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*Virginia Commonwealth University*

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EXPAND YOUR HORIZON: INVESTIGATING AN ONLINE INTERVENTION FOR  
WEIGHT BIAS INTERNALIZATION

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of  
Philosophy at Virginia Commonwealth University.

By: Alexandria Davies  
Bachelor of Arts, University of North Carolina at Chapel Hill, December 2012  
Master of Science, Virginia Commonwealth University, May 2018

Director: Suzanne Mazzeo, Ph.D.  
Professor of Psychology  
Department of Psychology

Virginia Commonwealth University  
Richmond, Virginia  
May 7, 2021

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## Abstract

Weight bias internalization (WBI; i.e., self-directed weight stigma or the degree to which individuals apply negative weight-based stereotypes to themselves), is problematic because it is associated with increased stress, emotional eating, healthcare avoidance, and exercise avoidance. Thus, WBI exacerbates health disparities and there is an urgent need to create treatments that address this concern. The current study examined the preliminary effectiveness of a previously developed online body gratitude journaling intervention (i.e., *Expand Your Horizon*) compared to an active control writing condition in emerging adult women with WBI. Racially/ethnically diverse women ( $N=100$ ; <50% White) completed measures and were randomized to either an active control condition ( $n=49$ ) or *Expand Your Horizon* ( $n=51$ ). Both conditions completed three writing tasks over the course of a week. Assessments occurred at baseline, post-test (one-week), and follow-up (two-weeks). Results indicated women in both conditions experienced decreases in WBI at follow-up. Moreover, women in both conditions experienced significant decreases in body image issues, mental health concerns, and disordered eating symptomatology. However, women in the *Expand Your Horizon* condition experienced greater decreases in healthcare related stress compared to the active control condition. In contrast, women in the active control condition experienced greater increases in cognitive acceptance of physical activity compared to women in the *Expand Your Horizon* condition. Furthermore, WBI mediated treatment outcomes, which suggests that it is an important target for body image and mental health interventions. In sum, both writing interventions appear to be accessible, affordable, and effective treatments for women with WBI. Avenues for future research include testing this intervention in more diverse populations with a longer follow-up.

*Keywords:* body image, weight stigma, body functionality, intervention



## Overview

Although obesity rates are on the rise in the United States, experiences of discrimination and negative stereotypes related to one's body weight (i.e., weight stigma) are increasing at an even faster pace. Experiences of weight stigma increased by 66% from 1995-1996 to 2005-2006 (Andreyeva, Puhl, & Brownell, 2008). In contrast, obesity rates rose by 14% in this same time period (Andreyeva et al., 2008). This rapid increase in weight stigma is concerning and is unlikely to be explained by the rise in obesity rates (Andreyeva et al., 2008).

Health promotion efforts often inadvertently include weight stigmatizing elements; these inclusions are typically intended to encourage healthier behaviors (Nolan & Eshleman, 2016; Pomeranz, 2008). However, weight stigmatizing campaigns can ironically contribute to poorer health behaviors, such as lower exercise self-efficacy (Seacat & Mickelson, 2009; Simpson, Griffin, & Mazzeo, 2017) and overeating (Brochu & Dovidio, 2013; Major, Hunger, Bunyan, & Miller, 2014; Nolan & Eshleman, 2016; Schvey, Puhl, & Brownell, 2011). Given the pervasiveness and negative impact of weight stigma, it is vital to develop treatments that could mitigate the effects of these experiences.

Weight stigma is particularly harmful when it is internalized (i.e., weight bias internalization; WBI). Approximately one in five adults in the United States reports high levels of WBI, regardless of their actual body weight (Puhl, Himmelstein, & Quinn, 2018). Weight bias internalization is associated with higher rates of disordered eating (Schvey & White, 2015), and healthcare avoidance (Mensinger, Tylka, & Calamari, 2018), and lower rates of physical activity (Mensinger & Meadows, 2017). These negative health correlates make WBI a key target for health behavior change interventions.

Weight bias internalization interventions can lead to greater improvements in physical activity, disordered eating, and BMI relative to traditional diet focused approaches (Bacon, Stern, Van Loan, & Keim, 2005; Mensinger, Calogero, Stranges, & Tylka, 2016; Palmeira, Pinto-Gouveia, & Cunha, 2017). However, extant WBI interventions involve a group-based format led by a trained professional, reducing their accessibility and affordability. Moreover, people across the BMI spectrum report WBI (Pearl & Puhl, 2018; Puhl et al., 2018), but previous interventions have been limited to those with overweight and obesity (Palmeira et al., 2017; Pearl, Hopkins, Berkowitz, & Wadden, 2018). An alternative approach, journaling-based interventions, requires a smaller time commitment, can be completed by individuals on their own schedules, and can be widely disseminated. Several body gratitude journaling interventions have yielded improvements in body dissatisfaction (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018; Alleva, Diedrichs, Halliwell, Peters, et al., 2018; Alleva, Martijn, Van Breukelen, Jansen, & Karos, 2015; Stern & Engeln, 2018). These findings are important because body dissatisfaction is associated with higher levels of smoking, binge eating, and lower levels of physical activity (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006). Despite the potential success of body gratitude journaling interventions, only one study to-date, limited by a post-test only design, has tested this approach for WBI (Dunaev, Markey, & Brochu, 2018).

### **The Current Study**

To address this need, the current study empirically evaluated the effects of a body gratitude journaling intervention on WBI and several health behaviors. *Expand Your Horizon* is a journaling intervention that redirects women's body focus from appearance-related cognitions to body functionality (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018; Alleva, Diedrichs, Halliwell, Peters, et al., 2018; Alleva, Martijn, Jansen, & Nederkoorn, 2014; Alleva, Veldhuis, &

Martijn, 2016; Alleva, Martijn, et al., 2015). Body functionality is defined as appreciating the body for its physical functioning (e.g., stamina), internal processes (e.g., digesting), and ability to engage in pleasurable activities (e.g., self-care; Alleva et al., 2014) Thus, body functionality creates a more holistic view of the body. The current study provided data on the preliminary effectiveness of *Expand Your Horizon* in a group of emerging adult (i.e., 18-25 years of age) women. More specifically, the current study evaluated *Expand Your Horizon*'s impact on improvements in WBI, healthcare stress, physical activity acceptance, body functionality appreciation, and disordered eating symptomatology. Because individuals had to self-identify as women to participate in the study, I will be using she/her/hers pronouns throughout the manuscript. However, many of these theories and concepts are relevant to individuals of diverse gender identities. Results have the potential to increase the accessibility of WBI treatment, improve health behaviors, and lower healthcare burden.

## **Literature Review**

### **Weight Stigma**

Weight stigma, the pervasive social devaluation of people with higher body weight, has harmful consequences (Puhl & Heuer, 2009). The experience of weight stigma is more strongly related to negative mental and physical health outcomes than is actual BMI (Durso & Latner, 2008). Weight stigma is particularly harmful because it is a chronic stressor directly affecting health through increased allostatic load, emotional eating, and exercise avoidance (Tomiya, 2014; Vadiveloo & Mattei, 2017). Therefore, weight stigma is linked to weight gain and might intensify health disparities faced by individuals in larger bodies.

Weight stigma is common; 40% of adults with overweight and obesity report daily experiences of weight discrimination (Puhl, Andreyeva, & Brownell, 2008). Indeed, a cross-

sectional study of adults in the community revealed that weight-based prejudice was more commonly reported than discrimination based on gender, race, and sexual orientation (Puhl et al., 2008). The social acceptability and pervasiveness of weight stigma is particularly concerning given that weight-based discrimination is not a protected category for legislation (Hilbert et al., 2017; Pomeranz, 2008). Consequently, there are limited protections against this harmful form of prejudice, and few interventions address weight-based bias (Alberga et al., 2016).

Further, individuals in larger bodies are not immune from applying and accepting negative weight-related stereotypes to both themselves and others. Implicit association tests reveal that people with overweight and obesity tend to hold unfavorable attitudes towards other individuals of higher body weight (Wang, Brownell, & Wadden, 2004). Contrary to many other minority groups, people in larger bodies do not have the same supportive attitudes towards fellow in-group members. Rather, individuals with larger weights often internalize negative weight-based stereotypes (Tajfel & Turner, 1986; Wang et al., 2004). Therefore, weight stigma can be experienced through discriminatory behaviors (e.g., teasing someone due to their weight) or through internalized attitudes (i.e., WBI).

### **Weight Bias Internalization**

Weight bias internalization (WBI) is the process of accepting and applying negative weight-related stereotypes to oneself (i.e., self-directed stigma; Durso & Latner, 2008). One in five adults in the United States reports high levels of WBI, regardless of his or her actual BMI (Puhl et al., 2018). Additionally, WBI is associated with poorer physical and mental health, social functioning (Pearl, White, & Grilo, 2014), depressive symptoms (Pearl & Puhl, 2014; Schvey & White, 2015), body dissatisfaction (Durso & Latner, 2008; Durso et al., 2012), and binge eating (Pearl & Puhl, 2014) even after controlling for BMI (see Pearl & Puhl, 2018 for a

review). Therefore, WBI exacerbates health disparities among individuals with higher body weights (Lee & Pausé, 2016; Mensinger et al., 2018).

A higher BMI is related to greater odds of experiencing a chronic health condition (Udo, Purcell, & Grilo, 2016) and increased mortality risk (Sutin, Stephan, & Terracciano, 2015). However, WBI is also linked to myriad mental health consequences that might put people at increased risk of premature death. For example, WBI is related to emotional distress for people of diverse body weights (Carels et al., 2013; Innamorati et al., 2017; Schvey & White, 2015). A cross-sectional study of adults with overweight and obesity seeking weight loss treatment found a strong correlation between WBI and depression ( $r = .66$ ) and binge eating ( $r = .57$ ; Carels et al., 2013). The relation among WBI, depression, and eating pathology has also been observed in non-treatment seeking adults with overweight and obesity (Innamorati et al., 2017) and in average weight individuals (Schvey & White, 2015). For instance, a cross-sectional study of 197 adults with BMIs in the average range found that WBI was strongly correlated with depression ( $r = .54$ ; Schvey & White, 2015). Further, WBI was associated with both binge eating and purging, even after controlling for BMI and depression (Schvey & White, 2015). Therefore, WBI is correlated with depression and eating pathology above and beyond BMI for individuals of diverse body weights.

Moreover, WBI is related to poorer health maintenance behaviors, including decreased engagement in physical activity. Cross-sectional research suggests that people with high levels of WBI are more likely to cope with weight stigmatizing experiences through exercise avoidance than participants with low WBI (Himmelstein, Puhl, & Quinn, 2017; Vartanian, Pinkus, & Smyth, 2018). The relation between WBI and decreased exercise motivation has also been demonstrated in experimental research. For example, one study randomized 80 women with

obesity into either a weight neutral health intervention or a traditional behavioral weight loss intervention for six-months (Mensinger, Calogero, Stranges, et al., 2016). WBI both moderated and mediated poorer outcomes following the intervention (Mensinger, Calogero, & Tylka, 2016; Mensinger & Meadows, 2017). Specifically, women with high WBI at baseline manifested smaller improvements in physical activity (Mensinger & Meadows, 2017) and adaptive eating behaviors at the end of the intervention period (Mensinger et al., 2016). Additionally, reductions in WBI partially explained increases in physical activity following the healthy living programs (Mensinger & Meadows, 2017). These results suggest that WBI reduction efforts could be important in encouraging health behaviors.

Finally, although WBI is consistently associated with body dissatisfaction (see Pearl & Puhl, 2018 for a review), it is nonetheless a distinct construct. Specifically, body dissatisfaction involves a *generalized negative attitude* towards *parts* of one's body, WBI refers to *self-directed negative weight-related stereotypes* (Durso & Latner, 2008). Although these constructs share some features, WBI is particularly harmful because these negative stereotypes become a part of one's identity, resulting in lower self-efficacy and motivation to engage in health behaviors (Hilbert, Braehler, Haeuser, & Zenger, 2014). There are strong correlations between WBI and body dissatisfaction in individuals across weight categories ( $r = .77$ ; Pearl & Puhl, 2014) and among people with overweight and obesity ( $r = .74$ ; Durso & Latner, 2008) even after controlling for BMI. The relation between body dissatisfaction and WBI is alarming because body dissatisfaction is related to higher rates of binge eating, substance use, and lower levels of physical activity (Bucchianeri & Neumark-Sztainer, 2014; Neumark-Sztainer et al., 2006; Paxton, Eisenberg, & Neumark-Sztainer, 2006).

In sum, WBI results in body shame and consequently poorer self-care behaviors (Tylka et al., 2014). Interventions targeting WBI are important given its associations with disordered eating (Schvey & White, 2015), depression (Chen et al., 2007), healthcare avoidance (Mensing et al., 2018), and physical inactivity (Mensing & Meadows, 2017). Moreover, there is a push for health professionals to provide more accessible weight management treatment (Apovian, 2014; Jansen, Desbrow, & Ball, 2015). However, providers' anti-fat attitudes contribute to reduced quality of care for individuals with higher BMIs, resulting in underutilization of preventive services and greater healthcare costs (Saultz & Lochner, 2005).

### **Weight Stigma among Healthcare Providers**

Medical providers are not immune to weight bias. Levels of explicit and implicit anti-fat attitudes in medical doctors are comparable to those reported by the general public (Sabin, Marini, & Nosek, 2012). For example, a survey of first year medical students across the United States found that 74% demonstrated *implicit* bias against people with obesity, and 67% expressed *explicit* bias against people with obesity (Phelan et al., 2014). Unlike many other forms of stigma, it appears that healthcare providers consider it acceptable to hold prejudicial attitudes about people with obesity, as evidenced by their willingness to express explicit anti-fat attitudes.

Additionally, even providers focused on obesity treatment tend to hold unfavorable attitudes towards people with this condition. For instance, a cross-sectional study found that obesity specialists (defined in this study as a group including both researchers and clinicians), hold strong explicit and implicit anti-fat attitudes (Schwartz, Chambliss, Brownell, Blair, & Billington, 2003). Additionally, obesity specialists were more likely to express explicit anti-fat attitudes in 2013 than obesity specialists in 2001 (Tomiya et al., 2015). Thus, explicit weight discrimination might even be increasing over time among health providers specializing in

obesity. Although there has been an effort to frame obesity as a multifaceted disease, weight bias could be increasing due to sociocultural messages (Andreyeva et al., 2008). For example, annual revenues for the diet industry increased substantially from \$33.3 billion in 1995 (Enterprises, 1996) to \$55 billion in 2006 (Enterprises, 2006). Because the diet industry frames weight as largely controllable, people might attribute obesity to be the result of a lack of willpower (Andreyeva et al., 2008).

Weight stigma could contribute to reduced quality of care for higher weight individuals in several ways. The belief that patients with obesity are more responsible for their illness and lazier than other patients could result in less optimism about prognosis, and negatively affect the patient-provider relationship (Schwartz et al., 2003). An analysis of audio-recorded physician visits revealed that medical doctors were less likely to build emotional rapport (i.e., offer empathy and reassurance, and engage in reflective listening) with patients of higher weights (Gudzune, Beach, Roter, & Cooper, 2013). This is problematic because emotional rapport is associated with higher patient satisfaction (Beck, Daughtridge, & Sloane, 2002) and treatment adherence (Zolnierek & Dimatteo, 2009).

Health professionals' stigmatizing attitudes towards people with obesity might also contribute to the high rates of healthcare avoidance among individuals with this condition. Thus, there has been a push to provide weight bias reduction programs for healthcare providers. A systematic review of 17 studies that evaluated weight bias reduction interventions among health providers found that the vast majority did not utilize a randomized-controlled design and had short-term follow-up periods (i.e., less than six months; Alberga et al., 2016). The authors concluded that there is insufficient evidence regarding the effectiveness of weight bias reduction programs (Alberga et al., 2016). There is also some evidence to suggest that weight bias



reduction efforts do not have sustained impacts (Kushner, Zeiss, Feinglass, & Yelen, 2014). For instance, a study conducted with first-year medical students found that those who received psychoeducation about the multidimensional causes of weight demonstrated decreased stereotyping behaviors following an immediate encounter with a patient with overweight (Kushner et al., 2014). However, these changes were not maintained at one-year follow-up (Kushner et al., 2014). It is likely that weight bias reduction efforts for health professionals need to be multifaceted and intensive in order to yield long-term changes (Alberga et al., 2016). Given the considerable resources such weight bias reduction efforts require, and the significant number of competing training interests for students in the health professions, interventions targeting WBI in patients will likely be more cost-effective and sustainable.

### **Weight Stigma and Healthcare Avoidance**

Healthcare avoidance, or the delay to access healthcare, is an important public health concern because preventive medical services can increase both years and quality of life (Byrne, 2008). Unfortunately, substantial research indicates that individuals with overweight and obesity actively avoid seeking preventive healthcare. For example, women with higher weights are less likely to receive routine gynecological screenings and/or mammograms (Cohen, Signorello, Gammon, & Blot, 2007; Wee, McCarthy, Davis, & Phillips, 2000; Zhu, Wu, Jatoi, Potter, & Shriver, 2006). These associations were evident even after controlling for socioeconomic status, health insurance coverage, and other medical conditions that might deter healthcare utilization (Cohen et al., 2007; Wee et al., 2000). Avoidance of these preventive procedures among women with higher weights is particularly concerning given the link between obesity and breast and cervical cancers (Calle & Thun, 2004; Carmichael & Bates, 2004). As such, it is a public health priority to enhance understanding of the reasons for healthcare avoidance among individuals

with overweight and obesity. A qualitative study of 60 women with obesity found that the most common reasons for healthcare avoidance included: inadequate medical equipment, providers' attitudes and treatment (e.g., perceived weight discrimination by providers), and issues concerning weight (i.e., unsolicited weight loss advice; Amy, Aalborg, Lyons, & Keranen, 2006).

Inadequate medical equipment (e.g., chairs that are too small or blood pressure cuffs that do not fit) is a commonly cited problem facing individuals with higher weights seeking healthcare (Amy et al., 2006; Ingraham, Roberts, & Weitz, 2014; Thompson & Thomas, 2000). For example, a cross-sectional study found that 25% of women with obesity who were seeking family planning services reported that at least one item in the clinic did not fit them (e.g., gowns that were too small, Ingraham et al., 2014). Given that people with higher weights tend to have greater body dissatisfaction, wearing a gown that is too small and more revealing could be particularly uncomfortable (Ingraham et al., 2014). Even within clinics focused on weight loss, inadequate medical equipment is a concern. For example, a cross-sectional study found that 35% of adults seeking weight loss treatment reported that chairs in a dietetic clinic were not big enough (Thompson & Thomas, 2000). Therefore, healthcare settings might unintentionally be discouraging care for people of higher weight status due to their insufficient equipment.

Another reason for healthcare avoidance among individuals with overweight and obesity involves their treatment by providers within medical settings. For instance, a study of women in the community across the weight spectrum revealed that 8.3% reported avoiding a healthcare encounter due to a fear that providers would suggest that they would be "able to [get] rid [of the] problem by weight loss (Drury & Louis, 2002)." This perception is far more pronounced for individuals with overweight and obesity. A cross-sectional study found that 84% of respondents

with obesity recruited from a dietetic clinic reported that weight is blamed for most of their medical problems (Thompson & Thomas, 2000). Therefore, many individuals with higher weights believe that their health problems will be dismissed or ignored due to their weight status.

Focus groups conducted with individuals with obesity reveal that experiences of anti-fat attitudes from providers are common (Buxton & Snethen, 2013; Forhan, Risdon, & Solomon, 2013). This has also been supported by cross-sectional research, which found that 69% of people with overweight and obesity report feeling stigmatized by their physician (Puhl & Brownell, 2006). This high prevalence of anti-fat attitudes among healthcare providers is disconcerting because it is inversely associated with patients' pursuit of preventive services (Adams, Smith, Wilbur, & Grady, 1993), and positively associated with emergency visits among patients with obesity (Gudzune et al., 2013). In turn, both of these patient behaviors are associated with a greater economic healthcare burden (Adams et al., 1993; Gudzune, Bleich, et al., 2013).

Finally, WBI is a potent reason for healthcare avoidance. Another focus group study conducted with individuals with obesity indicated that many felt personally responsible for their weight status, and were ambivalent about seeking primary care services due to this internalized shame (Brown, Thompson, Tod, & Jones, 2006). Further, an investigation that used structural equation modeling to analyze data from 315 women across the weight spectrum revealed that the associations among higher BMI, healthcare avoidance, and healthcare stress can partially be explained by experiences of weight stigma and WBI (Mensing et al., 2018). Thus, both WBI and experiences of weight stigma contribute to healthcare avoidance among individuals of higher body weights.

Moreover, women are disproportionately affected by WBI (Puhl et al., 2018) and are more likely to avoid healthcare encounters due to fear of fat shaming (Drury & Louis, 2002; Lee &

Pausé, 2016). Treatments targeting WBI could decrease body-related shame and subsequently promote health behaviors, impacting women significantly. However, only two interventions to date, both utilizing a group-based format requiring professionally-trained leaders, have specifically targeted WBI (Palmeira et al., 2017; Pearl et al., 2018). These interventions yielded significantly greater improvements in depression, diet and exercise self-efficacy (Pearl et al., 2018) health-related quality of life, and physical activity (Palmeira et al., 2017). Furthermore, reductions in WBI partially explained increases in physical activity following a healthy living program (Mensing & Meadows, 2017). Consequently, interventions that reduce WBI appear to improve health behaviors, but previous treatments studied have required substantial resources. Further, although people across the BMI spectrum report WBI (Pearl & Puhl, 2018; Puhl et al., 2018), these previous interventions were limited to those with overweight and obesity. Affordable and accessible interventions that target WBI in individuals across the BMI continuum are urgently needed given WBI's associations with poor health behaviors and outcomes.

### **Writing-Based Interventions**

Gratitude journaling interventions, which involve writing about topics for which one is grateful, are effective in improving health, require few resources, and can be widely disseminated. This type of journaling resulted in greater improvements in physical activity and fewer physical complaints relative to journaling about daily events (Emmons & McCullough, 2003). For example, a randomized control trial found that participants in a gratitude journaling intervention demonstrated greater increases in life satisfaction and optimism over a ten-week period than participants in a general writing intervention (Emmons & McCullough, 2003). Further, this study was replicated among patients with neuromuscular diseases. Patients with neuromuscular diseases who engaged in gratitude journaling for three-weeks experienced a

greater increase in improved sleep quality and amount of sleep compared to patients in a control condition (Emmons & McCullough, 2003). Therefore, gratitude journaling has the potential to improve physical health behaviors.

Gratitude journaling also appears to impact biomarkers that reduce morbidity in patients with chronic health conditions (Redwine et al., 2016). One study examined the effects of a gratitude journaling intervention in a sample of 70 men and women with asymptomatic stage B heart failure (Redwine et al., 2016). Participants were randomized to a treatment-as-usual condition ( $n = 36$ ) or a gratitude journaling intervention ( $n = 34$ ) for an eight-week time period. Participants in the gratitude journaling intervention experienced a greater decrease in inflammatory biomarkers compared with participants in the treatment-as-usual condition (Redwine et al., 2016). Thus, gratitude journaling could improve both physiological health and health behaviors.

### **Theories Underlying Writing-Based Interventions**

There are several psychological theories that propose models outlining the influence of expressive writing on emotional functioning. One of the most well-known is the emotional inhibition model (Pennebaker, 1989), which posits that emotional suppression is associated with adverse psychological (e.g., increased depression and anger) and physical outcomes (e.g., increased heart rate and immunosuppression). Emotional suppression of stressful thoughts and feelings requires one to utilize psychological and physical resources, which in turn can lead to adverse outcomes. Thus, journaling interventions can improve psychological health by providing an acceptable outlet for disclosure of inhibited emotions, which in turn reduces physiological reactivity and stress over time.

Alternatively, the cognitive adaptation model (Pennebaker, 1997) suggests writing about a stressful experience might help an individual provide structure and organization to her memory, which can foster new perceptions. These new insights are assimilated and create a more nuanced understanding of the stressful experience. Writing about stressful experiences can also serve as a form of exposure therapy (Foa & Kozak, 1986) such that individuals habituate to stressful memories by writing about them in a structured manner. Negative body image could be conceptualized as an ongoing, stressful experience. Thus, repeatedly writing about one's body could desensitize individuals from the uncomfortable feelings associated with negative body image, thereby freeing up emotional resources, and increasing their ability to reorganize their thoughts surrounding their body (Earnhardt, Martz, Ballard, & Curtin, 2001). In sum, although additional research is needed to enhance understanding of the mechanisms of change within expressive writing interventions (Sloan & Marx, 2004), the emotional inhibition model (Pennebaker, 1989) and cognitive adaptation model (Pennebaker, 1997) provide strong theoretical rationales for these approaches.

### **Expand Your Horizon**

Until recently, gratitude journaling interventions were not specifically body-focused. *Expand Your Horizon (EYH)* is a relatively recently developed body-focused gratitude journaling intervention that utilizes body functionality to combat self-objectification (Alleva, Diedrichs, Halliwell, Peters, et al., 2018; Alleva et al., 2014, 2016; Alleva, Martijn, et al., 2015). Objectification theory posits that women learn to fixate on the appearance of their body and view it as a passive object from an outsider's perspective (i.e., self-objectification; Fredrickson & Roberts, 1997). Given the ubiquitous unrealistic portrayals of women's bodies in the media, body dissatisfaction and body shame often develop (Fredrickson & Roberts, 1997). In contrast,

body functionality involves appreciating the body for its physical functioning (e.g., stamina), internal processes (e.g., digesting), and ability to engage in pleasurable activities (e.g., self-care; Alleva et al., 2014). Thus, body functionality instills body gratitude by shifting one's focus from appearance to a more holistic view of the body.

*EYH* is a one-week intervention consisting of three online body functionality writing assignments. Participants are first given a broad definition of body functionality and its importance to well-being. Each of the three writing assignments asks participants to focus on the importance of various aspects of body functionality: first on the body's senses (e.g., taste) and physical capacities (e.g., dancing), second on health (e.g., digestion) and creative endeavors (e.g., drawing), and third on self-care (e.g., sleeping) and communication with others (e.g., hugging).

Participants in *EYH* had greater improvements in body appearance satisfaction (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018; Alleva, Diedrichs, Halliwell, Peters, et al., 2018; Alleva, Martijn, et al., 2015) and body functionality satisfaction (i.e., appreciation for what the body can do; Alleva et al., 2014) compared to a control group. For instance, completing just one writing assignment from this intervention led to greater improvements in body functionality satisfaction in women ages 30-50, relative to a control group that wrote about their route to work at one-week follow-up (Alleva et al., 2014). These results are promising given that body functionality satisfaction is also related to more adaptive eating behaviors (Avalos & Tylka, 2006) and higher exercise frequency (Homan & Tylka, 2014).

Participation in *EYH* is also associated with improvements in self-objectification (Alleva, Martijn, et al., 2015). This finding is significant given self-objectification's associations with internalization of body ideals and subsequent disordered eating (Fredrickson & Roberts, 1997; Schaefer et al., 2018; Tiggemann & Williams, 2012). Because *EYH* creates a more

comprehensive view of one's body, it might lower the importance of appearance to one's self-concept. Consequently, this intervention could be protective in combatting media appearance pressures. Indeed, women who completed one *EYH* exercise demonstrated higher body appreciation and body functionality satisfaction following exposure to thin-ideal imagery compared with women in a control condition (Alleva et al., 2016). Therefore, this intervention might buffer women from the potential harms of viewing body ideals.

*EYH* also yielded greater increases in body appearance satisfaction and body functionality satisfaction in college women with poor body image (Alleva, Martijn, et al., 2015) and women with rheumatoid arthritis (Alleva, Diedrichs, Halliwell, Peters, et al., 2018) relative to a control group at one-week follow-up. However, there is equivocal evidence regarding *EYH*'s ability to improve body appearance satisfaction in women without body image concerns (Alleva et al., 2014). It should be noted that women with higher levels of body image disturbances reap more benefits from body image interventions generally because they have more room (i.e., range) to improve (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018; Alleva, Sheeran, Webb, Martijn, & Miles, 2015). Finally, there is evidence that the effects of *EYH* on appearance satisfaction and functionality satisfaction persist at one-month follow-up, which is impressive given that the intervention only takes about 45 minutes to complete (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018).

*EYH* is an accessible and affordable treatment modality with the potential to improve body dissatisfaction. However, its effects on WBI and health behaviors have not yet been evaluated. Only one study to date has examined the effectiveness of a body-focused gratitude intervention (not *EYH*) on WBI (Dunaev et al., 2018). This study used a different prompt than *EYH*. Specifically, these authors asked participants in the body gratitude group to write about



physical appearance *or* health *or* body functionality. In contrast, participants in the control group wrote about their ideal vacation. At post-testing, participants in the body-focused gratitude journaling condition reported lower WBI and body dissatisfaction compared with control participants (Dunaev et al., 2018). However, because this intervention utilized a post-test only design, its effectiveness in short-term and long-term WBI reduction is unknown (Dunaev et al., 2018). Additionally, many participants in the body gratitude group wrote about appearance-related gratitude, which might have resulted in self-objectification, a well-known risk factor for disordered eating (Cash, Melnyk, & Hrabosky, 2004; Fitzsimmons-Craft, 2011; Schaefer et al., 2018; Tiggemann & Williams, 2012). *EYH* emphasizes body functionality, which is less likely to trigger appearance-related cognitions and subsequent self-objectification. Therefore, more research is needed on *EYH*'s potential to reduce WBI and improve health behaviors.

Finally, it is important to note that most participants included in *EYH* research were White women, limiting the generalizability of findings (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018; Alleva, Martijn, et al., 2015). Indeed, most body image interventions are normed on White women (Stice, Shaw, Burton, & Wade, 2006; Stice, Shaw, & Marti, 2007) despite comparable rates of body dissatisfaction in ethnically and racially diverse women (Betz & Ramsey, 2017; Roberts, Cash, Feingold, & Johnson, 2006). Extant body image interventions tend to focus on the reduction of thin-ideal internalization (Stice, Shaw, Becker, & Rohde, 2008), an appearance ideal more relevant to White women (Ordaz et al., 2018; Overstreet, Quinn, & Agocha, 2010). *EYH*'s emphasis on body functionality might be a more culturally sensitive approach to fostering body acceptance. Thus, this project examined the intervention's effectiveness in a group of ethnically and racially diverse women.

## **Objectification Theory**

*EYH* was created using objectification theory. This theory posits that women are evaluated primarily on the basis of their appearance rather than their personality or intellect. Further, the media often presents women's bodies in a fragmented way, such that women's bodies are "reduced to the status of mere instruments (Fredrickson & Roberts, 1997, p. 175)." As a result, women are presented as not fully human in the media, and their internal attributes are often ignored. Thus, appearance becomes an important part of women's self-concept (Fredrickson & Roberts, 1997).

Additionally, women experience a number of sociocultural appearance pressures (e.g., the media, comments from friends and family) that socialize them to view their body as a passive object for others' pleasure. This is known as self-objectification, or the process of adopting an outsider's perspective towards one's own body. Self-objectification results in lower body attunement, which could partially explain the higher rates of sexual dysfunction, depression, and eating disorders in women (Fredrickson & Roberts, 1997). Given that many women do not attain cultural beauty ideals, body shame often develops. Body shame is a negative emotion resulting from the belief that one is a bad person because she does not meet cultural beauty ideals (McKinley & Hyde, 1996).

Body shame and self-objectification are underlying mechanisms for WBI and potent motivators for healthcare-related stress (Mensing et al., 2018), exercise avoidance (Castonguay, Pila, Wrosch, & Sabiston, 2015; Monge-Rojas et al., 2017), and disordered eating (Fitzsimmons-Craft, 2011; Schaefer et al., 2018; Tiggemann & Williams, 2012). Therefore, health behavior change interventions should endeavor to lower body shame and self-objectification. For instance, redirecting women's focus from their body's appearance to their

body functionality might combat self-objectification (Alleva et al., 2014). Additionally, enhancing awareness of body functionality could increase body attunement, which, in turn, might promote positive body image (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018; Tiggemann, Coutts, & Clark, 2014).

### **Summary and Purpose of the Current Study**

Evidence indicates that weight stigma affects physical and mental health above and beyond the effects of BMI (Durso & Latner, 2008). Experiences of weight stigma often lead to weight bias internalization (WBI), the process of accepting and applying negative weight-related stereotypes to oneself (i.e., self-directed stigma; Durso & Latner, 2008). Weight bias internalization is particularly harmful because it is a chronic stressor directly affecting health through increased allostatic load, emotional eating, and exercise avoidance (Tomiyama, 2014; Vadiveloo & Mattei, 2017). These outcomes, along with WBI's positive association with disordered eating (Schvey & White, 2015), and healthcare avoidance (Mensinger et al., 2018), and negative relation to physical activity (Mensinger & Meadows, 2017), make it a key target for health behavior change intervention efforts. However, few interventions have specifically targeted WBI. In addition, these previous treatments have required substantial resources, and were limited to individuals with overweight and obesity (Palmeira et al., 2017; Pearl et al., 2018). Affordable, accessible interventions targeting WBI in individuals across the BMI spectrum remain an unmet public health priority.

Gratitude journaling interventions are effective in improving health, require few resources, and can be widely disseminated. Several body gratitude journaling interventions have yielded improvements in body dissatisfaction (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018; Alleva, Diedrichs, Halliwell, Peters, et al., 2018; Alleva, Martijn, et al., 2015; Stern & Engeln,

2018). Although body dissatisfaction and WBI are related, they are distinct constructs (as body dissatisfaction is a more generalized negative attitude towards one's body). Despite the potential success of body gratitude journaling interventions, only one study to-date, limited by a post-test only design, has tested this approach for WBI (Dunaev et al., 2018). Additionally, this study used an appearance-related gratitude prompt, which could result in self-objectification (Dunaev et al., 2018).

Moreover, *EYH* has primarily been tested on White women. This intervention's focus on body functionality rather than thin-ideal reduction could be especially relevant for women of color, who often have body ideals that extend beyond thinness. Finally, previous research consistently demonstrates *EYH*'s ability to improve body functionality appreciation (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018; Alleva et al., 2014; Alleva, Martijn, et al., 2015). However, there is a dearth of research on health-related attitudes and mental health variables following this intervention.

To address these gaps, the current study recruited a racially and ethnically diverse group of women and used an experimental pre-post design, conducted over a one-week period with a one-week follow-up, to extend and expand previous work in this area. Participants were randomly assigned to an online body gratitude journaling intervention (i.e., *EYH*) or an active control group. The intervention consisted of three previously developed body gratitude writing assignments from *EYH* (Alleva et al., 2015). This study had three aims:

**Aim 1:** To assess the preliminary effectiveness of *EYH* on the primary outcome of WBI, on secondary psychological outcomes (e.g., self-compassion and depression), and on health-related attitudes (e.g., physical activity acceptance and healthcare stress).

H<sup>1</sup>: *It was hypothesized that participants in EYH would demonstrate greater reductions in WBI relative to participants in the control condition at follow-up.*

H<sup>2</sup>: *Participants in EYH would experience greater improvements in healthcare stress, physical activity acceptance, functional body appreciation, and mental health measures (e.g., self-compassion and disordered eating symptomatology) relative to participants in the control condition at follow-up.*

**Aim 2:** To conduct racial/ethnic comparisons in treatment outcomes following the intervention.

No a priori hypotheses were proposed because *EYH* has primarily been evaluated on White women. White women experience higher levels of WBI than Black women (Puhl et al., 2018). Thus, it is possible White women would experience greater reductions in WBI compared to Black women given that they have more room to improve (Alleva, Sheeran, et al., 2015).

**Aim 3:** To investigate the underlying mechanisms that potentially moderate and mediate treatment outcomes.

The researcher examined whether WBI and body image dissatisfaction moderated and mediated treatment outcomes. There is some evidence to suggest that women with high WBI experience smaller improvements following interventions (Mensing et al., 2016; Mensinger & Meadows, 2017). However, a meta-analysis found that women with high body dissatisfaction (and likely WBI) respond better to body image interventions because they have more room to improve (Alleva, Sheeran, et al., 2015). Thus, no directional hypotheses were made regarding WBI's impact on treatment outcomes.

In summary, WBI is related to a variety of negative mental and physical health outcomes. However, few interventions have specifically targeted this construct. Moreover, prior studies have not examined the impact of a body gratitude journaling intervention on WBI and physical

health attitudes (e.g., healthcare stress) longitudinally. The current study provided data on the preliminary effectiveness of *EYH*. Results have the potential to increase the accessibility of treatment, improve health behaviors, and lower healthcare burden.

## Method

### Recruitment and Participants

After receiving approval from the university's Institutional Review Board, participants were recruited through SONA, the Psychology department participant pool, the TelegRAM, a university newsletter, and social media platforms. Participants had to identify as a woman, ages 18-25 years, and have some degree of WBI at baseline, measured by positively endorsing at least one item of WBI on the WBI-M scale (details below). Men were ineligible because they experience significantly lower levels of WBI than women (Puhl et al., 2018), *EYH* has primarily been tested with samples of women (Alleva, Diedrichs, Halliwell, Martijn, et al., 2018; Alleva, Martijn, et al., 2015), and the study materials depicted women (see descriptions in Methods). All participants completed an electronic informed consent prior to the study. Although email addresses were collected for payment and measures, REDCap technology enables researchers to download the data without participant identifiers (i.e., email addresses). Therefore, all participant responses were deidentified prior to data analysis.

Participants ( $n = 103$ ) completed all writing assignments and follow-up measures. Two participants were excluded from analyses for not answering two of the three validation questions correctly (described below in Measures). Participants answered one validation question after each writing assignment. Most ( $n = 65$ ) answered all three validation questions correctly. However, 36 participants answered the question, "How long did this exercise take you?" incorrectly. Specifically, they wrote the actual length of time it took them to complete the writing

exercise (e.g., 15 minutes), rather than selecting “no answer” as instructed. The researcher reviewed these participants’ writing for the days they answered incorrectly to assess fidelity. All but one of these participants responded appropriately to the prompt, and thus  $n=35$  were included in analyses. These individuals had also correctly answered the validation questions on two of the three intervention days.

The final sample ( $N=100$ ) had a mean age of 20.55 years ( $SD=2.17$ ) and a mean BMI of 26.28 ( $SD=7.64$ ); 23.8% were first-year students, 25.7% second-year, 30.7% third-year, 5.0% fourth-year, 2.0% college graduates, and 9.9% graduate students. Of the total sample, 46.5% identified as White, 11.9% Black, 8.9% Latinx, 21.8% Asian, and 9.9% multiracial; 62.4% identified as straight, 3.0% lesbian, 24.8% bisexual, 4% queer, and 4% “other.” 31.7% of participants were recruited from SONA, 10.9% from social media/flyers, and 57.4% from the TelegRAM. See Table 1 for participant characteristics.

Table 1.

*Participant Characteristics by Condition and Overall*

	<i>EYH</i> ( $n=51$ )	Active control ( $n=49$ )	Overall ( $N=100$ )
Age	20.63 (2.01)	20.47 (2.34)	20.55 (2.17)
BMI	27.14 (9.23)	25.35 (5.39)	26.28 (7.64)
Race/ethnicity			
White	42.3% (22)	51.0% (25)	46.5% (47)
Black	13.5% (7)	10.2% (5)	11.9% (12)
Latinx	11.5% (5)	6.1% (3)	8.9% (8)
Asian	19.2% (10)	24.5% (12)	21.8% (22)
Multiracial	13.5% (7)	6.1% (3)	9.9% (10)
Year in school			
First	17.3% (9)	30.6% (15)	23.8% (24)
Second	28.8% (15)	22.4% (11)	25.7% (26)
Third	36.5% (18)	24.5% (12)	30.7% (30)
Fourth	1.9% (1)	8.2% (4)	5.0% (5)
College graduate	0% (0)	4.1% (2)	2.0% (2)
Graduate student	11.5% (6)	8.2% (4)	9.9% (10)
Sexual orientation			
Straight	67.3% (35)	57.1% (28)	62.4% (63)

Lesbian	1.9% (1)	4.1% (2)	3.0% (3)
Bisexual	19.2% (10)	30.6% (15)	24.8% (25)
Queer	5.8% (3)	2.0% (1)	4.0% (4)
Other	5.8% (3)	2.0% (1)	4.0% (4)

*Note.* Age is presented as  $M(SD)$ . Categorical variables presented as % ( $n$ ). Women were asked to choose all racial/ethnic groups that applied. Demographics were optional and some participants did not report this information. Thus, some variables do not add up to the total sample size.

## Procedures

All data were collected online via REDCap (Harris et al., 2009). After providing informed consent, participants completed a baseline questionnaire that included demographic, body image, psychological, and health-related measures. The baseline questionnaire was a part of a larger study examining WBI in undergraduate women. Thus, participants had to express interest through a yes/no question at the end of this baseline survey in order to be considered for enrollment in the intervention phase. After completing baseline, eligible participants were randomly assigned within one business day to either the control or *EYH* condition (conditions were assigned in Excel and then transferred into a randomization module in REDCap).

Participants were emailed the link to REDCap for the first day of the writing intervention following randomization. Two days later, they received the second writing assignment. Two days after that, they received the final writing assignment and post-test measures. One week later, they received follow-up measures. Participants received two reminder emails if any of the writing assignments or follow-up measures were not completed within 24 hours and then again in 48 hours. Participants were debriefed at follow-up and offered the videos to the other condition. Participants received a \$5 Amazon e-gift card for completing post-test measures and a \$5 e-gift card for completing follow-up measures. In sum, this study was a parallel randomized control trial design with assessments at baseline, post-test (one week), and follow-up (two weeks).



**Instructions for both conditions.** Participants in both conditions were instructed to: 1) keep writing once they had started, 2) try to write for at least 10 minutes, and 3) reread what they had written once they had finished. Writing assignments were emailed to participants over a one-week time period. Unlike the original intervention, the researcher created videos for both conditions because previous research suggests emerging adults are more engaged with digital (vs. print) media (Coyne, Padilla-Walker, & Howard, 2013; Twenge, Martin, & Spitzberg, 2019; Villanti et al., 2017). These videos were uploaded to YouTube; each was three-five minutes long. Based on social learning theory (Bandura, 1986), these videos showed young adult women answering the various writing prompts as a way to model the condition. The conditions had the same actresses, format, and length. The entire study was conducted online, to minimize participant burden and facilitate dissemination.

**Expand Your Horizon.** The *EYH* group's first video included an introduction describing the importance of body functionality and a list of examples of different body functions (Appendix A). The subsequent videos focused on specific aspects of body functionality (see Table 2). It should be noted this intervention encompassed a variety of body functions that are not restricted to able-bodied people (Alleva et al., 2015). Therefore, *EYH* could be used with women with a wide range of physical abilities. Each of the three writing exercises asked participants to focus on a different component of body functionality and consider why these functions are personally important to them. See Table 2 for an overview of writing assignments.

Table 2. Content of *Expand Your Horizon*

Day	Writing assignment focus	Examples
1	Body functions related to senses and sensations	Sight, Taste, Smell, Touch, Feel emotion
	Body functions related to physical activity and movement	Running, Stretching, Walking, Strength, Sports
3	Body functions related to health	Healing from a cold/wound, Digesting food, Breathing
	Body functions related to creative endeavors	Dancing, Painting, Drawing, Singing, Writing, Reading
5	Body functions related to self-care	Sleeping, Eating, Drinking, Cooking, Showering
	Body functions related to communication with others	Talking, Body language, Facial expressions, Hugging

**Active control group.** The active control group was part of a writing creativity program that was used in a previous pilot randomized control trial of *EYH* (Alleva, Martijn, et al., 2015). This group received an introduction outlining the importance of creativity to well-being. They also wrote three different essays over the course of one week (Appendix B). However, the original prompts were modified for the current study. The researcher gave the control condition three different prompts in order to match the number of prompts given in the active condition, and to reduce boredom. These prompts were similar to writing assignments included in college applications (see Table 3 for details). Like the intervention group, participants in the control group also viewed three different videos (one for each prompt). See Table 3 for an overview of writing assignments.

Table 3. Content of the Active Control

Day	Writing assignment focus	Examples
1	Describe an accomplishment or realization	Getting into school, Realizing a career that you wanted to pursue, Learning a new skill
3	Write about an engaging hobby or an interesting activity	Cooking, Reading, Sports, Studying an interesting topic, Playing a videogame, Hanging out with friends
5	Write about a problem you've solved or you'd like to resolve	Resolving a conflict with a friend, Time management How you chose a major/job

### Expert and Peer Review Feedback of the Videos

Prior to recruitment, videos were sent to undergraduate women aged 18-25 for feedback. Additionally, videos were sent to several researchers in the field of body image: Dr. Suzanne Mazzeo, Dr. Jessica Alleva, and Dr. Jennifer Webb. Based on peer and expert feedback, videos were shortened to no longer than five minutes and each contained an introduction and conclusion slide to remind participants of the prompts. The actresses in the videos were White, 62.5% ( $n=5$ ), Black, 12.5% ( $n=1$ ), South Asian, 12.5% ( $n=1$ ), and multiracial, 12.5% ( $n=1$ ). One actress uses a wheelchair. Expert and peer reviewers reported they liked the diversity of women.

## Measures

All measures were administered at each time point (baseline, post, and one-week follow-up) unless otherwise noted.

**Demographic questionnaire.** At baseline only, participants were asked their age, year in school, race/ethnicity, sexual orientation, and gender (Appendix C). Only individuals who self-identified as women were eligible for the study. Individuals reporting other gender identities were not randomized into either condition.

**Instructional manipulation check.** After finishing each of the writing assignments, participants completed an instructional manipulation check to ensure that they were reading the directions. For this check, participants were instructed to respond “No Answer” to the question “How long do you believe this survey was?”, to write “I read the instructions” in a comment box that followed, and to select a certain answer. These manipulation checks have been used in a previous online gratitude journaling intervention (Dunaev et al., 2018).

**Modified Weight Bias Internalization Scale (WBIS-M; Pearl & Puhl, 2014).** The WBIS-M is a self-report measure that examines the degree to which people accept negative weight-related stereotypes and apply these stereotypes to themselves (Appendix D). Participants had to positively endorse at least one item to meet eligibility criteria. An example item is: “Because of my weight, I don’t feel like my true self.” This scale consists of 11 items rated on a seven-point scale (1 = *strongly disagree*, 7 = *strongly agree*). Items are summed and then averaged to produce a total score with higher scores suggesting stronger internalized weight bias. It yields internally consistent scores (Cronbach’s alpha = .94) and demonstrates validity, including predicted associations with body image, eating pathology, and anti-fat attitudes (Pearl

& Puhl, 2014). In the current study, Cronbach's alphas were: .89 (baseline), .89 (post), and .90 (follow-up).

**Functionality Appreciation Scale (FAS;** Alleva, Tylka, & Kroon Van Diest, 2017). The FAS examines the degree to which one appreciates her body's physical functioning and capabilities (Appendix E). This measure has seven items rated on a five-point scale (1 = *strongly disagree*, 5 = *strongly agree*). An example item is: "I appreciate my body for what it is capable of doing." Items are summed and then averaged to produce a total score with higher scores reflecting greater functionality appreciation. This scale is internally consistent (Cronbach's alpha = .87) for women and demonstrates incremental validity (i.e., predicts positive body image above and beyond self-compassion; Alleva et al., 2017). Cronbach's alphas were: .87 (baseline), .93 (post), and .94 (follow-up) in the current study.

**Body-Image Ideals Questionnaire (BIIQ;** Cash & Szymanski, 1995). The BIQ is a 22-item measure of appearance satisfaction (Appendix F). This scale examines both perceived discrepancy between one's body image ideal and current appearance as well as the importance of appearance to one's self-concept. Unlike many other body image measures that focus exclusively on weight/shape concern, the BIQ assesses satisfaction with several physical attributes, such as facial features, hair, and chest size. Qualitative research demonstrates that Black, Indigenous, and people of color (BIPOC) women's body image is determined by multiple components that are not captured by weight/shape measures (Awad et al., 2015; Capodilupo, 2015; McHugh, Coppola, & Sabiston, 2014). Therefore, the BIQ could be a more culturally sensitive body image measure.

This measure gives respondents a list of physical characteristics and instructs them to indicate both how much they resemble their personal physical ideal on a four-point scale (0 =

*exactly as I am*, 3 = *very unlike me*), and how important their ideal is to them on a four-point scale (0 = *not important*, 3 = *very important*). This scale consists of two subscales: Discrepancy from personal ideals and Importance of these ideals. Items are summed and averaged.

Additionally, a weight discrepancy composite score can be derived by multiplying the total score from both subscales, with higher scores reflecting more appearance dissatisfaction (composite scores can range from -3 to +9). This measure demonstrated good internal consistency for the weighted discrepancy score (Cronbach's alpha = 0.77) and the related subscales (discrepancy ideals alpha = 0.75; importance of ideals alpha = 0.82; Cash & Szymanski, 1995). Convergent validity was established via its associations with other body image measures (Cash & Szymanski, 1995). In this study, Cronbach's alphas across time-points were: discrepancy from ideals: .71 (baseline), .72 (post), and .86 (follow-up); importance of ideals: .76 (baseline), .82 (post), .86 (follow-up); and weight discrepancy: .77 (baseline), .75 (post), and .90 (follow-up).

**Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996).** This 24-item measure assesses the degree to which one experiences her body as an object (Appendix G). The OBCS consists of three subscales: Body Surveillance, Body Shame, and Appearance Control Beliefs. The Body Surveillance subscale measures one's tendency to engage in habitual body checking and the degree to which one thinks of her body in terms of appearance rather than function (e.g., "During the day I think about how I look many times."). The Body Shame subscale assesses the degree to which one believes that she is a bad person because she does not meet cultural beauty ideals (e.g., "I feel ashamed of myself when I haven't made the effort to look my best."). The Appearance Control Beliefs subscale measures the degree to which one believes that she can control her weight and appearance (e.g., "I think a person can look pretty much how they want to if they are willing to work at it."). All subscales can be summed and

averaged for a total objectified body consciousness score. Items are rated on a 7-point scale ranging from 1 = *strongly agree* to 7 = *strongly disagree*. Items for each subscale are summed and averaged with higher scores reflecting greater levels of objectified body consciousness.

This measure demonstrated adequate internal consistency for body surveillance (Cronbach's alpha = 0.79) and body shame (Cronbach's alpha = 0.84). However, the appearance control beliefs subscale had lower internal consistency (Cronbach's alpha = 0.68; McKinley & Hyde, 1996). Criterion-related validity was evidenced by its expected associations with disordered eating and body esteem (McKinley & Hyde, 1996). In this study, average Cronbach's alphas were: body surveillance .80 (baseline), .82 (post), .82 (follow-up); body shame .78 (baseline), .81 (post), .82 (follow-up); appearance control .76 (baseline), .77 (post), .80 (follow-up); and total objectified body consciousness score .74 (baseline), .77 (post), .78 (follow-up).

**Self-Compassion Scale-Short Form** (SCS-SF; Raes, Pommier, Neff, & Van Gucht, 2011). This is a 12-item measure that assesses the degree to which one is able to hold her own feelings of suffering with a sense of warmth, connection, and concern (Appendix H). This shortened measure was used in lieu of the original 26-item Self-Compassion Scale (SCS; Neff, 2003) to reduce participant burden. An example item includes: "When I am going through a very hard time, I give myself the caring and tenderness I need." Items are rated on a five-point scale (1 = *almost never*, 5 = *almost always*), and are summed and averaged to create a total score, with higher scores suggesting greater self-compassion. This scale yielded internally consistent scores (Cronbach's alpha = .86) and had a high correlation with the original SCS ( $r = .97$ ; Raes et al., 2011). Additionally, the SCS-SF demonstrates criterion-related validity as evidenced by its expected associations with thin-ideal internalization and disordered eating (Tylka, Russell, &

Neal, 2015). Cronbach's alphas were .84 (baseline), .81 (post), and .90 (follow-up) in the current study.

**Depression, Anxiety, and Stress Scales** (DASS-21; Lovibond & Lovibond, 1995). This 21-item measure asks participants to rate the frequency and severity of negative emotions over the previous week (Appendix I). Items are rated on a four-point scale (0 = *did not apply to me at all*, 3 = *applied to me very much or most of the time*). This scale consists of three subscales: depression, anxiety, and stress. The depression subscale examines the degree to which someone experiences dysphoric mood and anhedonia (e.g., "I couldn't seem to experience any positive feeling at all."). The anxiety subscale assesses arousal states, including muscular tension and restlessness (e.g., "I experienced breathing difficulty e.g., excessively rapid breathing, breathlessness in the absence of physical exertion."). The stress scale examines general tension and rapid changes in emotions (e.g., "I tended to over-react to situations.").

Because this is a shortened measure of the DASS-42 (Lovibond & Lovibond, 1993), each subscale is summed and multiplied by two to create a total score. This measure demonstrated good internal consistency for the depression score (Cronbach's alpha = 0.83), anxiety score (Cronbach's alpha = 0.78), and stress score (Cronbach's alpha = 0.87; Norton, 2007).

Convergent validity was established via each subscale's expected associations with other measures of anxiety, depression, and positive/negative affect (Lovibond & Lovibond, 1995; Norton, 2007). In this study, average Cronbach's alphas were: stress .70 (baseline), .81 (post), .87 (follow-up); anxiety .79 (baseline), .83 (post), .89 (follow-up); and depression .86 (baseline), .89 (post), .91 (follow-up).

**Eating Disorder Examination Questionnaire** (EDE-Q; Fairburn & Beglin, 1994).

Disordered eating symptoms were assessed using the EDE-Q (Appendix J; Fairburn & Beglin,

1994), a 36-item self-report measure examining frequency of disordered eating behaviors and attitudes over the past 28 days (Fairburn & Beglin, 1994). Items are rated on a scale ranging from 1 (*No days*) to 7 (*Every day*). This measure consists of four subscales: eating concern (EDE-Q-EC: “Have you eaten in secret?”), shape concern (EDE-Q-SC: “Have you definitely wanted your stomach to be flat?”), weight concern (EDE-Q-WC: “Have you had a definite fear that you might gain weight or become fat?”), and dietary restraint (EDE-Q-R: “Have you tried to avoid eating foods which you like in order to influence your shape or weight?”) A global score is obtained by averaging responses across the four subscales. The global score consists of 30 of the 36 items. The six items excluded from the global score assess the frequency of disordered eating behaviors. The measure demonstrated good internal consistency for the overall score (Cronbach’s alpha = .90) and the subscales had alpha levels of .70 (restraint), .73 (eating concern), .83 (shape concern), and .90 (weight concern; Peterson et al., 2007). In this study, average Cronbach’s alphas were: shape concern .88 (baseline), .91 (post), .88 (follow-up); weight concern .77 (baseline), .78 (post), .78 (follow-up); eating concern .77 (baseline), .82 (post), .82 (follow-up); and global score .92 (baseline), .94 (post), and .93 (follow-up).

**Healthcare stress** (Mensing et al., 2018). This five-item scale was originally adapted for a study on healthcare anxiety in higher weight women (Appendix K). Participants use a 10-point scale (1 = *No stress*, 10 = *Very stressed*) to indicate their level of stress when thinking about numerous healthcare encounters. An example item is: “Please indicate your level of stress when you think about going to the gynecologist.” This measure was developed by weight stigma experts and tested with healthcare providers. Items are summed and then averaged to produce a total score with higher scores indicating higher levels of healthcare-related stress. The scale demonstrated internally consistent scores (Cronbach’s alpha = .91) and validity was established



via expected associations with perceived stress and patient trust (Mensing et al., 2018). Cronbach's alphas were: .73 (baseline), .79 (post), and .82 (follow-up) in this study.

**Healthcare avoidance** (Mensing et al., 2018). This four-item scale measures how often someone avoids healthcare (Appendix L). In the current study, an item about mammograms was deleted because it is not relevant to this age group. Also, given the short follow-up period, it was assumed that participants' healthcare utilization would not change over the course of the study. Thus, the researcher also modified the rating scale to reflect intent to avoid healthcare. Participants used a five-point scale (1 = *Extremely Likely*, 5 = *Extremely Unlikely*) to indicate their likelihood of utilizing numerous healthcare encounters. An example item is: "How likely are you to receive annual gynecological exams?" Items are summed and then averaged to produce a total score with higher scores indicating a higher intent to avoid healthcare. The scale demonstrated internally consistent scores (Cronbach's alpha = .82) and validity was established via an expected correlation with another scale that measured delay of care (Mensing et al., 2018). Average Cronbach's alphas were .68 (baseline), .70 (post), and .64 (follow-up) in the current study.

**Physical Activity Acceptance Questionnaire (PAAQ)** (Butryn et al., 2015). The PAAQ is a 10-item measure that assesses participants' ability to accept the discomfort associated with exercising (Appendix M). Responses are rated on a seven-point scale (1 = *never true*, 7 = *always true*). This measure consists of a total score and two subscales: cognitive acceptance and behavioral commitment. Cognitive acceptance refers to one's ability to engage in physical activity despite having discouraging thoughts. An example item is, "If I have the thought 'exercising today won't be enjoyable,' it derails me from my exercise plan." Behavioral commitment refers to one's ability to engage in exercise despite uncomfortable feelings or

physical sensations. An example item includes, “Even if I have the desire to stop while I am exercising, I can still follow my exercise plan.” Items are summed and averaged with higher scores reflecting a greater ability to accept and commit to physical activity.

This measure demonstrated good internal consistency for the total score (Cronbach’s alpha = 0.87) and the related subscales (Cognitive Acceptance alpha = 0.83; Behavioral Commitment alpha = 0.85; Butryn et al., 2015). This scale has shown construct validity via its expected associations with objectively assessed physical activity, mindfulness, and acceptance (Butryn et al., 2015). In this study, average Cronbach’s alphas were: cognitive acceptance .76 (baseline), .78 (post), .82 (follow-up); behavioral commitment .74 (baseline), .81 (post), .80 (follow-up); and total score .82 (baseline), .78 (post), .83 (follow-up).

### **Data Analysis Plan**

Data were cleaned and analyses conducted in SPSS 27.0. To minimize missing data, all ordinal items required a response in REDCap, but included the option *Prefer not to answer*. Little’s MCAR test demonstrated data were missing completely at random at each time point,  $\chi^2(6)=3.10, p<.05$  (baseline), no missing data (post-test), and  $\chi^2(10)=71.47, p<.05$  (follow-up). Thus, all missing data were handled with listwise deletion. There were no outliers (i.e.,  $>3.0$  SD) on primary study variables. Data were normal across time-points ( $<2.0$  skewness and kurtosis), with the exception of the FAS, which was negatively skewed (2.76). However, this is in line with previous studies that have examined the FAS (Alleva et al., 2017). Therefore, the researcher did not transform any variables. T-tests revealed there were no significant baseline differences between groups; thus, no covariates were added into the following analyses. This provides evidence that randomization was successful. GLM assumptions, including normality, linearity,

and homoscedasticity were assessed. Descriptive statistics across time are presented in Table 4 (all participants enrolled at each time point).

Table 4.

*Means and Standard Deviations of Overall Sample*

	Measure	Overall (N=100)		
		Baseline	Post	FU
Body image variables				
	WBI-M	4.62 (1.15)	3.99 (1.14)	3.83 (1.22)
	BIIQ Total	4.66 (2.04)	-2.42 (.78)	3.75 (3.02)
	FAS	3.93 (.73)	4.34 (.63)	4.31 (.65)
	OBCS	4.66 (.57)	4.35 (.61)	4.37 (.70)
Mental health variables				
	SCS – SF	2.59 (.61)	2.81 (.57)	2.88 (.70)
	DASS - Depression	15.68 (9.52)	13.64 (9.63)	13.23 (10.65)
	DASS - Anxiety	13.13 (9.01)	11.33 (8.85)	11.11 (10.01)
	DASS – Stress	19.90 (7.17)	16.20 (8.71)	16.69 (9.84)
	EDE-Q Global	3.67 (1.19)	3.18 (1.25)	2.99 (1.22)
Physical health variables				
	Healthcare Stress	5.84 (1.87)	5.51 (1.96)	5.44 (2.03)
	Healthcare Avoidance	2.91 (1.06)	2.86 (1.06)	2.81 (1.03)
	PAAQ Total	3.76 (.96)	3.88 (.98)	3.93 (.95)

*Note.* WBI-M = Weight Bias Internalization Scale - Modified; BIIQ = Body Image Ideals Questionnaire; FAS = Functionality Appreciation Scale; OBCS = Objectified Body Consciousness Scale; SCS-SF = Self-Compassion Scale – Short Form; DASS = Depression, Anxiety, Stress Scales; EDE-Q = Eating Disorder Examination Questionnaire; PAAQ = Physical Activity Acceptance Questionnaire.

**Analytic strategy: Aim 1.** Preliminary effectiveness of the interventions was evaluated using repeated measures multivariate analysis of variances (R-MANOVAs) to examine between-subjects differences over time (0, one week [post-treatment], two weeks [follow-up]). Intervention group, time, and group\*time interaction were entered as the independent variables. The mental and physical health variables as well as body image variables (including WBI) were entered as the dependent variables. If there was a significant omnibus effect, post-hoc ANOVAs were run with Sidak corrections to account for multiple comparisons. Effect sizes and standard deviations were also calculated.

**Analytic strategy: Aim 2.** The researcher assessed between-group differences among White, Asian, and Black women in both conditions. The study was not adequately powered to examine differences among other racial/ethnic groups. The researcher examined baseline differences in variables with one-way ANOVAs with a Sidak correction and racial/ethnic group was entered as the independent variable. R-MANOVA was used to examine between-subjects differences over time. Racial group, time, and group\*time interaction were entered as the independent variables. The significant body image and health variables from the previous R-MANOVAs were entered as the dependent variables. Finally, the researcher ran post-hoc ANOVAs with Sidak corrections.

**Analytic strategy: Aim 3.** Mechanisms that influenced treatment outcomes were investigated using moderation and mediation. The PROCESS macro for SPSS (Hayes, 2013) was used to determine if baseline levels of WBI strengthened or weakened intervention effects on significant secondary outcomes (i.e., follow-up levels of functionality appreciation, OBCS body shame, OBCS body surveillance, self-compassion, depression, and anxiety). The researcher also examined whether baseline WBI had indirect effects on outcome variables through mediation.

### **Power Analysis**

An a priori power analysis was conducted using G\*Power software (Faul, Erdfelder, Buchner, & Lang, 2009) to determine sample size. A previous study using this same intervention found a medium effect size ( $f = .25$ ) for changes in body dissatisfaction (Alleva, Martijn, et al., 2015). This effect size was used to determine the sample size needed for a between-subjects effect of group on changes in WBI scores. With 80% power ( $1 - \beta$ ), a sample size of 60 participants was needed to detect the hypothesized medium-size effect on WBI. However, the research aimed for a sample of 100 to account for missing or incomplete data and to obtain more

diversity in the sample. Thus, 103 women were recruited and randomized into either the active control condition ( $n=50$ ) or the intervention group ( $n=53$ ). This pilot trial was under-powered (<80%) to detect moderation and mediation effects and racial/ethnic differences in treatment response. Thus, these analyses are presented as exploratory.

## Results

### Mean Word Count

Independent sample t-tests were run to determine if groups differed on average number of words written across the three days. Results revealed that the active control group ( $M = 276.92$ ,  $SD = 124.96$ ) wrote significantly more than the *EYH* group ( $M = 225.10$ ,  $SD = 112.105$ ) on Day 1,  $t(96.289) = -2.18$ ,  $p = .03$ . The *EYH* group ( $M = 198.15$ ,  $SD = 109.08$ ) did not differ from the active control group ( $M = 237.53$ ,  $SD = 116.75$ ) on Day 2,  $t(97.41) = -1.74$ ,  $p = .08$ . Finally, the active control group ( $M = 258.63$ ,  $SD = 121.04$ ) wrote significantly more than the *EYH* group ( $M = 208.37$ ,  $SD = 105.52$ ) on Day 3,  $t(95.34) = -2.21$ ,  $p = .03$ . These results suggest that overall, the active control group wrote significantly more words than the *EYH* group across the intervention.

### Preliminary Effectiveness on Body Image

All body image variables (i.e., WBI, BIIQ composite score, functionality appreciation, OBCS body surveillance, OBCS body shame, and OBCS total score) were entered into a repeated measures MANOVA (RMANOVA). EDE-Q weight or shape concern subscales were not included in the RMANOVA given that they seemed repetitive with body dissatisfaction as measured by the BIIQ. The Box's M test for homogeneity of the variance-covariance matrices across design cells was not significant,  $\text{Box-M} = 244.83$ ,  $F(171, 29089.15) = 1.15$ ,  $p = .084$ , which suggests that the multivariate homogeneity of variance assumption was met. However, three out of 18 of Levene's tests were significant, providing only partial univariate support for

the homogeneity of variance assumption. Thus, the researcher used Pillai's trace as a more conservative estimate of  $F$ -statistic. Results revealed that there was a main effect for time, Pillai's trace = .91,  $F(12, 87) = 68.91$ ,  $p < .001$ ,  $\eta^2 = .91$  and group, Pillai's Trace = .130,  $F(6, 93) = 2.31$ ,  $p = .04$ ,  $\eta^2 = .130$ . There was not a significant group\*time interaction, Pillai's trace = .05,  $F(2, 98) = 2.52$ ,  $p = .086$ ,  $\eta^2 = .05$ .

Follow-up ANOVAs with a Sidak correction were conducted comparing the groups on their overall dependent variable means. Across every index, except BIIQ, both groups significantly improved from baseline to follow-up on body image measures. Moreover, functionality appreciation improved more for the *EYH* group than the control group  $F(1, 98) = 11.04$ ,  $p < .001$ ,  $\eta^2 = .10$ . See Table 5 for descriptive statistics by group and timepoint, main effects, and effect sizes.

Table 5.

*Descriptive Statistics and Results of the RMANOVA Comparing the Conditions on Body Image Measures*

	EYH <i>n</i> =51			Control <i>n</i> =49			Effects	<i>F</i> -value	<i>p</i> -value	$\eta^2$
	Baseline	Post	FU	Baseline	Post	FU				
WBI-M	4.72 (1.19)	3.96 (1.15)	3.72 (1.26)	4.52 (1.12)	4.03 (1.13)	3.95 (1.18)	<i>Time</i>	50.61	<.001	.338
BIIQ - Total	4.84 (2.23)	-2.43 (.89)	3.34 (2.13)	4.47 (1.82)	4.47 (1.82)	-2.41 (.65)	<i>Time</i> <i>Group</i>	1.347 .006	.262 .937	.014 < .00
FAS	3.99 (.67)	4.59 (.39)	4.51 (.48)	3.85 (.78)	4.06 (.72)	4.11 (.74)	<i>Time</i> <i>Group</i>	38.64 11.04	.001 .001	.283 .101
OBCS - Total	4.63 (.65)	4.30 (.62)	4.24 (.61)	4.70 (.49)	4.42 (.60)	4.51 (.76)	<i>Time</i> <i>Group</i>	32.19 1.328	.001 .252	.247 .013
OBCS - Surveillance	5.18 (.91)	4.63 (.82)	4.57 (.89)	5.49 (.74)	4.88 (1.04)	4.86 (.91)	<i>Time</i> <i>Group</i>	46.08 3.26	.001 .074	.320 .032
OBCS - Shame	4.45 (1.23)	3.85 (1.21)	3.81 (1.19)	4.39 (.76)	3.93 (1.03)	4.02 (.99)	<i>Time</i> <i>Group</i>	28.20 .156	<.001 .694	.223 .002

*Note.* Sidak corrections for multiple comparisons; WBI-M = Weight Bias Internalization Scale - Modified; BIIQ = Body Image Ideals Questionnaire; FAS = Functionality Appreciation Scale; OBCS = Objectified Body Consciousness Scale.

### **Preliminary Effectiveness on Mental Health**

All mental health variables (i.e., SCS self-compassion, DASS depression, DASS anxiety, DASS stress, EDE-global score, EDE eating concern, and EDE restraint) were entered into a RMANOVA. The Box's M test for homogeneity of the variance-covariance matrices across design cells was significant,  $\text{Box-M} = 137.705$ ,  $F(78, 30721.909) = 1.54$ ,  $p = .002$ , indicating the multivariate homogeneity of variance assumption was not met. Three out of 21 of Levene's tests were significant, providing only partial univariate support for the homogeneity of variance assumption. Results revealed that there was a main effect for time, Pillai's trace = .37,  $F(8, 92) = 6.73$ ,  $p < .001$ ,  $\eta^2 = .37$ . There was not a significant main effect for group, Pillai's Trace = .065,  $F(4, 96) = 1.66$ ,  $p = .16$ ,  $\eta^2 = .065$ . There was not a significant group\*time interaction, Pillai's trace = .133,  $F(8, 92) = 1.76$ ,  $p = .09$ ,  $\eta^2 = .13$ . Follow-up ANOVAs with a Sidak correction demonstrated both groups significantly improved from baseline to follow-up on all mental health measures. See Table 6 for descriptive statistics by group and timepoint, main effects, and effect sizes.



Table 6.

*Descriptive Statistics and Results of the RMANOVA Comparing the Conditions on Mental Health Measures*

	EYH n=51			Control n=49			Effects	F-value	p-value	$\eta^2$
	Baseline	Post	FU	Baseline	Post	FU				
SCS-SF	2.58 (.62)	2.87 (.56)	3.02 (.61)	2.59 (.59)	2.74 (.57)	2.73 (.77)	<i>Time</i>	17.81	<.001	.153
DASS - Depression	16.54 (10.35)	14.23 (9.72)	13.26 (10.62)	14.78 (8.56)	13.02 (9.60)	13.18 (10.78)	<i>Time</i> <i>Group</i>	5.02 .342	.009 .560	.048 .003
DASS - Anxiety	14.73 (10.48)	13.61 (10.19)	12.00 (10.16)	11.43 (6.84)	8.89 (6.39)	10.16 (9.86)	<i>Time</i> <i>Group</i>	4.31 4.174	.017 .075	.042 .040
DASS- Stress	20.81 (7.55)	17.50 (9.17)	16.96 (9.71)	18.94 (6.68)	14.81 (8.05)	16.41 (10.08)	<i>Time</i> <i>Group</i>	14.36 1.313	<.001 .255	.127 .013
EDE-Q - Eating Concern	2.94 (1.44)	2.39 (1.35)	2.28 (1.33)	2.69 (1.25)	2.39 (1.25)	2.32 (1.23)	<i>Time</i> <i>Group</i>	27.48 .091	<.001 .763	.221 .001
EDE-Q - Restraint	2.89 (1.42)	2.49 (1.31)	2.30 (1.22)	2.76 (1.34)	2.25 (1.36)	2.21 (1.35)	<i>Time</i> <i>Group</i>	22.83 .383	<.001 .537	.191 .004
EDE-Q - Global Score	3.73 (1.22)	3.19 (1.23)	3.01 (1.21)	3.56 (1.17)	3.11 (1.27)	2.95 (1.23)	<i>Time</i> <i>Group</i>	65.37 .213	<.001 .646	.403 .002

*Note.* Sidak corrections for multiple comparisons; SCS-SF = Self-Compassion Scale – Short Form; DASS = Depression, Anxiety, Stress Scales; EDE-Q = Eating Disorder Examination Questionnaire.

### **Preliminary Effectiveness on Physical Health Attitudes**

All physical health attitudes (i.e., healthcare avoidance, healthcare stress, PAAQ cognitive acceptance, PAAQ behavioral commitment, and PAAQ total score) were entered into a RMANOVA. The Box's M test for homogeneity of the variance-covariance matrices across design cells was not significant,  $\text{Box-M} = 345.339$ ,  $F(231, 28487.670) = 1.52$ ,  $p = .06$ , indicating the multivariate homogeneity of variance assumption was met. One out of 15 of Levene's tests were significant, providing partial univariate support for the homogeneity of variance assumption. Results revealed that there was a main effect for time, Pillai's trace = .191,  $F(10, 89) = 2.10$ ,  $p = .03$ ,  $\eta^2 = .19$ . There was not a significant main effect for group, Pillai's Trace = .053,  $F(5, 94) = 1.06$ ,  $p = .38$ ,  $\eta^2 = .053$ . The main effect of time was qualified by a significant group\*time interaction, Pillai's trace = .208,  $F(10, 89) = 2.39$ ,  $p = .02$ ,  $\eta^2 = .21$ . This suggests that the rate of change between the groups differed over time.

Follow-up ANOVAs with a Sidak correction were conducted comparing the groups on their overall dependent variable means. All variables met the assumption of sphericity (Mauchly's  $W = .942-.994$ ;  $ps > .05$ ). Results demonstrated the active control group had a greater increase in physical activity cognitive acceptance from baseline to follow-up than the *EYH* group,  $F(2, 196) = 4.26$ ,  $p = .016$ ,  $\eta^2 = .041$ . Furthermore, the *EYH* group had a larger decrease in healthcare stress from baseline to follow-up compared to the active control group,  $F(2, 196) = 3.43$ ,  $p = .037$ ,  $\eta^2 = .033$ . See Table 7 for descriptive statistics by group and timepoint, interaction effects, and effect sizes.

Table 7.

*Descriptive Statistics and Results of the RMANOVA Comparing the Conditions on Physical Health Attitudes and Behaviors*

	EYH <i>n</i> =51			Control <i>n</i> =49			Effect	<i>F</i> -value	<i>p</i> -value	$\eta^2$
	Baseline	Post	FU	Baseline	Post	FU				
Healthcare Avoidance	2.77 (1.05)	2.74 (1.03)	2.63 (.92)	3.03 (1.06)	2.95 (1.07)	2.96 (1.10)	<i>Time x Group</i>	.366	.694	.004
Healthcare Stress	5.80 (1.96)	5.35 (1.99)	5.08 (2.10)	5.84 (1.78)	5.65 (1.95)	5.76 (1.89)	<i>Time x Group</i>	3.343	.037	.033
PAAQ - Cognitive Acceptance	3.38 (1.14)	3.55 (1.27)	3.37 (.96)	2.98 (1.18)	3.13 (1.00)	3.51 (1.36)	<i>Time x Group</i>	4.225	.016	.041
PAAQ -Behavioral Commitment	4.51 (1.03)	4.42 (1.01)	4.55 (1.00)	4.20 (1.05)	4.21 (1.09)	4.33 (1.18)	<i>Time x Group</i>	.192	.825	.002
PAAQ - Total	3.94 (.91)	3.99 (.89)	3.96 (.72)	3.59 (.96)	3.67 (.87)	3.93 (1.13)	<i>Time x Group</i>	2.58	.079	.026

*Note.* Sidak corrections for multiple comparisons; PAAQ = Physical Activity Acceptance Questionnaire.

## Racial and Ethnic Comparisons in Treatment Outcomes

**Body image.** One-way ANOVAs did not reveal any baseline differences between racial/ethnic groups. Therefore, no covariates were entered into the following analysis. The Box's M test for homogeneity of the variance-covariance matrices across design cells was significant,  $\text{Box-M} = 210.464$ ,  $F(120, 5701.061) = 1.23$ ,  $p = .049$ , indicating the multivariate homogeneity of variance assumption was not met. Two out of 15 of Levene's tests were significant, providing partial univariate support for the homogeneity of variance assumption. Results revealed that there was a main effect for time, Pillai's trace = .56,  $F(10, 69) = 8.78$ ,  $p < .001$ ,  $\eta^2 = .56$ . There was not a significant main effect for racial/ethnic group, Pillai's Trace = .302,  $F(10, 150) = 2.66$ ,  $p = .18$ ,  $\eta^2 = .05$ . There was not a significant racial/ethnic group\*time interaction, Pillai's trace = .272,  $F(20, 140) = 1.10$ ,  $p = .356$ ,  $\eta^2 = .14$ . This suggests that Asian, Black, and White women had similar improvements in body image following the intervention. See Table 8 for descriptive statistics by group and timepoint, interaction effects, and effect sizes.

**Mental health.** One-way ANOVAs revealed that Asian women had significantly higher depression scores at baseline than White women ( $p = .025$ ). Thus, baseline depression was entered as a covariate. Results indicated that the time\*depression interaction was significant, Pillai's Trace = .306,  $F(12, 66) = 2.42$ ,  $p = .01$ ,  $\eta^2 = .306$ . This suggests that depression also decreased over time following the intervention.

The Box's M test for homogeneity of the variance-covariance matrices across design cells was significant,  $\text{Box-M} = 405.497$ ,  $F(171, 5650.083) = 1.51$ ,  $p < .001$ , indicating the multivariate homogeneity of variance assumption was not met. Two out of 18 of Levene's tests were significant, providing partial univariate support for the homogeneity of variance assumption.

Results revealed a main effect for time, Pillai's trace = .37,  $F(12, 66) = 3.16, p < .001, \eta^2 = .37$ . There was not a significant main effect for racial/ethnic group, Pillai's Trace = .115,  $F(12, 146) = .74, p = .71, \eta^2 = .06$ . There was not a significant racial/ethnic group\*time interaction, Pillai's trace = .375,  $F(24, 134) = 1.29, p = .18, \eta^2 = .19$ . Post-hoc tests revealed that Asian, Black, and White women had similar improvements in all mental health variables, except anxiety and stress, following the intervention after controlling for baseline depression. Asian, Black, and White women did not improve on anxiety or stress following the intervention; however, the research was also underpowered to see changes on these measures. See Table 8 for descriptive statistics by group and timepoint, interaction effects, and effect sizes.

**Physical health attitudes.** One-way ANOVAs did not reveal any baseline differences between racial/ethnic groups. Box's M test for homogeneity of the variance-covariance matrices across design cells was significant, Box-M = 77.4893,  $F(42, 3767.118) = 1.55, p = .014$ , indicating the multivariate homogeneity of variance assumption was not met. One out of nine of Levene's tests were significant, providing partial univariate support for the homogeneity of variance assumption. Results revealed that there was not a significant main effect for time, Pillai's trace = .11,  $F(4, 74) = 2.34, p = .06, \eta^2 = .11$ . There was not a significant main effect for racial/ethnic group, Pillai's Trace = .01,  $F(4, 154) = .14, p = .97, \eta^2 = .003$ . There was not a significant racial/ethnic group\*time interaction, Pillai's trace = .12,  $F(8, 150) = 1.18, p = .313, \eta^2 = .06$ . It should be noted that the research was underpowered to examine these small effects (<80%). However, these results suggest that White, Asian, and Black women did not improve on healthcare stress or PAAQ cognitive acceptance in either the active control condition or *EYH* condition. See Table 8 for descriptive statistics by group and timepoint, interaction effects, and effect sizes.

*Descriptive Statistics and Results of the RMANOVA Comparing Racial/Ethnic Groups*

	Measure	White (n=47)		Asian (n=22)		Black (n=12)		Effect	F-value	$\eta^2$
		Baseline	FU	Baseline	FU	Baseline	FU			
Body image	WBI	4.54	3.88	4.86	3.83	4.11	3.15	<i>Time</i>	36.37**	.318
		(1.16)	(1.06)	(1.25)	(1.51)	(1.33)	(1.24)	<i>Group</i>	1.21	.030
	FAS	3.94	4.24	3.65	4.07	4.21	4.48	<i>Time</i>	17.86**	.186
		(.75)	(.66)	(.77)	(.63)	(.37)	(.35)	<i>Group</i>	2.38	.058
	OBCS - Surveillance	5.52	4.93	5.13	4.72	5.29	4.27	<i>Time</i>	33.69**	.302
		(.83)	(.88)	(.75)	(.67)	(.75)	(1.06)	<i>Group</i>	2.81	.067
	OBCS - Shame	4.47	3.98	4.43	3.97	3.77	3.24	<i>Time</i>	17.54**	.184
		(.97)	(.98)	(.92)	(1.09)	(.95)	(1.09)	<i>Group</i>	2.75	.066
OBCS - Total	4.64	4.33	4.68	4.42	4.58	4.08	<i>Time</i>	22.49**	.224	
	(.59)	(.55)	(.57)	(.50)	(.46)	(.71)	<i>Group</i>	.457	.012	
Mental health	EDE-Q - Eating Concern	2.76	2.34	2.88	2.20	2.13	1.56	<i>Time</i>	5.54**	.067
		(1.23)	(1.21)	(1.25)	(1.27)	(1.27)	(.63)	<i>Group</i>	2.70	.066
	EDE-Q - Restraint	2.80	2.26	2.92	2.17	2.23	1.73	<i>Time</i>	4.13*	.051
		(1.29)	(1.33)	(1.31)	(1.23)	(1.09)	(.76)	<i>Group</i>	1.80	.045
	EDE-Q - Global Score	3.60	3.04	3.74	2.93	2.96	2.18	<i>Time</i>	11.42**	.129
		(1.16)	(1.14)	(1.10)	(1.32)	(1.20)	(.69)	<i>Group</i>	2.95	.071
	DASS - Stress	18.72	15.40	21.00	16.36	17.33	17.00	<i>Time</i>	1.95	.025
		(6.55)	(7.98)	(6.49)	(9.86)	(8.58)	(10.49)	<i>Group</i>	.199	.005
	DASS - Anxiety	12.34	8.76	13.55	10.36	10.33	12.00	<i>Time</i>	1.72	.022
		(8.66)	(6.91)	(9.98)	(10.21)	(8.12)	(9.34)	<i>Group</i>	.687	.018
SCS-SF	2.53	2.80	2.59	2.79	2.62	3.02	<i>Time</i>	3.99*	.049	
	(.55)	(.61)	(.66)	(.49)	(.66)	(.76)	<i>Group</i>	.850	.022	
Physical health	PAAQ – Cognitive Acceptance	3.26	3.50	3.27	3.11	2.90	3.57	<i>Time</i>	1.72	.044
		(1.04)	(.98)	(1.16)	(1.05)	(1.49)	(1.54)	<i>Group</i>	.073	.002
	Healthcare Stress	5.74	5.32	5.55	5.59	5.55	4.18	<i>Time</i>	.827	.021
		(1.72)	(2.00)	(1.92)	(1.51)	(1.96)	(2.21)	<i>Group</i>	.197	.005

*Note.* Results controlled for depression. Sidak corrections for multiple comparisons. WBI = Weight Bias Internalization Scale; FAS = Functionality Appreciation Scale; OBCS = Objectified Body Consciousness Scale; EDE-Q = Eating Disorder Examination Questionnaire; DASS = Depression, Anxiety, Stress Scales; SCS-SF = Self-Compassion Scale – Short Form; PAAQ = Physical Activity Acceptance Questionnaire; \*\*  $p < .01$ , \*  $p < .05$

## Treatment Mechanisms

**Body image.** Bivariate correlations examined if baseline WBI were associated with significant body image variables at follow-up (i.e., FAS, OBCS body surveillance, and OBCS body shame). All variables were significantly correlated with WBI ( $ps < .05$ ), except FAS. The researcher did not examine changes in FAS because it was not correlated with WBI. Based on objectification theory (Fredrickson & Roberts, 1997), body surveillance at baseline should be associated with body shame at follow-up. The researcher conducted a bootstrapping analysis using PROCESS model 1 (Hayes, 2013) to examine whether WBI moderated the association between body surveillance at baseline and body shame at follow-up. The overall model was significant,  $F(3, 97) = 15.81, p < .001$ , and accounted for 32.8% of the variance in body shame. The interaction between body surveillance  $\times$  WBI was not statistically significant, indicating the direct effect from body surveillance to body shame was not moderated by WBI.

The researcher then used PROCESS model 4 to examine the indirect effect of body surveillance at baseline on body shame at follow-up via WBI at baseline (Figure 1), using 5000 bootstrap samples. The overall model was significant,  $F(2, 98) = 22.56, p < .001, R^2 = .31$ . This model yielded a mean bootstrap estimate of the indirect effect of 0.23 ( $SE = 0.08$ ). The 95% confidence interval did not include 0 (95% CI[0.07, 0.39]), suggesting the indirect effect of WBI on the association between body surveillance and body shame was significant. In addition, both the direct positive pathway between body surveillance and body shame  $\beta = 0.41, 95\% \text{ CI } [0.14, 0.67]$ , and the direct positive pathway between WBI and body shame were significant,  $\beta = 0.51, 95\% \text{ CI } [0.34, 0.69]$ . Finally, the direct positive pathway between body surveillance and body shame was not significant after controlling for WBI,  $\beta = 0.18, 95\% \text{ CI } [-0.06, 0.42]$ . In other

words, body surveillance at baseline was associated with higher WBI at baseline, which in turn, was associated with higher body shame at follow-up (see Figure 1).

**Mental health.** Bivariate correlations examined if baseline WBI was associated with significant mental health variables at follow-up (i.e., self-compassion, depression, and anxiety). All variables were significantly correlated with WBI ( $ps < .05$ ). There is a significant literature suggesting that self-compassion is robustly associated with depression and anxiety (see MacBeth & Gumley, 2012 for a systematic review); thus the indirect effects of baseline self-compassion via baseline WBI on follow-up anxiety and depression were examined.

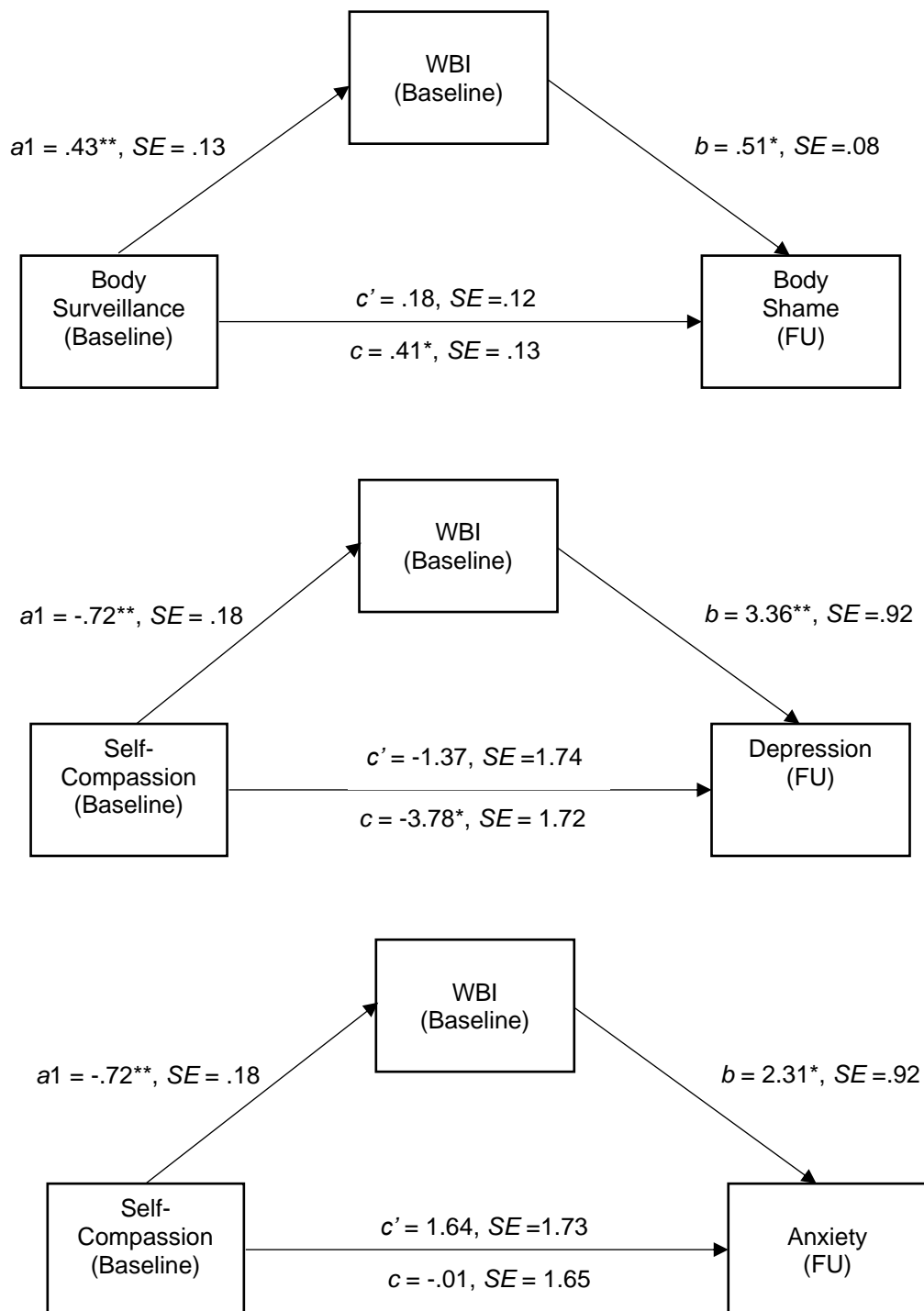
Moderation analyses with PROCESS model 1 (Hayes, 2013) revealed the interaction between self-compassion  $\times$  WBI was not statistically significant for either depression or anxiety. These results suggest that women with high WBI at baseline did not experience report different levels of anxiety/depression at follow-up than women with low WBI.

Next, PROCESS model 4 examined the indirect effect of self-compassion at baseline on anxiety/depression at follow-up via WBI at baseline, using 5000 bootstrap samples. Both models were significant,  $ps < .001$ . The model yielded a mean bootstrap estimate of the indirect effect of  $-2.40$  ( $SE = 0.92$ ) for depression and  $-1.66$  for anxiety ( $SE = .79$ ). The 95% confidence intervals did not include 0, suggesting the indirect effects of WBI on the associations between self-compassion and anxiety, CI  $[-3.40, -0.33]$ , and depression, CI  $[-4.45, -0.83]$ , were significant. In addition, the direct negative pathway between self-compassion and depression,  $\beta = -3.78$ , 95% CI  $[-7.18, -0.37]$  was significant, but not for anxiety,  $\beta = -.01$ , 95% CI  $[-3.20, 3.26]$ . Finally, the direct negative pathway between self-compassion and depression was not significant after controlling for WBI,  $\beta = -1.37$ , 95% CI  $[-4.84, 2.09]$ . It should be noted that self-compassion was not directly associated with anxiety, which is consistent with some previous research, but self-



compassion was associated with anxiety through WBI (Finlay-Jones, Kane, & Rees, 2016). In sum, higher self-compassion at baseline was associated with lower WBI at baseline, which in turn, was associated with lower anxiety and depression at follow-up (see Figure 1).

Figure 1. Simple mediation models with standardized path loadings and standard errors using 5000 bootstrap samples.



Note. WBI = Weight bias internalization; FU = Follow-up; a = direct path from the independent variable to WBI; b = direct path from WBI to the dependent variable; c = direct path from the independent variable to the dependent variable; c' = direct path from independent variable to the dependent variable controlling for WBI.  $*p < .05$ ,  $**p < .001$ .

## Fidelity to Writing Prompts and Themes

A random number generator was used to select 20% of written responses (10% of each group) across three days to examine fidelity to the prompts. All responses examined answered the prompts appropriately. Linguistic Inquiry and Word Count (LIWC; Pennebaker, Booth, & Francis, 2015) was used to compare the conditions on writing themes. LIWC is a computerized program that analyzes words into categories. Research demonstrates that LIWC is a reliable and valid text analysis program (Tausczik & Pennebaker, 2010). LIWC has four broad categories: analytic thinking (i.e., use of logical and formal words that reflect higher thinking), clout (i.e., use of words that reflect leadership/confidence), authenticity (i.e., use of words that reflect vulnerability and honesty), and emotional tone (i.e., use of words that reflect both positive and negative emotions; see Pennebaker et al., 2015 for a full manual and definitions). A MANOVA evaluated whether the groups differed among these categories. Post-hoc tests with Sidak corrections then investigated which variables significantly differed. In sum, the active control group used significantly more analytic thinking and clout words; in contrast, the *EYH* group used more emotional tone words ( $p < .001$ ). The groups did not differ in their use of authenticity words ( $p = .08$ ) See table 9 for descriptive statistics and results of the MANOVA.

Table 9.

*Descriptive Statistics and Results of the MANOVA Comparing Writing Themes*

	<i>EYH</i> ( <i>n</i> =51)	Control ( <i>n</i> =49)	F-statistic	$\eta^2$
Analytic	33.06 (17.21)	45.09 (14.23)	16.83**	.127
Clout	10.95 (6.81)	23.08 (13.98)	37.28**	.243
Authenticity	87.89 (9.06)	90.50 (6.26)	3.22	.027
Emotional Tone	96.55 (9.02)	62.14 (22.41)	125.27**	.519

Note. \*\*  $p < .01$

## Discussion

The current study examined the preliminary effectiveness of an online body gratitude journaling intervention (i.e., *Expand Your Horizon*), compared to an active control writing condition in a sample of emerging adult women with WBI. Guided by social learning theory (Bandura, 1986), the original intervention was modified using videos that showcased young adult women answering the various writing prompts as a way to model the writing activity. Results indicated that both *Expand Your Horizon* and the active control condition's writing tasks had beneficial mental health and body image effects in emerging adult women with WBI.

### Preliminary Effectiveness

The primary hypotheses were that the *EYH* condition would yield significantly greater reductions in WBI (as measured by the WBI-M), and improvements in body image (i.e., body image discrepancy - BIIQ, objectified body consciousness - OBCS, and functionality appreciation - FAS), mental health (i.e., disordered eating symptomatology – EDE-Q, depression, anxiety, stress – DASS, and self-compassion - SCS), and physical health attitudes (i.e., healthcare stress and physical activity acceptance - PAAQ) from baseline to one-week follow-up compared to the control group. Hypotheses were partially supported; the *EYH* group experienced greater improvements in healthcare stress and reported significantly higher body functionality at follow-up than the control group. However, both groups had comparable improvements on WBI, objectified body consciousness, and all mental health measures.

**Expand Your Horizon.** Although both groups improved on body functionality appreciation, scores on this variable were significantly higher at follow-up for the *EYH* condition compared to the control condition. This finding is important because body functionality appreciation is positively associated with adaptive eating behaviors (e.g., intuitive eating), better

mental health (e.g., self-esteem, life satisfaction) and negatively associated with self-objectification and consideration of cosmetic surgery (Alleva et al., 2017).

Scholars have suggested that fostering body functionality appreciation is an important avenue for the treatment of eating disorders given its relation to positive embodiment (Cook-Cottone, 2015; Piran, 2015; Tylka & Wood-Barcalow, 2015). Positive embodiment, defined as an attunement to bodily sensations and how the body engages with the world, increases a positive connectedness to one's body (Alleva, Holmqvist Gattario, Martijn, & Lunde, 2019; Piran, 2015, 2016). Embodying activities, such as yoga and belly dancing, have been demonstrated to improve body satisfaction and increase positive affect, which are both important components in the treatment and prevention of eating disorders (Alleva et al., 2020; Cox & Tylka, 2020; Cox, Ullrich-French, Cook-Cottone, Tylka, & Neumark-Sztainer, 2020; Halliwell, Dawson, & Burkey, 2019; Mahlo & Tiggemann, 2016; Tiggemann et al., 2014). Indeed, increased attunement to one's body could allow individuals with eating disorders to better respond to eating-related cues, which is a central component in eating disorder recovery (Perey & Cook-Cottone, 2020). Cultivating positive embodiment and body functionality appreciation might be important components for health behavior change interventions because they are associated with mindfulness and physical activity (Cook-Cottone & Guyker, 2018). Because *EYH* resulted in increased body functionality appreciation, it could be used in conjunction with a more extensive physical activity program that fosters positive embodiment.

Further, participants in the *EYH* condition manifested greater decreases in healthcare stress compared to the active control condition. This finding is important because healthcare stress is associated with healthcare avoidance (Mensing et al., 2018). Healthcare avoidance partially explains the link between obesity and mortality because individuals in larger bodies

avoid preventive health services due to perceived stigma (Phelan et al., 2015; Sutin et al., 2015). Additionally, healthcare avoidance of preventive services is related to a greater economic burden on the healthcare system (Dzau et al., 2017; Saultz & Lochner, 2005). As such, lowering healthcare stress is an urgent public health priority. It is encouraging that *EYH* had significant reductions in healthcare stress because it is an intervention that is both brief and accessible.

It should also be noted that a decrease in body surveillance (i.e., the habitual monitoring of one's appearance) approached significance (i.e.,  $p = .07$ ) in the *EYH* condition. This is important because body surveillance results in lower body attunement, which partially explains the higher rates of sexual dysfunction and disordered eating symptomatology in women (Davies, Burnette, & Mazzeo, 2020; Fredrickson & Roberts, 1997; Tiggemann & Williams, 2012). Therefore, interventions that can lower body surveillance are important for women's mental health and *EYH* appeared to have positive impacts on several body image and mental health variables.

**Active control condition.** Contrary to our hypotheses, participants in the active control condition also manifested significant improvements on body image and mental health measures at follow-up. Furthermore, the active control condition improved significantly more on physical activity cognitive acceptance (i.e., the ability to engage in physical activity despite having discouraging thoughts; Butryn et al., 2015). This finding is important because physical activity cognitive acceptance is correlated with greater objective physical activity levels and higher mindfulness (Butryn et al., 2015). It is possible these prompts elicited increased self-efficacy (i.e., the belief that one can achieve their goals) in the active control group. Indeed, LIWC analyses revealed that the active control group used significantly more analytic and clout words than the *EYH* group.

Both clout and analytic thinking are important variables because they are related to greater achievement in several domains. For example, clout is associated with higher perceived expertise in occupational settings (Newman, Jones, & Ritter, 2016) and an indicator of better mental health (O’Dea, Larsen, Batterham, Calear, & Christensen, 2017). Further, individuals who use more analytic words demonstrate higher educational attainment (Pennebaker, Chung, Frazee, Lavergne, & Beaver, 2014). As such, it is possible the active control group’s prompts elicited confidence in several areas, which could benefit body image and mental health.

However, another possible explanation is that most participants were recruited through a VCU newsletter, which advertised the intervention as “body acceptance strategies” (see Appendix N). Thus, it’s possible that individuals were actively seeking strategies to improve their body image and intervention participation resulted in a placebo effect.

**Summary of preliminary effectiveness.** It is promising that both groups experienced significant improvements in body image and mental health because certain individuals might respond better to non-body related prompts. For example, previous research found that women with body dissatisfaction reported worse body dissatisfaction after listening to a body positive song compared to women who listened to a neutral song (Coyne et al., 2020). This suggests that women with body dissatisfaction might respond better to non-body related prompts. As such, interventions that target women with high body dissatisfaction could consider avoiding body-related cues, even if these cues are positive (Coyne et al., 2020). Indeed, research indicates that repeating positive affirmations can make individuals feel worse if they do not believe them (Wood, Perunovic, & Lee, 2009). Therefore, individuals with high body dissatisfaction might respond better to general expressive writing versus body-related prompts because drawing attention to one’s body could increase body surveillance.

No significant changes were observed on health-related behaviors (i.e., healthcare avoidance and PAAQ behavioral commitment). It is likely these behaviors require a longer follow-up to demonstrate changes. However, both conditions manifested improvements on physical health attitudes. For instance, *EYH* participants reported lower healthcare stress, while active control participants reported greater cognitive acceptance of physical activity. Moreover, experts have suggested that health behavior interventions should be multifaceted and incorporate a behavioral component (Alleva et al., 2020; Burnette & Mazzeo, 2020; King et al., 2006). Future work could examine using these writing exercises in conjunction with a physical activity intervention or an intuitive eating program.

Finally, LIWC analyses revealed that women in *EYH* used significantly more emotion-focused words than the control group. The emotional disinhibition theory posits that emotional expression results in lower stress and physiological arousal, which could help explain why the *EYH* condition improved on variables, such as healthcare stress and depression (Pennebaker, 1989). In contrast, the active control group used more analytic and clout words, which might suggest their improvements were better explained by the cognitive adaptation model. Specifically, the structured writing tasks could have cultivated new understandings, thereby lowering stress (Pennebaker, 1997). For example, individuals in this condition wrote about enjoyable hobbies, a situation that fostered insight, and a problem that they resolved. These writing tasks might have elicited positive emotions, which in turn created higher self-efficacy and confidence (Fredrickson, 2001). A future study should investigate these hypotheses to enhance understanding of treatment mechanisms of writing interventions.



## **Racial and Ethnic Comparisons**

Black, Asian, and White women had similar improvements on all body image variables (i.e., WBI, body functionality appreciation, body surveillance, and body shame) following the intervention. Body image interventions are often lacking in their representation of racially/ethnically diverse women (Rodgers et al., 2019), despite evidence that Black, Latinx, Asian, and White women experience similar levels of body dissatisfaction (Dunn, Hood, & Owens, 2019; Rodgers, Berry, & Franko, 2018; Smith et al., 2020). Extant body image interventions have been criticized for their focus on lowering thin-ideal internalization (Overstreet et al., 2010; Simpson, Burnette, & Mazzeo, 2020), an appearance ideal that is primarily relevant to White women (Ordaz et al., 2018; Watson, Lewis, & Moody, 2019). It appears that fostering body functionality appreciation or utilizing general expressive writing methods might be more culturally sensitive approaches to lowering body dissatisfaction in racially/ethnically diverse women.

Black, Asian, and White women also had similar improvements in disordered eating symptomatology and self-compassion following the writing intervention. Current research suggests that Black, Asian, and Latinx women experience similar rates of disordered eating symptomatology as White women (Lipson & Sonnevile, 2017; Smith et al., 2020), but, BIPOC women are less likely to be diagnosed and treated for disordered eating (Sonneville & Lipson, 2018). Further, BIPOC women are more likely to drop out of disordered eating interventions, which might be the result of limited adaptations for culturally sensitive treatments (Goode et al., 2019). Thus, interventions that do not focus on certain body ideals could be an important avenue for disordered eating treatment and prevention for diverse women.

Moreover, it is encouraging that all racial/ethnic groups reported increases in self-compassion. Self-compassion, defined as a mindful awareness of one's own pain and the ability to treat oneself with kindness during moments of suffering (Neff, 2003), is an important aspect of psychological well-being (Zessin, Dickhäuser, & Garbade, 2015). Fostering self-compassion could also be a significant element of body image interventions because self-compassion reduces striving for unrealistic body ideals that do not necessarily serve one's long-term values (Braun, Park, & Gorin, 2016; Rahimi-Ardabili, Reynolds, Vartanian, McLeod, & Zwar, 2018; Seekis, Bradley, & Duffy, 2020).

It should be noted that data collection occurred from March 2020 – February 2021 during the COVID-19 pandemic, which had disproportionate financial and health impacts on Black and Brown women (Aldridge et al., 2020; Fairlie, Couch, & Xu, 2020). Indeed, this study had lower rates of Black women than previous studies conducted by this team at VCU (e.g., Burnette & Mazzeo, 2020), which could be the result of lower college enrollment for Black individuals during the pandemic (Barshay, 2020). Therefore, the research was underpowered to detect racial and ethnic differences on a few outcomes (anxiety, stress, healthcare stress, and physical activity acceptance). The COVID-19 pandemic might also explain the higher rates of baseline depression in Asian women because of the increased anti-Asian racism and xenophobia during this time (Noel, 2020; Le, Cha, Han, & Tseng, 2020). Our results revealed a decrease in depression from baseline to follow-up for Black, Asian, and White women, which is encouraging given the increased mental health struggles during the COVID-19 pandemic (Cullen, Gulati, & Kelly, 2020; Pfefferbaum & North, 2020). These writing interventions are promising because their online modalities allow them to be widely disseminated and expand treatment access to diverse individuals. Despite some criticism of technology-based interventions (Lorence, Park, & Fox,

2006), previous research demonstrates that online interventions are accessible to ethnically/racially diverse individuals (Rodgers et al., 2016; Shiyko, Perkins, & Caldwell, 2017).

### **Moderation and Mediation Analyses**

Treatment mechanisms were examined with moderation and mediation analyses using PROCESS (Hayes, 2013). Specifically, the researcher examined whether baseline WBI moderated and mediated treatment outcomes for significant follow-up body image variables and mental health variables. It is important to note that these analyses were underpowered and thus results should be interpreted with caution. In sum, WBI did not significantly moderate mental health or body image variables, meaning there was no evidence that women with lower WBI at baseline experienced different treatment outcomes at follow-up than women with higher WBI at baseline.

Conversely, WBI mediated the association between body surveillance and body shame. This finding is important because body surveillance is strongly related to disordered eating symptomatology and body shame (Davies et al., 2020; Fitzsimmons-Craft, Harney, Brownstone, Higgins, & Bardone-Cone, 2012; Tiggemann & Williams, 2012). Given that WBI influences the association between body surveillance and body shame, body image interventions should incorporate techniques that explicitly lower WBI. For instance, clinicians could teach women to celebrate body size diversity, critically analyze body image ideals, and engage in body functionality appreciation exercises (Alleva, Martijn, et al., 2015; Stice, Marti, Spoor, Presnell, & Shaw, 2008; Stice, Rohde, Shaw, & Marti, 2013). Moreover, WBI mediated the relations among self-compassion, anxiety, and depression. In other words, lower self-compassion at baseline was associated with higher WBI at baseline, which in turn, was associated with higher

anxiety and depression at follow-up. These results suggest that WBI might be an important target for mental health and body image interventions.

### **Strengths and Limitations**

#### **Strengths**

The current study has several strengths. First, the need for sustainable treatments delivered through virtual modalities has become increasingly apparent during the COVID-19 pandemic. These expressive writing interventions were accessible, affordable, and conducted entirely online. Extant body image and mental health interventions are predominantly conducted with a trained professional, limiting their accessibility. The current intervention required fewer resources and can be widely disseminated. Based on social learning theory (Bandura, 1986), the researcher created short videos to illustrate women modeling each of the writing tasks. The videos from our intervention, rather than the original printed directions from *EYH*, might be more appealing to emerging adults given that this age group is more likely to engage with digital media (Twenge et al., 2019; Villanti et al., 2017).

To our knowledge, this was the first study to examine a journaling intervention on WBI using a longitudinal design. Although *EYH* has been successful in increasing body satisfaction (Alleva et al., 2018; Alleva et al., 2015), its impact on WBI had not been studied. Given that WBI is related to healthcare avoidance, treatments that address WBI are needed to increase accessibility of care. It was promising that the entire intervention only required ~45 minutes in total, yet yielded significant effects on WBI, mental health, and healthcare related stress.

Additionally, the current study recruited women across the BMI continuum. Previous WBI reduction programs were limited to individuals with overweight and obesity, despite evidence people of diverse body weights experience WBI (Pearl & Puhl, 2014; Schvey & White,

2015). Therefore, piloting a WBI reduction intervention for women of diverse body weights is innovative, and could result in more individuals receiving appropriate care.

Finally, *EYH* and the active control condition might be more culturally sensitive approaches to increasing body satisfaction in diverse women compared to existing body image interventions. The active control group had non-body related prompts, and *EYH* emphasized body functionality rather than thin-ideal internalization reduction. BIPOC women report lower thin-ideal internalization than White women, but experience similar body dissatisfaction rates (Betz & Ramsey, 2017; Roberts et al., 2006). Thus, many body image interventions, which focus on lowering thin-ideal internalization (e.g., Stice, Rohde, & Shaw, 2013; Thompson & Stice, 2001), likely are not appropriate for most women of color (Overstreet et al., 2010; Simpson et al., 2020). In this study, Black, Asian, and White women experienced similar improvements in body image and mental health following both writing conditions, supporting the potential cultural sensitivity of this approach.

### **Limitations**

It is also important to note this study's limitations. First, the sample consisted of only emerging adult (ages 18-25) women. There is research that midlife and older adult women experience body image disturbances and disordered eating symptomatology, but they are often underrepresented in research (Samuels, Maine, & Tantillo, 2019). However, the transition to college is a high stress time that is associated with an increase in body dissatisfaction (Barker & Galambos, 2007; Fitzsimmons-Craft, 2011) and weight gain (Deforche, Van Dyck, Deliens, & De Bourdeaudhuij, 2015). Therefore, college is a critical intervention point for body image interventions. Nevertheless, future work should examine the impact of these writing

interventions in more diverse populations. For example, future research could expand these interventions to adults facing additional challenges, men, and diverse age ranges.

In addition, the entire study was completed online, so the research environment was not standardized and participants might have been distracted during the study. However, the instructional manipulation checks helped mitigate this possibility. Previous writing interventions found that online writing tasks had smaller effect sizes than in-person writing tasks because a quiet space might be more conducive to reflection (Stern & Engeln, 2018).

Further, although the actresses in our videos were relatively diverse, undergraduate reviewers suggested that the videos display more women in general, talking for a shorter amount of time. Future work could recruit more actors with various gender identities and edit the videos accordingly to appeal to a more diverse population. Finally, the current study had a short term (i.e., one-week) follow-up. Thus, the durability of intervention effects is unknown, and healthcare avoidance could not be properly examined.

### **Conclusion**

Weight bias internalization results in body shame, which is associated with healthcare avoidance and unhealthy behaviors. The current study evaluated an accessible, affordable treatment modality in a group of ethnically and racially diverse women. The primary aim of this study was to examine a previously developed body gratitude journaling intervention's (i.e., *Expand Your Horizon*) preliminary effectiveness in reducing WBI and increasing mental health and health-related attitudes and behaviors. Both *Expand Your Horizon* and an active control condition (i.e., general expressive writing) yielded significant improvements in WBI, several body image variables, and mental health. However, women in the *Expand Your Horizon* condition experienced greater decreases in healthcare related stress compared to women in the

general expressive writing condition. In contrast, women in the general expressive writing condition experienced greater cognitive acceptance of physical activity compared to women in the *Expand Your Horizon* condition. Moreover, both the general expressive writing condition and *Expand Your Horizon* appeared to have equally beneficial effects on mental health and body image for Black, Asian, and White women. Results suggest that body gratitude and general expressive writing interventions are effective approaches to increasing body satisfaction and well-being in diverse women.

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## Appendix A

### Expand Your Horizon videos

**Day 1:** [https://www.youtube.com/watch?v=bL\\_vNq705kc&feature=youtu.be](https://www.youtube.com/watch?v=bL_vNq705kc&feature=youtu.be)

**Day 2:** <https://www.youtube.com/watch?v=6JaxCa-wu0U&feature=youtu.be>

**Day 3:** <https://www.youtube.com/watch?v=n99o-pM70rY&feature=youtu.be>

## Appendix B

### Writing Creativity Videos

Day 1: <https://www.youtube.com/watch?v=DG-JcPwLWtk&feature=youtu.be>

Day 2: <https://www.youtube.com/watch?v=gBxI1zZZ7CY&feature=youtu.be>

Day 3: <https://www.youtube.com/watch?v=AimTN10w1f0&feature=youtu.be>

## Appendix C

### Demographic Questionnaire

1. Age (in whole numbers): \_\_\_\_\_

2. Year in school:

First-year (Freshman)

Sophomore

Junior

Senior

Graduate

3. Race/ethnicity (check all that apply):

White/Caucasian

Black/African-American

Hispanic/Latino

Asian/Asian-American

Other

4. With which gender do you identify?

Man

Woman

Other

**If other, please specify:** \_\_\_\_\_

5. What is your sexual orientation?

Straight/Heterosexual

Bisexual

Gay

Lesbian

Queer

Other

**If other, please specify:** \_\_\_\_\_

6. Current height (in inches): \_\_\_\_\_

7. Current weight (in pounds): \_\_\_\_\_

## Appendix D

### Modified Weight Bias Internalization Scale

1 = Strongly Disagree    2 = Disagree    3 = Slightly Disagree    4 = Neither Agree nor Disagree

5 = Slightly Agree    6 = Agree    7 = Strongly Agree

1. Because of my weight, I feel that I am just as competent as anyone.<sup>1</sup>
2. I am less attractive than most other people because of my weight.
3. I feel anxious about my weight because of what people might think of me.
4. I wish I could drastically change my weight.
5. Whenever I think a lot about my weight, I feel depressed.
6. I hate myself for my weight.
7. My weight is a major way that I judge my value as a person.
8. I don't feel that I deserve to have a really fulfilling social life, because of my weight.
9. I am OK being the weight that I am.<sup>1</sup>
10. Because of my weight, I don't feel like my true self.
11. Because of my weight, I don't understand how anyone attractive would want to date me.

<sup>1</sup>Item reverse-scored

## Appendix E

### Functionality Appreciation Scale

Please indicate the extent to which you agree with each of the following statements:

		<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neither agree nor disagree</i>	<i>Agree</i>	<i>Strongly agree</i>
<b>1.</b>	I appreciate my body for what it is capable of doing.					
<b>2.</b>	I am grateful for the health of my body, even if it isn't always as healthy as I would like it to be.					
<b>3.</b>	I appreciate that my body allows me to communicate and interact with others.					
<b>4.</b>	I acknowledge and appreciate when my body feels good and/or relaxed.					
<b>5.</b>	I am grateful that my body enables me to engage in activities that I enjoy or find important.					
<b>6.</b>	I feel that my body does so much for me.					
<b>7.</b>	I respect my body for the functions that it performs.					

**Scoring:** Scores on the seven FAS items are averaged, with higher scores reflecting higher levels of functionality appreciation.

## Appendix F

### Body-Image Ideals Questionnaire (BIQ)

Each item on this questionnaire deals with a different physical characteristic. For each characteristic, think about how you would describe yourself as you actually are. Then think about how you wish you were. The difference between the two reveals how close you come to your personal ideal. In some instances, your looks may closely match your ideal. In other instances, they may differ considerably. On Part A of each item, rate how much you resemble your personal physical ideal by selecting the appropriate rating.

Part A: How much you resemble your personal physical ideal.

	Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me
<b>1. My ideal height is:</b>	1	2	3	4
<b>2. My ideal skin complexion is:</b>	1	2	3	4
<b>3. My ideal hair texture and thickness are:</b>	1	2	3	4
<b>4. My ideal facial features (eye, nose, ears, facial shape) are:</b>	1	2	3	4
<b>5. My ideal muscle tone and definition is:</b>	1	2	3	4
<b>6. My ideal body proportion is:</b>	1	2	3	4
<b>7. My ideal weight is:</b>	1	2	3	4
<b>8. My ideal chest size is:</b>	1	2	3	4
<b>9. My ideal physical strength is:</b>	1	2	3	4
<b>10: My ideal physical coordination is:</b>	1	2	3	4
<b>11. My ideal overall physical appearance is:</b>	1	2	3	4

Your physical ideals may differ in their importance to you, regardless of how close you come to them. You may feel strongly that some ideals embody the way you want to look or be. In other areas, your ideals may be less important to you. On Part B of each item, rate how important your ideal is to you by selecting the most appropriate rating.

Part B: How important your ideal is to you

Rated with: Not Important, Somewhat Important, Moderately Important, Very Important

	<b>Not Important</b>	<b>Somewhat Important</b>	<b>Moderately Important</b>	<b>Very Important</b>
<b>1. My ideal height is:</b>	1	2	3	4
<b>2. My ideal skin complexion is:</b>	1	2	3	4
<b>3. My ideal hair texture and thickness are:</b>	1	2	3	4
<b>4. My ideal facial features (eye, nose, ears, facial shape) are:</b>	1	2	3	4
<b>5. My ideal muscle tone and definition is:</b>	1	2	3	4
<b>6. My ideal body proportion is:</b>	1	2	3	4
<b>7. My ideal weight is:</b>	1	2	3	4
<b>8. My ideal chest size is:</b>	1	2	3	4
<b>9. My ideal physical strength is:</b>	1	2	3	4
<b>10: My ideal physical coordination is:</b>	1	2	3	4
<b>11. My ideal overall physical appearance is:</b>	1	2	3	4

## Appendix G

### Objectified Body Consciousness Scale

Circle the number between 1 and 7 that corresponds to how much you agree with each of the statements. **1 = strongly disagree... 7 = strongly agree.** Circle NA (“does not apply”) only if the statement does not apply to you. Do not circle NA if you don’t agree with a statement. For example, if the statement says “When I am happy, I feel like singing” and you don’t feel like singing when you are happy, then you would circle one of the disagree choices. You would only circle NA if you were **never** happy.

**1. I rarely think about how I look.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**2. When I can’t control my weight, I feel like something must be wrong with me.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**3. I think it is more important that my clothes are comfortable than whether they look good on me.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**4. I think a person is pretty much stuck with the looks they are born with.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	



**5. I feel ashamed of myself when I haven't made the effort to look my best.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**6. A large part of being in shape is having that kind of body in the first place.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**7. I think more about how my body feels than how my body looks.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**8. I feel like I must be a bad person when I don't look as good as I could.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**9. I rarely compare how I look with how other people look.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**10. I think a person can look pretty much how they want to if they are willing to work at it.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**11. I would be ashamed for people to know what I really weigh.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**12. I really don't think I have much control over how my body looks.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**13. Even when I can't control my weight, I think I'm an okay person.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**14. During the day, I think about how I look many times.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**15. I never worry that something is wrong with me when I am not exercising as much as I should.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**16. I often worry about whether the clothes I am wearing make me look good.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**17. When I'm not exercising enough, I question whether I am a good enough person.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**18. I rarely worry about how I look to other people.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**19. I think a person's weight is mostly determined by the genes they are born with.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**20. I am more concerned with what my body can do than how it looks.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**21. It doesn't matter how hard I try to change my weight, it's probably always going to be about the same.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**22. When I'm not the size I think I should be, I feel ashamed.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**23. I can weigh what I'm supposed to when I try hard enough.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

**24. The shape you are in depends mostly on your genes.**

1	2	3	4	5	6	7	NA
Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree	

## Appendix H

### Self-Compassion Scale- Short Form

#### HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

**Almost never**

**Almost always**

**1**

**2**

**3**

**4**

**5**

\_\_\_\_ 1. When I fail at something important to me I become consumed by feelings of inadequacy.

\_\_\_\_ 2. I try to be understanding and patient towards those aspects of my personality I don't like.

\_\_\_\_ 3. When something painful happens I try to take a balanced view of the situation.

\_\_\_\_ 4. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

\_\_\_\_ 5. I try to see my failings as part of the human condition.

\_\_\_\_ 6. When I'm going through a very hard time, I give myself the caring and tenderness I need.

\_\_\_\_ 7. When something upsets me I try to keep my emotions in balance.

\_\_\_\_ 8. When I fail at something that's important to me, I tend to feel alone in my failure

\_\_\_\_ 9. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

\_\_\_\_ 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

\_\_\_\_ 11. I'm disapproving and judgmental about my own flaws and inadequacies.

\_\_\_\_ 12. I'm intolerant and impatient towards those aspects of my personality I don't like.

To compute a total self-compassion score, reverse score the negative subscale items - self-judgment, isolation, and over-identification (i.e., 1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1) - then compute a total mean.

## Appendix I

### Depression, Anxiety, and Stress Scales-21

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all - NEVER

1 Applied to me to some degree, or some of the time – SOMETIMES

2 Applied to me to a considerable degree, or a good part of time - OFTEN

3 Applied to me very much, or most of the time - ALMOST ALWAYS

1. I found it hard to wind down
2. I was aware of dryness of my mouth
3. I couldn't seem to experience any positive feeling at all
4. I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)
5. I found it difficult to work up the initiative to do things
6. I tended to over-react to situations
7. I experienced trembling (eg, in the hands)
8. I felt that I was using a lot of nervous energy
9. I was worried about situations in which I might panic and make a fool of myself
10. I felt that I had nothing to look forward to
11. I found myself getting agitated
12. I found it difficult to relax
13. I felt down-hearted and blue
14. I was intolerant of anything that kept me from getting on with what I was doing
15. I felt I was close to panic
16. I was unable to become enthusiastic about anything
17. I felt I wasn't worth much as a person
18. I felt that I was rather touchy
19. I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)
20. I felt scared without any good reason
21. I felt that life was meaningless

## Appendix J

### Eating Disorder Examination Questionnaire (EDE-Q)

#### Instructions

The following questions are concerned with the PAST FOUR WEEKS ONLY (28 days). Please read each question carefully and circle the appropriate number on the right. Please answer all the questions.

<b>ON HOW MANY DAYS OUT OF THE PAST 28 DAYS.....</b>	No	1-5	6-12	13-15	16-22	23-27	Every
	days	days	days	days	days	days	day

1. Have you been deliberating trying to limit the amount of food you eat to influence you shape or weight?

0      1      2      3      4      5      6

2. Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?

0      1      2      3      4      5      6

3. Have you tried to avoid eating any foods which

you like in order to influence  
your shape or weight?                    0      1      2      3      4      5      6

4. Have you tried to  
follow definite rules  
regarding your eating in  
order to influence your  
shape or weight; for example,  
a calorie limit, a set amount  
of food, or rules about what or  
when you should eat?                    0      1      2      3      4      5      6

5. Have you wanted your  
stomach to be empty?                    0      1      2      3      4      5      6

6. Has thinking about food  
or its calorie content made it much  
more difficult to concentrate on  
things you are interesting in; for  
example, read, watch TV, or  
follow a conversation?                    0      1      2      3      4      5      6



7. Have you been afraid  
of losing control over eating?      0      1      2      3      4      5      6

8. Have you had episodes  
of binge eating?      0      1      2      3      4      5      6

9. Have you eaten in  
secret? (Do not count binges.)      0      1      2      3      4      5      6

10. Have you definitely  
wanted your stomach to  
be flat?      0      1      2      3      4      5      6

11. Has thinking about shape  
or weight made it more  
difficult to concentrate on  
things you are interested in;  
for example read, watch TV,  
or follow a conversation?      0      1      2      3      4      5      6

12. Have you had a

definite fear that you might  
gain weight or become fat?            0            1            2            3            4            5            6

13. Have you felt fat?                    0            1            2            3            4            5            6

14. Have you had a strong  
desire to lose weight?                0            1            2            3            4            5            6

OVER THE PAST FOUR WEEKS (28 DAYS)

15. On what proportion of time            0 – None of the times  
that you have eaten have you                1 – A few of the times  
felt guilty because the effect on            2 – Less than half the times  
your shape or weight? (Do not            3 – Half of the times  
count binges.) (Circle the number            4 – More than half the times  
which applies.)                                5 – Most of the times  
    6 – Every time

16. Over the past four weeks (28 days), have there been any times when you have felt you have eaten what other people would regard as an unusually large amount of food given the circumstances? (Please put appropriate number in box).

0 – No

1 – Yes [ ]

17. How many episodes have you had over the past four weeks?

[ ] [ ] [ ]

18. During how many of these episodes of overeating did you have a sense of having lost control over your eating?

[ ] [ ] [ ]

19. Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have not eaten an unusually large amount of food given the circumstances?

0 – No

1 – Yes [ ]

20. How many such episodes have you had over the past four weeks?

[ ] [ ] [ ]

21. Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight?

0 – No

1 – Yes [ ]

22. How many times have you done this over the past four weeks?

[ ] [ ] [ ]

23. Have you taken laxatives as a means of controlling your shape or weight?

0 – No

1 – Yes [ ]

24. How many times have you done this over the past four weeks?

[ ] [ ] [ ]

25. Have you take diuretics (water tablets) as a means of controlling your shape or weight?

0 – No

1 – Yes [ ]

26. How many times have you done this over the past four weeks?

[ ] [ ] [ ]

27. Have you exercised hard as a means of controlling your shape or weight?

0 – No

1 – Yes [ ]

28. How many times have you done this over the past four weeks?

[ ] [ ] [ ]

<b>OVER THE PAST FOUR WEEKS (28 DAYS)</b> (Please circle the number which best describes your behavior.)	NOT AT ALL		SLIGHTLY		MODERATELY		MARKEDLY
29. Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
30. Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
31. How much would it upset you if you had to weight yourself once a week for the next four weeks?	0	1	2	3	4	5	6
32. How dissatisfied have you felt about your weight?	0	1	2	3	4	5	6
33. How dissatisfied have you felt about your shape?	0	1	2	3	4	5	6
34. How concerned have you been about other people seeing you eat?	0	1	2	3	4	5	6
35. How uncomfortable have you felt seeing your body; for example, in the mirror, in shop window reflections, while undressing or taking a bath or shower?	0	1	2	3	4	5	6
36. How uncomfortable have you felt about others seeing your body; for example, in communal changing rooms, when swimming or wearing tight clothes?	0	1	2	3	4	5	6

## Appendix K

Healthcare stress questionnaire.

Please indicate your level of stress on a scale from 1 (no stress) to 10 (very stressed)	No stress									Very stressed
(1) When you think about going to see your healthcare provider for a wellness visit	1	2	3	4	5	6	7	8	9	10
(2) When you think about getting a mammogram (If not yet applicable because of your age, think about how you would feel)	1	2	3	4	5	6	7	8	9	10
(3) When you think about going to the gynecologist	1	2	3	4	5	6	7	8	9	10
(4) When you think about seeing a healthcare provider for an injury	1	2	3	4	5	6	7	8	9	10
(5) When you think about seeing a health care provider because you have been feeling ill for unknown reasons	1	2	3	4	5	6	7	8	9	10

## Appendix L

### Healthcare avoidance questionnaire.

	<b>Extreme ly Likely</b>	<b>Somewh at Likely</b>	<b>Neithe r Likely or Unlike ly</b>	<b>Somewh at Unlikely</b>	<b>Extrem ly Unlikely</b>
(1) If you are not feeling well or have symptoms that are bothering you, how likely are you to delay seeking treatment from a health care provider?	1	2	3	4	5
(2) How likely are you to receive annual wellness visits with your primary care provider?	1	2	3	4	5
(3) How likely are you to receive annual gynecological exams?	1	2	3	4	5
(4) How likely are you to receive annual clinical breast exams?	1	2	3	4	5

*Note.* An additional item, “In general, about how long after first noticing symptoms of a condition (whether it is known or unknown) do you wait before seeking help from a health care provider? That is, reaching out and making an appointment?” was administered to participants but subsequently deleted. Response categories for this item were anchored on time frames (e.g., *less than a week* to *more than 3 months*). Participants could choose “not applicable” for this item if they had never sought treatment under such circumstances. Ten percent of the sample chose the not applicable response, which contributed to our decision to delete this item.

\*\*Item 1 is reverse coded

## Appendix M

### Physical Activity Acceptance Questionnaire

1 = Never True

2 = Very Seldom True

3 = Seldom True

4 = Sometimes True

5 = Frequently True

6 = Almost Always True

7 = Always True

1. I need to concentrate on getting rid of my urges to stop exercising or put off exercise.
2. My thoughts and feelings about physical activity must change before I can make changes in my exercise.
3. If I have the thought “exercising today won't be enjoyable,” it derails me from my exercise plan
4. I will have better control over my exercise routine if I can control my negative thoughts about exercise.
5. I avoid exercising if it is going to make me feel physically uncomfortable, bored, or pressed for time.
6. Even if I have the desire to stop while I am exercising, I can still follow my exercise plan.
7. I am committing to being physically active no matter what feels uncomfortable or challenging about that.
8. It is okay to experience discomfort (e.g., fatigue, boredom, sweating) while I am exercising.
9. I can keep my commitment to physical activity even when I get busy with other responsibilities (e.g., school, work, family).
10. When I start to feel out of breath or tired during exercise I find a way to keep going.



## Appendix N

### TelegRAM announcement

Want to learn strategies to accept your body?

Are you a woman ages 18 to 25? Would you like to participate in a research study aimed to accept your body? Involvement includes participation in a one-week online intervention that lasts ~45 minutes total. Participants are asked to complete 1-hour online surveys at three time-points. Eligible participants will receive compensation in the form of Amazon gift cards and SONA credit (if applicable). For more information and to see if you are eligible, contact Alexandria Davies with VCU's Department of Psychology, [daviesae@mymail.vcu.edu](mailto:daviesae@mymail.vcu.edu).