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Post-Bariatric surgery patients fail to exercise consistently: exploring the potential role of self-compassion

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POST-BARIATRIC SURGERY PATIENTS FAIL TO EXERCISE CONSISTENTLY: EXPLORING THE POTENTIAL ROLE OF SELF-COMPASSION

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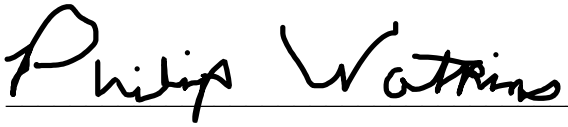

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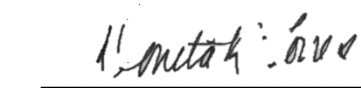

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Abstract

Many bariatric weight loss surgery patients do not exercise after surgery. One potential reason this population may not exercise is due to body image shame and low self-compassion, which can contribute to lower appreciation for one's body. Adult participants from an international bariatric population sample (N = 805) and an Eastern Washington University undergraduate student sample (N = 104) completed a one-time online questionnaire that included measures of self-compassion, physical activity frequency, body appreciation, and body image shame. In the bariatric sample, self-compassion was indirectly associated with exercise frequency via body appreciation and body image shame. Additionally, at the highest levels of self-compassion, exercise frequency was negatively impacted by the highest levels of body image shame. These results were not found in the undergraduate sample. Moving forward, interventions targeting self-compassion, body appreciation, and body image shame may help support members of the bariatric surgery population's physical activity efforts.

Keywords: self-compassion, body shame, body appreciation, bariatric surgery, physical activity

Post-Bariatric Surgery Patients Fail to Exercise Consistently: Exploring the Potential Role of Self-Compassion

"My bariatric weight loss surgeon told me that I would never have to exercise to maintain my weight loss." For health professionals, this admission of a sedentary lifestyle post-surgery can be troubling news, but is not altogether unheard of. The CDC reports that a mere 22.9% of adult U.S. Americans aged 18-64 meet the guidelines put forth by the World Health Organization (2011), recommending a minimum of 150 minutes of moderate-intensity aerobic activity per week (Blackwell & Clarke, 2018). Nevertheless, physical activity is a strongly recommended practice for those who are pre- and post-bariatric surgery. Exercise can play an important role in regulating body weight and contributes to better surgical outcomes after bariatric surgery (Jacobi, et al., 2011; King & Bond, 2013).

So, why does research suggest that the majority of bariatric patients do not exercise as regularly as they self-report and do not meet the minimum physical activity recommendations (Bergh et al., 2017; Berglind et al., 2014, 2016; Bond et al., 2010; Herring et al., 2015; King & Bond, 2013)? One reason may involve how the individual engages with their suffering and the discomfort they feel about their weight and/or body image. Many individuals experience significant challenges following bariatric surgery due to drastic lifestyle changes. These changes include monitoring food intake, eating much smaller meals than what they have been used to, and the physical and emotional discomfort of moving their body in ways they may not have done in a long time (if ever) (Meana & Ricciardi, 2008). Consequently, for a successful lifestyle change to occur, it appears almost essential that one would need to treat themselves with compassion to face and work with the struggles and discomfort associated with unlearning unsupportive behaviors and building healthier ones following bariatric surgery.

The purpose of the current research was to examine whether individuals in the bariatric community who exercise consistently exhibited higher levels of self-compassion than did those who exercised less frequently or were sedentary. I also investigated whether body appreciation was positively related to exercise frequency, and if body shame was negatively related to exercise frequency. Lastly, I explored whether body shame mediated the link between self-compassion and exercise frequency, while body appreciation has a moderating effect.

Considering that the prevalence of obesity has increased nearly threefold since 1975 (World Health Organization, 2018) and 228,000 bariatric weight loss procedures were performed in 2017 (American Society for Metabolic and Bariatric Surgery, 2018), it is essential to understand why many bariatric surgery patients fail to reach the recommended levels of weekly physical activity through objective measurement, since exercise is a predictor of weight loss maintenance (Bergh et al., 2017; Berglind et al., 2014, 2016; Bond et al., 2010; Sellberg et al., 2017). If lower self-compassion exists in individuals who do not exercise consistently, it would be particularly important to study given that self-compassion appears to play a vital role in protecting against negative psychological responses to challenging events (MacBeth & Gumley, 2012; Neff, Kirkpatrick, and Rude, 2007; Neff, Rude, and Kirkpatrick, 2007; Sick et al., 2020; Terry & Leary, 2011).

A significant underpinning of the existing self-compassion research findings is that individuals higher in self-compassion appear to have higher intrinsic motivation for exercise (Cox et al., 2018; Magnus, Kowalski, and McHugh, 2010). According to self-determination theory, intrinsic motivation is the most autonomous form of motivation (Ryan & Deci, 2000, 2007) and is the strongest motivational predictor of sustained physical activity (Teixeira et al., 2012). These findings are interesting because self-compassion has been associated with setting

goals that improve one's well-being and happiness as opposed to goals that focus on bolstering feelings of self-worth and making good impressions with others (Neff et al., 2007; Neff, Hsieh, and Dejitterat, 2005). However, some research indicates those who have bariatric surgery tend to focus on extrinsic motivators for exercise, such as weight loss or weight loss maintenance (Possmark et al., 2019). This extrinsic motivation for exercise may be for the sake of impression management, and not the immediate rewards of physical activity such as better mood, increased energy, and overall enjoyment of movement. Therefore, understanding the role of shame and self-compassion in physical activity within the bariatric community may provide useful information to researchers and practitioners seeking to improve physical activity interventions in this population.

To better understand these issues, it is imperative to consider past research on the importance of exercise to bariatric patients, the role weight stigma and shame may play in exercise motivation for this population, and promising findings linking self-compassion to higher body appreciation and intrinsic exercise motivation.

The Importance of Physical Activity Within the Bariatric Community

Why focus on physical activity when so much research has focused on eating behaviors and disordered eating in the obesity and bariatric communities? Recent research in the pre- and post- Roux-en-Y gastric bypass bariatric surgery population has demonstrated that physical activity was associated with higher health-related quality of life scores, which is a multidimensional measure of physical, mental, functional, and social well-being in the general population. The same study also found that physical activity post-surgery was related to experiencing less bodily pain (Sellberg et al., 2019). Some studies have found that 10-30% of total body weight loss is attributed to decrements in muscle mass as a result of bariatric surgery

(Pouwels et al., 2015; Ito, et al., 2017). This is problematic because muscle strength decline independently translates to greater risk for premature death (Volaklis, Halle, and Meisinger, 2015). However, exercise interventions with bariatric patients have been found to lead to a better preservation of muscle strength and muscle mass (Pouwels et al., 2015). Exercise also contributes to beneficial outcomes in body composition, insulin sensitivity, high-density lipoprotein cholesterol (Wefers et al., 2016), increases in cardio-respiratory fitness (Caudwell et al., 2008) and lower blood pressure independent of weight loss (Caudwell et al., 2008; Williamson et al., 2016). Dietary change is also essential for members of the bariatric community, but research indicates coupling dietary changes with exercise is a more significant predictor of weight loss maintenance over dietary change alone (Foright et al., 2018; King et al., 2021; Odgen et al., 2014; Petridou, Siopi, and Mougios, 2019; Santos et al., 2017). Therefore, should an individual wish to improve their post-bariatric surgery outcomes, prioritizing exercise is essential.

Exploring Explanations for Lack of Physical Activity in the Bariatric Community

When considering the challenge of exercise maintenance in the bariatric community, the problem appears to be that the immediate benefits of physical activity are not appealing enough to get many members of the bariatric community active in reaching the recommended amount of weekly exercise (Assakran et al., 2020; Bergh et al., 2017; Berglind et al., 2014, 2016; Bond et al., 2010; Sellberg et al., 2017). One cross-sectional study examining the reasons for poor adherence to diet and exercise post bariatric surgery found that out of 399 participants, 44.1% did not engage in physical activity with the top reasons being lack of time, low self-discipline, and weather (Assakran et al., 2020). Negative attitudes toward physical activity appear to be another probable contributor to a lack of physical fitness. One qualitative study found that

individuals who self-reported lower levels of physical activity five years post-surgery had negative attitudes toward exercise, did not prioritize physical activity, did not feel supported, and saw no need or benefit of physical activity. Most of the inactive participants used self-defeating words like "lazy" or "couch potato" to describe themselves and their physical activity habits. It is also worth mentioning that the majority of these participants viewed physical activity with extrinsic motivation—merely as a means to lose weight rather than the intrinsic value of enjoyment and building competence (Possmark et al., 2019). Other research has found that individuals with higher body mass index (BMI) scores report more weight stigma experiences and body dissatisfaction as well as lower motivation for physical activity (Vartanian & Shaprow, 2008), as well as actual physical activity (Vartanian & Shaprow, 2008; Wott & Carels, 2010). Furthermore, experiencing weight stigma while internalizing anti-fat attitudes contributes to exercise avoidance in public settings such as gyms (Vartanian & Novak, 2011).

The Role of Weight Stigma and Shame in the Bariatric Community

According to the work of Kurzban and Leary (2001), stigmatization is part of an evolutionary process by which individuals decide with whom to associate and cooperate and whom they want to exclude, reject, or avoid due to the threat of contamination or catching a disease. Obesity is a visible target for stigmatization from members of society (Fardouly & Vartanian, 2011; Major & O'Brien, 2005; Puhl & Brownell, 2006; Tomiyama, 2014) and leads to negative stereotyping, prejudice, and discrimination of bigger-bodied people (Tomiyama, 2014). Unfortunately, public health campaigns and health policy scholars have routinely used the element of moral disgust concerning the health of the obesity population that contributes to stigmatization and discrimination of individuals in bigger bodies (Callahan, 2012; Lupton, 2015). These same campaigns often position obesity as a product of a self-chosen lifestyle (Hruby et al.,

2016) —flying in the face of evidence that obesity is a product of a complex interaction of sociocultural, economic, genetic, biological, psychological, as well as lifestyle factors (Courtemanche et al., 2016; Salici, 2017). This emphasis on self-chosen lifestyle and personal responsibility may partially explain research findings that indicate viewing weight loss as controllable is what sparks the stigmatizing belief that an overweight or obese individual is lazy and lacks motivation to take care of themselves (Fruh et al., 2016; Ringel & Ditto, 2019). One study, however, found that effort played a more important role than controllability when evaluating people in bigger bodies. The study's participants ascribed fewer obesity stereotypes to people in bigger bodies who put in effort to be healthy and were considered to have a more acceptable lifestyle and evoked less disgust even when the person's body weight was viewed as uncontrollable (e.g., thyroid medication not working) as compared to controllable (Black, Sokol, and Vartanian, 2014).

To add insult to injury, research also shows that overweight or obese individuals who lost weight were perceived by others to have healthier eating and exercise behaviors. However, if the individual lost weight through means of bariatric surgery (instead of just diet and exercise), the individual was still believed to have healthier eating and exercise behaviors, but they were also viewed as lazy and presumed to exercise less than those who lost weight through diet and exercise alone (Fardouly & Vartanian, 2011). This difference appears to be due to people viewing bariatric surgery patients as less responsible for their weight loss and the effort required (Vartanian & Fardouly, 2013, 2014). Unfortunately, the bariatric surgery patient often also faces stigma in their household from family members claiming the bariatric surgery patient "took the easy way out" (Meana & Ricciardi, 2008, p. 97) by having the surgery. It is not surprising that individuals from the bariatric community report facing weight stigma at home as other studies

have shown individuals report that the most frequent perpetrators of weight stigma were strangers, healthcare and service professionals, and family members (including partner or spouse) (Sutin & Terracciano, 2017; Vartanian, Pinkus, and Smyth, 2014). It would seem that for many individuals in the bariatric community, stigma is an inescapable part of life.

It is important to note that stigma can also serve as a contributing factor to external and internal shame. Shame is linked to the concept of stigma consciousness, which is the fear of being allocated into a stigmatized group (Pinel, 1999). According to Gilbert (1997, 1998a), shame is an affective-defensive response or pattern of responses to the threat or experience of social rejection or devaluation because one is found to be unattractive in some way. Shame is a multifaceted experience consisting of components of social cognition, internal self-evaluations, emotions, behaviors, and physiology (Gilbert, 2002). External shame refers to a group of emotions associated with personal attributes or characteristics one thinks others see as bad, weak, inadequate, or disgusting in the self and would, could, or have resulted in rejection, attacks, or losing attractiveness in the eyes of others (e.g., “they think I’m disgusting”) (Gilbert, 1997, 1998a, 1998b). Internal shame, on the other hand, is centered on self-devaluation and feelings of being personally bad, undesirable, weak, inadequate, or disgusting to oneself (e.g., “I am disgusting”) (Gilbert, 1998a).

Gilbert (2002) suggests that an individual is most vulnerable to internalizing shame when social needs for love, affiliation, belonging, and status are unmet instead of affirmed by those who mean the most to the individual. It is important to note that many who experience external shame may also experience internal shame, but one does not necessarily imply the other. Indeed, many who experience stigma and external shame like themselves and do not view their inner selves as unworthy or flawed (Gilbert, 2002). Another critical characteristic of shame is how it is

typically externally manifested in behavior. Although shame can present as anxiety, anger, or demobilization, the pattern of behaviors connected with shame are typically submissive—the desire to hide, conceal one's self, avoid eye gaze, escape, and inhibition of confident action (Gilbert & McGuire, 1998; Keltner & Harker, 1998). Recent studies have found a significant link between shame and lower levels of physical activity (Castonguay et al., 2017; Pila et al., 2021) and missing a pre-planned exercise session (Meade, Semenchuk, and Strachan, 2019). In particular, a study measuring body-related shame and guilt in breast cancer survivors found that higher levels of body shame were associated with a decrease in physical activity (Castonguay et al., 2017). Unsurprisingly, internalized and externalized body shame is also correlate with higher BMI and fear of self-compassion (Dias, Ferreira, and Trindade, 2020; Ferreira, Dias, and Oliveira, 2019).

When we consider what these findings mean for post-bariatric patients, we cannot forget that one major downfall to bariatric weight loss surgery is that rapid and massive weight loss often results in excess skin that can leave patients with a negative view of their "new" bodies (Meana & Ricciardi, 2008). In many cases, this dissatisfaction of loose skin leads them to seek subsequent body contouring surgeries (Ivezaji & Grilo, 2018) in the hopes of improving body appreciation. In short, bariatric surgery patients may avoid exercise because of shame tendencies toward their body and internalizing stigmatizing messages claiming they took "the easy way out."

Self-Compassion and its Link to Exercise

Compassion is defined as having both a sensitivity to the suffering of self and others and a motivation to help alleviate and prevent suffering (Gilbert, 2010; Gilbert et al., 2017; Gilbert & Choden, 2013; Gilbert & Irons, 2005). Neff (2003a) conceptualized self-compassion as

consisting of three components—self-kindness (vs. self-judgment), common humanity (vs. isolation), and mindfulness (vs. over-identification). When life circumstances are challenging or painful, self-compassionate people respond with self-kindness and are self-soothing. Common humanity involves recognizing that difficulties and suffering are normal parts of life that are shared by many people. Lastly, mindfulness suggests having a balanced approach to one's cognitions and emotions.

Research has demonstrated that self-compassion is associated with positive psychological outcomes, including less depression and anxiety and increased life satisfaction (MacBeth & Gumley, 2012; Neff, Kirkpatrick, and Rude, 2007: Neff, Rude, and Kirkpatrick, 2007). Moreover, research suggests that self-compassion allows for individuals to cope with distressing health events more readily (Terry et al., 2013) and be more proactive in self-regulation toward health behaviors due to less self-blaming and being able to adjust their behavior and goals when progress is not made (Terry & Leary, 2011). Among women, higher self-compassion appears to have a buffering effect between body shame and depressive symptoms (Sick et al., 2020). One study in particular found that self-compassion acted as a partial buffer against the mental and global health detriments of self-stigma within the overweight and obesity population, lowering the predictive effect of self-stigma on outcomes of depression, somatic symptoms (e.g., back pain, stomach/bowel problems, low energy, trouble sleeping, etc.), and health status/quality of life by nearly one-third (Hilbert et al., 2015).

Most relevant to the current study, self-compassion research shows benefits to those who exercise. A recent systematic review and meta-analysis examining a total of 25 studies with a sample size of 5622 found a significant effect size on the overall positive correlation between physical activity and self-compassion (Wong, Chung, and Leung, 2020). One doctoral

dissertation study found with middle-aged women that self-compassion positively predicted body image, which in turn predicted higher levels of physical activity participation (Thall, 2014). Another study found with adolescent females, those who were involved in exercise demonstrated higher self-compassion and self-esteem than adolescents who reported having a sedentary lifestyle (Thakur & Joshi, 2016). For those who exercise, self-compassion is also positively related to intrinsic motivation (Cox et al., 2019; Magnus et al., 2010; Thall 2014), self-regulation, self-efficacy (Biber, 2020; Hallion et al., 2019), and exercise identity (Biber, 2020). Moreover, self-compassion is negatively related to external and introjected motivation, ego goal orientation, social physique anxiety, obligatory exercise behavior (Magnus et al., 2010), and body mass index (Hallion et al., 2019). Because these findings are correlational and cross-sectional, we cannot determine if self-compassion promotes motivation for exercise or if exercising promotes self-compassion. However, a recent study found that change in self-compassion predicted changes in body surveillance and body appreciation for participants involved in a 16-week yoga course that met twice weekly, which positively predicted change in intrinsic motivation for exercise (Cox et al., 2019). It is worth noting that although this research demonstrated changes in intrinsic motivation for exercise, exercise adherence or frequency was not measured or reported during or after the 16-week course.

Given these collective findings, we would anticipate that people who relate in compassionate ways toward their suffering and struggle—whether they are facing weight stigma, body dissatisfaction, not performing well in their workout, or skipping a workout-- should be less self-critical, better able to adjust their behavior and goals without complete abandonment of the goal, and not feel a need to withdraw from social exercise environments. In contrast, a person who experiences shame is more likely to be self-judgmental, have a narrowed focus and cognitive

distortions such as cognitive fusion (e.g., “because I have failed again, I am a failure”), and may possess lower social skills, isolating themselves from social interactions.

The Current Study

One limitation of past self-compassion exercise research is that it was all measured with Neff’s widely used Self-Compassion Scale (Neff 2003a; Neff 2003b). There has been controversy over the constructs and the measurement of Neff’s scale, particularly the combining of negative and positive items as a single measure of the compassion construct (Costa et al., 2015; López et al., 2015; Muris & Petrocchi, 2016). Neff’s scale uses bipolar constructs such as kindness vs. self-judgment, mindfulness vs. over-identification, and common humanity vs. isolation, which allows for subjects to rank high on both positive and negative constructs or low on both positive and negative constructs and still get the same score (Gilbert et al., 2017). Neff’s scale was also criticized for confounding distinct psychological processes, in that self-judgment/attacking—or refraining from doing this—represents different psychological processes than does actively relating kindly to the self (Irons et al., 2006), and evidence indicates these psychological processes may even be associated with different brain systems (Longe et al., 2010). For this study, which focuses upon the extent to which individuals actively relate compassionately to their struggles, I will use Gilbert’s (2017) self-compassion subscale from the Compassionate Engagement and Action Scale along with Neff’s Self-Compassion scale. This measure focuses on motivation, separating engagement from action, and assesses specific competencies associated with compassion such as paying attention, distress tolerance, and empathy.

Given that self-compassion contributes to well-being (MacBeth & Gumley, 2012; Neff, Kirkpatrick, and Rude, 2007: Neff, Rude, and Kirkpatrick, 2007) and exercise habits (Cox et al.,

2018; Magnus, Kowalski, and McHugh, 2010; Thakur & Joshi, 2016) it is reasonable to propose that self-compassion may also have implications for exercise frequency within the bariatric community. Because research findings have revealed correlations between intrinsic motivation for exercise and self-compassion, but have not taken any self-reported or objective measures of exercise frequency from participants, it will be essential to determine if individuals who have higher self-compassion also exercise more frequently.

To examine these issues, a sample of participants from the bariatric population received an internet questionnaire consisting of demographic information (including information about their BMI, date of bariatric surgery, and if they have any physical injuries) and scales to rate levels of physical activity, body image shame, body appreciation, and self-compassion. To examine if the relationships found in the bariatric population are generalizable, a sample of Eastern Washington University undergraduate students also received the same internet questionnaire. I hypothesized that self-compassion would lead to greater frequency of exercise. I also hypothesized that body appreciation would be positively related to exercise frequency, and that body shame would be negatively related to exercise frequency. Finally, I predicted that body shame would mediate the link between self-compassion and exercise frequency, while this link would be moderated by body appreciation. These relationships were expected to be similar for the undergraduate student population given past research findings in this area with undergraduate students (Cox et al., 2018; Magnus, Kowalski, and McHugh, 2010). Understanding the role of body shame and self-compassion in physical activity within the bariatric community may provide useful information to researchers and practitioners seeking to improve physical activity interventions in this population.

Method

Overview and Design

In this study we used a cross-sectional, correlational design to examine the relationship between self-compassion and self-reported exercise frequency. A sample of individuals who have had bariatric surgery and a sample of Eastern Washington University undergraduate students took an online survey answering scales designed to measure self-compassion, body image shame, body appreciation, physical activity behavior, demographic information, and two open-ended questions about relationship to body and exercise and whether or not COVID-19 impacted their exercise routine.

Participants

The first sample comprised of 805 participants representing a global population of individuals post-bariatric surgery. Participants included 763 females, 34 males, 1 non-binary individual, and 10 participants who declined to disclose. The most frequent age range represented in this sample was age 35 to 44 (39.6%), followed by age range 25 to 34 (25.6%). The ethnicity of the participants was predominately White (79.6%), followed by Black or African American (5.9%), Hispanic or Latino (5.7%), and Multiracial (4.5%). The education level of the participants were largely college graduates (32.1%), followed by completing 1-3 years of college (20.5%), and completion of graduate school (17.6%). The median amount of time living with bariatric surgery was 12.0 months (range 0-419) and postoperative mean body mass index (BMI) was 33.95 (*SD* = 7.82; range 16.29–76.44) kg/m2. The median amount of days the participant reported between the time that they weighed themselves and the date of participation in this study was 1 day (range 0-407). For full demographic information, see Table 1 in appendix.

The second sample was made up of 104 Eastern Washington University undergraduate students. Participants included 91 females, 12 males, and 1 non-binary individual. The greatest age range represented in this sample was age 18 to 24 (87.5%). The ethnicity of the participants was predominately White (61.5%), followed by Hispanic or Latino (16.3%), Multiracial (9.6%), and Asian or Pacific Islander (6.7%). The education level of the participants was largely the completion of 1-3 years of college (81.7%) followed by graduation from high school (11.5%). Their average body mass index (BMI) was 25.86 (*SD* = 6.16; range 15.55–44.62) kg/m2. The median amount of days the participant reported between the time that they weighed themselves and the date of participation in this study was 11.5 days (range 0-376). For full demographics information, see Table 2 in appendix.

Measures

Demographics form.

All participants were asked to complete a socio-demographic form, which included items regarding gender, age, ethnicity, level of education, height and weight for BMI calculation, date of initial bariatric surgery (if applicable), date of follow-up surgery (if applicable), estimated date that they last weighed themselves on a scale, and list of physical injuries (if applicable).

Self-compassion: Self-Compassion Scale (Neff, 2003b).

Self-compassion was assessed using both Neff's (2003b) 26-item Self-Compassion Scale and Gilbert et al.'s (2017) Compassionate Engagement and Action self-compassion 13-item subscale. The Self-Compassion Scale (SCS) is a self-reported measurement of one's level of self-compassion that consists of 26 items divided into six subscales: Self-Kindness (e.g., ''When I'm going through a very hard time, I give myself the caring and tenderness I need"), Self-Judgment (e.g., ''When I see aspects of myself that I don't like, I get down on myself"), Common

Humanity (e.g., ‘‘When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people”), Isolation (e.g., ‘‘When I’m really struggling, I tend to feel like other people must be having an easier time of it”), Mindfulness (e.g., ‘‘When something painful happens I try to take a balanced view of the situation”), and Over-Identification (e.g., ‘‘When I fail at something important to me I become consumed by feelings of inadequacy”). Participants responded to how often they experience a particular response to pain and suffering using a 5-point Likert scale ranging from 1 (“Almost Never”) to 5 (“Almost Always”). After reverse scoring negative dimension items, mean scores on the six subscales are summed to form a composite self-compassion score (SCS), with higher scores reflecting a greater level of self-compassion. The scale has high internal consistency with a Cronbach’s alpha of 0.92 in the original study (Neff, 2003b) and a Cronbach alpha of 0.95 and 0.93 in the present study for bariatric sample and undergraduate sample, respectively.

Self-compassion: Self-Compassion Scale (Gilbert et al., 2017).

The Compassionate Engagement and Action Scales (CEAS) is a self-report instrument that includes three subscales that evaluate the different flows of compassion: (1) compassion for others; (2) the ability to receive compassion from others; and (3) self-compassion (SC). Each subscale consists of 13 items divided into two subsections: attributes (which evaluate the sensitivity and motivation to deal with suffering with a loving and compassionate attitude) and actions (which assess the commitment and skills to effectively act to alleviate and prevent suffering). Participants were asked to rate items according to how frequently each occurs, using a 10-point Likert scale ranging from 1 (“Never”) to 10 (“Always”). Higher scores are indicators of higher levels of compassionate attributes and compassionate actions. In the current study, only the self-compassionate attribute (e.g., “I reflect on and make sense of my feelings of distress”)

and action (e.g., “I direct my attention to what is likely to be helpful to me”) subscales were used. In the original study, which presented validation for the American, British, and Portuguese populations, CEAS revealed good psychometric characteristics, presenting internal consistencies of 0.74 and 0.89 for self-compassionate attributes and self-compassionate actions, respectively (Gilbert et al., 2017). The present study had a Cronbach’s alpha’s of 0.67 and 0.65 for self-compassionate attributes and 0.92 and 0.86 for self-compassionate actions in the bariatric and undergraduate samples, respectively.

Body shame.

The Body Image Shame Scale (BISS) is a self-response measure that evaluates the experience and phenomenology of shame experiences associated with body image. It consists of 14 items divided into two subscales: externalized body image shame, which involves the perception that one’s body image is negatively evaluated by others and the adoption of defensive behaviors (e.g., “I do not like to exercise in front of others because I am afraid of how they might evaluate me”); and internalized body shame, which includes negative self-perceptions of personal worth on the basis of one’s body image, and consequent concealment and avoidance behaviors of body image (e.g., “When I see my body in the mirror I feel I am a defective person”). Participants were asked to respond to items on a 5-point Likert scale (0 = “never” to 4 = “almost always”). The scale has high internal consistency with a Cronbach’s alpha of 0.92 in the original study (Duarte et al., 2015) and of 0.94 and 0.96 for the bariatric and undergraduate sample in the present study.

Body appreciation.

Body Appreciation Scale (BAS) was used to assess participants’ acceptance of and appreciation for their bodies. It consists of 13 items (e.g., “I feel good about my body,” “Despite its flaws, I accept my body for what it is”). Participants are asked to rate items on a 5-point Likert scale (1 =

"never" to 5 = "always"). Higher scores indicate higher body appreciation. Studies supported the scale's unidimensionality and the internal consistency, construct validity, and 3-week stability of its scores in college women. The scale's Cronbach alpha was 0.91 for the initial study and 0.93 for the second study (Avalos, Tylka, and Wood-Barcalow, 2005). The present study showed Cronbach's alpha of 0.92 and 0.94 for the bariatric and undergraduate samples.

Self-reported physical activity behavior

The Leisure Time Exercise Questionnaire (LTEQ) was used to assess physical activity behavior. Participants were asked to report the number of times per week they engaged in mild, moderate, and strenuous physical activity for more than 15 min. Each category of physical activity intensity was operationalized with examples of physical activity. A total Metabolic Equivalent of Task (MET) physical activity score was calculated by multiplying the weekly frequencies of mild, moderate, and strenuous activity by three, five, and nine, respectively, and summing the scores to create a weighed composite score. A second item on the LTEQ asks about the frequency of regular activity during a typical 7-day period that results in a fast heartbeat and sweating, which is reported on a 3-point Likert scale ranging from 1 (often) to 3 (never). This item was reverse-scored. The GLTEQ has been shown to be a valid (Jacobs et al., 1993) and reliable (Godin & Shephard, 1985) measurement tool and is a popular resource used to measure physical activity behavior within health behavior research (Meade, Semenchuk, and Strachan, 2019; Sabiston et al., 2010).

Procedure

All study procedures were approved by the Internal Review Board of Eastern Washington University, and this study conformed to the ethical principles of the American Psychological

Association. The questionnaire package was delivered in an online format through Survey Monkey, which is a secure survey tool that ensures the confidentiality of data.

Two bariatric samples exist for this study due to suspicion of order effects. Although the order of the initial questionnaire set was arranged with the intention to minimize order effects, two factors prompted a reordering of the scales mid-study for the bariatric sample. The first concern that prompted reordering was a very high participant drop-out rate (which continued even after the scale reordering). The second factor was participant commentary in Facebook groups that suggested the questions on particular scales (CEAS, etc.) were "vague," "did not make sense," "were too negative," and "did not seem related to bariatric surgery." For the first bariatric sample (and the undergraduate sample), the scales were ordered as follows: CEAS, BAS, SCS, BISS, LTEQ, and demographics. For the second bariatric sample, the scales were reordered: BAS, LTEQ, BISS, SCS, CEAS, and demographics.

The first bariatric sample was collected between October 4, 2020 and January 5, 2021. The second bariatric sample was collected between January 6, 2021 and March 26, 2021. The Eastern Washington University undergraduate student sample was collected between January 9, 2021 and March 16, 2021. The disclosure of the study and the recruitment of potential participants for the bariatric sample were conducted via email, Facebook groups, Facebook private messages, Instagram, Instagram direct messages, Reddit BariatricSurgery and wls communities, and ObesityHelp.com forum using the snowball sampling method. The invitation for participation in the study included a brief description of its objectives and procedures. In this invitation, a link that directed to the online version of the research protocol was included, which was composed of informed consent, questionnaire of biographical data, and the self-report measures described above. The initial sample size for this population totaled 1681 participants

(1064 for the first sample and 671 for the second sample). For the bariatric population, there was no reward incentive for participation.

The undergraduate student participants were recruited using Eastern Washington University's SONA system, which is an online system for research study registration. The initial sample size for this population was 121 participants. The undergraduate students were compensated for their time with two points of extra credit in their classes. Participation in this experiment was entirely voluntary, and students were free to excuse themselves from participation at any point during the experiment without penalty. In accordance with the aims of this study, data were cleaned to exclude participants who: (1) did not answer the majority of the scale items; (2) reported that they have not had bariatric surgery and/or reported a future bariatric surgery date in the bariatric sample; (3) did not report a bariatric surgery date in the bariatric sample; (4) were younger than 18 years old; (5) and did not pass the three attention check question items. This process resulted in the final sample of 805 bariatric participants and 104 undergraduate participants. From these final sample sizes, 141 participants were not included in the primary analyses because 109 did not report exercise behavior and 32 reported extreme outlier exercise scores.

Data analyses

Data analyses were performed using IBM SPSS Statistics software version 27 (SPSS IBM; Chicago, IL) and macro-program PROCESS 2.1 (Hayes, 2013). Prior to analysis, the exercise frequency dependent variable was inspected for outlier scores using box plots. The normality of the variables was also evaluated by the skewness and kurtosis values. To examine the first study purpose, Pearson correlation analyses were used to examine the relationships between self-compassion and exercise frequency in each sample and to check for

multicollinearity. To examine the second study purpose, based on correlations of the variables, four mediation analyses were conducted using PROCESS SPSS macro (model 4) for each measure of self-compassion with body image shame and each measure of self-compassion with body appreciation. Five thousand bootstrap samples were used to create 95% bias-corrected and accelerated (BCa) confidence intervals to test the significance of indirect effects, which are significant at $p < .05$ if the 95% confidence interval does not include zero.

To examine the third purpose of the study, four moderation analyses were conducted using PROCESS SPSS macro (model 1) for each measure of self-compassion with body image shame and each measure of self-compassion with body appreciation. To examine statistical assumptions prior to analysis, four linear regression analyses were conducted to check for outliers, homogeneity, and homoscedacity. Mahalanobis, Cook's, and Leveraged values were used to assess cut-off values for outliers to be excluded from the moderation analysis. Bootstrapping was set to 5,000 samples. Bias-corrected 95% confidence intervals were estimated for all effects. An effect was considered significant when the confidence interval did not contain zero. To examine the difference in physical activity frequency between the samples, I performed an ANCOVA to control for the covariate of change in exercise routine due to the impact of COVID-19.

Test for Order Effects in Bariatric Samples

An independent groups Welch's t-test revealed a significant difference between the two bariatric community samples for the variables of CEAS-SC, BAS, and BISS, independent of the presence of exercise behavior. In the measure of CEAS-SC, bariatric sample 1 ($M = 6.35$, $SD = 1.39$) reported significantly higher values than bariatric sample 2 ($M = 5.98$, $SD = 1.64$), $t(476.92) = 3.19$, $p < .01$, $d = .25$. In the measure of BAS, bariatric sample 1 ($M = 3.27$, $SD = .77$)

reported significantly lower values than bariatric sample 2 (M = 3.41, SD = .68), t (613.91) = -2.62, $p < .01$, d = -.19. Lastly, in the measure of BISS, bariatric sample 1 (M = 2.14, SD = 1.06) reported significantly higher values than bariatric sample 2 (M = 1.87, SD = .98), t (593.97) = 3.66, $p < .01$, d = .27. There was no significant difference between the two bariatric samples for the SCS measure or self-reported exercise. See Table 3 for all the results of independent groups t-test.

Table 3

Independent Group T-Test for Order Effects in Bariatric Samples

	Sample 1		Sample 2		
	M	*SD*	*M*	*SD*	t-test
Total METs	30.21	24.14	31.91	24.68	-0.91
CEAS-SC	6.35	1.39	5.98	1.64	3.19**
SCS	3.02	0.76	3.11	0.79	-1.52
BAS	3.27	0.77	3.41	0.68	-2.62**
BISS	2.14	1.06	1.87	0.98	3.66**

**$p < .01$

Note. METs = metabolic equivalent for task used for exercise frequency; SCS = Self-Compassion Scale (Neff); CEAS-SC = Compassionate Engagement and Action Self-Compassion subscale (Gilbert); BAS = Body Appreciation Scale; BISS = Body Image Shame Scale.

Results

Correlational Findings

I hypothesized and found support among bariatric sample 1 that participants who reported at least 1 Metabolic Equivalent of Task (MET) worth of weekly exercise that the frequency of physical activity was significantly and positively correlated with SCS [$r(433) = .13$, $p < .01$] and CEAS-SC [$r(435) = .17$, $p < .01$]. This relationship with exercise frequency was not significant

with SCS [$r(227) = -.02$, $p = .80$] and CEAS-SC [$r(227) = .01$, $p = .85$] for bariatric sample 2, however. The difference in the correlation coefficients between these two samples for the SCS and exercise relationship produced a z-score of 1.84, $p = .06$. The difference between samples for the CEAS-SCS and exercise relationship z-score was 1.87, $p = .07$. Because a probability value of more than 0.05 indicates that the two correlation coefficients were not signicantly different from one another, I concluded it was reasonable to combine the two bariatric samples for the remaining analysis, which may estimate the effects I would have seen from counterbalancing the scales on the questionnaire.

For the total bariatric sample of participants who reported at least 1 Metabolic Equivalent of Task (MET) worth of weekly exercise, frequency of physical activity was significantly and positively correlated with SCS [$r(661) = .08$, $p = .04$] and CEAS-SC [$r(663) = .10$, $p < .01$] (see Table 4). There was not a significant correlational relationship, however, between physical activity and SCS [$r(102) = .17$, $p = .08$] or CEAS-SC [$r(102) = .10$, $p = .33$] for the undergraduate sample (see Table 5).

Moreover, I hypothesized and found support that there was a significant positive relationship between body appreciation and exercise frequency in the bariatric sample [$r(668) = .21$, $p < .01$] but not in the undergraduate sample [$r(102) = .14$, $p = .16$]. There was also a significant negative correlational relationship between body image shame and exercise frequency for the bariatric sample [$r(668) = -.19$, $p < .01$] but not in the undergraduate sample [$r(102) = -.11$, $p = .32$]. As demonstrated in past studies, body mass index (BMI) was also significantly correlated with both measures of self-compassion, body appreciation, body image shame, and exercise frequency in the bariatric sample (see Table 4). For the undergraduate sample, BMI was

also significantly correlated with all of the study's variables of interest except exercise (see Table 5).

Lastly, there was a significant correlation between Neff's Self-Compassion Scale (SCS) and Gilbert's Compassionate Engagement and Action Self-Compassion subscale (CEAS-SC) for both the total bariatric sample [$r(795) = .67$, $p < .01$] and the undergraduate sample [$r(102) = .49$, $p < .01$].

Table 4

Correlation Matrix of Variables for Bariatric Sample

	1	2	3	4	5	6
1. Total METS	--					
2. SCS	**.08***	--				
3. CEAS-SC	**.10****	**.67****	--			
4. BAS	**.21****	**.64****	**.50****	--		
5. BISS	**-.19****	**-.60****	**-.40****	**-.68****	--	
6. BMI	**-.18****	**-.11****	**-.09****	**-.27****	**.28****	--

Note. METs = metabolic equivalent for task used for exercise frequency; SCS = Self-Compassion Scale (Neff); CEAS-SC = Compassionate Engagement and Action Self-Compassion subscale (Gilbert); BAS = Body Appreciation Scale; BISS = Body Image Shame Scale; BMI = body mass index.
* $p < .05$, ** $p < .01$.

Table 5

Correlation Matrix of Variables for Undergraduate Sample

	1	2	3	4	5	6
1. Total METs	--					
2. SCS	.17	--				
3. CEAS-SC	.10	**.49****	--			
4. BAS	.14	**.67****	**.48****	--		
5. BISS	-.11	**-.57****	**-.36****	**-.82****	--	
6. BMI	-.02	**-.22***	**-.27****	**-.37****	**.41****	--

Note. METs = metabolic equivalent for task used for exercise frequency; SCS = Self-Compassion Scale (Neff); CEAS-SC = Compassionate Engagement and Action Self-Compassion subscale (Gilbert); BAS = Body Appreciation Scale; BISS = Body Image Shame Scale; BMI = body mass index.
* $p < .05$, ** $p < .01$.

Self-Compassion and Exercise by Sample

Although not reflected in the core hypotheses of the study, it was expected that those who exercise in the bariatric community would exhibit greater self-compassion than those who do not exercise. In an independent groups Welch's t-test, there was no significant difference between non-exercisers (M = 3.04, SD = .77) and exercisers (M = 3.05, SD = .77) in the total bariatric sample for SCS $t(135.51) = -.17$, $p = .86$. There was also no significant difference between non-exercisers (M = 6.09, SD = 1.61) and exercisers (M = 6.24, SD = 1.47) for CEAS-SC measure of self-compassion in the total bariatric sample $t(137.55) = -.89$, $p = .38$. Moreover, I also found no difference in the SCS measure of self-compassion between the total bariatric sample (M = 3.05, SD = .77) and undergraduate student sample (M = 2.99, SD = .63) independent of exercise presence $t(146.11) = .89$ $p = .37$. Similarly, there was not a significant difference in the CEAS measure of self-compassion between the total bariatric sample (M = 6.22, SD = 1.49) and undergraduate student sample (M = 6.15, SD = 1.19) $t(147.87) = .55$, $p = .59$ (See Table 6).

Interestingly, the only significant difference between exercisers and non-exercisers in the total bariatric sample was that exercisers (M = 3.36, SD = .72) reported higher body appreciation than did non-exercisers (M = 3.06, SD = .86) $t(133.22) = -3.44$, $p < .01$. While there was not a significant difference between bariatric exercisers and undergraduate exercisers for body appreciation, there was a significant difference between the bariatric sample (M = 2.05, SD = 1.04) and the undergraduate sample (M = 1.68, SD = 1.14) in body image shame scores $t(126.21) = 3.10$, $p < 01$.

Table 6

Independent Group T-Test for Differences Between Bariatric Exercisers and Undergraduate Exercisers

	Total Bariatric Exercisers		Undergraduate Exercisers		
	M	*SD*	*M*	*SD*	t-test
Total METs	35.81	22.54	41.31	22.48	-2.30**
CEAS-SC	6.22	1.49	6.15	1.19	.55
SCS	3.05	.77	2.99	.63	.89
BAS	3.32	.74	3.43	0.86	-1.29
BISS	2.05	1.04	1.68	1.14	3.10**

Note. METs = metabolic equivalent for task used for exercise frequency; SCS = Self-Compassion Scale (Neff); CEAS-SC = Compassionate Engagement and Action Self-Compassion subscale (Gilbert); BAS = Body Appreciation Scale; BISS = Body Image Shame Scale.

**$p < .01$

The Mediating Effect of Body Appreciation and Body Image Shame

For the total bariatric sample, there was a positive total effect of Neff's self-compassion measure on physical activity frequency (b = 2.43, p = .03). However, as predicted, this relationship became non-significant when the body image shame mediator was included in the model (b = -1.13, $t(659)$ = -.81, p = .42). The relationship was also non-significant when the body appreciation mediator was included in the model (b = -2.56, $t(657)$ = -1.76, p = .08). As predicted, for Neff's measure of self-compassion, there was a significant indirect mediating effect of body appreciation (b = 8.53, 95% BCa CI: 3.18, 6.91) and body image shame (b = -4.64, 95% BCa CI: 2.01, 5.18) on physical activity frequency (see Tables 7 and 8 for F statistics and Figure 1 for mediation models).

Table 7

Mediation Analysis of Body Appreciation between Self-Compassion (SCS) and Exercise Frequency

	b	*t*	95% CI	*F*	*R2*
Step 1				4.47	0.01**
Constant	28.25	2.11	[21.18, 35.32]		
SCS	2.42	7.85**	[.17, 4.67]		
Step 2				17.07	0.05**
Constant	14.88	3.46**	[6.43, 23.32]		
SCS	-2.56	-1.76	[-5.40, .29]		
BAS	8.53	5.43**	[5.44, 11.61]		

Note. Total $N = 660$; SCS = Self-Compassion Scale (Neff); BAS = Body Appreciation Scale.
** $p < .01$.

Table 8

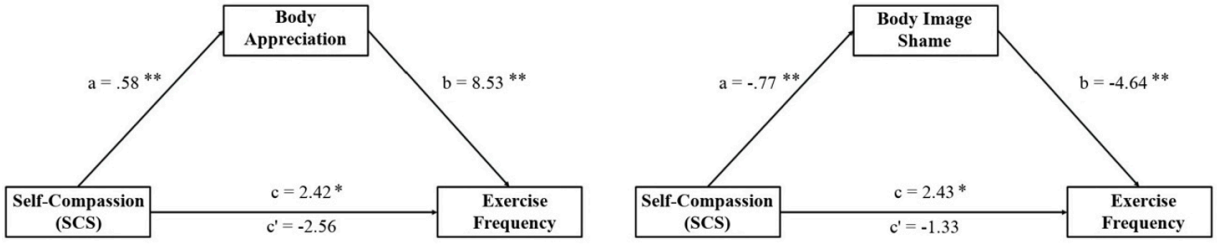
Mediation Analysis of Body Image Shame between Self-Compassion (SCS) and Exercise Frequency

	b	*t*	95% CI	*F*	*R2*
Step 1				4.53	0.01**
Constant	28.21	7.86**	[21.17, 35.25]		
SCS	2.43	2.13**	[.19, 4.67]		
Step 2				12.18	0.04**
Constant	48.56	8.38**	[37.19, 59.93]		
SCS	-1.23	-.81	[-3.84, 1.59]		
BISS	-4.64	-4.44**	[-6.69, -2.59]		

Note. Total $N = 662$; SCS = Self-Compassion Scale (Neff); BISS = Body Image Shame Scale.
** $p < .01$.

Figure 1

The Direct and Indirect Effects of Body Appreciation and Body Image Shame between Self-Compassion (SCS) and Exercise Frequency



Note. SCS = Self-Compassion Scale (Neff); BAS = Body Appreciation Scale; BISS = Body Image Shame Scale.
* $p < .05$, ** $p < .01$.

When exploring the relationship between Gilbert's self-compassion measure and physical activity frequency for the total bariatric sample, I found a similar positive total effect of self-compassion on physical activity frequency ($b = 1.51$, $p = .01$). This relationship also became non-significant when the body image shame mediator ($b = 0.40$, $t(661) = .62$, $p = .54$) and the body appreciation mediator ($b = -.14$, $t(659) = -.21$, $p = .84$) were included in the model. For Gilbert's measure of self-compassion, there was also a significant indirect mediating effect of body appreciation ($b = 7.04$, 95% BCa CI: 1.06, 2.46) and body image shame ($b = -4.03$, 95% BCa CI: .61, 1.70) on physical activity frequency (see Tables 9 and 10 for F statistics and Figure 2 for mediation models).

Table 9

Mediation Analysis of Body Appreciation between Self-Compassion (CEAS-SC) and Exercise Frequency

	b	*t*	95% CI	*F*	*R2*
Step 1				7.13	0.01**
Constant	25.74	6.73**	[18.23, 33.26]		
CEAS-SC	1.60	2.67**	[.42, 2.77]		
Step 2				16.22	0.05**
Constant	12.97	2.85**	[4.05, 21.89]		
CEAS-SC	-.14	-.21	[-1.48, 1.20]		
BAS	7.04	5.00**	[4.28, 9.80]		

Note. Total N = 662; CEAS-SC = Self-Compassion Scale (Gilbert); BAS = Body Appreciation Scale. ** $p < .01$.

Table 10

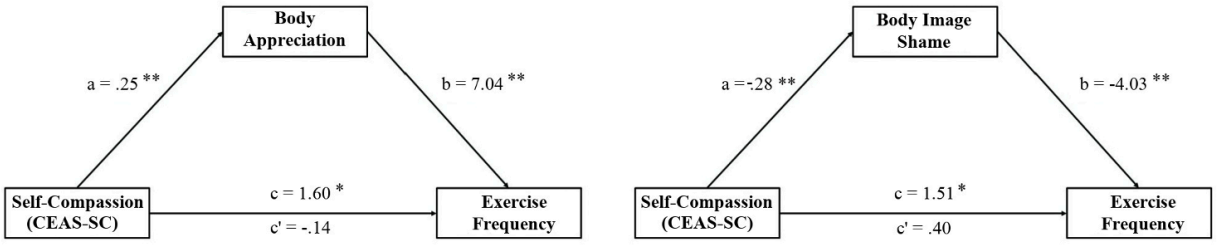
Mediation Analysis of Body Image Shame between Self-Compassion (CEAS-SC) and Exercise Frequency

	b	*t*	95% CI	*F*	*R2*
Step 1				6.43	0.01**
Constant	26.24	6.88**	[18.50, 33.74]		
CEAS-SC	1.51	2.54*	[.34, 2.68]		
Step 2				12.85	0.04**
Constant	41.43	8.08**	[31.37, 51.50]		
CEAS-SC	.40	.62	[-.86, 1.66]		
BISS	-4.03	-4.37**	[-5.85, -2.22]		

Note. Total N = 664; CEAS-SC = Self-Compassion Scale (Gilbert); BAS = Body Image Shame Scale. * $p < .05$, ** $p < .01$.

Figure 2

The Direct and Indirect Effects of Body Appreciation and Body Image Shame between Self-Compassion (CEAS-SC) and Exercise Frequency



Note. CEAS-SC = Compassionate Engagement and Action Self-Compassion subscale (Gilbert); BAS = Body Appreciation Scale; BISS = Body Image Shame Scale.
* $p < .05$, ** $p < .01$.

Because there was not a significant correlational relationship between either measure of self-compassion and exercise frequency in the undergraduate sample, mediation analysis was not explored.

The Moderating Effect of Body Appreciation and Body Image Shame

Despite our hypothesis for the bariatric sample, no moderating effect of body appreciation was found for the relationship between either measure of self-compassion and exercise frequency (see Table 11). However, there was a moderating effect of body image shame for the relationship between Neff's measure of self-compassion (SCS) and exercise frequency $F(3, 654) = 9.32$, $p < .001$, $R^2 = .04$. The moderating effect only became significant for body image shame at a score of "3" or more $b = -3.68$, $t(654) = -1.98$, $p = .05$. As body image shame and self-compassion are at their highest levels, exercise decreases, $b = -5.81$, $t(654) = -2.20$, $p = .03$ (see Figure 3).

Table 11

Moderation Analyses of Body Image Shame and Body Appreciation between Both Measures of Self-Compassion (SCS and CEAS-SC) and Exercise Frequency

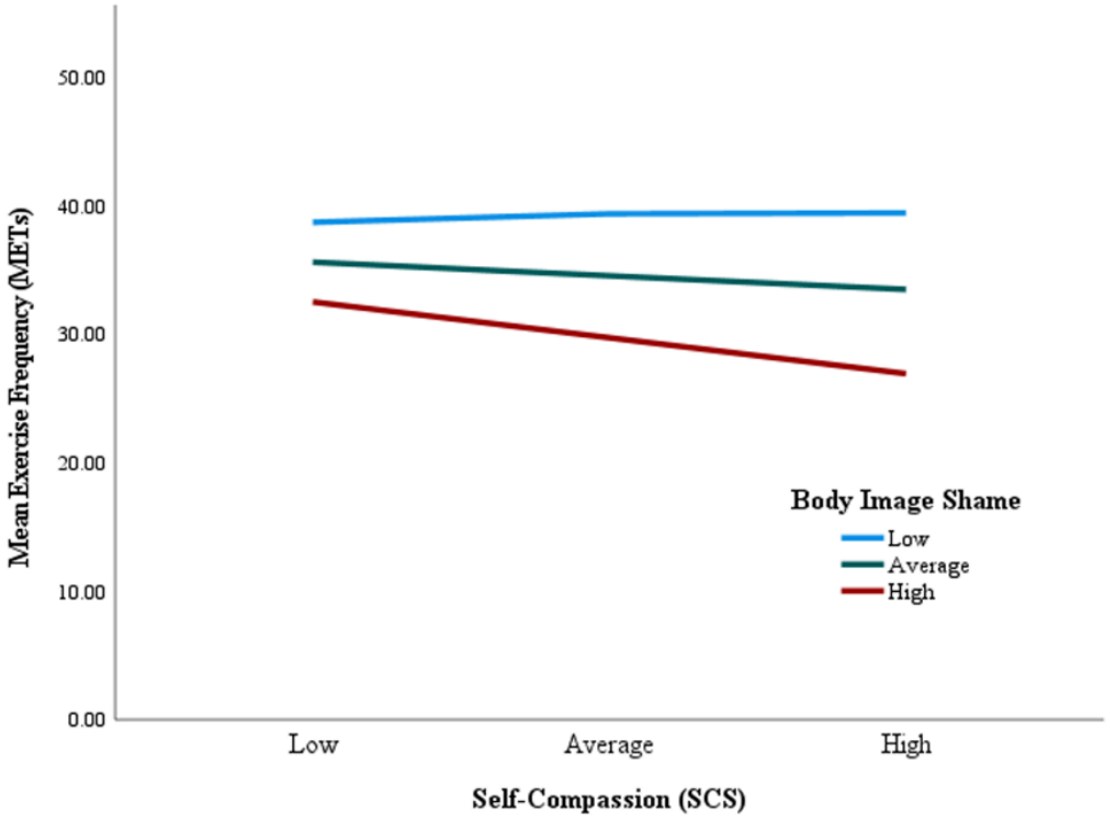
	b	*t*	95% CI	*F*	*R2*
Analysis 1: SCS-BAS-METs					
Overall model				(3, 650) 14.12	.06**
Predictor: BAS	9.64	6.04**	[6.51, 12.77]		
Predictor: SCS	-3.25	-2.20*	[-6.16, -.34]		
Predictor: Interaction SCS x BAS	2.11	1.40	[-.85, 5.06]		
Analysis 2: SCS-BISS-METs					
Overall model				(3, 654) 9.32	.04**
Predictor: BISS	-4.78	-4.49**	[-6.87, -2.69]		
Predictor: SCS	-1.40	-.99	[-4.19, 1.38]		
Predictor: Interaction SCS x BISS	-2.26	-2.07*	[-4.40, -.11]		
Analysis 3: CEAS-SC-BAS-METs					
Overall model				(3, 649) 11.39	.05**
Predictor: BAS	7.0	4.89**	[4.19, 9.81]		
Predictor: CEAS-SC	.15	.21	[-1.22, 1.51]		
Predictor: Interaction CEAS-SC x BAS	-.06	-.07	[-1.73, 1.60]		
Analysis 4: CEAS-SC-BISS-METs					
Overall model				(3, 655) 9.93	.04**
Predictor: BISS	-4.17	-4.50**	[-5.99, -2.35]		
Predictor: CEAS-SC	.67	1.03	[-.61, 1.94]		
Predictor: Interaction CEAS-SC x BISS	-.33	-.54	[-1.53, .87]		

Note. METs = metabolic equivalent for task used for exercise frequency; SCS = Self-Compassion Scale (Neff); CEAS-SC = Compassionate Engagement and Action Self-Compassion subscale (Gilbert); BAS = Body Appreciation Scale; BISS = Body Image Shame Scale.

* $p < .05$, ** $p < .01$.

Figure 3

Mean Exercise Frequency (METs) by Self-Compassion (SCS) by Body Image Shame



Because there was not a significant correlational relationship between either measure of self-compassion and exercise frequency in the undergraduate sample, moderation analysis was not explored.

Qualitative Question: In what ways has your exercise routine changed since COVID-19?

Responses to the open-ended question, “In what ways has your exercise routine changed since COVID-19?” were coded into a 3-point numerical scale. Answers that indicated a decrease in exercise were coded “0”, answers that indicated no change in physical activity routine were coded “1”, answers that indicated an increase in physical activity were coded “2”. Answers that

were unclear in terms of physical activity change were coded with a "3" and then excluded from the analysis. In the bariatric sample, 39.1% reported a decrease in exercise (n = 254), 49.7% reported no change (n = 323), and 11.2% reported an increase. In the undergraduate sample, 52.6% reported a decrease in exercise (n = 50), 32.6% reported no change (n = 31), and 14.7% reported an increase (n = 14).

Responses to this question from the bariatric sample ranged from positive experiences of exercise during the global pandemic, such as: "My husband and I have started spending more time together doing physical exercise at home since COVID. It's been a positive change for both of us" to negative experiences: "I went from going to the gym 4 days a week to not going to the gym at all and falling into depression with panic attacks every day." Responses to this question from the undergraduate sample ranged from positive experiences of exercise, such as: "It's only gotten better. No commute equals more time for me" to negative experiences: "Covid has changed my exercise routine a lot, I used to go to the gym 5 days a week, along with walking, basketball and trails during summer."

Because there results of the Pearson correlation analyses revealed a relationship in the bariatric community between both measures of self-compassion and exercise frequency, but this relationship was not found in the undergraduate sample, it was hypothesized that COVID-19 may have had more of an impact on the undergraduate sample's exercise routines than it did for the bariatric sample. To test this hypothesis, a one-way ANCOVA was conducted to compare the bariatric sample to the undergraduate sample in terms of exercise frequency while controlling for change in exercise routine due to COVID-19. Levene's test and normality checks were carried out and the assumptions met. There was a significant effect of sample type on exercise frequency after controlling for the COVID-19 covariate, $F(1, 631) = 8.61$, $p < .01$, $\eta 2 = .01$. Comparing the

estimated marginal means showed that more exercise was reported by the undergraduate sample (M = 41.31, n = 95) than the bariatric sample (M = 35.81, n = 650). Post hoc tests showed there was a significant difference between the bariatric sample and the undergraduate sample ($p < .01$). Table 12 presents the results of the ANCOVA test.

Table 12

Analysis of Covariance Results and Descriptives for Exercise Frequency by Sample Type with COVID-19 Exercise Disruption as Covariate

Sample Type	Exercise Frequency (METs)					
	Observed Mean		Adjusted Mean		*SD*	*n*
Bariatric Sample	35.81		35.49		22.54	668
Undergraduate Sample	41.31		42.78		22.48	101
Source	*SS*	*df*	MS	*F*	*p*	*n2*
COVID-19 Exercise Disruption (Covariate)	5.10	1	5.10	.01	.91	.000
Sample Type: Bariatric vs Undergradate	4174.08	1	4174.08	8.61	.003**	.013
Error	305875.41	631	484.747			

Note. R Squared = .014 (Adjusted R Squared = .010); SS = sum of squares, MS = mean square; METs = metabolic equivalent for task used for exercise frequency; ** p < .01.

Discussion

Overview of the Results

The primary goal of this study was to investigate a link between self-compassion and exercise frequency within the bariatric community. As hypothesized, there was a significant positive relationship between self-compassion and exercise frequency in the bariatric sample for those who reported at least one Metabolic Equivalent of Task (MET) of weekly exercise, but this relationship was not found in the undergraduate sample. Moreover, average self-compassion scores were not significantly different between exercisers and non-exercisers in the bariatric sample. This finding appears to challenge past research that suggests participants who exercise report higher self-compassion than sedentary individuals (Thakur & Joshi, 2016). However, exercisers in the bariatric sample did report significantly higher scores of body appreciation than non-exercisers. This finding is interesting because past research suggests that body appreciation is intimately related to intrinsic motivation for physical activity (Cox et al., 2019), which may

suggest that those who exercised in the bariatric sample were not just motivated to exercise for the sake of weight loss, impression management, and other extrinsic motivations.

As predicted, there was also a significant positive correlational relationship between body appreciation and exercise frequency in the bariatric sample. There was also a significant negative relationship between body image shame and exercise frequency for the bariatric sample. These correlational relationships with exercise were not found in the undergraduate sample, however. These undergraduate sample findings seem to contradict past research examining exercise motivation, body appreciation, and self-compassion in undergraduate student populations (Cox et al., 2018; Magnus, Kowalski, and McHugh, 2010). These differences may reveal that although past research has shown a correlation with intrinsic motivation for physical activity and self-compassion (and body appreciation), intrinsic motivation does not always translate into actual behavior, particularly when there may be other intervening factors (e.g., global pandemics). If data collection took place during a typical school year, it is possible the correlational relationships with exercise would exist.

Although it was not predicted in this study, body appreciation mediated the relationship between both measures of self-compassion and exercise frequency in the bariatric sample. This finding makes sense given past cross-sectional research findings that demonstrated a partial mediating effect of body appreciation in the relationship of self-compassion and intrinsic motivation for physical activity (Cox et al., 2019). As hypothesized, body image shame also mediated the relationship between both measures of self-compassion and exercise frequency in the bariatric sample. This finding means that self-compassion impacts exercise through the pervasive effects of body image shame. This finding contributes to other research findings that have already established a link between shame and lower levels of physical activity (Castonguay

et al., 2017; Meade, Semenchuk, and Strachan, 2019; Pila et al., 2021) and fear of self-compassion (Dias, Ferreira, and Trindade, 2020; Ferreira, Dias, and Oliveira, 2019).

Despite the hypothesis, body appreciation did not have a moderating effect on the relationship between either measure of self-compassion and exercise frequency. This finding indicates that body appreciation does not interact with self-compassion to create a different effect on exercise frequency at different levels of self-compassion. Unlike body appreciation, a significant moderating effect of body image shame was found for Neff's self-compassion (SCS) measure and exercise frequency, but only for the highest levels of body image shame. At the highest levels of self-compassion, exercise frequency was only impacted significantly by the highest levels of body image shame. This finding means that at the highest levels of self-compassion, average to lower amounts of body image shame do not seem to significantly diminish exercise frequency in this bariatric sample. It is possible that a specific component of body image shame (e.g., internal or external body image shame) feeds into extrinsic motivation for exercise in this sample.

Further moderation analysis with body image shame subscales could point more closely to what drives this interaction. However, there was no moderating effect of body image shame between Gilbert's self-compassion (CEAS-SC) measure and exercise frequency. Therefore, it is possible that the answer to the interaction lies in the SCS measure of self-compassion. Neff's scale (SCS) uses bipolar constructs that confound distinct psychological processes. The inclusion of negative items that tap into psychopathology may contribute to an inflated link with mental health problems (Muris & Petrocchi, 2016), such as body image shame. If it were possible to use just the three positive indicators of self-compassion in this scale for the

moderation analysis, there may no longer be an interaction between self-compassion and body image shame in terms of exercise frequency.

Limitations

Although this study presents promising findings, there are several limitations. First, its cross-sectional nature does not allow for presuming causal conclusions, even though mediation analyses were conducted for this study. Furthermore, the use of self-report measures and recruitment through an online survey may not allow for the generalization of data. This recruitment method did not assess participants' objective physical activity, which may have played an important part in the study model. Therefore, rigorously controlled intervention studies and other experimental designs are needed to explore whether these relationship are causal in nature.

Moreover, because past bariatric research has found that individuals in this community do not exercise as regularly as they self-report (Bergh et al., 2017; Herring et al., 2015; Sellberg et al., 2017), an objective measurement would be of great importance in examining the relationship between self-compassion and exercise frequency. Another limitation of this study is that participants were not asked if exercise was a new or a well-established behavior. Because the time span of the exercise relationship is unknown, we cannot make inferences about whether or not self-compassion skills are stronger for individuals who have a more committed relationship to physical activity. Future research may benefit from gathering this insight from participants to better understand how self-compassion interacts with an individual's exercise history to explain exercise frequency.

Another limitation was that counterbalancing of scales should have been done in the online questionnaires from the beginning of the study. Although the scales were arranged in a

way that was believed to minimize order effects, the was a significant difference in variable scores for CEAS-SC, BAS, and BISS between the two bariatric samples. The average scores for CEAS-SC and BAS were both higher when front-loaded in the questionnaires, while BISS scores were higher only after the participant responded to both self-compassion scales (bariatric sample 2). Future research wishing to measure these variables should counterbalance the scales for the most valid results.

While this study included two different population samples, recruitment for the bariatric sample was still limited to mostly highly educated middle-aged white individuals who identify as female. This finding may be due to primarily recruiting from bariatric Facebook groups without the incentive of a reward for participation. The undergraduate sample was compensated for their participation, but recruitment was limited to 67 days, which did not allow for a substantial sample size. Future recruitment efforts for similar studies should attempt to assess a more demographically diverse sample, specifically collecting data from individuals who identify as male and non-binary to examine gender differences in the relationships among body appreciation, body image shame, and self-compassion. Understanding the differences between gender identities may shed light on how to best meet the needs of bariatric patients in a physical activity setting.

Perhaps the most significant limitation of this study is that data collection took place during the COVID-19 global pandemic. Social distancing protocols drastically limited most individual's ability to use public fitness centers, sports engagement, and other athletic club participation. Because recruitment for the global bariatric population took place during five months, there was likely more access to fitness center options than the undergraduate student sample who were limited to fitness centers located in Eastern Washington state for just the 67

days of recruitment. While it was helpful to ask participants how their exercise routine changed due to COVID-19, in order to get a sense of their routine disruption, future exercise research should be conducted when a sense of normalcy has returned to everyday life.

Implications

The present study contributes to the growing body of research examining the correlational relationship between self-compassion and physical activity. This is also the first study to examine this relationship within a sample of individuals following bariatric surgery to the best of my knowledge. Moreover, this study contributes to the few studies that have examined the role body appreciation plays in exercise and self-compassion. For example, one prospective model study found that self-compassion predicted changes in body appreciation in individuals who did a 16-week yoga practice. In contrast, a cross-sectional study found that body appreciation partially mediated the relationship between self-compassion and intrinsic motivation for exercise (Cox et al., 2019). The present study also offers self-reported behavioral evidence of physical activity to add weight to the self-determination theory that intrinsic motivation is the strongest predictor of sustained physical activity.

Because this study found that body image shame mediated the relationship between self-compassion and exercise while also moderating the relationship at the highest levels of body image shame, it provides further evidence in support of past research interested in understanding the specific link between body image shame, self-compassion, and exercise (Castonguay et al., 2017; Meade, Semenchuk, and Strachan, 2019; Pila et al., 2021; Thall, 2014). These correlational findings between self-compassion and body image shame also contribute to past research demonstrating a link between body image shame and the fear of self-compassion (Dias, Ferreira, and Trindade, 2020; Ferreira, Dias, and Oliveira, 2019). Additionally, since body image

shame was also significantly higher in the bariatric community sample than it was in the undergraduate sample (see Table 6), softening the shame in this population will be of great importance. Designing exercise interventions for individuals who experience high body image shame may require extra consideration to the application of self-compassion toward their body and how they approach fitness. It may be helpful to allocate time to exploring and validating these fears while encouraging clients to experiment with a new care-based approach to exercise. More importantly, this study's findings also strengthen the supposition that the externalized behavior of shame can manifest into submissive behaviors with inhibition of confident action (Gilbert & McGuire, 1998; Keltner & Harker, 1998) through exercise avoidance.

Past research suggests that self-compassion has been associated with setting goals that improve one's well-being and happiness (Neff et al., 2007; Neff, Hsieh, and Dejitterat, 2005) while coping more readily with distressing health events (Terry et al., 2013) and exhibiting more proactive self-regulation toward health behaviors (Terry & Leary, 2011). This study may not supply direct evidence supporting these past findings, but we could infer that the correlational relationship with exercise found in the bariatric community implies a possible benefit of self-compassion to embracing the difficulty of healthy lifestyle change. In terms of practicality, it is possible that self-compassion could play a role in facilitating care-based exercise interventions for inconsistent exercisers in order to avoid the declines in muscle mass due to bariatric surgery (Pouwels et al., 2015; Ito, et al., 2017) that contribute to greater risk for premature death (Volaklis, Halle and Meisinger, 2015). Because Compassion-Focused Therapy was developed specifically to help individuals who struggle with shame and self-criticism, this theoretical model could also be a helpful framework for clinicians who work with post-bariatric patients who struggle with these issues (Carter, Bojam, and Kelly, 2018). Broadly speaking,

conclusions from this study may also apply to the 77% of adult U.S. Americans who do not exercise the recommended amount per week (Blackwell & Clarke, 2018).

Conclusions

This study contributes to a growing body of research investigating the role of self-compassion in physical activity via the influences of body appreciation and body image shame. This study was also the first to examine these measures within the bariatric community. Because weight stigma is prevalent in the bariatric weight loss community and is a contributing factor in external and internal shame, it is not surprising that it might influence one's willingness to take confident actions such as exercising (especially in the presence of others). Even in a population that has committed to drastic lifestyle change, this study found clear evidence that body image shame obstructs the healthy behavior of exercise. However, given the findings that body appreciation was significantly higher for exercisers than for non-exercisers, it may be beneficial to apply aspects of body appreciation with body image shame reduction techniques to self-compassion interventions designed to cultivate intrinsic motivation for a sustainable exercise routine. Moving forward, we must continue to investigate the most effective approaches for helping members of the bariatric community develop self-compassion skills as they relate to their body and adopt a more appreciative view of their body. Interventions targeting self-compassion and body appreciation may help support members of the bariatric population to reduce instances of suffering and shame while increasing physical activity efforts.

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Appendix

The study questionnaires were hosted using Survey Monkey. To see each of the surveys in context, please click through to each of the links:

- Bariatric sample 1: https://www.surveymonkey.com/r/MK3J9BP
- Bariatric sample 2: https://www.surveymonkey.com/r/KM2NHWX
- Undergraduate sample: https://www.surveymonkey.com/r/PFLNCJD

Informed Consent

Experiences of Physical Activity and Relationship to Body in the Bariatric Community
You are invited to take part in a research project by Naomi Teeter in partial fulfillment of her masters thesis at Eastern Washington University, Cheney, WA, USA. Please take your time to read the following information before proceeding with the survey. Once you read this information, you may choose whether or not you wish to complete the survey.

Purpose of the study: The purpose of this study is to understand the ways in which individuals who have had bariatric surgery relate to their body and physical activity.

Why we are inviting you: You are being invited to complete this survey as you are an adult (over the age of 18) who has had bariatric surgery.

Can I refuse to participate? It is up to you to decide whether or not you want to take part in this survey. If you decide to take part in the survey, you may print a copy of this sheet for your reference. Participants may refuse to answer any question for any reason. You can withdraw anytime from this survey without giving any reason. In that event, we will discard all your responses.

What can you expect if you choose to participate? If you choose to complete this survey, you will be asked to make certain choices among multiple options and/or respond to questions involving your experiences with bariatric surgery and your relationship to your body and physical activity. You will be asked to complete six separate surveys, consisting of a total of 86 questions. We expect you to pay full attention to the survey for the duration of the survey (ranging from 15 minutes to 30 minutes) and respond to the questions in the survey.

Your privacy: As this research is completely anonymous, no personally identifiable information will be collected. All research data is coded (i.e. only identified with a code number) from the very beginning and is stored on Survey Monkey, a secure database. Your responses will be anonymized and aggregated with responses from other respondents of this survey, may be reported in scientific journals and publications.

Risks and discomforts: The risks associated with this project are not expected to exceed those encountered in daily life (less than minimal risk), but it is possible that some individuals may experience general discomfort associated with sitting at a computer for a given duration or feeling upset as a result of responding to a series of sensitive questions. If you feel you are in need of counseling services, participants are encouraged to call their local mental health hotline. Here is a list of the most relevant hotlines for this survey:
Australia: 13 11 14 Lifeline Australia
Canada: 902-429-8167 Mental Health Mobile Crisis Telephone Line
New Zealand: 09 5222 999 (Auckland) & 0800 543 354 (Rest of NZ) Lifeline New Zealand
South Africa: 0861 322 322 Lifeline Southern Africa
United Kingdom: 0800 068 4141 HopeLine UK
United States: 1-800-950-6264 National Alliance on Mental Illness (NAMI)

Possible benefits: Even though you may not directly benefit from participating in this research, you may learn more about how you relate to yourself and your body in times of suffering.

Contact: In case of any question or query, please contact:
Principal Investigator: Naomi Teeter, EWU M.S. Experimental Psychology Student, nstalcup@eagles.ewu.edu
Responsible Project Investigator: Dr. Russell Kolts, EWU Psychology Professor, rkolts@ewu.edu
If you have any concerns about your rights as a participant in this research or any complaints you wish to make, you may contact Charlene Alspach, Executive Director, Grant & Research Development, at (509) 359-2517 or calspach@ewu.edu

Your consent to take part in this study:
I confirm that I read and understand the information sheet explaining the above research project and I can contact the Principle Investigator in case I have any query. I agree for the data collected from me to be stored and used in relevant future research in an anonymized form.

Please click on 'I agree' below to continue to the survey or 'I disagree' below to withdraw from this survey. If you are under the age of 18, please do not take the survey.

I agree
I disagree

Scale to Measure Self-Compassion (Neff, 2003b)

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

_____ 2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

_____ 3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.

_____ 4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.

_____ 5. I try to be loving towards myself when I'm feeling emotional pain.

_____ 6. When I fail at something important to me I become consumed by feelings of inadequacy.

_____ 7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.

_____ 8. When times are really difficult, I tend to be tough on myself.

_____ 9. When something upsets me I try to keep my emotions in balance.

_____ 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 intolerant and impatient towards those aspects of my personality I don't like.

_____ 12. When I'm going through a very hard time, I give myself the caring and tenderness I need.

_____ 13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

_____ 14. When something painful happens I try to take a balanced view of the situation.

_____ 15. I try to see my failings as part of the human condition.

_____ 16. When I see aspects of myself that I don't like, I get down on myself.

_____ 17. When I fail at something important to me I try to keep things in perspective.

_____ 18. When I'm really struggling, I tend to feel like other people must be having an easier time of it.

_____ 19. I'm kind to myself when I'm experiencing suffering.

_____ 20. When something upsets me I get carried away with my feelings.

_____ 21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.

_____ 22. When I'm feeling down I try to approach my feelings with curiosity and openness.

_____ 23. I'm tolerant of my own flaws and inadequacies.

_____ 24. When something painful happens I tend to blow the incident out of proportion.

_____ 25. When I fail at something that's important to me, I tend to feel alone in my failure.

_____ 26. I try to be understanding and patient towards those aspects of my personality I don't like.

Scale to Measure Body Image Shame (Duarte et al., 2014)

BISS

(Duarte, Pinto-Gouveia, Ferreira, & Batista, 2014)

Instructions:

The sentences below comprise feelings or experiences of shame regarding one's body. Anyone may have already, at some point, had some of these feelings or gone through these experiences. Please read each sentence carefully and indicate the number that best translates the frequency with which you experience what is described in each item. Use the following scale:

0	1	2	3	4
Never	Rarely	Sometimes	Frequently	Almost always

	Never	Rarely	Some-times	Frequently	Almost Always
1. I avoid wearing tight clothes that reveal my body shape.	0	1	2	3	4
2. I avoid social situations (e.g., going out, parties) because of my physical appearance.	0	1	2	3	4
3. It bothers me to see my body undressed.	0	1	2	3	4
4. When I see my body in the mirror I feel I am a defective person.	0	1	2	3	4
5. I choose clothes that hide parts of my body that I consider ugly or disproportional.	0	1	2	3	4
6. The relationship I have with my body prevents me from having an intimate relationship with someone.	0	1	2	3	4
7. I pay close attention to the movements and posture of my body to hide parts that I do not like.	0	1	2	3	4
8. I feel bad about myself when I use clothes that reveal my body shape.	0	1	2	3	4
9. I avoid moving my body (for example, dancing) in public places because I feel I am exposing my physical appearance to the criticism of others.	0	1	2	3	4
10. I feel uncomfortable in social situations because I feel that people may criticize me because of my body shape.	0	1	2	3	4
11. There are parts of my body that I prefer to hide.	0	1	2	3	4
12. My physical appearance makes me feel inferior in relation to others.	0	1	2	3	4
13. I do not like to exercise in front of others because I am afraid of how they might evaluate me.	0	1	2	3	4
14. The relationship I have with my physical appearance makes it difficult for me to feel comfortable in social situations.	0	1	2	3	4

Scale to Measure Body Appreciation (Avalos et al., 2005)

Body Appreciation Scale

Please indicate whether the statement is true about you:

Never	Seldom	Sometimes	Often	Always
1	2	3	4	5

_____ 1 I respect my body

_____ 2 I feel good about my body

_____ 3 On the whole, I am satisfied with my body

_____ 4 Despite its flaws, I accept my body for what it is

_____ 5 I feel that my body has at least some good qualities

_____ 6 I take a positive attitude toward my body

_____ 7 I am attentive to my body's needs

_____ 8 My self-worth is independent of my body shape or weight

_____ 9 I do not focus a lot of energy being concerned with my body shape or weight

_____ 10 My feelings toward my body are positive, for the most part

_____ 11 I engage in healthy behaviors to take care of my body

_____ 12 I do not allow unrealistically thin images of women presented in the media to affect my attitudes toward my body

_____ 13 Despite its imperfections, I still like my body

Scale to Measure Leisure Time Exercise (Godin & Shephard, 1985)

Godin Leisure-Time Exercise Questionnaire

Considering a **7-Day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your **free time** (write on each line the appropriate number).

	Times Per Week
a) **STRENUOUS EXERCISE** **(HEART BEATS RAPIDLY)** (i.e. running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)	_____
b) **MODERATE EXERCISE** **(NOT EXHAUSTING)** (i.e. fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)	_____
c) **MILD EXERCISE** **(MINIMAL EFFORT)** (i.e. yoga, archery, fishing from river band, bowling, horseshoes, golf, snow-mobiling, easy walking)	_____

2. Considering a 7-Day period (a week), during your leisure-time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?

OFTEN	SOMETIMES	NEVER/RARELY
1. ☐	2. ☐	3. ☐

Demographics

What is your gender?

- ○ Female
- ○ Male
- ○ Non-binary
- ○ Rather not say

What is your age?

- ○ 18 to 24
- ○ 25 to 34
- ○ 35 to 44
- ○ 45 to 54
- ○ 55 to 64
- ○ 65 to 74
- ○ 75 or older

What is your ethnicity? (Please select all that apply.)

- ☐ American Indian or Alaskan Native
- ☐ Asian or Pacific Islander
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ White / Caucasian
- ☐ Prefer not to answer
- ☐ Other (please specify)

What is the highest level of education you have completed?

What is your height in feet and inches? For example, if you are 5 feet and 4 inches, write 5'4".

What is your current weight in pounds?

When was the last time you weighed yourself?

Estimate as close as you can

Date

MM/DD/YYYY

Have you had bariatric weight loss surgery?

- Yes
- No

Please confirm the date of your bariatric surgery (if you've had more than one, please give the date of your initial surgery)

Estimate as close as possible

Date

MM/DD/YYYY

If you've had more than one bariatric surgery, please confirm the date of your most recent bariatric surgery (answer ONLY if you've had more than one bariatric surgery)

Estimate as close as possible

Date

MM/DD/YYYY

List any current physical injuries

Study Announcement

Hello, my name is Naomi Teeter and I am a graduate student at Eastern Washington University. Part of my graduation requirement is completing a thesis, which is why I need your help. I am conducting research with individuals from the bariatric weight loss surgery community to understand their experiences with physical activity and how they relate to their body. I am inviting you to participate. Participation in this research involves completing an online survey consisting of about 80 questions and will take you approximately 20 minutes to complete. To participate please select the survey link: https://www.surveymonkey.com/r/MK3J9BP . In addition, if you know of anyone else who is over the age of 18 and had bariatric surgery, please forward this message to them.

Table 1

Total Bariatric Sample Demographics

Gender		Frequency	Percent
	Male	34	4.2
	Female	763	94.8
	Non-Binary	1	0.1
	Rather Not Say	10	0.13
Age			
	18 to 24	21	2.6
	25 to 34	207	25.6
	35 to 44	320	39.6
	45 to 54	173	21.4
	55 to 64	70	8.7
	65 to 74	17	2.1
Ethnicity			
	American Indian or Alaskan Native	19	2.4
	Asian or Pacific Islander	8	1
	Black or African American	48	5.9
	Hispanic or Latino	46	5.7
	White / Caucasian	643	79.6
	Multi-racial	36	4.5
	Prefer not to say	3	0.4
	Other	5	0.6
Education Level			
	Middle school	1	0.1
	10th grade	5	0.6
	11th grade	3	0.4
	High school	96	11.9
	Technical certificate or degree	84	10.4
	1-3 years of college	166	20.5
	Graduated from college	259	32.1
	Some graduate school	52	6.4
	Completed graduate school	142	17.6

Table 2

Total Undergraduate Sample Demographics

Gender		Frequency	Percent
	Male	12	11.5
	Female	91	87.5
	Non-Binary	1	1
Age			
	18 to 24	91	87.5
	25 to 34	8	7.7
	35 to 44	2	1.9
	45 to 54	3	2.9
Ethnicity			
	American Indian or Alaskan Native	2	1.9
	Asian or Pacific Islander	7	6.7
	Black or African American	3	2.9
	Hispanic or Latino	17	16.3
	White / Caucasian	64	61.5
	Multi-racial	10	9.6
	Prefer not to say	1	1
Education Level			
	High school	12	11.5
	Technical certificate or degree	1	1
	1-3 years of college	85	81.7
	Graduated from college	2	1.9
	Some graduate school	3	2.9
	Completed graduate school	1	1

VITA

NAOMI TEETER
nstalcup@ewu.edu / nteeter2@zagmail.gonzaga.edu / (509) 475-4430

EDUCATION:

- Eastern Washington University, Cheney, WA – Master of Science, Experimental Psychology, (In progress, June 2021), College Instruction Certificate (In progress, June 2021); GPA 4.0
- Gonzaga University, Spokane, WA—Bachelors of Arts, Psychology, May 2019; GPA 3.69
- Spokane Falls Community College, Spokane, WA—Associate of Arts, Biology, June 2013, Library & Information Services Certification June 2013; GPA 3.72

RESEARCH INTERESTS:

- Minority populations experiences of shame (with emphasis on body shame) and the physiological implications of shame
- Obesity and the bariatric weight loss surgery community experiences of weight stigma, fatphobia, and internal & external shame
- The role of compassion (with emphasis on self-compassion) in health behaviors, such as physical activity, sleep, studying, personal grooming, and eating
- The intention-behavior gap
- Stress, coping, and resiliency factors
- Adverse Childhood Experiences impact on cardiovascular and metabolic health

POSTER PRESENTATIONS:

- **Teeter, N.,** Wolff, J., and Kolts, R. (accepted, May 26-27, 2021). Post-Bariatric Surgery Patients Fail to Exercise Consistently: Exploring the Potential Role of Self-Compassion. Submitting for presentation at Association for Psychological Science, virtual convention.
- Viveiros, M., Gilmore, A., **Teeter, N.**, Wolff, J., & Kolts, R. (accepted, April 28-30, 2021) . Proposing the mindful check-in: a brief mindfulness exercise. Submitted for presentation at Western Psychological Association, virtual convention.

TEACHING EXPERIENCE

Institution: Eastern Washington University, Psychology Department
Position: Teaching Intern, January - April 2021
Courses: PSYC302: Abnormal Psychology w/ Dr. Linda Kirsch (200 students), PSYC231: The Science of Stress and Coping w/ Dr. Linda Kirsch (45 students), and PSYC433: Compassion-Focused Therapy w/ Dr. Russell Kolts (40 students)

Institution: Eastern Washington University, Psychology Department
Position: Graduate Teacher Assistant, September 2019 - June 2020
Courses: CSBS 320: Introductory Statistics, PSYC 100: General Psychology, PSYC 201: Lifespan Development, PSYC 231: The Science of Stress and Coping, PSYC 302: Abnormal Psychology, PSYC 305: Child & Adolescent Development, PSYC 307: Psychology of Adjustment, PSYC 381: Social Psychology, and PSYC 420: Biological Basis of Behavior