nature of the research project
4. Are at least 18 years of age
5. Understand that your participation is voluntary
6. Consent to participate in the study

(Participant Signature) (Date)

(Investigator Signature) (Date)

REFERENCES

- Abramowitz, J. S., Schwartz, S. A., & Whiteside, S. P. (2002). A contemporary conceptual model of hypochondriasis. *Mayo Clinic Proceedings*. <https://doi.org/10.4065/77.12.1323>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, D.C.: American Psychiatric Publishing.
- Antony, M. M., Coons, M. J., McCabe, R. E., Ashbaugh, A., & Swinson, R. P. (2006). Psychometric properties of the social phobia inventory: Further evaluation. *Behaviour Research and Therapy*, *44*(8), 1177–1185. <https://doi.org/10.1016/j.brat.2005.08.013>
- Barlow, D. H., Allen, L. B., & Choate, M. L. (2004). Toward a unified treatment for emotional disorders. *Behavior Therapy*. [https://doi.org/10.1016/S0005-7894\(04\)80036-4](https://doi.org/10.1016/S0005-7894(04)80036-4)
- Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, *56*(6), 893–897. <https://doi.org/10.1037/0022-006X.56.6.893>
- Buhlmann, U., Glaesmer, H., Mewes, R., Fama, J. M., Wilhelm, S., Brähler, E., & Rief, W. (2010). Updates on the prevalence of body dysmorphic disorder: A population-based survey. *Psychiatry Research*, *178*(1), 171–175. <https://doi.org/10.1016/j.psychres.2009.05.002>
- Castle, D. J., Rossell, S., & Kyrios, M. (2006). Body dysmorphic disorder. *Psychiatric Clinics of North America*. <https://doi.org/10.1016/j.psc.2006.02.001>
- Clark, D. M. (1999). Anxiety disorders: Why they persist and how to treat them. *Behaviour Research and Therapy*. [https://doi.org/10.1016/S0005-7967\(99\)00048-0](https://doi.org/10.1016/S0005-7967(99)00048-0)
- Cohen J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. New York: Routledge Academic.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Connor, K. M., Davidson, J. R. T., Churchill, L. E., Sherwood, A., Weisler, R. H., & Foa, E. (2000). Psychometric properties of the Social Phobia Inventory (SPIN). *British Journal of Psychiatry*, *176*(4), 379–386. <https://doi.org/10.1192/bjp.176.4.379>
- Deacon, B., & Maack, D. J. (2008). The effects of safety behaviors on the fear of contamination: An experimental investigation. *Behaviour Research and Therapy*, *46*(4), 537–547. <https://doi.org/10.1016/j.brat.2008.01.010>
- Ehlers, A., & Breuer, P. (1992). Increased cardiac awareness in panic disorder. *Journal of Abnormal Psychology*, *101*(3), 371–382. <https://doi.org/10.1037/0021-843X.101.3.371>

- Engelhard, I. M., van Uijen, S. L., van Seters, N., & Velu, N. (2015). The effects of safety behavior directed towards a safety cue on perceptions of threat. *Behavior Therapy, 46*(5), 604–610. <https://doi.org/10.1016/j.beth.2014.12.006>
- Fairburn, C. G., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: A “transdiagnostic” theory and treatment. *Behaviour Research and Therapy, 41*(5), 509–528. [https://doi.org/10.1016/S0005-7967\(02\)00088-8](https://doi.org/10.1016/S0005-7967(02)00088-8)
- Fang, A., & Hofmann, S. G. (2010). Relationship between social anxiety disorder and body dysmorphic disorder. *Clinical Psychology Review, 30*(8), 1040–1048. <https://doi.org/10.1016/j.cpr.2010.08.001>
- Farrell, N. R., Brosorf, L. C., Vanzhula, I. A., Christian, C., Bowie, O. R., & Levinson, C. A. (2019). Exploring mechanisms of action in exposure-based cognitive behavioral therapy for eating disorders: The role of eating-related fears and body-related safety behaviors. *Behavior Therapy*. <https://doi.org/10.1016/j.beth.2019.01.008>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015). *Structured Clinical Interview for DSM–5 Disorders, Clinician version (SCID-5-CV)*. Arlington, VA: American Psychiatric Association.
- Fydrich, T., Dowdall, D., & Chambless, D. L. (1992). Reliability and validity of the beck anxiety inventory. *Journal of Anxiety Disorders, 6*(1), 55–61. [https://doi.org/10.1016/0887-6185\(92\)90026-4](https://doi.org/10.1016/0887-6185(92)90026-4)
- Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders, 2*(2), 15–34. [https://doi.org/10.1002/1098-108X\(198321\)2:2<15::AID-EAT2260020203>3.0.CO;2-6](https://doi.org/10.1002/1098-108X(198321)2:2<15::AID-EAT2260020203>3.0.CO;2-6)
- Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Delgado, P., Heninger, G. R., & Charney, D. S. (1989). The Yale-Brown Obsessive Compulsive Scale: II. Validity. *Archives of General Psychiatry, 46*(11), 1012–1016. <https://doi.org/10.1001/archpsyc.1989.01810110054008>
- Harris, D. L., & Carr, A. T. (2001). Prevalence of concern about physical appearance in the general population. *British Journal of Plastic Surgery, 54*, 223–226. <https://doi.org/10.1054/bjps.2001.3550>
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.

- Helbig-Lang, S., & Petermann, F. (2010). Tolerate or eliminate? A systematic review on the effects of safety behavior across anxiety disorders. *Clinical Psychology: Science and Practice*. <https://doi.org/10.1111/j.1468-2850.2010.01213.x>
- Kamphuis, J. H., & Telch, M. J. (2000). Effects of distraction and guided threat reappraisal on fear reduction during exposure-based treatments for specific fears. *Behaviour Research and Therapy*, *38*(12), 1163–1181. [https://doi.org/10.1016/S0005-7967\(99\)00147-3](https://doi.org/10.1016/S0005-7967(99)00147-3)
- Kim, E.-J. (2005). The effect of the decreased safety behaviors on anxiety and negative thoughts in social phobics. *Journal of Anxiety Disorders*, *19*(1), 69–86. <https://doi.org/10.1016/j.janxdis.2003.11.002>
- Koran, L. M., Abujaoude, E., Large, M. D., & Serpe, R. T. (2008). The prevalence of body dysmorphic disorder in the United States adult population. *CNS Spectrums*, *13*(4), 316–322. <https://doi.org/10.1017/S1092852900016436>
- Lecrubier, Y., Sheehan, D., Weiller, E., Amorim, P., Bonora, I., Harnett Sheehan, K., ... Dunbar, G. (1997). The Mini International Neuropsychiatric Interview (MINI). A short diagnostic structured interview: reliability and validity according to the CIDI. *European Psychiatry*, *12*, 224–231. [https://doi.org/10.1016/S0924-9338\(97\)83296-8](https://doi.org/10.1016/S0924-9338(97)83296-8)
- Legenbauer, T., Martin, F., Blaschke, A., Schwenzfeier, A., Blechert, J., & Schnicker, K. (2017). Two sides of the same coin? A new instrument to assess body checking and avoidance behaviors in eating disorders. *Body Image*, *21*, 39–46. <https://doi.org/10.1016/j.bodyim.2017.02.004>
- Levinson, C. A., Rodebaugh, T. L., White, E. K., Menatti, A. R., Weeks, J. W., Iacovino, J. M., & Warren, C. S. (2013). Social appearance anxiety, perfectionism, and fear of negative evaluation. Distinct or shared risk factors for social anxiety and eating disorders? *Appetite*, *67*, 125–133. <https://doi.org/10.1016/j.appet.2013.04.002>
- Marques, L., Weingarden, H. M., LeBlanc, N. J., & Wilhelm, S. (2011). Treatment utilization and barriers to treatment engagement among people with body dysmorphic symptoms. *Journal of Psychosomatic Research*, *70*(3), 286–293. <https://doi.org/10.1016/j.jpsychores.2010.10.002>
- McManus, F., Sacadura, C., & Clark, D. M. (2008). Why social anxiety persists: An experimental investigation of the role of safety behaviours as a maintaining factor. *Journal of Behavior Therapy and Experimental Psychiatry*, *39*(2), 147–161. <https://doi.org/10.1016/j.jbtep.2006.12.002>
- Miller, W. C., Anton, H. A., & Townson, A. F. (2008). Measurement properties of the CES-D scale among individuals with spinal cord injury. *Spinal Cord*, *46*(4), 287–292. <https://doi.org/10.1038/sj.sc.3102127>
- Moscovitch, D. A. (2009). What is the core fear in social phobia? A new model to facilitate

- individualized case conceptualization and treatment. *Cognitive and Behavioral Practice*, 16(2), 123–134. <https://doi.org/10.1016/j.cbpra.2008.04.002>
- Moscovitch, D. A., & Huyder, V. (2011). The Negative Self-Portrayal Scale: Development, validation, and application to social anxiety. *Behavior Therapy*, 42(2), 183–196. <https://doi.org/10.1016/j.beth.2010.04.007>
- Moscovitch, D. A., Rowa, K., Paulitzki, J. R., Ierullo, M. D., Chiang, B., Antony, M. M., & McCabe, R. E. (2013). Self-portrayal concerns and their relation to safety behaviors and negative affect in social anxiety disorder. *Behaviour Research and Therapy*, 51(8), 476–486. <https://doi.org/10.1016/j.brat.2013.05.002>
- Nevonen, L., Clinton, D., & Norring, C. (2006). Validating the EDI-2 in three Swedish female samples: Eating disorders patients, psychiatric outpatients and normal controls. *Nordic Journal of Psychiatry*, 60(1), 44–50. <https://doi.org/10.1080/08039480500504537>
- Olatunji, B. O., Etzel, E. N., Tomarken, A. J., Ciesielski, B. G., & Deacon, B. (2011). The effects of safety behaviors on health anxiety: An experimental investigation. *Behaviour Research and Therapy*, 49(11), 719–728. <https://doi.org/10.1016/j.brat.2011.07.008>
- Phillips, K. A. (1998). Body dysmorphic disorder: Clinical aspects and treatment strategies. *Bulletin of the Menninger Clinic*, 62(4), 33–48. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9810776>
- Phillips, K. A., & Diaz, S. F. (1997). Gender differences in body dysmorphic disorder. *The Journal of Nervous and Mental Disease*, 185(9), 570–577. <https://doi.org/10.1097/00005053-199709000-00006>
- Phillips, K. A., Hart, A. S., & Menard, W. (2014). Psychometric evaluation of the Yale–Brown Obsessive-Compulsive Scale Modified for Body Dysmorphic Disorder (BDD-YBOCS). *Journal of Obsessive-Compulsive and Related Disorders*, 3(3), 205–208. <https://doi.org/10.1016/j.jocrd.2014.04.004>
- Phillips, K. A., McElroy, S. L., Keck, P. E., Pope, H. G., & Hudson, J. I. (1993). Body dysmorphic disorder: 30 cases of imagined ugliness. *American Journal of Psychiatry*, 150(2), 302–308. <https://doi.org/10.1176/ajp.150.2.302>
- Phillips, K. A., Menard, W., & Fay, C. (2006). Gender similarities and differences in 200 individuals with body dysmorphic disorder. *Comprehensive Psychiatry*, 47(2), 77–87. <https://doi.org/10.1016/j.comppsy.2005.07.002>
- Phillips, K. A., Menard, W., Fay, C., & Pagano, M. E. (2005). Psychosocial functioning and quality of life in body dysmorphic disorder. *Comprehensive Psychiatry*, 46(4), 254–260. <https://doi.org/10.1016/j.comppsy.2004.10.004>
- Phillips, K., Hollander, E., Rasmussen, S., & Aronowitz, B. (1997). A severity rating scale for

body dysmorphic disorder: Development, reliability, and validity of a modified version of the Yale-Brown Obsessive Compulsive Scale. *Psychopharmacology Bulletin*, 33, 17–22.

- Powers, M. B., Smits, J. A. J., & Telch, M. J. (2004). Disentangling the effects of safety-behavior utilization and safety-behavior availability during exposure-based treatment: A placebo-controlled trial. *Journal of Consulting and Clinical Psychology*, 72(3), 448–454. <https://doi.org/10.1037/0022-006X.72.3.448>
- Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, 31, 437–448. <https://doi.org/10.3102/10769986031004437>
- Rachman, S., Radomsky, A. S., & Shafran, R. (2008). Safety behaviour: A reconsideration. *Behaviour Research and Therapy*, 46(2), 163–173. <https://doi.org/10.1016/j.brat.2007.11.008>
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385–401. <https://doi.org/10.1177/014662167700100306>
- Ree, M. J., French, D., MacLeod, C., & Locke, V. (2008). Distinguishing cognitive and somatic dimensions of state and trait anxiety: Development and validation of the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA). *Behavioural and Cognitive Psychotherapy*, 36, 313–332. <https://doi.org/10.1017/S1352465808004232>
- Rief, W., Buhlmann, U., Wilhelm, S., Borkenhagen, A., & Brähler, E. (2006). The prevalence of body dysmorphic disorder: A population-based survey. *Psychological Medicine*, 36(6), 877–885. <https://doi.org/10.1017/S0033291706007264>
- Salkovskis, P. M. (1991). The importance of behaviour in the maintenance of anxiety and panic: A cognitive account. *Behavioural Psychotherapy*, 19(1), 6–19. <https://doi.org/10.1017/S0141347300011472>
- Salkovskis, P. M., Clark, D. M., Hackmann, A., Wells, A., & Gelder, M. G. (1999). An experimental investigation of the role of safety-seeking behaviours in the maintenance of panic disorder with agoraphobia. *Behaviour Research and Therapy*, 37(6), 559–574. [https://doi.org/10.1016/S0005-7967\(98\)00153-3](https://doi.org/10.1016/S0005-7967(98)00153-3)
- Schmidt, N. B., Buckner, J. D., Pusser, A., Woolaway-Bickel, K., Preston, J. L., & Norr, A. (2012). Randomized controlled trial of false safety behavior elimination therapy: A unified cognitive behavioral treatment for anxiety psychopathology. *Behavior Therapy*, 43(3), 518–532. <https://doi.org/10.1016/j.beth.2012.02.004>
- Schmidt, N. B., Richey, J. A., Maner, J. K., & Woolaway-Bickel, K. (2006). Differential effects of safety in extinction of anxious responding to a CO₂ challenge in patients with panic

- disorder. *Journal of Abnormal Psychology*, 115(2), 341–350. <https://doi.org/10.1037/0021-843X.115.2.341>
- Shafran, R., Fairburn, C. G., Robinson, P., & Lask, B. (2004). Body checking and its avoidance in eating disorders. *International Journal of Eating Disorders*, 35(1), 93–101. <https://doi.org/10.1002/eat.10228>
- Shankman, S. A., Funkhouser, C. J., Klein, D. N., Davila, J., Lerner, D., & Hee, D. (2018). Reliability and validity of severity dimensions of psychopathology assessed using the Structured Clinical Interview for DSM-5 (SCID). *International Journal of Methods in Psychiatric Research*, 27, e1590. <https://doi.org/10.1002/mpr.1590>
- Sheehan, D. V, Janavs, J., Baker, R., Harnett-Sheehan, K., Knapp, E., & Sheehan, M. (2006). *MINI International Neuropsychiatric Interview (English version 5.0. 0) for DSM-IV*. Tampa, FL: University of South Florida.
- Sloan, T., & Telch, M. J. (2002). The effects of safety-seeking behavior and guided threat reappraisal on fear reduction during exposure: An experimental investigation. *Behaviour Research and Therapy*, 40(3), 235–251. [https://doi.org/10.1016/S0005-7967\(01\)00007-9](https://doi.org/10.1016/S0005-7967(01)00007-9)
- Spangler, D. L. (2002). Testing the cognitive model of eating disorders: The role of dysfunctional beliefs about appearance. *Behavior Therapy*, 33, 87–105. [https://doi.org/10.1016/S0005-7894\(02\)80007-7](https://doi.org/10.1016/S0005-7894(02)80007-7)
- Spangler, D. L., Baldwin, S. A., & Agras, W. S. (2004). An examination of the mechanisms of action in cognitive behavioral therapy for bulimia nervosa. *Behavior Therapy*, 35, 537–560. [https://doi.org/10.1016/S0005-7894\(04\)80031-5](https://doi.org/10.1016/S0005-7894(04)80031-5)
- Spangler, D. L., & Stice, E. (2001). Validation of the beliefs about appearance scale. *Cognitive Therapy and Research*, 25(6), 813–827. <https://doi.org/10.1023/A:1012931709434>
- Summers, B. J., & Coughle, J. R. (2016). Modifying interpretation biases in body dysmorphic disorder: Evaluation of a brief computerized treatment. *Behaviour Research and Therapy*, 87, 117–127. <https://doi.org/10.1016/j.brat.2016.09.005>
- Summers, B. J., & Coughle, J. R. (2018). An experimental test of the role of appearance-related safety behaviors in body dysmorphic disorder, social anxiety, and body dissatisfaction. In *Journal of Abnormal Psychology*. <https://doi.org/10.1037/abn0000387>
- Thiel, A., & Paul, T. (2006). Test–retest reliability of the Eating Disorder Inventory 2. *Journal of Psychosomatic Research*, 61(4), 567–569. <https://doi.org/10.1016/j.jpsychores.2006.02.015>
- van Uijen, S. L., & Toffolo, M. B. J. (2015). Safety behavior increases obsession-related cognitions about the severity of threat. *Behavior Therapy*, 46(4), 521–531. <https://doi.org/10.1016/j.beth.2015.04.001>

- Veale, D. (2004). Advances in a cognitive behavioural model of body dysmorphic disorder. *Body Image, 1*(1), 113–125. [https://doi.org/10.1016/S1740-1445\(03\)00009-3](https://doi.org/10.1016/S1740-1445(03)00009-3)
- Vossbeck-Elsebusch, A. N., Waldorf, M., Legenbauer, T., Bauer, A., Cordes, M., & Vocks, S. (2015). Overestimation of body size in eating disorders and its association to body-related avoidance behavior. *Eating and Weight Disorders, 20*(2), 173–178. <https://doi.org/10.1007/s40519-014-0144-1>
- Wells, A., Clark, D. M., Salkovskis, P., Ludgate, J., Hackmann, A., & Gelder, M. (1995). Social phobia: The role of in-situation safety behaviors in maintaining anxiety and negative beliefs. *Behavior Therapy, 26*(1), 153–161. [https://doi.org/10.1016/S0005-7894\(05\)80088-7](https://doi.org/10.1016/S0005-7894(05)80088-7)
- Wilhelm, S. (2006). *Feeling good about the way you look: A program for overcoming body image problems*. New York: Guilford Press.
- Williamson, D. A., White, M. A., York-Crowe, E., & Stewart, T. M. (2004). Cognitive-behavioral theories of eating disorders. *Behavior Modification, 28*(6), 711–738. <https://doi.org/10.1177/0145445503259853>

BIOGRAPHICAL SKETCH

Natalie Wilver graduated from Tufts University in 2012 with a Bachelor of Arts Degree in Clinical Psychology and a Minor in Child Psychology. She then worked as a Clinical Research Coordinator at the OCD and Related Disorders Program at the Massachusetts General Hospital/Harvard Medical School in Boston, Massachusetts. Natalie is currently pursuing a doctorate in Clinical Psychology under the mentorship of Dr. Jesse Cougle at Florida State University. Her research interests include identifying factors related to the maintenance and treatment of anxiety, obsessive-compulsive and related disorders, and problematic appearance concerns, broadly.