THE ROLE OF SHAME AND SELF-COMPASSION IN THE RELATIONSHIP BETWEEN WEIGHT-BASED STIGMA AND HEALTH-RELATED BEHAVIOURS

by

© Laura Couturier

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Abstract

Background: Weight-based stigma (WS) has been associated with a number of maladaptive health-related behaviours. Given that perceived negative evaluations from others are theorized contributors to heightened shame, and that shame has been linked with poor health-related behaviours, shame may explain the association between WS and health-related behaviours. Self-compassion, suggested to be an antidote to shame, may act as a protective factor against the impact of WS. The current study examined how WS relates to health-related behaviours in a young adult sample, whether heightened shame mediates the relationships between WS and health-related behaviours, and whether self-compassion moderates these relationships. **Method:** Participants (299 undergraduate students aged 18-25) completed online self-report measures of WS, health-related behaviours (i.e., disordered eating, physical activity, and substance use), shame, and self-compassion. Correlation coefficients between variables were generated and a mediation analysis was used to examine whether shame mediated the relationships between WS and health-related behaviours. A moderated mediation model was used to determine whether self-compassion moderated this mediation. **Results:** After controlling for body mass index (BMI), WS was associated with increased disordered eating and increased physical activity, with small to medium effect sizes, but was not significantly correlated with substance use. The association between WS and disordered eating was partially mediated by shame. Self-compassion did not moderate this mediation. Shame did not mediate the relationship between WS and physical activity. **Conclusions:** WS is a significant predictor of disordered eating and physical activity in young adults after controlling for BMI, with the relationship between WS and disordered eating partially explained by increased shame. Implications for clinical settings and anti-WS awareness programs are discussed.

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1.0 Introduction

Weight-based stigma (WS) refers to negative attitudes and acts of discrimination toward people with higher body weights. WS has been referred to as the last socially acceptable form of stigma and bias within society (e.g., Puhl & Brownell, 2001). Individuals with higher body weights are often negatively stereotyped as being lazy, unhappy, unsuccessful, lacking willpower and self-discipline, personally to blame for their size and weight, and unhealthy (Puhl & Heuer, 2010). Research has shown that experiences of WS can occur in many domains of living, including in educational settings (Burmeister et al., 2013; Puhl & Suh, 2015), healthcare settings (Puhl & Brownell, 2001), employment settings (Judge & Cable, 2011; Rudolph et al., 2009), as well as within interpersonal relationships (i.e., with friends, parents, siblings, and romantic partners; Puhl & Heuer, 2009), and can be experienced in a variety of formats, from weight-based teasing and bullying, to social exclusion and unequal access to opportunities (e.g., health care, employment, love, etc.; Puhl & Heuer, 2010). A growing body of literature suggests that WS has a negative impact on health and wellbeing (Brown et al., 2022). Specifically, WS has been negatively associated with a number of unhealthy behaviours (e.g., disordered eating, decreased physical activity, increased substance use; Zhu et al., 2022). However, the underlying mechanisms by which these relationships occur remain poorly understood. The present thesis sought to build on existing literature by examining the mediating role of shame and moderating role of self-compassion in the relationship between WS and health-related behaviours in young adults.

1.1 Language and Terminology

Language is a powerful tool. Beyond their explicit meaning, words used to describe certain groups of people may inadvertently or deliberately communicate assumptions,

judgements, values and stereotypes that initiate or reinforce negative portrayals of devalued groups. That is, when describing individuals belonging to stigmatized groups, the terminology used can contribute to the stigma faced by these individuals. As such, the use of non-stigmatizing language in the research literature is imperative.

Individuals with higher body weight constitute a highly stigmatized population. Moreover, using stigmatizing language when discussing this population can contribute to further discrimination. Therefore, organizations, researchers and people with lived experience have advocated for the use of non-stigmatizing terms to describe individuals living at higher body weights. However, to date, there is no clear consensus on what language is most appropriate to use when referring to individuals with higher body weights, with recommendations differing significantly depending on the source.

Among weight- and medical-focused research journals, authors are encouraged to use "person-first" language, with the term "person with obesity" being viewed as more appropriate than "obese person" (Kyle & Puhl, 2014; Meadows & Daníelsdóttir, 2016). Person-first language was initially introduced by disability activist groups with the goal of encouraging language that places individuals before their disability, allowing them to recover a sense of personhood in a society that frequently sees condition or diagnosis first (Blaska, 1993). However, due to person-first language medicalizing body weight and implying that "obesity" is a disability, it has been argued that the term "person with obesity" reinforces negative attitudes and stigma surrounding those living with higher body weight (Meadows & Daníelsdóttir, 2016). For instance, certain organizations (e.g., The National Association to Advance Fat Acceptance, NAAFA) encourage the use of the term "fat" as a descriptor of an individual's body weight. While the word "fat" may still be viewed as pejorative by many, individuals belonging to the "fat acceptance

community" show a preference for this term and refute the use of person-first language to describe those with higher body-weight (Saguy & Ward, 2011).

Due to a lack of universal consensus on appropriate language to use when referencing individuals with higher body-weight, research has been conducted to understand what terminology is most preferred by people with lived experience. A systematic review conducted by Puhl (2020) found that across 33 studies examining preferences for weight-related terminology in the current research literature (1999 to 2019), neutral terms such as "weight" or "BMI" were preferred most often while the terms "problem," "unhealthy," or "excess" were preferred less often, and "obesity" and "fat" were deemed the least acceptable, regardless of participant age, gender, ethnicity, or body mass index (BMI). Moreover, a preference for neutral language has been repeatedly documented in samples of treatment-seeking individuals with higher body-weight (Dutton et al., 2010; Volger et al., 2012; Wadden & Diddie, 2003). However, as weight-loss seeking populations are likely different from non-treatment seeking populations, findings of such research cannot be regarded as representing general agreement among all individuals with higher body-weight (Meadows & Daníelsdóttir, 2016). Thus, despite findings suggesting that many people with higher body weights support and endorse the use of neutral language, preferences cannot be generalized to the entire population (e.g., members of the fat acceptance community). While limited research to date has examined the differences in weight-related terminology preferences, preliminary findings suggest that language preferences could be influenced by an individual's experiences of weight stigma, and/or the degree to which they have internalized this stigma, particularly among younger individuals (Puhl, 2020; Puhl & Himmelstein, 2018; Puhl et al., 2011).

Considering the variance in terminology preferences, and based on the large body of literature indicating that neutral language is highly preferable, both Meadows and Daníelsdóttir (2016) as well as Puhl (2020) recommend the term "higher body weight". Therefore, the present thesis will adopt the term "higher body weight" to describe individuals whose body weight is considered "obese" based BMI, in accordance with the Canadian Guidelines for Body Weight Classification in Adults (Douketis et al., 2005). According to this classification system, "obese" refers to a BMI greater than or equal to 30 kg/m^2 (Health Canada, 2003). The terms used in the present thesis to describe people with higher body weight are included with the sole purpose of providing accurate description of participant BMI classification as reported in the research literature as it pertains to weight stigma, not as an indicator of health status independent of WS.

1.2 Weight-Based Stigma (WS) Within Society and Across the Weight Spectrum

In Western society, value is placed on the thinness of the female body and the muscularity of the male body (Grossbard et al., 2011). Moreover, a body that lacks fat is viewed as the ideal for both women and men alike (Kelley et al., 2010; Nuttall, 2015), with a thin, toned physique widely considered most attractive and desirable (Aniulis et al., 2022). Not only is a fat-free body seen as the blueprint for physical attractiveness, meeting society's body ideal is commonly viewed as a symbol of social attractiveness, with those living in thin, toned bodies frequently assigned desirable, positive attributes, including happy, popular, highly motivated, successful, intelligent and healthy (Glass et al., 2010). As a result of Western culture's stringent body ideals, individuals who do not fit within these ideals tend to be perceived negatively within society (Dorian & Garfinkel, 2002). Furthermore, negative beliefs and stereotypes surrounding those with higher body weights are endorsed and encouraged by highly influential sources within society, including social media and public health messaging (Clark et al., 2021).

Given the value that western society places on the thin body ideal, higher body weight is often viewed as a public health issue that requires management, with individuals being encouraged to lose weight in order to improve health (Ogden et al., 2012; Penney & Kirk, 2015). However, the association between weight and health remains unclear, with research showing that individuals can be healthy regardless of BMI (Puhl & Heuer, 2010). Furthermore, focusing on weight as a sole determinant of health has been shown ineffective in improving health, contributing to food and body preoccupation, repeated cycles of weight loss and regain, distraction from other personal health goals and wider health determinants, reduced self-esteem, eating disorders, other health decrement, and, weight stigmatization and discrimination (Bacon & Aphramor, 2011; Daníelsdóttir et al., 2010; Larson et al., 2009; Puhl & Heuer, 2010). Notably, the literature has suggested that various lifestyle conditions and behaviours play a critical role in health (Von Ah et al., 2004). Thus, health cannot be determined based solely on weight, and more factors must be taken into consideration before deeming an individual as unhealthy (Penney & Kirk, 2015).

Recent research has suggested that WS extends beyond only those classified as living with “obesity”, with findings showing that those who perceived themselves as being of a higher body weight demonstrated poorer health outcomes, regardless of BMI (Lee et al., 2021). Based on this research, it appears as though the stigmatization surrounding being of a higher weight, rather than weight itself, influences health and engagement in negative health-related behaviours that may subsequently lead to weight gain and negatively impact overall health (Phelan et al., 2015). While BMI does not directly predict the undertaking of health promoting behaviour, those who are perceived as being of a higher body weight, are more likely to experience WS than peers perceived as being of average weight (Puhl & Lessard, 2020). Moreover, individuals who

perceive themselves as having a higher body weight and feel that they are a potential target of WS, may also be more likely to perceive experiences of WS compared to those who consider themselves as being average weight, independent of their objective weight status (Puhl & Heuer, 2010).

Perhaps due to the heightened presence and acceptance of WS within society, it is commonly overlooked as a psychosocial contributor to obesity. However, research suggests that WS can have negative impacts on mental health, physical health and well-being (Puhl & Lessard, 2020).

1.3 Weight-Based Stigma (WS), Health and Health-Related Behaviours

There is substantial evidence linking WS to poorer mental health outcomes (Emmer et al., 2020; Warnick et al., 2022). Research has found an association between WS and increased anxiety and depression (Friedman et al., 2008), low self-esteem (Annis et al., 2004), body dissatisfaction (Rosenberger et al., 2007) and suicidality (Hunger et al., 2020) in adult samples. Similarly, research examining child and adolescent samples have found WS to also be associated with an elevated risk for developing a variety of psychological and emotional problems, such as depression, anxiety, low self-esteem, and body dissatisfaction (Bucchianeri et al., 2013; Jensen & Steele, 2009; Magson & Rapee, 2022; Puhl & Latner, 2007; Warnick et al., 2022). Furthermore, it has been found that adolescents who experience WS are at increased risk for self-harm behaviours and suicidal ideation (Eaton et al., 2005; Eisenberg et al., 2003).

Although limited, there is growing evidence that WS also contributes to negative physical health outcomes. WS is a stress-inducing experience (Hatzenbuehler et al., 2009; Tomiyama, 2014). Physiologically, stress activates the sympathetic nervous system and the Hypothalamic Pituitary Axis, increasing catecholamines and cortisol (Björntorp & Rosmond, 2000). Increased

cortisol disrupts the cardiovascular and endocrine systems (Björntorp & Rosmond, 2000), and has been found to play an important role in the development and maintenance of metabolic and cardiovascular diseases (Dimsdale, 2008; Schwartz et al., 2012), as well a prominent role in weight gain and obesity (Major et al., 2014; Puhl & Heuer, 2010; Puhl & Suh, 2015; Torres & Nowson, 2007). Although limited, experimental studies have found that compared to controls, when exposed to a WS manipulation, adult women demonstrate decreased self-regulation and increased cortisol levels (Himmelstein et al., 2015; Major et al., 2014; Schvey et al., 2011; Tomiyama, 2014). Moreover, preliminary evidence suggests that experiences of WS also have physical health consequences for young populations, including weight gain (Puhl & Lessard, 2020). These findings provide preliminary evidence that WS is, indeed, a psychosocial contributor to obesity, trapping individuals in an endless cycle of stigmatization (Puhl et al., 2020). Furthermore, it is possible that the social threat of being of a higher body weight and maintaining a cycle of stigmatization due to one's body weight or size may initiate counterproductive, or maladaptive, coping behaviours that contribute to poorer health (Prunty et al., 2023).

Weight-based social identity threat, as defined by Hunger et al. (2015), is the situational state where an individual experiences concern that they have been or will be discriminated against or devalued based on their weight or shape. This social identity threat is driven by the societal devaluation of individuals with higher body weights and consequent negative stereotypes surrounding larger bodies (Hunger et al., 2015; Major et al., 2012). WS and associated harms have been linked to increased motivation to avoid and escape stigma (Hunger et al., 2015), potentially leading to engagement in maladaptive health-related behaviours. Health-related behaviours are activities undertaken to maintain, achieve, or recover good health, as well

as prevent disease. These behaviours include engagement in proper nutrition and physical activity, and avoidance of behaviours that may negatively impact health, such as excessive drug and alcohol consumption, or healthcare avoidance (Spring et al., 2012). Not surprisingly, health-related behaviours are considered important determinants of health and well-being, whereby engagement in poor, or maladaptive, health-related behaviours may lead to a variety of adverse health outcomes including higher risk of substance use dependency, mental or physical health problems, as well as obesity (Lee et al., 2021; Puhl & Heuer, 2010; Short & Mollborn, 2015). Indeed, research has indicated that individuals affected by WS may be particularly vulnerable to engaging in maladaptive health-related behaviours, including disordered eating, decreased physical activity, as well as increased substance use (Siqueira et al., 2021; Zhu et al., 2022).

1.3.1 Weight-Based Stigma (WS) and Disordered Eating

Eating a healthy diet has been linked with preventing diseases, such as diabetes, heart disease, and cancer (GBD 2017 Diet Collaborators, 2019). However, research suggests WS may pose a barrier to healthy eating habits and behaviours (Lee et al., 2021). It has been theorized that when exposed to social-victimization, individuals may cope with associated emotion and cognitions through eating behaviour (Lillis et al., 2011; Puhl & Brownell, 2006). Indeed, disordered eating and unhealthy weight control behaviours have been linked with various forms of social victimization and discrimination, including bullying (Bellows et al., 2023) and racial discrimination (Cheng et al., 2017). Furthermore, through a meta-analysis of 55 cross-sectional studies examining the relationship between different forms of discrimination and disordered eating across the lifespan, Mason et al. (2021) found the largest effect sizes for weight-based discrimination. Therefore, as a form of social victimization, consistent with weight-based social

identity threat theory, WS may render individuals especially vulnerable to coping through disordered eating behaviour.

A growing body of research has documented a positive relationship between WS and disordered eating, most of which being cross-sectional (Vartanian & Porter, 2016). Cross-sectional studies examining samples of adults with higher body weights evidence an association between experiences of WS and disordered eating pathology. For instance, research conducted by Vartanian and Novak (2011) and Vartanian (2015) found that for both women and men, experiences of WS were positively correlated with scores on the bulimia subscale of the Eating Disorder Inventory in a sample of adults with higher body weights (EDI; Garner et al., 1983). A similar association has been found between WS and binge eating. For example, Womble et al. (2001) found that in a sample of adults with higher body weights, an association existed between childhood weight-based teasing and binge eating in adulthood. Another study conducted by Wu and Liu (2015) found that experiences of WS predicted binge eating in a community sample of Taiwanese adults with higher body weights. While individuals with higher body weights may experience WS more frequently than individuals without higher body weights, cross-sectional research using community samples of adults has also found that a relationship exists between experiences of WS and disordered eating in adults across the weight spectrum (Zhu et al., 2022). For instance, in a cross-sectional study of 2022 American adults recruited from the general population, Lee and colleagues (2021) found that experiences of WS were significantly associated with disordered eating, while controlling for BMI. Collectively, these research findings support a relationship between experiences of WS and disordered eating in adults. However, as most research to date has examined samples of adults with higher body weights, the

relationship between WS and disordered eating in adults of varying weight statuses remains understudied.

Cross-sectional studies examining samples of adolescents with higher body weights have also evidenced an association between experiences of WS and disordered eating pathology. For example, it has been found that compared to those who do not experience teasing, adolescents with higher body weights who experienced weight-based teasing from peers and family members (Neumark-Sztainer et al., 2002), and who experienced a higher frequency of weight-based teasing from peers and family members (Libbey et al., 2008), present with increased levels of unhealthy weight control behaviours (e.g., inducing vomiting, fasting) and binge eating behaviours. A similar relationship between WS and disordered eating has been found in unrestricted adolescent samples. For instance, frequent weight-based teasing from peers or parents has been associated with more external eating, emotional eating, and restrictive eating in middle and high school students (Goldfield et al., 2010). A relationship between experiences of WS and eating pathology has also been documented among adolescents from low-income backgrounds (Najjar et al., 2018), as well as in adolescents of diverse sexual and gender identities (Himmelstein et al., 2019), and adolescent military dependents (Pearlman et al., 2019), after controlling for BMI. While the aforementioned research findings provide preliminary support for a relationship between WS and disordered eating in adolescents across the weight spectrum, it is important to note that most of the research conducted to date has focused on WS in the form of weight-based teasing from peers and/or family members, failing to account for the many other experiences of WS that a young person may encounter.

A number of studies have also cross-sectionally examined the association between experiences of WS and disordered eating in university samples. Through examination of a

cumulative risk model for binge eating, accounting for the frequency of multiple risk factors (e.g., psychological adjustment, stressful life events), Almeida et al. (2011) found that WS was a significant predictor of binge eating in a sample of undergraduate students. In addition, experiences of WS have been associated with a higher frequency of dieting, binge eating and eating disorders in undergraduate women (Piran & Thompson, 2008) and increased emotional eating in both undergraduate men and women (Cheng et al., 2017; Farrow & Tarrant, 2009). Other studies have shown that weight-related teasing in childhood is associated with binge eating, eating problems, compensatory behaviours, and dysfunctional eating symptoms in university students (Benas & Gibb, 2008; Quick et al., 2013). Quick et al. (2013) showed that in a sample of undergraduate women, a greater variety of weight-related insults (made fun of, called names, laughed at) during childhood and adolescence were associated with greater disordered eating behaviour. Similarly, Salwen and colleagues (2015) showed that recalled weight-related abuse was associated with binge eating, emotional eating, night eating, and unhealthy weight control behaviours in undergraduate students, and that this association was mediated by the emotional impact of the abuse. Furthermore, Muscat and Long (2008) found that undergraduate female athletes who experienced critical comments about their weight and body shape in the past had higher levels of disordered eating than those who did not experience critical comments about their weight. However, most research conducted in university samples has not controlled for BMI. Recent cross-sectional research conducted by Romano et al. (2021) assessing two samples of undergraduate students aged 18-years and older (Sample 1: $N = 1{,}228$; Sample 2: $N = 1{,}368$), of varying BMIs, found a positive relationship between WS and disordered eating, with limited variation in this relationship for individuals with different BMIs. These findings

provide preliminary support that a relationship exists between WS and disordered eating in university students of varying weight statuses, however, more research in this area is required.

Although limited due to ethical constraints, experimental studies have additionally shown consistent evidence of a relationship between WS and eating behaviour. Research examining eating behaviours when exposed to weight stigmatizing content have found that exposure to WS manipulations increased women's food intake, while controlling for BMI (Aubie & Jarry, 2009; Major et al., 2014; Schvey et al., 2011), and led to greater negative affect (Aubie & Jarry, 2009). These experimental findings provide preliminary evidence of a causal relationship between WS and disordered eating behaviour. More recently, research has also been conducted to explore how WS experiences unfold in daily life. Using ecological momentary assessment methods, it has been found that individuals who report more frequent daily experiences of WS demonstrate decreased motivation to diet and more disordered eating symptomology (Seacat et al., 2016; Vartanian et al., 2018). One study conducted by Romano and Heron (2022) found that multiple concurrent within-person associations existed between women's daily experiences of WS and daily eating disorder symptoms (e.g., skipping meals, binge eating, and body dissatisfaction). Time-lagged associations also demonstrated that women's experiences of WS on a given day were associated with a higher likelihood that they would limit the amount of food they consumed the following day. Furthermore, these associations did not differ depending on BMI, suggesting that experiences of WS contribute to disordered eating behaviour and pathology across the weight spectrum (Romano & Heron, 2022). Despite experimental and ecological momentary assessment research providing more concrete support for an association between WS and disordered eating, research of this nature has strictly been conducted using female samples. Therefore, the relationship between WS and disordered eating behaviour in individuals of

varying gender identities remains unclear, and more research examining this relationship in broader populations is required.

To date, only one study has examined the relationship between WS and eating behaviour longitudinally. Eisenberg and colleagues (2012) conducted a study to assess the impact of hurtful weight-related comments at three time points over an 11-year period spanning adolescence and young adulthood. The results showed that although recent hurtful weight-related comments from family members and relationship partners were associated with unhealthy weight-control behaviours, extreme weight-control behaviours, and binge eating, early hurtful comments from family and peers were not associated with disordered eating after controlling for recent hurtful comments. These findings suggest that hurtful weight-related comments are most strongly linked to disordered eating in the short term, but may not have lasting effects in the long term unless these experiences are repeated. Moreover, these findings speak to how experiences of WS impact young individuals, and how this impact may differ depending on the age at which WS is experienced. Notably, Eisenberg et al. (2012)'s results imply that experiencing WS during young adulthood may make individuals particularly susceptible to disordered eating behaviours.

Although young adulthood (i.e., age 18-25), appears to be a period of heightened vulnerability to the impacts of WS, few studies examining the association between WS and eating behaviour to date have specifically focused on this age group. While a number of studies have examined the relationship between WS and disordered eating behaviour in university samples, minimal research has restricted their samples to specifically include young adults (i.e., individuals aged 18-25), with participation commonly being open to university students aged 18-years and older. Given that eating disorders typically have their onset during the transition to adulthood (i.e., mean age of onset of anorexia nervosa and bulimia nervosa is between 15 and 19

years, and the onset of binge eating disorder typically occurs between 23 and 24 years; Hudson et al., 2007; Kessler et al., 2013; Micali et al., 2013; Steinhausen & Jensen, 2015), it is imperative that more research is conducted to gain a better understanding of how experiences of WS relate to disordered eating behaviour in young adults.

1.3.2 Weight-Based Stigma (WS) and Physical Activity

Physical activity refers to bodily movement, which leads to increased energy expenditure. Exercise is a form of physical activity performed in a planned, structured and repetitive way to improve physical health and fitness (i.e. endurance, strength, flexibility and body composition; Liguori & American College of Sports Medicine, 2020). Research suggests that experiencing WS may impact an individual's engagement in physical activity and exercise. However, the nature of the relationship between WS and physical activity remains poorly understood, with studies yielding mixed findings.

For instance, through a recent systematic review of 38 cross-sectional, observational and longitudinal studies examining the relationship between WS and physical activity in clinical and non-clinical samples of adults and adolescents, Pearl and colleagues (2021) found that WS was significantly associated with reduced physical activity in 58.6% of adult studies and 66.7% of adolescent studies, and significantly associated with increased physical activity in 17.2% of adult studies and 22.2% of adolescent studies. Moreover, most studies included in the review controlled for BMI. These results highlight the complexity of the relationship between WS and physical activity, over and above BMI, and suggest that this relationship may be dependent on varying coping responses to WS (Pearl et al., 2021). While research has suggested that some individuals may cope with experiences of WS through compensatory behaviours aimed at counteracting stigmatization, resulting in a positive relationship between WS and engagement in

physical activity (Puhl & Brownell, 2003); other research has suggested that some individuals may cope with experiences of WS through avoidance behaviours, resulting in a negative relationship between WS and engagement in physical activity (Vartanian & Novak, 2011).

Limited studies to date have examined the relationship between WS and physical activity in young adults. One cross-sectional study conducted by Vartanian and Shaprow (2008) found that in a sample of young adult women, experiences of WS were related to increased desire to avoid exercise, even when controlling for BMI and body dissatisfaction. Furthermore, a number of studies have examined the relationship between WS and physical activity in samples of university students. A cross-sectional study conducted by Brunson and colleagues (2014) documented a negative relationship between WS and physical activity in undergraduate men and women. Similalrly, Bevan et al. (2022) found experiences of WS to be associated with lower levels of enjoyment of, and participation in, physical activity and sport in a sample of college students. In a study conducted by Boros et al. (2017), 90 university women wore accelerometers for seven days, and completed the Physical Activity Enjoyment Scale (Kendzierski & DeCarlo, 1991) and the Perception of Teasing Scale (Thompson et al., 1995). Results of this study revealed that women with previous experiences of weight-related teasing accumulated significantly fewer minutes of vigorous physical activity, demonstrated lower levels of physical activity enjoyment and had a higher percentage of body fat than their counterparts without a history of weight-related teasing. While conducted using university samples, participant age criteria was not consistently and entirely representative of the young adult population (i.e., 18-25 years old). For instance Brunson et al. (2014) only included participants ages 18-23 years, Bevan et al. (2022) included participants ages 17-35 years, and Boros et al. (2017) did not have a specified participant age range. Nonetheless, the results of these studies provide preliminary

evidence of a negative association between WS and physical activity in young adults, over and above BMI.

Young adulthood is a period where individuals are very sensitive to appraisals of their image, particularly their body image (Bucchianeri et al., 2013). Therefore, because physical activity draws attention to the body, it is possible that young adults who experience WS may feel as through their social identity is being threatened due to their body weight or size, and, in turn, may refrain from being physically active in an attempt to evade situations which they believe make them more vulnerable to negative appraisals and weight-focused judgement and stigma. However, given the lack of existing research examining the relationship between WS and physical activity in young adult samples, this is speculative and more research is required.

1.3.3 Weight-Based Stigma (WS) and Substance Use

Substance use, that is the consumption, inhalation, injection, or absorption of alcohol, marijuana, tobacco, illegal drugs (e.g., cocaine, heroin, etc.), or the misuse of prescription drugs (e.g., opioid analgesics), is a behaviour that may be deleterious to health (McLellan, 2017). Research has suggested that social-victimization may render individuals particularly vulnerable to engaging in substance use. For instance, bullying from peers has been associated with greater engagement in substances, including cigarettes and inhalants, in adolescent samples (Tharp-Taylor et al., 2009; Turner et al., 2018), and adult samples (Takizawa et al., 2014). Although limited, a number of studies have found that experiences of WS are associated with increased substance use in adulthood and adolescence.

Through a cross-sectional study examining a large community sample of individuals with higher body weights within the United States (N = 22,231), Hatzenbuehler and colleagues (2009) found perceived weight-based discrimination to be positively associated with nicotine

dependence, alcohol dependence, and drug dependence, after controlling for BMI. Similarly, while controlling for BMI, Sutin and Terracciano (2017) found an association between experiences of WS and increased cigarette smoking, as well as increased use of illegal drugs in a sample of adults. Sutin and colleagues (2020) found a positive relationship between body discrimination and nicotine, marijuana and alcohol use in a sample of Australian adolescents. Moreover, a longitudinal study conducted by Simone et al. (2019) found that unhealthy weight control behaviours at baseline resulted in increased substance use at 10-year follow-up among adolescent girls who reported experiencing WS and its associated harms, but not among those who did not report experiencing WS. No studies to date have examined the relationship between WS and substance use in university or young adult samples.

Based on the existing literature, it appears as though a relationship exists between WS and increased substance use. As research is lacking, however, little is known about this relationship. Notably, as most research to date exploring the association between WS and substance use has collected data from samples of adults and adolescents with higher body weights, or without controlling for BMI, it is unclear whether this association exists in young adults, and/or across the weight spectrum. Given the importance of young adulthood in the development of sense of self and belonging, the threat of not being accepted or of being stigmatized due to one's body weight or size may be particularly salient during this time, and therefore, young adults may be more vulnerable to engaging in substance use as a way of coping with this threat. More research is required to better understand how WS is associated with substance use, especially during young adulthood.

1.4 Shame

1.4.1 Shame and Weight-Based Stigma (WS)

Gilbert (2002) defines shame as a painful emotion arising from the belief that one is flawed, inadequate, or inferior to others. Shame can manifest as a combination of primary emotions such as anxiety or disgust, as submissive or defensive behaviours (e.g., hiding), or as elevated activity in the parasympathetic nervous system (Gilbert, 2002). Gilbert posits that one of the roots of shame is a knowledge and awareness surrounding the criticality of social attractiveness, and feeling inferior when one does not fit within this ideal (Gilbert, 1997). From an evolutionary standpoint, social attractiveness and acceptance have historically been directly associated with survival, whereby those regarded as attractive were chosen in detriment of and had increased social resources (e.g., support from others) than those perceived as less attractive (Gilbert, 2000, 2003). Thus, one's display of attractiveness is a factor that determines their social rank or standing within society (Kemper, 1990). In order to know how one is viewed as a social agent, they must be aware of the qualities that society deems as highly attractive or highly unattractive (Gilbert, 2002). Thus, drawing on evolutionary theory, perception of low social rank or low attractiveness acts as a threat of exclusion from society, resulting in shame (Gilbert, 1997). Western society places a heavy emphasis on the attractiveness and desirability of the thin body shape, with social messages affirming that thinness is associated with power, success and happiness (Strahan et al., 2006). Moreover, stigma largely influences how individuals are viewed within society, with those being stigmatized being perceived as less socially attractive (Hebl & Heatherton, 1998). Therefore, when someone with a higher body weight experiences social exclusion or stigmatization related to their body size and feels as though they do not meet the

standards of attractiveness set by society, they are likely to experience feelings of shame (Gilbert, 2000, 2003).

1.4.2 Shame and Health-Related Behaviours

1.4.2.1 Shame and Eating Behaviour. Preliminary findings suggest that shame is associated with a variety of maladaptive coping behaviours, including disordered eating. For instance, feelings of shame and proneness to shame have been shown to predict the severity of disordered eating symptomology in several studies (Blythin et al., 2020; Cavalera et al., 2016; Gois et al., 2018; Troop et al., 2008). A recent meta-analysis synthesizing findings from 195 studies that examined the association between shame and disordered eating found that shame was significantly associated with eating disorder symptoms with a medium to large effect size (Nechita et al., 2021). As well, those with diagnosed eating disorders show significantly higher levels of shame than the general population, and those with disordered eating symptoms show higher shame-proneness levels than their non-disordered eating peers (Cavalera et al., 2016; Kelly et al., 2014). Given this, it is possible that some individuals cope with the discomfort of shame through their eating behaviours (Goss & Allan, 2009). That is, in the case of WS, it is possible that affected individuals develop maladaptive eating behaviours as they attempt to soothe the emotion of shame arising from their experiences of stigma, or even alter their body weight or size to avert further stigmatization.

1.4.2.2 Shame and Physical Activity. Preliminary research has found evidence to suggest that shame is associated with decreased physical activity (Castonguay et al., 2017; Sabiston et al., 2010). For example, some cross-sectional research has found higher levels of shame to be associated with less physical activity in adolescents (Lucibello et al., 2023) and young adults (Lucibello et al., 2020). However, other research has found that the direction of the

relationship between shame and physical activity may differ depending on whether shame is experienced or anticipated. For instance, a study conducted by Pila and colleagues (2021) found that in a sample of adolescent girls, while the experience of shame was associated with lower reported engagement in physical activity, the anticipation of shame was associated with higher reported engagement in physical activity. As physical activity draws attention to the self, particularly the body, individuals are likely to feel vulnerable to social evaluation (Duygu et al., 2019). Therefore, individuals affected by WS who experience shame may engage in less physical activity in an attempt to directly avoid negative social evaluation and further shame, whereas those who anticipate experiencing shame may engage in more physical activity in an attempt to indirectly avoid negative social evaluation and shame in the future. As both experienced and anticipated shame are likely products of WS, more research is required to understand the directionality of the relationship between shame and physical activity in those who experience WS.

1.4.2.3 Shame and Substance Use. Another potentially maladaptive response to shame is substance use. Researchers have suggested that shame and substance use may have a cyclic relationship (Luoma et al., 2019; Potter-Efron & Carruth, 2014; Wiechelt, 2007). That is, while individuals may initially use substances (e.g., alcohol, marijuana, etc.) as a means of avoiding or escaping feelings of shame, substance use may, in turn, lead to behaviours that further reinforce feelings of shame (e.g., drinking more than is deemed suitable by society), thereby perpetuating both substance use and shame (Wiechelt, 2007). A relationship between shame and substance use has been documented in various studies (Luoma et al., 2019; O'Connor et al., 1994; Wiechelt & Sales, 2001). For example, O'Connor and colleagues (1994) found that individuals with problematic substance use report higher levels of shame than individuals without substance use

difficulties. Moreover, the cyclical nature of the shame-substance use relationship has been supported by research showing that shame is positively associated with recurring substance use (Wiechelt & Sales, 2001). Thus, it is possible that stigmatization, or fear of stigmatization, due to one's body weight or size (i.e., social identity threat) may propagate a cycle of shame and substance use in vulnerable individuals.

1.4.3 Shame as a Mediator in The Relationship Between Weight-Based Stigma (WS) and Health-Related Behaviours

Given the relationships that have been found between WS and health-related behaviours, WS and shame, and health-related behaviours and shame, it is possible that shame plays a mediating role. Specifically, it is plausible that the associations evidenced between WS and disordered eating, WS and physical activity, and WS and substance use may occur through heightened shame resulting from experiences of stigmatization.

Indeed, shame has been found to be a significant mediator in the relationship between varying forms of social victimization and disordered eating. For instance, Duarte and colleagues (2015) found that the relationship between bullying and disordered eating in adolescents was fully mediated by scores on a measure of body image shame. Moreover, Bellows and colleagues (2023) found shame to partially mediate the relationship between childhood experiences of bullying and disordered eating in a sample of young adults. Similarly, Velez et al. (2015) found that in a sample of Latina women, a positive association between racist discrimination and disordered eating was fully mediated by shame. These findings suggest that the relationship between WS, as another form of social victimization, and disordered eating may occur through increased levels of shame. However, no study to date has specifically examined the role of shame in the relationship between WS and disordered eating. Additionally, while no research has

assessed the mediating role of shame in the relationships between social victimization/WS and other health-related behaviours (i.e., physical activity and substance use), given the associations that have been found between shame and physical activity (Lucibello et al., 2020; Lucibello et al., 2023), and between shame and substance use (Luoma et al., 2019; O'Connor et al., 1994; Wiechelt & Sales, 2001), it is possible that these relationships are also mediated by shame. However, more research is required before this can be confirmed.

1.5 Self-Compassion

Self-compassion, which is considered an antidote to shame, refers to the ability to relate to oneself and others in difficult times in a caring and compassionate manner (Gilbert, 2010). Self-compassion includes distancing from negative emotions and examining one's pain objectively and as part of the larger human experience (Neff, 2003). It has been suggested that self-compassion is an evolved mechanism that allows us to regulate our emotions by self-soothing. Thus, the aim of cultivating self-compassion is to foster feelings of reassurance and warmth towards oneself. As a result, self-compassion can reduce feelings of self-criticism and shame (Gilbert, 2010) and is associated with general well-being in young people (Neff & McGehee, 2010).

Neff (2003) suggested that there are three ways in which difficult feelings can be addressed with self-compassion. First, we can approach our personal situations and feelings with common humanity (i.e., see our suffering as a common experience that all people go through), rather than isolate our experiences from those of others. The second way is to approach feelings of inadequacy with self-kindness versus self-judgment. Third, instead of over-identifying with our painful emotions, we may approach our painful thoughts and feelings with mindfulness, openness, and without judgment (Neff, 2003). Researchers have suggested that we can self-

regulate through the three aforementioned approaches to self-compassion, or, alternatively, we can self-regulate through self-coldness (Brenner et al., 2018). However, while self-compassionate regulation has been found to be linked with increased well-being, self-coldness has been found to be a predictor of psychological distress (Brenner et al., 2018).

Self-compassion has been suggested to be an antidote to shame and self-criticism or self-attacking (Gilbert, 2010, 2011; Gilbert & Irons, 2009), perhaps improving these symptoms by improving approaches to self-regulation, such as increasing positive emotions and decreasing negative emotions (Inwood & Ferrari, 2018). In particular, self-compassion has been found to be negatively related to shame-proneness (Johnson & Obrien, 2013; Woods & Proeve, 2014), social anxiety (Werner et al., 2012), the incidence of non-suicidal self-harm (Xavier et al., 2016), anxiety and depressive symptoms (MacBeth & Gumley, 2012), poor psychological and affective well-being (Zessin et al., 2015) and poor body image (Ferreira et al., 2013a). Notably, research has shown that individuals high in self-compassion demonstrate less shame compared to those with lower self-compassion in the face of perceived social unattractiveness and stigma (Gilbert, 2010, 2011; Gilbert & Irons, 2009; Wong et al., 2019). Furthermore, research has shown that individuals who are self-compassionate tend to be less self-conscious and have less concern about others' perceptions of them, when compared to individuals who have low self-compassion (Barnard & Curry, 2011; Neff & Vonk, 2009).

Although studies have been limited, some evidence in the literature suggests that self-compassion may play a role in protecting against stigma and social victimization. Cross-sectional studies have found that self-compassion is inversely related to the internalization of stigma (Heath et al., 2018; Hilbert et al., 2015; Wasylkiw & Clairo, 2016), as well as negatively related to shame (Reilly et al., 2014). Furthermore, studies have shown that people with high self-

compassion are less likely to feel defeated in hypothetical situations that are embarrassing or shameful, or when recalling a previous failure, rejection, or loss (Leary et al., 2007). These findings provide initial evidence that self-compassion may help protect against the negative effects of stigma, such as shame and negative outcomes, among stigmatized individuals.

Based on these findings, some researchers have begun to explore the mechanism by which self-compassion helps to mitigate the impacts of stigma. Preliminary evidence suggests that self-compassion is an important and adaptive coping resource for those who are stigmatized, with self-compassionate individuals likely being more efficient in distinguishing between their sensory and mental experiences of stigma (Wong et al., 2019). Therefore, those with high self-compassion are subsequently less likely to permit their thoughts surrounding their experiences of stigma define the self, and are, in turn, at decreased risk of experiencing stigma-related shame (Wong et al., 2019).

Despite limited research exploring the role of self-compassion in the face of WS, initial findings suggest that self-compassion may buffer against the negative effects that WS (Tylka et al., 2014) and shame (Braun et al., 2016) have on health-related behaviours.

1.5.1 Self-Compassion and Health-Related Behaviours

Self-compassion has been linked with increased engagement in health-related behaviours. A recent meta-analysis of 94 articles revealed significant positive associations between self-compassion and both physical health and composite health-related behaviour (Phillips & Hine, 2021). Research has also examined associations between self-compassion and specific health-related behaviours, such as disordered eating. A body of literature shows that self-compassion may protect against risk factors for disordered eating, such that those higher in self-compassion experience less disordered eating. For instance, self-compassion has been found to moderate the

associations between disordered eating and appearance-related perfectionism (Bergunde & Dritschel, 2020), as well as between disordered eating and pressure to be thin (Tylka et al., 2015). Self-compassion has also been shown to be a protective factor against disordered eating in individuals who experience shame (Ferreira et al., 2013b). In a study conducted by Ferreira and colleagues (2013b), a sample of female patients with eating disorders and a similar non-clinical sample were compared in terms of self-compassion, shame and disordered eating. Shame was measured using the Other as Shamer Scale (OAS; Goss et al., 1994), a tool specifically designed to measure external shame (i.e., feeling that one is negatively evaluated by others). The findings of this study revealed that external shame predicted drive for thinness in both groups. In addition, self-compassion partially mediated this relationship in the non-clinical population and fully mediated this relationship in the clinical population (Ferreira et al., 2013b). This suggests that the feeling that others are shaming you is associated with an increased drive for thinness. However, when one faces external shame with high self-compassion, this association is buffered or weakened. Thus, self-compassion may be the antidote for high external shame.

The importance of self-compassion in disordered eating and eating disorders is revealed through research examining self-compassion, compassion-focused therapy (CFT), and treatment outcomes. For example, Kelly et al. (2013) found that a combination of low self-compassion and high fear of self-compassion at the start of treatment predicts poorer treatment outcomes in individuals with eating disorders. Furthermore, clinical research has shown that building and/or enhancing self-compassion is an effective treatment for eating disorders. In a review of CFT for eating disorders, Goss and Allan (2014) found that CFT effectively addresses shame and self-criticism in eating disorder patients. In a self-help approach to CFT in binge eating disorder patients, Kelly and Carter (2015) found that CFT led to a greater decrease in eating and weight

concerns than behavioural strategies, a change that was especially evident in patients with low fears of self-compassion. Furthermore, Kelly and colleagues (2017) found that in a group-based CFT intervention, those that received CFT in combination with treatment-as-usual had greater decreases in shame and eating pathology than the group that did not receive CFT.

Although very limited, some research has found preliminary evidence of a positive relationship between self-compassion and engagement in physical activity. For instance, various studies have found self-compassion to assist athletes in coping with sport-related failure (Killham et al., 2018; Mosewich et al., 2013; Reis et al., 2015; Wilson et al., 2019). Additionally, self-compassion has been associated with increased body appreciation, body ownership, and decreased engagement in social comparison in young adult women exercisers (Berry et al., 2010). Another study examining the role of self-compassion in women's motivation to exercise demonstrated that self-compassion does not emphasize outward social comparisons of the self to others (Magnus et al., 2010). While these results suggest that self-compassion may act as a potential buffer against negative self-evaluations and shame, these findings are preliminary and no research to date has specifically assessed whether self-compassion can buffer the relationship between shame and physical activity.

An association has also been found between self-compassion and decreased substance use. In an investigation of alcohol use in adult clients of a publicly funded Drug and Alcohol Service in Australia, Brooks et al. (2012) found that while participants initially scored significantly lower than the general population in the positive subscales of self-compassion (i.e., self-kindness, common humanity and mindfulness), and significantly higher in the negative subscales (i.e., overidentification, isolation, and self-judgment), after 15 weeks in treatment, overall self-compassion, mindfulness, common humanity, and self-kindness increased

significantly compared to the results at the beginning. In addition, there was a significant decrease in self-judgment, isolation, overidentification and alcohol consumption, which was associated with an increase in self-compassion. In another study, Rendon (2006) found that alcohol use was negatively associated with self-esteem, self-compassion, and psychological symptoms in a sample of US undergraduate students. No study to date has directly examined the buffering role of self-compassion in the relationship between shame and substance use. However, research exploring the role of mindfulness in the association between shame and substance use has yielded promising findings. Luoma and colleagues (2012) conducted a randomized trial to examine the effectiveness of a group-based intervention for shame based on mindfulness and acceptance in a sample of patients attending a 28-day residential addictions treatment program ($N = 133$). Results of this study showed that the intervention resulted in larger reductions in patient shame, fewer days of substance use and higher treatment attendance at 4-month follow-up (Luoma et al., 2012). Self-compassion is believed to play a key role in mindfulness, and vice versa (Neff, 2003), and thus, these findings provide indirect insight into the potential buffering role of self-compassion in the relationship between shame and substance use.

Findings of research examining self-compassion in relation to shame, disordered eating, physical activity and substance use have provided initial evidence that self-compassion may prove effective in buffering the impact of WS on shame and health-related behaviours. One study to date has assessed the interrelationships between self-compassion, shame, social victimization and disordered eating. In a cross-sectional study of young adults, Bellows et al. (2023) found that shame mediated the relationship between childhood experiences of social/relational bullying and current disordered eating, and that self-compassion moderated this

mediation. Specifically, in those who had been bullied, individuals high in self-compassion experienced less shame and less disordered eating than those low in self-compassion (Bellows et al., 2023). While no study to date has examined whether self-compassion buffers the relationship between WS and health-related behaviours, the findings of Bellows et al. (2023) suggest that self-compassion is capable of combatting the negative impacts of social victimization. In turn, if the mechanism by which WS relates to health-related behaviours is through increased shame, it is possible that self-compassion may act as a protective factor against the impacts of WS on maladaptive health-related behaviours.

1.6 The Present Study

The present study aimed to explore the relationships between WS, shame, self-compassion, and three health-related behaviours (i.e., disordered eating, physical activity, and substance use). First, this study looked at the relationship between experiences of WS, disordered eating, physical activity and substance use. Despite young adulthood being a period of development where individuals may be particularly vulnerable to the negative impacts of weight-based social identity threat, most research to date on WS and health-related behaviours has focused on adolescent or adult samples, and limited studies have examined the relationship between WS and health-related behaviours in young adults. Moreover, previous research examining WS and health-related behaviours in younger populations has typically focused on weight-based teasing from peers and family and has rarely accounted for BMI. In addition, much of the current literature exploring the relationship between WS and health-related behaviours, particularly the association between WS and disordered eating, has largely focused on females and has excluded individuals of other gender identities from participation. Therefore, the present study will add important information about how a range of WS experiences predict disordered

eating, physical activity and substance use in young adults of varying gender identities and across the weight spectrum.

Next, this study aimed to address questions about the mechanism by which WS relates to health-related behaviours. Specifically, this study looked at shame as a potential mediator of the relationship between WS and disordered eating, the relationship between WS and physical activity, as well as the relationship between WS and substance use. This study is the first to examine whether experiences of WS predict shame. As previous research has found that other forms of social victimization (i.e., bullying) predict shame (Bellows et al., 2023), the present work will build on our understanding of how shame relates to another form of social victimization (i.e., WS). Furthermore, no research to date has examined the interactions between WS, shame, and the three health-related behaviours of interest (i.e., disordered eating, physical activity and substance use). Thus, this is an important gap in the literature given the complex interactions found between social rank, shame, and disordered eating, as well as the interactions found between shame and engagement in physical activity, and between shame and substance use.

Finally, the current study aimed to add to the literature by examining self-compassion as a moderator of the relationship between WS and health-related behaviours, as mediated by shame. Given that self-compassion is considered to be an antidote to shame, self-compassion may be associated with less shame, disordered eating and substance use, and more physical activity, among those who have experienced WS. These findings will add to our knowledge of how to prevent and ameliorate the negative impacts of WS.

Two research questions and three hypotheses were tested in this study. The primary aim of the present research was to examine the relationships between WS and health-related

behaviours including disordered eating, physical activity and substance use in a young adult sample. A second aim was to examine the roles of shame and self-compassion in explaining these relationships by testing a moderated mediation model. In addition, the following hypotheses were tested: First, I hypothesized that more frequent experiences of WS would be associated with more disordered eating, less physical activity, and more substance use, over and above BMI. Second, I hypothesized that shame would mediate the relationships between WS and health-related behaviours (i.e., increased disordered eating, decreased physical activity, and increased substance use) [see Figure 1], again while controlling for BMI. Finally, I hypothesized that self-compassion would moderate the indirect (i.e., shame mediated) relationships between WS and health-related behaviours (i.e., increased disordered eating, WS and decreased physical activity, and WS and increased substance use) [see Figure 2], over and above BMI. Specifically, I predicted that self-compassion would moderate the path between WS and shame, in turn, weaken the relationship between WS and health-related behaviours. That is, in young adults who experience WS, it was hypothesized that those with higher self-compassion would report lower levels of shame, less disordered eating, more physical activity, and less substance use, regardless of their BMI.

Figure 1

Weight-Based Stigma (WS) and Health-Related Behaviours: Hypothesized Mediation Model

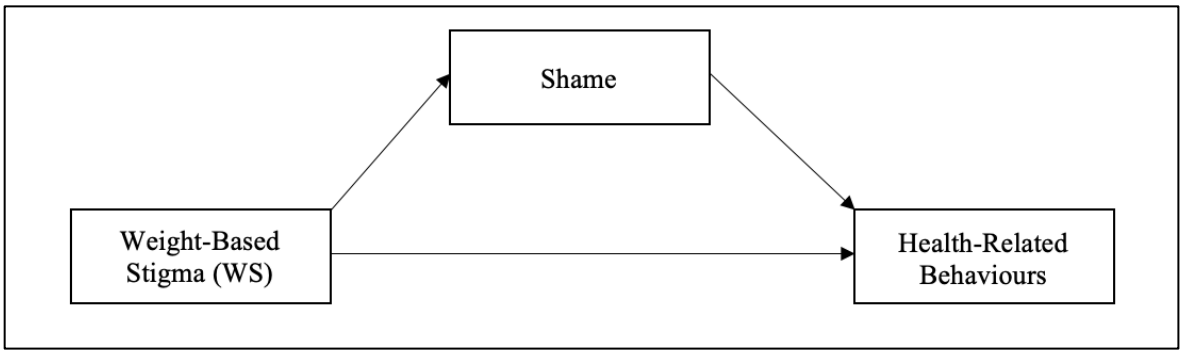
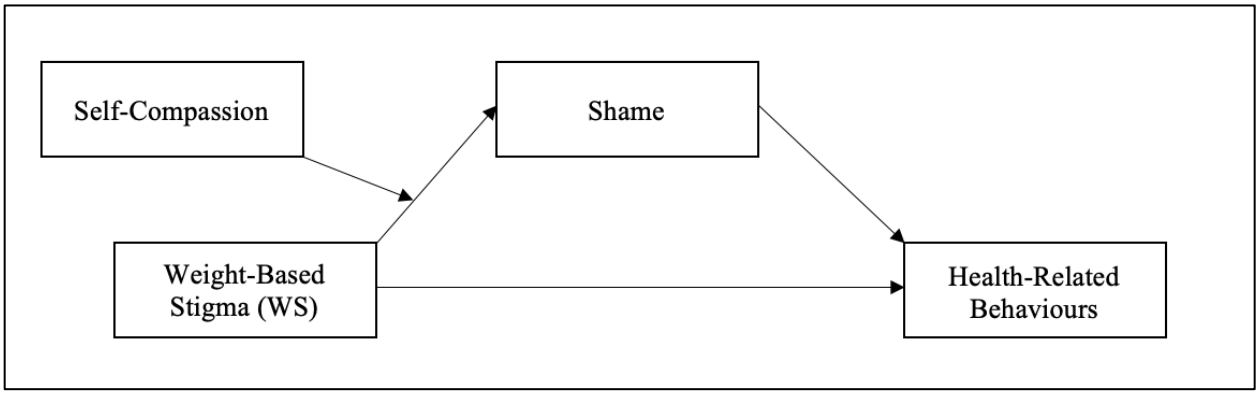


Figure 2

Weight-Based Stigma (WS) and Health-Related Behaviours: Hypothesized Moderated-Mediation Model



2.0 Method

This study employed a cross-sectional design using self-report measures to address the aims and hypotheses. Young adult participants accessed an online survey through the Memorial University Psychology Research Experience Pool (PREP), or by visiting the study link or QR code provided on advertisements posted around campus and on social media platforms. Participants completed a series of questionnaires on the survey platform Qualtrics at one time point. All aspects of this study were approved by the Interdisciplinary Committee on Ethics in Human Research (ICEHR) at Memorial University of Newfoundland in accordance with the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans 2 (TCPS2).

2.1 Participants

A total of 497 individuals took part in this study. Of these, 127 did not complete a minimum of 90% of the study and thus were removed (n > 90% study completion = 370), and of these, 20 individuals did not spend a minimum time of 5 minutes (300 seconds) completing the survey and were also removed (n > 5 minutes = 350). Of the remaining 350, a total of 319 individuals consented for their data to be included in the present study. Three hundred and fifteen

(N = 315) individuals who consented met the age criteria of being between the ages of 18 and 25. Of the remaining 315 participants, 299 passed both manipulation check questions. The final sample therefore consisted of 299 young adult participants aged 18-25 years. Participants were all undergraduate or graduate students at Memorial University of Newfoundland's St. John's Campus or Grenfell Campus.

2.1.1 Participant Recruitment

Participants were recruited using multiple methods. First, participants were recruited from Memorial University of Newfoundland's Psychology Research Experience Pool (PREP). Students who completed the survey through PREP followed a link to access the study and were granted course credit for participation. The remaining participants were recruited through posts on the social media platform Facebook, signs posted across multiple buildings in the St. John's campus, and e-mails and newsletters circulated by various groups and societies. Through these recruitment methods, students could access the study through the given link, a QR code, or by e-mailing the researcher. Given that students who did not access the study through PREP could not receive course credit for participating, students recruited using other recruitment methods were given the option to enter their e-mail in a draw to win one of two $50 gift cards for additional incentive/compensation at the end of the survey.

2.2 Procedure

Participants accessed the study by clicking or typing out the anonymous link given (or using a QR code to access the website) which directed them to the survey platform Qualtrics to complete the study. First, participants were presented a consent form which described the purpose of the study and provided participation instructions (see Appendix A). An implied informed consent process was used meaning that at the end of the consent form it was explained

that by clicking the "next" button, consent was implied. After providing informed consent, participants were then asked to select either "Research Participation" or "Research Observation", whereby choosing "Research Participation" allows their data to be included in the study.

Next, participants were directed to a series of six questionnaires. Directions for completing each questionnaire were presented in their respective sections. Participants were asked to complete the Stigmatizing Situations Inventory-Brief (SSI-B; Vartanian, 2015), an open-ended question regarding personal experiences of WS, the Eating Disorder Examination Questionnaire 6.0 (EDE-Q; Fairburn & Beglin, 2008), the International Physical Activity Questionnaire – Short Form (IPAQ-S; Lee et al., 2011), the CRAFFT Questionnaire 2.1 (CRAFFT; Knight, 2002), the Experiences of Shame Scale (ESS; Andrews et al., 2002), the Self-Compassion Scale Short Form (SCS-SF; Raes et al., 2011), and a demographic questionnaire, in that order.

Lastly, participants were directed to a debriefing form which explained the purpose of the research and provided participants another opportunity to choose whether or not they would like to have their responses included in the study (see Appendix B).

2.3 Measures

2.3.1 Internal Consistency of Measures

Three reliability coefficients (i.e., McDonald's omega hierarchical, McDonald's omega total, and Cronbach's alpha) were calculated for each of the study measures to assess the internal consistency of each scale. Cronbach's alpha has been found to have limitations, including the overestimation or underestimation of internal consistency (McNeish, 2018; Sijtsma, 2009). It has been proposed that omega is a more useful indicator of reliability, and reporting both ω hierarchical and ω total for each scale eliminates some of the limitations of simply reporting

Cronbach's alpha (Flora, 2020; Revelle & Zinbarg, 2008; Zinbarg et al., 2005). As such, McDonald's omega (ω) hierarchical and McDonald's omega (ω) total were calculated for each of the study measures. However, as inclusion of Cronbach's alpha is still prominent throughout the literature, it was also included for each of the measures in the present study as a means of comparison with previous findings.

2.3.2 Demographics Questionnaire

Participants completed a series of demographic questions asking about gender, age, race/ethnicity, weight, height, and year of study (see Appendix C).

2.3.3 Weight-Based Stigma (WS)

Experiences of weight-based stigma (WS) were measured using the Stigmatizing Situations Inventory-Brief (SSI-B; Vartanian, 2015) [see Appendix D]. The SSI-B is a 10-item self-report measure of lifetime experiences of WS, with items covering a variety of sources of WS including remarks made by healthcare professionals and children, physical barriers to being overweight or obese, and negative assumptions from others (e.g., having people assume that you overeat or binge eat because you are overweight). Participants are asked to rate how often they have experienced each item on a Likert scale from 0 (*never*) to 9 (*daily*). Scores on the SSI-B can range from 0 to 9, with higher scores indicating more experiences with stigmatizing situations. After completing the SSI-B, participants were additionally asked to describe any other situations they have encountered over their lifetime where they have felt discriminated against (e.g., treated unfairly, singled out) as a result of their weight or size. The SSI-B has been found to be a reliable and valid measure of stigmatizing experiences (Vartanian, 2015). The SSI-B demonstrated good internal consistency in the current study, with McDonald's ω hierarchical being 0.74, and

McDonald's ω total for the scale being 0.92. Cronbach's Alpha for the SSI-B in the present study was 0.90.

2.3.4 Disordered Eating

Disordered eating symptoms were measured using the Eating Disorder Examination Questionnaire 6.0 (EDE-Q; Fairburn & Beglin, 2008) [see Appendix E]. The EDE-Q consists of 36-items assessing eating habits and concerns about body shape and weight over the past 28 days. The EDE-Q has four subscales: Eating Concern (e.g., "Have you had a definite fear of losing control over eating?), Weight Concern (e.g., "Have you had a definite fear that you might gain weight?), Shape Concern (e.g., "Have you had a definite desire to have a totally flat stomach?"), and Restraint (e.g., "Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?"). In addition, the EDE-Q also measures the frequency of key eating disorder behaviours (e.g., binge eating and purging). Participants are asked to indicate on a 7-point Likert scale, how many days out of the past 28 that they have experienced each item, with 0 being no days and 6 being every day. Global EDE-Q scores are calculated as the average of the four subscales, with scores ranging from 0 to 6. Higher scores indicate more disordered eating. Throughout the literature, the EDE-Q has been shown to have acceptable validity and reliability (Berg et al., 2012). The internal consistency of the global EDE-Q measure in the present study was good, with McDonald's ω hierarchical being 0.76, and McDonald's ω total being 0.97. Cronbach's Alpha for the EDE-Q global in the present study was 0.95.

2.3.5 Physical Activity

Levels of physical activity were measured using the International Physical Activity Questionnaire – Short Form (IPAQ-S; Lee et al., 2011) [see Appendix F]. The IPAQ-S asks

participants to indicate the frequency of engagement in physical activities of varying intensities (i.e., vigorous activy, moderate activity, walking activity) and sitting activity over the past 7 days on an 8-point Likert scale, ranging from 0 (*no days*) to 8 (*7 days*). Scores on the IPAQ-S are calculated as metabolic equivalent of task (MET) minutes a week. MET minutes represent the amount of energy expended carrying out physical activity. As such, scores on the IPAQ-S can range from 0 upward. High scores on the IPAQ-S range between 1500 and 3000 MET per week, moderate scores on the IPAQ-S range between 600 and 1500 MET per week, and low scores on the IPAQ-S range between 0 and 600 MET per week. This measure has been found to have acceptable reliability and validity in university students (Dinger et al., 2013). In the current study, internal consistency of the IPAQ-S was satisfactory. McDonald's ω hierarchical for the IPAQ-S in the current study was 0.57, and McDonald's ω total for the scale was 0.91. Cronbach's Alpha of the IPAQ-S was 0.68.

2.3.6 Substance Use

The CRAFFT Questionnaire 2.1 (CRAFFT; Knight, 2020) measures use of alcohol, marijuana and other substances (see Appendix G). The CRAFFT consists of nine items, the first three asking participants to indicate the number of days in the past 12 months that they have drank alcohol, used marijuana, or used anything to get high. The remaining six items ask participants who indicated that they have used a substance in the first three items to answer either "yes" or "no" to various statements, such as "Do you ever use alcohol or drugs to relax, feel better about yourself, or fit in?" and "Do your family or friends ever tell you that you should cut down on your drinking or drug use?". Total CRAFFT scores range from 0 to 6, with higher scores indicating more substance use difficulties. The CRAFFT has been shown to be a valid and reliable means of screening substance-related problems in adolescent and young adult

populations (Knight et al., 2002; Levy et al., 2004). The CRAFFT was found to have satisfactory internal consistency in the present study. McDonald's ω hierarchical for the CRAFFT was 0.53, and McDonald's ω total for the scale was 0.74. Cronbach's Alpha for the CRAFFT in the present study was 0.67.

2.3.7 Shame

Shame was measured using the Experiences of Shame Scale (ESS; Andrews et al., 2002) [see Appendix H]. The ESS consists of 25-items measuring experiential, cognitive, and behavioural components of shame across three subscales: Characterological Shame (e.g., "Have you felt ashamed of the sort of person you are?"); Behavioural Shame (e.g., "Do you feel ashamed when you do something wrong?") and Body Shame (e.g., "Have you felt ashamed of your body or any part of it?"). Participants are asked to rate how frequently each shameful experience has occurred within the past year on a 4-point Likert scale from 1 (*not at all*) to 4 (*very much*). Total scores on the ESS are derived by summing all item scores, allowing for scores to range from 25 to 100, with higher scores indicating higher levels of shame. The factor structure, concurrent and predictive validity of this measure has been supported (Andrews et al., 2002). Internal consistency of the ESS in present study was good, with a McDonald's ω hierarchical of 0.74, and a McDonald's ω total of 0.96. Cronbach's Alpha for the ESS in the present study was 0.95.

2.3.8 Self-Compassion

Self-compassion was measured using the Self-Compassion Scale – Short Form (SCS-SF; Raes, 2011) [see Appendix I]. The SCS-SF is a 12-item self-report measure that is used to measure capacity to hold one's feelings of suffering with a sense of warmth, connection and concern across six subscales: self-kindness (e.g., "I try to be understanding and patient towards

those aspects of my personality I don't like"), self-judgment (e.g., "I'm intolerant and impatient towards those aspects of my personality I don't like"), common humanity (e.g., "I try to see my failings as part of the human condition"), isolation (e.g., "When I'm feeling down, I tend to feel like most other people are probably happier than I am"), mindfulness (e.g., "When something upsets me I try to keep my emotions in balance"), and overidentification (e.g., "When I'm feeling down I tend to obsess and fixate on everything that's wrong"). Six items are worded positively (e.g., "When something painful happens I try to take a balanced view of the situation"), and six are negatively worded (e.g., "When I fail at something that's important to me, I tend to feel alone in my failure"), and are oppositely rated. Questions are rated on a 5-point Likert scale from 1 (*almost never*) to 5 (*almost always*). Scores on each of the subscales are computed by calculating the mean of subscale item responses. Total scores on the SCS-SF are computed by calculating the mean of total item responses, with the negative subscale items reverse scored. Total SCS-SF scores range from 1 to 5, with higher scores indicating a higher level of self-compassion. Previous research has found that the SCS-SF is a valid measure (Neff et al., 2019). The SCS-SF was found to have satisfactory internal consistency in the current study. McDonald's ω hierarchical for the SCS-SF was 0.67, and McDonald's ω total for the scale was 0.91. Cronbach's Alpha for the SCS-SF in the present study was 0.84**.**

2.4 Statistical Analysis

Statistical analyses used to test hypotheses 1 and 2 were completed using Jamovi (The jamovi project, 2020). Statistical analyses conducted to address hypothesis 3 were completed using Hayes' PROCESS v4.1 for SPSS (Hayes, 2018). Significance was determined at $p < .05$ for all analyses. First, a Pearson's bivariate correlation coefficient matrix was generated to assess relationships between all study variables and WS (i.e., SSI-B). To address hypothesis one, that

higher levels of WS would be associated with higher levels of disordered eating and substance use, and lower physical activity, over and above BMI, hierarchical regression analyses were conducted, with BMI entered on the first step. To address hypothesis two, that shame would mediate the relationship between higher WS and higher levels of disordered eating, more substance use, and lower physical activity, over and above BMI, mediation analyses were conducted through the medmod module in Jamovi, with BMI entered as a covariate. Addressing hypothesis 3, that social safeness and self-compassion would moderate the relationship between WS and higher levels of disordered eating, more substance use, and lower physical activity, over and above BMI, as mediated by shame, Hayes' moderated-mediation model 7 was used in the PROCESS add on for SPSS.

2.4.1 Power Analysis

Traditional a priori power analysis is typically not used nor considered useful for a moderated mediation (Hayes, 2013). As inferences for simple and complex mediation models are rooted in bootstrapping, power analyses for these models must involve resampling techniques to determine an anticipated size of the indirect effect, and how much that indirect effect is expected to differ conditional on the moderator. To predict a minimum number of participants required to achieve a power of 0.80 for the simple mediation, a Monte Carlo Power Analysis for Indirect Effects was employed (Schoemann et al., 2017). Across 1,000 resamples, it was determined that for a simple mediation with a small standardized coefficient of the indirect effect (a x b = 0.14) a minimum sample size of 208 participants is required to achieve a power of 0.80 with a 95% confidence interval. Further, power analysis for the moderated mediation was conducted using Preacher and colleagues (2007)'s Table of Type I Error Rates and Empirical Power (specific to when the a path of a mediation is moderated by another variable, W). Across 1,000 resamples,

when the standardized coefficient of the conditional, moderated, indirect effect is small (*a* x *b* = .014), a sample between 200 and 500 participants is required to achieve a statistical power of 0.80 with a 95% confidence interval (Preacher et al., 2007). As the current sample consisted of 299 participants, this study holds adequate statistical power.

3.0 Results

3.1 Data Screening

Data were inspected for violations of regression assumptions (i.e., independence of observations, linearity of relationships among variables, homoscedasticity of error values, lack of multicollinearity among independent variables, and normally distributed error values; Hayes, 2018). To verify that these assumptions were met, a one-step procedure outlined by Clement and Bradley-Garcia (2022) was conducted three times, with the following combinations: EDE-Q scores entered as a dependent variable and ESS, SCS-SF and SSI-B scores entered as predictors; IPAQ-S scores entered as a dependent variable and ESS, SCS-SF and SSI-B scores entered as predictors; and CRAFFT scores entered as a dependent variable and ESS, SCS-SF and SSI-B scores entered as predictors.

Results revealed that the assumption of independence of residuals was met for all combinations: when EDE-Q scores were entered as a dependent variable and ESS, SCS-SF and SSI-B scores were entered as predictors (Durbin Watson statistic = 1.80***), when IPAQ-S scores were entered as a dependent variable and ESS, SCS-SF and SSI-B scores were entered as predictors (Durbin Watson statistic = 1.74***), and when CRAFFT scores were entered as a dependent variable and ESS, SCS-SF and SSI-B scores were entered as predictors (Durbin Watson statistic = 1.70***).

The VIF statistics for each of the predictor variables in each of the three combinations also revealed that there was a lack of multicollinearity: when EDE-Q scores were entered as a dependent variable and ESS, SCS-SF and SSI-B scores were entered as predictors (VIF(ESS) = 1.68, VIF(SCS-SF) = 1.56, VIF(SSI-B) = 1.10), when IPAQ-S scores were entered as a dependent variable and ESS, SCS-SF and SSI-B scores were entered as predictors (VIF(ESS) = 1.68, VIF(SCS-SF) = 1.56, VIF(SSI-B) = 1.10), and when CRAFFT scores were entered as a dependent variable and ESS, SCS-SF and SSI-B scores were entered as predictors (VIF(ESS) = 1.67, VIF(SCS-SF) = 1.55, VIF(SSI-B) = 1.10).

Visual inspection of the three scatterplots of studentized residuals and unstandardized predicted values revealed that the assumption of linearity was met as the data were horizontally scattered. This suggests that the relationships between all variables in each of the three combinations of variables being exercised in the model are linear. Further inspection of these scatterplots confirmed that the residuals consistently fit a rectangular shape. Thus, for each of the three combinations, the error values were randomly scattered across different values of the dependent variable and the assumption of homoscedasticity was met across combinations.

When inspecting the three Normal Probability Plots (P-P Plots), there was consistent deviance from the diagonal line, suggesting a lack of normality across all combinations. However, regression is robust against non-severe violations of normality (Hayes, 2018). As such, data were not transformed beyond mean centering. Missing data were imputed with the mean value of the scale/subscale for participants who completed at least 90% of the given assessment measure.

3.2 Participant Demographics

Sociodemographic characteristics of the sample (N = 299) can be found in Table 1. Participant age ranged from 18-25 (M = 20.53, SD = 1.8) and body mass index (BMI) ranged from 15.1-47.7 (M = 24.1, SD = 5.4). Participants were 71.2% White, and the majority (97.0%) were undergraduate students, with (72.2%) being within their first and third years of study.

Table 1

Sociodemographic Characteristics of Participants

Demographic	Frequency	Percent (%)
Gender		
Female	236	78.9
Male	55	18.4
Non-Binary	6	2.0
Prefer not to say	2	0.7
Ethnicity		
White	213	71.2
Asian or Asian Canadian	41	13.7
Black or African Canadian	17	5.7
Hispanic or Latino	8	2.7
Indigenous Canadian	7	2.3
Mixed	6	2.0
Other	7	2.3
Level of study		
Undergraduate	289	97.0
Graduate	9	3.0
Year of Study		
1	77	25.8
2	59	19.7
3	80	26.8
4	56	18.7
5	19	6.4
6+	8	2.7

3.3 Scale Means and Standard Deviations

The means and standard deviations of participant scores on the study measures are presented in Table 2.

Table 2

Means and Standard Deviations of Participants Scores on Study Measures

Scale	Mean	*SD*
Stigmatizing Situations Inventory - Brief	1.75	1.05
Eating Disorder Examination Questionnaire (Global)	2.92	1.40
International Physical Activity Questionnaire – Short Form	2766.60	2501.35
CRAFFT Questionnaire	1.86	1.59
The Experiences of Shame Scale	65.44	17.13
Self-Compassion Scale – Short Form	2.70	0.70

Note. SD refers to standard deviation.

3.4 Relationships Between Study Variables

A Pearson's bivariate zero-order correlation matrix was generated to examine the relationships between all study variables. As shown in Table 3, as predicted, WS (i.e., SSI-B) was significantly positively associated with disordered eating (EDE-Q; $r = .498$, $p < .001$), with a medium effect size. Unexpectedly, higher WS was significantly associated with higher physical activity (IPAQ-S; $r = .118$, $p < .05$), with a small effect size. However, the relationship between WS and substance use (CRAFFT) was not statistically significant.

As expected, shame (ESS) was significantly positively associated with WS ($r = .280$, $p < .001$), with a small effect size. Significant positive relationships were also found between shame and disordered eating ($r = .541$, $p < .001$), with a medium effect size, and between shame and substance use ($r = .289$, $p < .002$), with a small effect size. The relationship between shame and physical activity was not statistically significant.

As hypothesized, lower self-compassion (SCS-SF) was associated with more disordered eating ($r =- .346$, $p < .001$), and more substance use ($r = -.185$, $p < .001$), with small effect sizes. A significant positive relationship was also found between self-compassion and shame ($r = -.593$, $p < .001$), with a medium effect size. The relationship between self-compassion and physical activity was not statistically significant, nor was the relationship between WS and self-compassion.

There was a statistically significant positive correlation between BMI and WS ($r = .184$, $p < .001$), with a small effect size. BMI was also positively associated with disordered eating ($r = .278$, $p < .001$), with a small effect size, but was not correlated with substance use or physical activity. BMI was significantly positively correlated with shame ($r = .115$, $p < .05$), with a small effect size, but was unrelated to self-compassion.

Table 3

Pearson Bivariate Correlation Matrix Displaying Relationships Between Study Variables

Variable	1	2	3	4	5	6	7
1. SSIB	-						
2. EDEQ	.498**	-					
3. IPAQ	.118*	.027	-				
4. CRAFFT	.068	.208**	-.001	-			
5. ESS	.280**	.541**	-.020	.289**	-		
6. SCS	-.081	-.346**	.087	-.185**	-.593**	-	
7. BMI	.184**	.278**	-.098	.019	.115*	-.054	-

Note. $^{*}p < .05$, $^{**}p < .001$. SSIB refers to WS, measured by the Stigmatizing Situations Inventory - Brief, EDEQ refers to disordered eating, measured by the Eating Disorder Examination Questionnaire 6.0, IPAQ refers to physical activity, measured using the International Physical Activity Questionnaire – Short Form, CRAFFT refers to substance use, measured by the CRAFFT Questionnaire, ESS refers to shame, measured by the Experiences of Shame Scale, SCS refers to self-compassion, measured by the Self-Compassion Scale - Short Form, and BMI refers to Body Mass Index.

3.5 Relationships Between Weight Stigma (WS) and Health-Related Behaviours

The first objective of the current study was to examine the association between WS and three health-related behaviours among young adults: disordered eating, physical activity and substance use. Since BMI was significantly correlated with WS, BMI was held constant in all analyses to ensure that results were consistent across the weight-spectrum and not influenced by participant weight-status.

3.5.1 Weight Stigma (WS) Accounts for Unique Variance in Disordered Eating

Hypothesis 1 predicted that higher WS (SSI-B) would account for unique variance in disordered eating (EDE-Q), after controlling for BMI. Results of a hierarchical regression analysis regressing EDE-Q scores on SSI-B scores, with BMI entered on the first step, are presented in Table 4.

Supporting hypothesis 1, scores on the SSI-B accounted for unique variance in EDE-Q Global scores, $r(299) = .498$, $p < .001$, with a moderate effect size. As shown in Table 4, this relationship remained significant when controlling for BMI, $\Delta R^2 = .207$, F change = 85.384, $p < .001$. BMI also accounted for a significant amount of variance in the relationship between scores on the SSI-B and scores on the EDE-Q, $R^2 = .077$, F change = 24.892, $p < .001$. These findings suggest that experiences of WS are associated with disordered eating, regardless of BMI. However, it is important to note that BMI does explain a significant, albeit small, percentage of the variance in this relationship (i.e., 7.7%).

Table 4

Results of Hierarchical Regression Analysis Regressing EDE-Q on SSI-B with BMI Entered at Step 1

Model, Step and Predictor	*b*	SE_b	*b* 95% CI [LL,UL]	*t*	*p*	*beta*	*beta* 95% CI [LL,UL]	ΔR^2	R^2	F change
Step 1										
(Intercept)	2.177	.168	[1.846, 2.508]	12.950	<.001	-	-	-	-	-
BMI	.027	.005	[.016, .038]	4.989	<.001	.278	[.168, .388]	-	.077**	24.891
Step 2										
(Intercept)	1.332	.174	[.989, 1.675]	7.641	<.001	-	-	-	-	-
BMI	.019	.005	[.009, .028]	3.856	<.001	.193	[.094, .291]	-	-	-
SSIB	.613	.066	[.483, .744]	9.240	<.001	.462	[.364, .561]	.207**	.284**	85.384

Note. $^{*}p < .05$, $^{**}p < .001$, *b* = standardized regression coefficient, *SE* = standard error, CI = confidence interval, LL = lower limit, UL = upper limit, *beta* = unstandardized regression coefficient. SSIB refers to experienced WS, as measured by the Stigmatizing Situations Inventory – Brief. BMI refers to Body Mass Index.

3.5.2 Weight Stigma (WS) Accounts for Unique Variance in Physical Activity

Hypothesis 1 also predicted that WS (SSI-B) would account for unique variance in physical activity (IPAQ-S), after controlling for BMI. Based on previous findings, it was expected that WS would be negatively related to physical activity. Results of a hierarchical

regression analysis regressing IPAQ-S scores on SSI-B scores, with BMI entered on the first step, are presented in Table 5.

Opposite of what was predicted, scores on the SSI-B were significantly positively related with scores on the IPAQ-S, $r(299) = .118$, $p = .042$, with a small effect size. As shown in Table 5, after controlling for BMI, this relationship remained significant, $\Delta R^2 = .019$, F change = 5.834, $p = .016$. On the first step, BMI did not account for a significant amount of unique variance in the relationship between WS and physical activity, $R^2 = .010$, $p = .090$. These findings indicate that, over and above BMI, higher frequency of WS accounts for unique variance in physical activity, such that people who have experienced more WS tend to exercise more.

Table 5

Results of Hierarchical Regression Analysis Regressing IPAQ-S on SSI-B with BMI Entered at Step 1

Model, Step and Predictor	*b*	SE_b	*b* 95% CI [LL,UL]	*t*	*p*	*beta*	*beta* 95% CI [LL,UL]	ΔR^2	R^2	F change
Step 1										
(Intercept)	3236.225	311.511	[2623.176, 3849.273]	10.389	<.001	-	-	-	-	-
BMI	-17.126	10.070	[-36.944, 2.692]	-1.701	.090	-.098	[-.212, .015]	-	.010	2.892
Step 2										
(Intercept)	2776.001	363.027	[2061.561, 3490.441]	7.647	<.001	-	-	-	-	-
BMI	-21.644	10.163	[-41.644, -1.643]	-2.130	.034	-.124	[-.239, -.009]	-	-	-
SSIB	333.938	138.252	[61.856, 606.020]	2.415	.016	.141	[.026, .255]	.019*	.029*	5.384

Note. $^{*}p < .05$, $^{**}p < .001$, *b* = standardized regression coefficient, *SE* = standard error, CI = confidence interval, LL = lower limit, UL = upper limit, *beta* = unstandardized regression coefficient. SSIB refers to experienced WS, as measured by the Stigmatizing Situations Inventory – Brief. BMI refers to Body Mass Index.

3.5.3 Weight Stigma (WS) Does Not Account for Unique Variance in Substance Use

Hypothesis 1 also predicted that higher WS (SSI-B) scores would be associated with increased substance use (CRAFFT), while controlling for BMI. Results of a hierarchical regression analysis regressing CRAFFT scores on SSI-B scores, with BMI entered on the first step, are presented in Table 6.

Scores on the SSI-B were not significantly related to scores on the CRAFFT, $r(299) = .068$, $p = .262$. As shown in Table 6, when controlling for BMI, these findings remain non-significant, $\Delta R^2 = .004$, F change = 1.268, $p = .261$. Further, BMI did not account for a significant amount of variance in the relationship between scores on the SSI-B and scores on the CRAFFT, $R^2 = .000$, $p = .742$. These findings indicate that, over and above BMI, higher frequency of WS does not account for unique variance in substance use, such that people who have experienced more WS do not report more substance use.

Table 6

Results of Hierarchical Regression Analysis Regressing CRAFFT on SSI-B with BMI Entered at Step 1

Model, Step and Predictor	*b*	SE_b	*b* 95% CI [LL,UL]	*t*	*p*	*beta*	*beta* 95% CI [LL,UL]	ΔR^2	R^2	F change
Step 1										
(Intercept)	1.805	.199	[1.412, 2.197]	9.047	<.001	-	-	-	-	-
BMI	.002	.006	[-.011, .015]	.329	.742	.019	[-.095, .133]	-	.000	.108
Step 2										
(Intercept)	1.666	.234	[1.205, 2.127]	7.113	<.001	-	-	-	-	-
BMI	.001	.007	[-.012, .014]	.116	.907	.007	[-.109, .123]	-	-	-
SSIB	.100	.089	[-.075, .276]	1.126	.261	.066	[-.050, .183]	.004	.005	1.268

Note. $^{*}p < .05$, $^{**}p < .001$, *b* = standardized regression coefficient, *SE* = standard error, CI = confidence interval, LL = lower limit, UL = upper limit, *beta* = unstandardized regression coefficient. SSIB refers to experienced WS, as measured by the Stigmatizing Situations Inventory – Brief. BMI refers to Body Mass Index.

3.6 Mediating Role of Shame

My second hypothesis was that shame (ESS) would be a mediator in the relationships between WS (SSI-B) and health-related behaviours, while controlling for BMI. That is, it was predicted that scores on the ESS would mediate the relationship between scores on the SSI-B and scores on the EDE-Q, the relationship between scores on the SSI-B and scores on the IPAQ-S, as

well as the relationship between scores on the SSI-B and scores on the CRAFFT. Of note, shame was only tested as a mediator in relationships found to be significant in section 3.5 above.

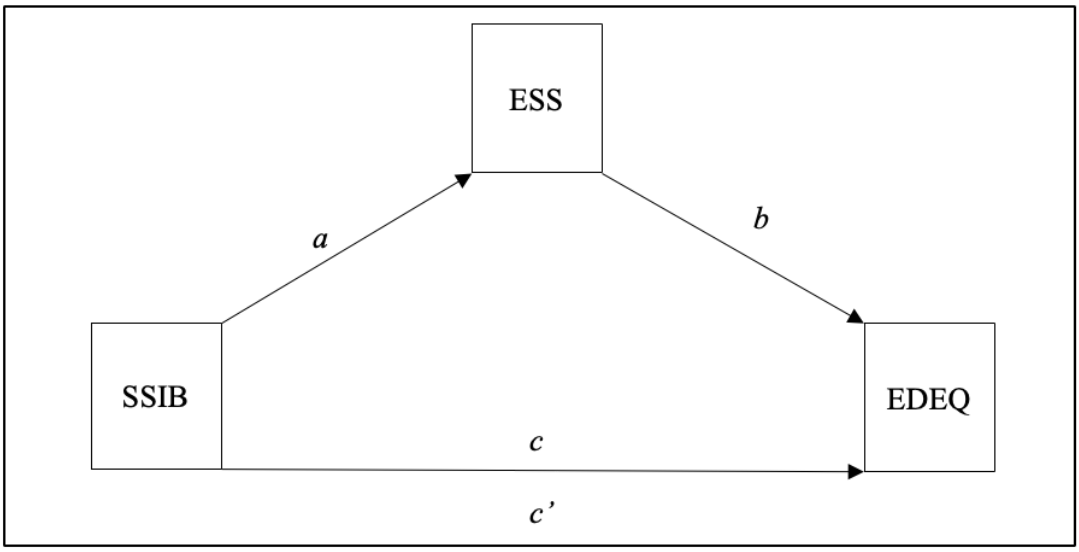
3.6.1 Shame Partially Mediated the Relationship between Weight Stigma (WS) and Disordered Eating

First, shame (ESS) was tested as a mediator in the relationship between WS (SSI-B) and disordered eating (EDE-Q), while controlling for BMI. A statistical diagram of this mediation model is presented in Figure 3, and model coefficients are presented in Table 7.

Using 1000 bootstrapped samples, a mediation analysis was conducted to examine the mediating effect of shame in the relationship between SSI-B scores and scores on the EDE-Q. BMI was entered as a covariate. The total effect of the model was found to be significant (c = .66, SE_c = 0.07, Z = 9.91, BCa CI [0.53, 0.79], p < .001) with a medium standardized effect size, β = .498. Further, the upper and lower confidence intervals did not straddle zero, supporting the significance of the effect. It was found that there was a statistically significant direct effect of SSI-B scores on EDE-Q scores (c' = .50, $SE_{c'}$ = 0.06, Z = 8.22, 95% BCa CI [0.40, 0.63], p < .001), also with a medium standardized effect size, β = .376. This finding is supported by the upper and lower confidence intervals both being above zero. A statistically significant indirect effect between scores on the SSI-B and scores on the EDE-Q was also found (a x b = .162; $SE_{a \times b}$ = 0.04, Z = 4.45, 95% BCa CI [0.09, 0.25], p < .001), with a small standardized effect size, β = .122. The upper and lower confidence intervals of the indirect effect did not straddle zero, providing additional evidence of significance. These results suggest that shame partially mediated the positive relationship between WS and disordered eating, while controlling for BMI. That is, higher WS is associated with more disordered eating, in part, due to the positive association between WS and levels of shame.

Figure 3

Weight-Based Stigma (WS) and Disordered Eating: Statistical Model of Mediation Model Tested in Hypothesis 2



Note. SSIB refers to WS, measured by the Stigmatizing Situations Inventory - Brief, ESS refers to shame, measured by the Experience of Shame Scale, SCS refers to self-compassion, measured by the Self-Compassion Scale, and EDEQ refers to disordered eating, measured by the Eating Disorder Examination Questionnaire 6.0**.**

Table 7

Weight-Based Stigma (WS) and Disordered Eating: Model Coefficients of Mediation Model Tested in Hypothesis 2

Effect	Label	*beta*	*SE*	*Z*	Lower 95% CI	Upper 95% CI	*p*
Total	*c*	.66**	.07	9.91	.53	.79	< .001
Direct	*c'*	.50**	.06	8.22	.40	.63	< .001
Indirect	*a x b*	.16**	.04	4.45	.09	.25	< .001

Note. $^{*}p < .05$, $^{**}p < .001$, *beta* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval.

3.6.2 Shame Did Not Mediate the Relationship Between Weight Stigma (WS) and Physical Activity

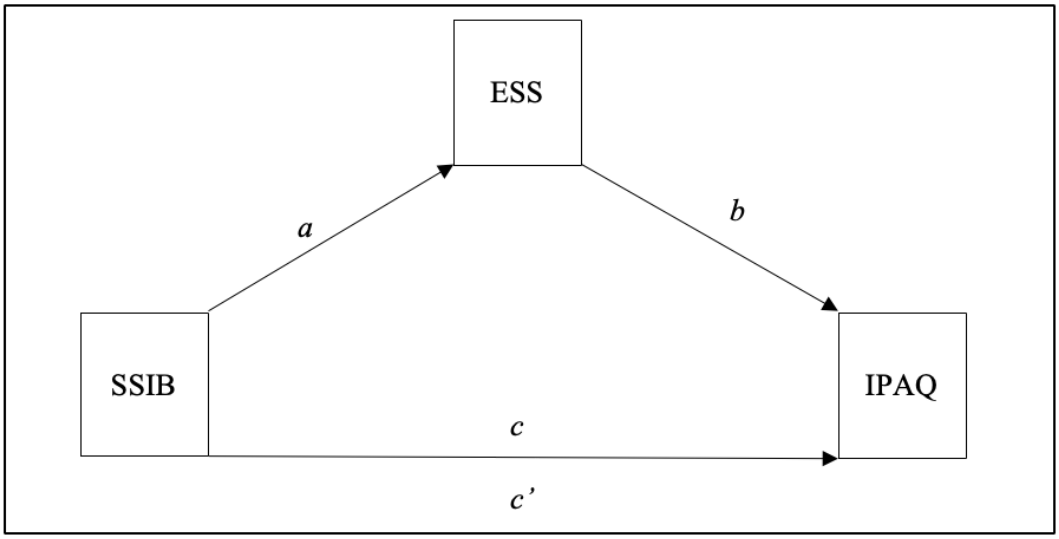
Next, shame was tested as a mediator in the relationship between WS (SSI-B) and physical activity (IPAQ-S), while controlling for BMI. A statistical diagram of this mediation model is presented in Figure 4, and model coefficients are presented in Table 8.

Using 1000 bootstrapped samples, a mediation analysis was conducted to examine the mediating effect of shame in the relationship between SSI-B scores and scores on the IPAQ-S. Again, BMI was entered as a covariate. The total effect of the model was found to be significant ($c = 279.75$, $SE_c = 136.47$, $Z = 2.05$, BC*a* CI [12.27, 547.22], $p = .04$), with a small standardized effect size, $\beta = .118$. The upper and lower confidence intervals of the total effect did not straddle zero, further supporting the significance of the effect. It was found that there was a statistically significant direct effect of SSI-B scores on IPAQ-S scores, ($c' = 317.53$, $SE_{c'} = 153.60$, $Z = 2.07$, 95% BC*a* CI [29.65, 636.18], $p = .04$), with a small standardized effect size, $\beta = 0.134$. This

finding is supported by the upper and lower confidence intervals of the direct effect both being above zero. In contrast, no statistically significant indirect effect between scores on the SSI-B and scores on the IPAQ-S was found (a x b = -37.79, $SE_{a \times b}$ = 45.15, Z = -0.837, 95% BCa CI [-141.20, 43.168], p = .403) with a very small standardized effect size, β = -.016. Furthermore, the upper and lower confidence intervals of the indirect effect straddle zero, providing additional evidence that this effect was not significant. These results suggest that shame did not mediate the positive relationship between WS and physical activity, while controlling for BMI. That is, while higher WS may be associated with more physical activity, this association does not appear to occur indirectly through heightened levels of shame.

Figure 4

Weight-Based Stigma (WS) and Physical Activity: Statistical Model of Mediation Model Tested in Hypothesis 2



Note. SSIB refers to WS, measured by the Stigmatizing Situations Inventory - Brief, ESS refers to shame, measured by the Experience of Shame Scale, SCS refers to self-compassion, measured by the Self-Compassion Scale – Short Form, and IPAQ refers to physical activity, measured by the International Physical Activity Questionnaire – Short Form.

Table 8

Weight-Based Stigma (WS) and Physical Activity: Model Coefficients of Mediation Model Tested in Hypothesis 2

Effect	Label	*beta*	*SE*	*Z*	Lower 95% CI	Upper 95% CI	*p*
Total	*c*	279.75*	136.47	2.05	12.27	547.22	.04
Direct	*c'*	317.53*	153.60	2.07	29.65	636.18	.04
Indirect	*a x b*	37.79	45.15	-.84	-141.20	43.12	.40

Note. $^{*}p < .05$, $^{**}p < .001$, *beta* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval.

3.7 Moderated-Mediation Analysis

Hypothesis 3 predicted that if shame mediated the relationship between WS and health-related behaviours (disordered eating, substance use, and physical activity), then self-compassion would moderate this mediation. That is, it was hypothesized that self-compassion would buffer the indirect relationships between WS scores and health-related behaviours, as mediated through shame. As reported above, only one significant mediation was found: shame partially mediated the relationship between WS and disordered eating. As such, self-compassion was tested as a moderator of this mediation.

3.7.1 Self-Compassion Did Not Moderate the Mediated Relationship Between Weight Stigma (WS) and Disordered Eating

To test the influence of self-compassion on the mediated relationship between WS (SSI-B) and disordered eating (EDE-Q), with shame (ESS) as the mediator, a moderated mediation analysis was conducted. Figure 5 presents the statistical diagram for this moderated-mediation

model, Table 9 presents model coefficients and their associated *p* values, and Table 10 presents the index of moderated mediation.

Hayes' moderated-mediation Model 7 was employed, with 1000 bootstrapping samples. In this model (see Figure 5), WS (SSI-B) was entered as a predictor, self-compassion (SCS-SF) as the moderator, shame (ESS) as the mediator, and disordered eating (EDE-Q) as the outcome variable. BMI was included as a covariate.

First, the path between WS (SSI-B) and shame (ESS) was tested (see Table 9). Results revealed that the main effect of scores on the SSI-B (path a_{1i}) was significant (b = 3.904, SE =.765, $t(294) = 5.100$, $p < .001$) and the main effect of scores on the SCS-SF was also significant (path a_{2i}; b = -13.830, SE = 1.111, $t(294) = -12.449$, $p < .001$). However, the predicted two-way interaction between scores on the SSI-B and scores on the SCS-SF (path a_{3i}) was not significant (b = 1.660, SE = 1.301, $t(294) = 1.275$, p = .203). Further, as a covariate, BMI did not have a significant main effect in the path between scores on the SSI-B and scores on the ESS (b = .058, SE =.055, $t(294) = 1.057$, p = .299). These findings suggest that self-compassion did not moderate the relationship between WS and shame.

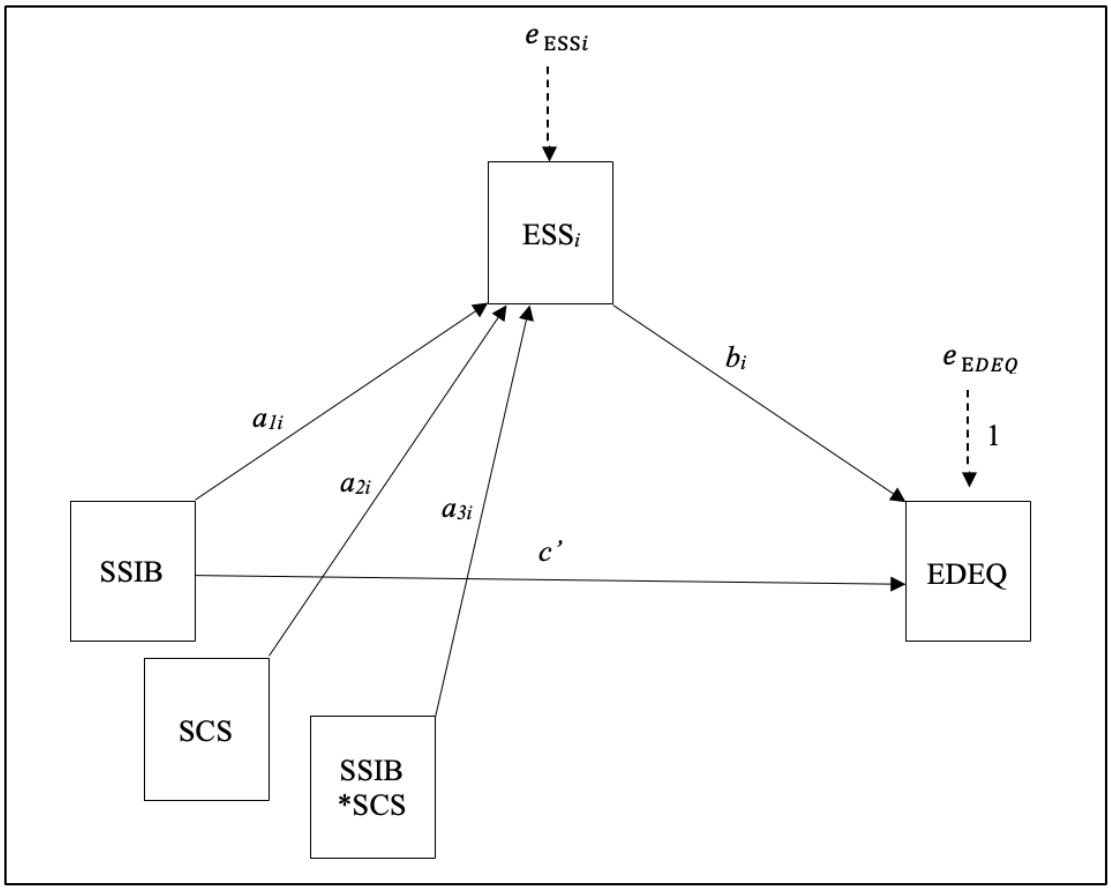
Next, the path between shame (ESS) and disordered eating (EDE-Q) was tested (see Table 9). Analyses revealed that the main effect of scores on the ESS (path b_i) was significant (b = .035, SE = .004, $t(295) = 9.414$, $p < .001$). Analysis of the direct *c'* path between SSI-B and EDE-Q scores revealed a significant main effect of scores on the SSI-B (b = .463, SE = .061, $t(295) = 7.651$, $p < .001$). Further, as a covariate, the main effect of BMI was found to be significant (b = .016, SE = .004, $t(295) = 3.747$, $p < .001$).

As presented in Table 10, the overall moderated mediation model was not supported by the index of moderated mediation (*effect* = .058, *SE* = .064, *Lower 95% CI* = -.075, *Upper 95%*

CI = .179). Based on the procedures outlined by Hayes (2015), as the upper and lower confidence intervals straddle zero, the moderated mediation was not significant. The conditional moderating effect of self-compassion in the indirect relationship between WS and disordered eating, as mediated by shame, revealed no significant difference between those low in self-compassion (one standard deviation below the mean of self-compassion (*effect* = .095, *SE* = .056, *Lower 95% CI* = .007, *Upper 95% CI* = .230) and those high in self-compassion (one standard deviation above the mean of self-compassion `*effect* = .176, *SE* = .058, *Lower 95% CI* = .073, *Upper 95% CI* = .303). These findings suggest that the mediating effect of shame in the relationship between WS and disordered eating did not depend on level of self-compassion**.**

Figure 5

Weight-Based Stigma (WS) and Disordered Eating: Statistical Diagram of Moderated-Mediation Model Tested in Hypothesis 3



Note. SSIB refers to experienced WS, measured by the Stigmatizing Situations Inventory - Brief, EDEQ refers to disordered eating, measured by the Eating Disorder Examination Questionnaire 6.0, ESS refers to shame, measured by the Experience of Shame Scale, and SCS refers to self-compassion, measured by the Self-Compassion Scale – Short Form.

Table 9

Weight-Based Stigma (WS) and Disordered Eating: Model Coefficients of Moderated-Mediation Model Tested for Hypothesis 3

	Dependent Variable									
	ESS					EDEQ				
Independent Variable	Label	*beta*	*SE*	*t*	*p*	Label	*beta*	*SE*	*t*	*p*
SSIB	a_{1i}	3.904**	.765	5.100	<.001	*c'*	.463**	.061	7.651	<.001
ESS	-	-	-	-	-	b_i	.035**	.004	9.414	<.001
SCS	a_{2i}	-13.830**	1.11	-12.449	<.001	-	-	-	-	-
SSIB*SCS	a_{3i}	1.660	1.301	1.275	.203	-	-	-	-	-
BMI	-	.058	.055	1.057	.291	-	.016**	.004	3.747	<.001

Note. $^{*}p < .05$, $^{**}p < .001$, *beta* = unstandardized regression coefficient, *SE* = standard error. SSIB refers to WS, measured by the Stigmatizing Situations Inventory - Brief, EDEQ refers to disordered eating, measured by the Eating Disorder Examination Questionnaire 6.0, ESS refers to shame, measured by the Experience of Shame Scale, SCS refers to self-compassion, measured by the Self-Compassion Scale, and BMI refers to Body Mass Index.

Table 10

Weight-Based Stigma (WS) and Disordered Eating: Index of Moderated Mediation

Model	Index of Moderated Mediation	*SE*	Lower 95% CI	Upper 95% CI
SSIB(X), EDEQ(Y), ESS(M), SCS(W)	.058	.064	-.075	.179

Note. SE = standard error, CI = confidence interval. SSIB refers to experienced WS, measured by the Stigmatizing Situations Inventory - Brief, EDEQ refers to disordered eating, measured by the Eating Disorder Examination Questionnaire 6.0, ESS refers to shame, measured by the Experiences of Shame Scale, and SCS refers to self-compassion, measured by the Self-Compassion Scale – Short Form.

4.0 Discussion

The first objective of this study was to investigate the relationships between weight-based stigma (WS) and three health-related behaviours (i.e., disordered eating, physical activity, and substance use) in a sample of young adults, while controlling for BMI. It was found that WS was significantly associated with increased disordered eating and physical activity, over and above participant BMI, but contrary to expectations, no association was found between WS and substance use. Second, this study investigated the mediating role of shame in the relationships found between WS and disordered eating and WS and physical activity. The results showed that shame partially mediated the relationship between WS and increased disordered eating, but did not mediate the relationship between WS and increased physical activity. This implies that the positive association found between WS and disordered eating can, in part, be explained by increased levels of shame, however, the association found between WS and physical activity

cannot be explained by increased levels of shame. Finally, this study used a moderated mediation model to examine whether shame is more likely to mediate this relationship among those with low self-compassion versus those with high self-compassion. The results indicated that self-compassion did not moderate the shame-mediated relationship between WS and disordered eating. This suggests that the mediating effect of shame found in the relationship between WS and disordered eating did not differ depending on participants' levels of self-compassion. The present section begins with a discussion of the key study findings followed by an examination of the strengths and limitations of the current study, the potential implications of the findings, and future research directions.

4.1 Weight-Based Stigma (WS) and Health-Related Behaviours

4.1.1 Weight-Based Stigma (WS) and Disordered Eating

Consistent with previous research (e.g., Almeida et al., 2011; Benas & Gibb, 2008; Cheng et al., 2017; Farrow & Tarrant, 2009; Piran & Thompson, 2008, Quick et al., 2013; Romano et al., 2021; Salwen et al., 2015), a significant positive relationship was found between WS and disordered eating in a university sample of young adults, with a moderate effect size. Notably, consistent with the findings of Romano et al. (2021), this relationship was sustained while controlling for BMI. While longitudinal research conducted by Eisenberg and colleagues (2012) provided evidence that young adults who experience WS may be especially vulnerable to disordered eating behaviour, research to date has focused on university samples of individuals aged 18 and older, and no study has specifically examined the relationship between WS and disordered eating in a sample of strictly young adults (i.e., individuals aged 18-25). In turn, the present study builds on the findings of Eisenberg et al. (2012), highlighting how WS may impact eating behaviour during young adulthood. Additionally, the current findings provide novel

support for a relationship between WS and disordered eating in young adults across the weight spectrum, suggesting that WS is an important contributor to the development of disordered eating during young adulthood, regardless of weight status.

Furthermore, while WS was found to be positively associated with disordered eating, over and above BMI, it is important to note that BMI alone did account for a significant amount of variance in this relationship. This finding suggests that while BMI is not responsible for the relationship between WS and disordered eating, it does partially explain variation in this relationship across participants. That is, while WS can be experienced by people of all body weights and sizes, the relationship between WS and disordered eating varies, to a certain extent, across individuals of different weight statuses, with individuals of higher body weights being more likely to experience WS (Brown et al., 2022). This finding is not surprising considering widely perpetuated societal ideals surrounding body weight and size (Kelley et al., 2010; Nuttall, 2015), and the important role that body image dissatisfaction has been found to play in the development of disordered eating psychopathology (Braun et al., 2016). These findings are also in line with Hunger et al. (2015)'s theory of weight-based social identity threat. Given the association found between WS and disordered eating in the present study, it is plausible that young adults affected by WS maladaptively cope with the threat incurred by this stigmatization through engagement in disordered eating behaviours.

4.1.2 Weight-Based Stigma (WS) and Physical Activity

Although the effect size was small, WS was found to be significantly associated with increased physical activity. Furthermore, this association remained the same when controlling for BMI, suggesting that young adults who experience WS are more likely to engage in increased physical activity or exercise, regardless of their weight status. These findings are consistent with

previous research that has been conducted in adult and adolescent samples (e.g., Puhl & Brownell, 2003), however, they are not consistent with research conducted in university samples. Previous research examining the relationship between WS and physical activity in university/undergraduate samples has found experiences of WS to be associated with decreased physical activity (e.g., Brunson et al., 2014; Vartanian & Shaprow, 2008). However, this is the first study to examine the relationship between WS and physical activity in a sample of clearly defined young adults instead of a broad sample of university students (i.e., individuals aged 18 and older). In turn, the added specificity of the current sample may account for findings being inconsistent with previous research in objectively similar samples. Furthermore, while WS was found to be positively associated with physical activity, over and above BMI, BMI alone also accounted for a significant amount of variance in this relationship. Similar to what was established in the relationship between WS and disordered eating, this finding suggests that while BMI is not responsible for the relationship between WS and physical activity, it does partially explain variation in this relationship across participants.

Given that this is the first study to examine the relationship between WS and physical activity in young adults across the weight spectrum, results add novel insight into how experiences of WS may impact physical activity during young adulthood. Specifically, the present study provides preliminary evidence that, in the face of WS, young adults may cope through increased engagement in physical activity. That is, young adults who experience WS may engage in increased levels of physical activity in an attempt to change their body, such that negative experiences surrounding their body weight and size are avoided or reduced, and threat to their social identity is diminished.

4.1.3 Weight-Based Stigma (WS) and Substance Use

No significant association was found between WS and substance use over and above BMI. Moreover, given that only a small effect size was detected, we can be confident that this non-significant association was not due to a lack of statistical power but, indeed, the result of WS and substance use being unrelated in the current sample. This finding is in contrast to previous research that has found WS to be associated with increased substance use in adult and adolescent samples (e.g., Hatzenbeuhler et al., 2009; Sutin & Terracciano, 2017; Sutin et al., 2020). Furthermore, BMI did not account for a significant amount of variance in this association, suggesting that weight status cannot explain why no relationship was found between WS and substance use in the present study.

As this study is the first to examine this relationship in a sample of young adults across the weight spectrum, it is possible that WS does not impact substance use in this population. However, based on what is understood about weight-based social identity threat (Hunger et al., 2015) and how individuals may cope with this threat, this finding is unexpected. Given the present results, young adults who experience WS do not appear to rely on substance use as a coping response, but rather turn to engagement in disordered eating and/or physical activity. It is plausible that the positive associations observed between WS and disordered eating and between WS and physical activity, but not between WS and substance use, may be due to eating and physical activity being advocated as a direct weight-modification behaviours, with dieting and exercise often encouraged for weight-loss by the media and public health (Samdal et al., 2017). In turn, the findings of this study build on our understanding of how WS relates to different health-related behaviours, and which behaviours young adults are more susceptible to engaging in as coping responses in the face of WS.

4.2 Shame Explains Part of the Relationship Between Weight-Based Stigma (WS) and Disordered Eating

This was the first study to investigate the mediating role of shame in the relationship between WS and disordered eating. In support of the second hypothesis, it was found that shame partially explained the relationship between WS and disordered eating. That is, in the present study, a direct relationship between WS and disordered eating was found to be significant, as well as an indirect relationship between WS and disordered eating, occurring through increased levels of shame. Therefore, the positive association found between WS and disordered eating can, in part, be explained by heightened shame. This finding is consistent with previous research documenting a relationship between shame and disordered eating (e.g., Blythin et al., 2020; Cavalera et al., 2016; Gois et al., 2018; Nichita et al., 2021; Troop et al., 2008). This finding is additionally consistent with research indicating that shame mediates the relationship between instances of social victimization and disordered eating in adult, adolescent, and young adult samples (Bellows et al., 2023; Duarte et al., 2015; Velez et al., 2015). Therefore, as the present study examined a sample of young adults, findings not only provide insight into a potential mechanism through which WS relates to disordered eating, but also builds on our existing understanding of how social victimization relates to disordered eating in this population.

There are a few factors that may contribute to why only a partial mediation was found in the current study compared to previous research which found that shame fully mediated the relationship between social victimization and disordered eating. Notably, unlike previous research, this is the first study to examine this mediation in a sample of young adults, therefore, this may explain why a partial mediation was detected in the present study instead of a full mediation. Additionally, some of the previous research that has shown a full mediating effect of

shame in the relationship between social victimization and disordered eating has specifically measured body shame (Duarte et al., 2015) instead of global shame. As the present study assessed global shame, this is another potential explanation as to why only a partial mediation was detected. It is important to consider how results may differ from previous research examining shame as a mediator of relationships between various forms of social stigmatization and disordered eating. Every form of social victimization is unique and involves different aspects that others likely do not. For instance, social victimization based on race or ethnicity, while similar to WS in principle, involves a factor that WS typically does not: race. In the same regard, racial victimization typically does not involve targeting an individual's body weight or size. As such, it is possible that shame plays a slightly more or slightly less significant role in the relationships between differing forms of social victimization and disordered eating, and this may explain why a partial mediating effect was detected in the relationship between WS and disordered eating in the current study, compared to the full mediating effect of shame that has been found in previous work.

Another potential explanation for why only a partial mediation was found in the present study may be due to the study measuring participants' lifetime experiences of WS, but current levels of shame and disordered eating. As the WS measure (i.e., the SSI-B) asked participants to report on the frequency of stigmatizing experiences throughout the course of their lifetime, it is possible that depending on the individual, scores on the WS measure may be more representative of past experiences of WS in some participants, and more representative of current experiences of WS in others. However, there is no way of determining whether a participant's WS score is more representative of past or current experiences, and it is possible that shame has a different mediating effect depending on whether WS is experienced currently or in the past. As there is no

differentiation in the period at which WS was experienced in the current study, this may explain why only a partial mediation was detected.

It is also possible that shame only partly accounted for the relationship between WS and disordered eating because another mediator is also at play. For instance, previous research has found weight bias internalization, that is the tendency to accept and blame oneself for experiencing WS from others (O'Brien et al., 2016), to mediate the relationship between experiences of WS and disordered eating (Bidstrup et al., 2022). Therefore, it is possible that weight bias internalization also accounts for part of the relationship found between WS and disordered eating in the present study.

4.3 Shame Does Not Explain the Relationship Between Weight-Based Stigma (WS) and Physical Activity

In contrast, shame did not account for the relationship between WS and physical activity. Therefore, the positive association between WS and physical activity does not appear to occur through the mechanism of shame. However, as findings of research exploring the relationship between WS and physical activity have been mixed, with some supporting a negative relationship (e.g., Brunson et al., 2014; Pearl et al., 2021; Vartanian & Novak, 2011; Vartanian & Shaprow, 2008) and others supporting a positive relationship (e.g., Pearl et al., 2015), it is possible that the relationship between WS and physical activity occurs through more than one mechanism.

4.4 Self-Compassion Does Not Moderate the Relationship Between Weight-Based Stigma (WS) and Disordered Eating

Given that shame mediated the relationship between WS and disordered eating, it was predicted that self-compassion would moderate this mediation. However, results of the

moderated mediation analysis was not significant. That is, the shame-mediated relationship between WS and disordered eating was not significantly different at different levels of self-compassion. This contradicts previous research examining the moderating role of self-compassion in the relationship between bullying, another form of social victimization, and disordered eating. For example, Bellows et al. (2023) found that shame mediated the relationship between social/relational bullying and disordered eating, and that self-compassion moderated this mediation, such that higher self-compassion was associated with both decreased shame and disordered eating in a sample of young adults. Additionally, a concept closely related to self-compassion, self-reassurance, has been shown to moderate the relationship between bullying and disordered eating (Duarte & Pinto-Gouveia, 2017). Given that previous research has focused on bullying, the present findings suggest that despite both bullying and WS being forms of social victimization, the mechanism by which WS relates to eating behaviour likely differs from the mechanism by which bullying relates to eating behaviour.

Gilbert's (2010) theory and previous findings suggest that the indirect relationship between WS and increased disordered eating (occurring through elevated levels of shame) would become weaker as self-compassion increased. However, this prediction was not supported, and level of self-compassion held no bearing in the strength of the relationship between WS and disordered eating. This is an interesting finding given that self-compassion was negatively related to both WS and shame, and that WS was positively related to shame.

In attempting to understand this finding, it is important to consider the broader literature surrounding self-compassion. There are a few possible reasons why self-compassion did not moderate the relationship between WS and disordered eating in the present study. First, it is possible that once the variance accounted for by shame as a mediator was removed from the

model, there was not enough statistical power to detect self-compassion as a moderator of the relationship between WS and disordered eating. Given that shame was shown to be a mediator of the relationship between WS and disordered eating, this could explain why self-compassion did not significantly moderate the relationship between WS and disordered eating. The conditional moderating effect of self-compassion in the indirect relationship between WS and disordered eating, as mediated by shame, revealed that the relationship was stronger when self-compassion was one standard deviation above the mean, and weaker when self-compassion was one standard deviation below the mean. However, this moderation did not reach statistical significance.

A second potential explanation for why self-compassion did not moderate the relationship between WS and disordered eating in the present study may be related to the timing of variable measurement. Specifically, in contrast to previous research, the present study used a non-specific lifetime measure of WS and not a measure of recalled social victimization specific to a previous life period. Most previous research has measured experiences of social victimization that have occurred at around the same time that measures of shame and self-compassion were administered. For example, in Duarte and Pinto-Gouveia (2017), self-reassurance was found to moderate the relationship between recent bullying and disordered eating in a sample of adolescents. In this study, the self-reassurance, body shame, and disordered eating measures would have been given near the time of bullying. In Beekman et al. (2017), where self-compassion moderated the relationship between social rejection and restrictive eating, the focus was on current bullying experiences, and self-compassion and restrictive eating were measured at the same time bullying was taking place. As the measure of WS administered in the present study (i.e., the SSI-B) assessed lifetime frequency of experiences of WS, without differentiating between past and recent experiences, this may explain why results were

inconsistent with previous work. Perhaps self-compassion is a skill developed following social victimization to cope with shame, preventing later disordered eating rather than a pre-existing protective factor. If this is the case, the same buffering effect may not be present when measuring WS, shame, self-compassion and disordered eating concurrently, as was the case in the current study.

4.5 Strengths and Limitations of the Study

4.5.1 Strengths

This study had several notable strengths. The first strength is that reliable and valid measures were employed which allowed confidence in the measurement of variables. In addition, in comparison to previous studies in this area, this study used a more comprehensive measure of WS (the SSI-B). Given that previous work examining WS in young populations has focused narrowly on weight-based teasing, the use of a broader measure of WS in the present study allowed examination of a variety of stigmatizing weight-based experiences that participants may have encountered throughout their lifetimes including being stared at or singled out in public, being teased, exploited, or treated differently in academic and medical settings because of one's body weight or size.

A second strength of this study was that it addressed a gap in the current literature by focusing on a nonclinical sample of young adults. Most research examining the relationship between WS and health-related behaviours has focused on bariatric populations (e.g., Rosenberger et al., 2007; Braun et al., 2021). Procurement of a nonclinical, sample of young adult university students additionally allowed the results of the current study to be more generalizable to the general population of young adults. Moreover, most previous studies have recruited either child/adolescent or adult samples. Thus, the current study adds valuable insight

into the associations between WS and various health-related behaviours (i.e., disordered eating, physical activity and substance use) in an understudied population, young adults.

The development and application of a new framework for understanding the relationship between WS and health-related behaviours is a third strength of the present work. This study was the first to test the relationships between WS and shame, self-compassion, and health-related behaviours. More specifically, the moderated mediation model that was employed shed important light on the potential mechanisms by which the relationships between WS and various health-related behaviours may occur, as well as what variables may or may not be capable of buffering these relationships.

A fourth strength of this study is the inclusion of individuals of varying gender identities. While most participants were female, study participation was open to individuals of any gender identity, and representation of individuals identifying as male, non-binary, or who hold another gender identity is a notable strength. Much of the research on WS and its consequences has been conducted using female samples, leaving the effects of WS on other gender identities largely understudied (Wellman et al., 2019). Therefore, recruiting individuals of varying gender identities allowed for variables to be measured in a general sample of young adults rather than just a female sample.

4.5.2 Limitations

This study also had certain limitations. First, as with all cross-sectional research, the data were collected at one point in time and, therefore, the temporal relationships between the study variables cannot be established. For example, WS was measured by asking participants to recall any stigmatizing experiences throughout their lifetime, but measures of disordered eating, physical activity, substance use, shame and self-compassion were based on current or recently

experienced behaviours/psychopathology. Therefore, we are unable to firmly determine which variables preceded others. For example, it may be that one's level of self-compassion at the time WS was experienced plays a role in one's subsequent experience of shame and negative health-related behaviours. However, given the study's cross-sectional design, it is not possible to establish time precedence. Without longitudinal research, it is impossible to infer the temporal or directional relationships between the study variables. Further, as self-report measures were used, we cannot be certain that participant reports were accurate. Notably, as the WS measure (i.e., the SSI-B) asked participants to recall situations of WS encountered throughout their lifetime, there is additional potential for recall bias.

Another potential limitation concerning external validity is whether the present sample is representative of the young adult population. This sample consisted of primarily White female university students (71.2%) which limits generalizability of the study results across young adults of different races/ethnicities, and of different socioeconomic statuses. In addition, while efforts were made to include individuals of diverse gender identities in this study, the sample was still predominantly (78.9%) women, making it unfeasible to include gender as a feature of analysis. Future studies should recruit more diverse community samples.

4.6 Future Research Directions

Based on the results, strengths and limitations of this study, there are a number of research avenues that are important to explore. Given the significant prevalence and impact of WS, it is important to gain an understanding of how WS impacts mental and physical health through longitudinal research. While the current study established relationships between WS, disordered eating, physical activity, substance use, shame, and self-compassion, this was a cross-sectional study and, therefore, we cannot determine temporal or causal relationships between WS

and consequent mental or physical health. To examine whether WS precedes higher shame or more disordered eating, physical activity, and substance use, longitudinal research is needed. Specifically, it may be beneficial to measure WS and self-compassion in childhood/adolescence and then to measure health-related behaviours and shame in young adulthood to investigate whether self-compassion may be a protective factor against the later development of shame and poor health-related behaviours among those who have experienced WS.

In addition to the three health-related behaviours explored in this research (i.e., disordered eating, physical activity and substance use), it would also be interesting to examine the relationships between WS and other health-related behaviours or activities. For instance, media use (e.g., watching TV/movies, using laptops/smart phones/tablets to connect to social media platforms, playing computer/video games, etc.) is a common behaviour within young populations (Bozzola et al., 2022). Given the association found between media use and negative health outcomes, including increased depression and anxiety (Augner & Hacker, 2012) and poor immune functioning (Reed et al., 2015), media use can be classified as a health-related behaviour. Some researchers have even proposed that media use may be a maladaptive avenue to coping with stress (Wolfers & Schneider, 2021). As such, it is possible that for some young adults, unhealthy/excessive media use may arise after experiencing WS, as a coping mechanism.

To get a complete picture of the relationships between the study variables in young adults, future research should aim to recruit more representative samples. Specifically, individuals who do not identify as female/women have historically been excluded or underrepresented in research examining WS, health related behaviours, self-compassion, shame and relationships between these variables. Research must make efforts to examine how WS affects individuals with various gender identities. Specifically, given the unique body-image

concerns that have been documented in young adults identifying as transgender/non-binary (McGuire et al., 2016), future studies should explore the relationship between WS and health-related behaviours in these populations.

Finally, future efforts should aim to develop more comprehensive measures of WS. While the measure employed in the current study (i.e., the SSI-B) does include a broader range of weight-based stigmatizing situations in comparison to other commonly used measures of WS (e.g., The Perception of Teasing Scale; Thompson et al., 1995), including items pertaining to WS in healthcare, education and employment settings, there are experiences of WS that the SSI-B does not measure. For instance, no SSI-B items ask about situations where one may have felt left out or found it difficult to make friendships because of their weight, shape or size. Additionally, some of the stigmatizing situations making up items on the SSI-B are overly specific, limiting the ability to gauge participant's broader experiences of WS. For instance, the item attempting to measure the frequency of WS experienced in one's romantic relationships (i.e., "Having a romantic partner exploit you, because she or he assumed you were 'desperate' and would put up with it.") describes a very precise situation that likely only applies to a limited group of individuals. Therefore, the SSI-B likely does not provide an accurate measurement of WS experienced in romantic relationships. This heightened specificity is also present in the item attempting to grasp the frequency of WS experienced in public seating (i.e., "Being glared at or harassed by bus passengers for taking up 'too much' room."). Restricting this experience to only occurring on a bus, and no other forms of transportation, waiting rooms, lecture halls, etc., limits the group of individuals to which the item applies. As not everyone takes the bus, the SSI-B likely does not provide an accurate measurement of WS experienced in public sitting areas. A more comprehensive measure of WS is needed that includes a broader range of items that are

applicable to more individuals and situations. Another potential solution would be to develop a measure of WS that consists of subscales, each with multiple items set out to gauge the frequency of various stigmatizing situations that fall under a similar construct (e.g., friendships/social relationships, romantic relationships, family, education, employment, seating, etc.).

Additionally, as existing measures of WS target frequency of occurrence, it may be pertinent to develop a measure that gauges the harm of WS. The current study included a measure of frequency of occurrence of WS, which allowed for the investigation of how negative experiences surrounding body weight and size impact health. However, different forms/frequency of WS may impact participants in different ways, and a rating of the distress participants experienced as a result of WS is an important avenue for future research.

4.7 Study Implications

4.7.1 Clinical Implications

The first major implication of the results of this study pertains to the clinical significance of shame on the health-related behaviours of those who have experienced WS. Specifically, the current findings suggest that shame has a direct influence on whether those who have experienced WS also experience disordered eating. This is important information for social workers, school counsellors, clinical psychologists, and other health care professionals. While the current study design does not allow for firm conclusions to be made about the direction of this relationship or whether the relationship is causal, the findings suggest that interventions to reduce shame, possibly through compassion-focused interventions (e.g., CFT; Kelly et al., 2013; Kelly & Carter, 2015), among those impacted by WS may reduce the risk for later disordered eating. It is also important in therapeutic settings to determine whether those who have

experienced WS in the past and are experiencing current disordered eating may be experiencing high shame.

Additionally, as shame was found to partially mediate the relationship between WS and disordered eating, and weight-bias internalization has been shown to mediate the relationship between WS and eating behaviour in previous research, it is possible that interventions targeting weight-bias internalization may also prove effective in mitigating the relationship between WS and disordered eating. Preliminary research highlights the importance of targeting weight-bias internalization in clinical interventions (Pearl et al., 2023), and efforts towards developing clinical interventions aiming to reduce internalized WS and related suffering have begun (Davies et al., 2022; Levin et al., 2018; Palmeira et al., 2017; Pearl et al., 2018, 2020). Given that the present study revealed shame as another important contributor in the relationship between WS and health and well-being, findings of the present study may help inform future interventions targeting both weight-bias internalization and shame.

4.7.2 Anti-Weight-Based Stigma (WS) Programs and Awareness

Another major implication of this study involves the importance of raising awareness about WS as a serious and potentially damaging form of social victimization. Currently, WS is not taken as seriously as other forms of stigma present within society, and is even endorsed by the media and public health (Puhl & Heuer, 2010). Notably, current "obesity prevention programs" are rarely evidence based and may exacerbate WS by focusing on an individual's weight rather than on their health or health-related behaviour (Kenney et al., 2017). As such, it is imperative that non-stigmatizing, evidence-based programs are developed and implemented by public health. Additionally, anti-WS training and information may reduce the incidence of WS and improve outcomes for victims. The current study adds to a body of literature demonstrating

the harmful impact of WS on health and well-being, suggesting that it is important to implement non-stigmatizing "obesity prevention programs" within public health, and to implement educational programs within the community and in professional training programs, that will improve knowledge about the harms of WS, and ways to reduce this form of stigma. Findings also point to the need for public education to combat misconceptions about weight and promote body diversity, and implementation of laws and policies prohibiting weight-based discrimination within society.

5.0 Conclusions

WS is associated with a variety of negative mental and physical health consequences (DeJong, 1980; Puhl & Brownell, 2001; Puhl & Heuer, 2010; Puhl et al., 2020). Notably, WS has been linked with engagement in poor health-related behaviours, including disordered eating, reduced physical activity levels, and substance use (Puhl et al., 2020). Understanding how WS influences health-related behaviours is of particular importance given that WS is widespread and widely accepted within society. Negative attitudes and stereotypes surrounding body weight and size have been documented coming from employers, coworkers, teachers, physicians, nurses, medical students, dietitians, psychologists, peers, friends, and family members (Puhl & Brownell, 2001; Puhl & Heuer, 2009). The results of the current study suggest that WS has a significant positive relationship with disordered eating, which can partly be explained by an increase in shame among those who experience WS. The current results also reveal that WS has a significant positive relationship with physical activity. Excessive exercise is a core feature of eating disorders. These findings add to the growing literature documenting a negative impact of WS on victims.

Evidence was found that the association between WS and disordered eating occurred via shame. However, self-compassion did not moderate the relationship between WS and disordered eating, as mediated by shame. Given that previous research has found that high self-compassion at the time of social victimization (i.e., bullying) weakens the relationship between bullying and disordered eating (Beekman et al., 2017; Duarte & Pinto-Gouveia, 2017), it may be the case that self-compassion is only effective as a moderator of the relationship between WS and disordered eating if increased self-compassion occurs close to the time WS happens. Future research examining the relationships between WS, self-compassion, shame, and health-related behaviours, particularly longitudinal research, is imperative to ensure that there is a clear understanding of how these variables interact.

Beyond providing insight about how WS, shame, and self-compassion interact to predict disordered eating, this study, in conjunction with past research, suggests that WS is a significant predictor of future mental health and behavioural concerns, particularly shame and disordered eating. This is an important consideration for clinicians as well as public health campaigns. Furthermore, it is crucial for the public to recognize their negative beliefs, attitudes, and behaviours surrounding body weight and size as contributors to WS within society and for individuals experiencing WS to recognize that WS is a serious form of social bias and discrimination with significant negative health consequences. Public education campaigns aiming to raise awareness and reduce the prevalence of WS are also imperative.

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Appendix A

Informed Consent Form

Title: Examining Attitudes Toward Others, Self-image, and Wellbeing in University Students

Researcher(s): Darcie Valois, M.A
Psychology Department, Memorial University of Newfoundland.
dvalois@mun.ca

Laura Couturier
Psychology Department, Memorial University of Newfoundland.
lec435@mun.ca

Suhail Hassan
Psychology Department, Memorial University of Newfoundland.
shassan@mun.ca

Supervisor: Dr. Jacqueline Carter-Major, PhD
Professor, Psychology Department, Memorial University of Newfoundland
jacqueline.carter@mun.ca

You are invited to take part in a research project entitled "Examining Attitudes Toward Others, Self-image, and Wellbeing in University Students".

This form is part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. It also describes your right to withdraw from the study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. This is the informed consent process. Take time to read this carefully and to understand the information given to you. Please contact the researcher, Darcie Valois, if you have any questions about the study or for more information not included here before you consent.

It is entirely up to you to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

Introduction

Our names are Darcie Valois, Laura Couturier and Suhail Hassan and as part of our Doctoral/Masters/Honours theses we are conducting research under the supervision of Dr Jacqueline Carter-Major. This study is available to students of Memorial University of Newfoundland through the Psychology Research Experience Pool (PREP).

Purpose of study:
The purpose of this study is to examine how attitudes toward others are related to self-image, eating behaviors and psychological wellbeing in undergraduate students.

What you will do in this study:
If you decide to complete this study, you will complete a series of short surveys. The surveys will include questions about how you view yourself and others, your attitudes towards yourself and your life events, your health, mood, and eating behavior. At the end, you will be asked a few questions about yourself (e.g. your current height/weight, age, gender, cultural background). If you indicated that you are originally from a country outside of North America, you will be asked to complete a short survey on your experiences adjusting to a new cultural environment in Canada.

Length of time:
It should take approximately 45 minutes to complete this study.

Withdrawal from the study:
There are no consequences for withdrawing from the study. You may withdraw from the study at any time up, until you submit your final response, by clicking the EXIT button on the screen. If you choose to withdraw from this study after beginning the survey, you will still receive a bonus point in your psychology course. If you choose to withdraw while completing the survey any information you have entered up until the point of withdrawal will be deleted from the online system. Please note that it will not be possible to withdraw your responses from the study after you submit the full-length survey because all data will be anonymized (i.e., there is no way to link your identity to your responses).

Possible benefits:
Participating in this research can be a learning opportunity. You may gain knowledge or insight about the research process. You will also be contributing valuable information to the scientific community. Your data may help researchers learn about self-image and healthy eating behavior and be able distribute that knowledge, potentially helping the general population as well.

Possible risks:
This is a minimal risk study. However, some individuals may experience temporary emotional discomfort while answering questions about how you view your body, your eating behavior, and your mood. It is important to remember that you may skip any questions that you do not wish to answer. If you would like to speak further about the information in this survey you may contact Dr. Jacqueline Carter-Major at jacqueline.carter@mun.ca. If you have concerns about your mental well-being you may also receive support by contacting the MUN Student Wellness and Counselling Center at 709-864-8500 or by calling the provincial Mental Health Helpline at 709-737-4668.

Confidentiality:
Confidentiality is ensuring that identities of participants are accessible only to those authorized to have access. All data that you provide will remain confidential. Only the researchers will have

access to any and all data. No personally identifiable information will be associated with your data. Your SONA ID will be removed prior to data analyses.

Your course instructor will not have access to participation details. He or she will only be able to view the total number of credit points earned by students and will not know whether you have participated in this, or any other study, nor whether any credit points earned from participation in any study were earned from Research Participation, Research Observation, or completion of the alternative assignment.

Anonymity:
Anonymity refers to not disclosing participant's identifying characteristics, such as name or description of physical appearance.

Every reasonable effort will be made to ensure participant anonymity. In the current study, no identifying information will be included on the survey itself and results of this research will be presented or published in aggregate form only. Any information provided on the SONA system will be kept separate from survey responses. No identifying information will be included in any publications of this research; data will be presented in aggregate form only.

Use, access, ownership, and storage of data:
All data will be stored on a password-protected computer in encrypted folders. The researchers Darcie Valois, Suhail Hassan, Laura Couturier and Dr. Jacqueline Carter-Major, will be the only individuals with access to the data. Anonymized data will be kept for a minimum of five years as required by Memorial University policy on Integrity of Scholarly Research. Following this five-year period all data will be completely destroyed.

Third-party data collection and/or storage:
Data collected from you as part of your participation in this project will be hosted by the online survey platform, Qualtrics. All data stored by Qualtrics is subject to their privacy policy and to any relevant laws of the country in which their servers are located. Therefore, anonymity and confidentiality of data may not be guaranteed in the rare instance, for example, that government agencies obtain a court order compelling the provider to grant access to specific data stored on their servers. If you have questions or concerns about how your data will be collected or stored, please contact the researcher and/or visit the provider's website for more information before participating.

The Qualtrics privacy statement can be found at: https://www.qualtrics.com/privacy-statement/
The Qualtrics security statement can be found at: https://www.qualtrics.com/security-statement/

Research Participation vs. Research Observation
Your participation in this study is intended to be an educational Research Experience. You therefore have the choice of whether or not to provide data to researchers for inclusion in their analysis. If you consent to provide your data for analysis, please check the box below labeled "Research Participation". However, if you wish to observe the process of research participation without providing data to researchers for inclusion in their analysis, then you may choose to do so, without any loss of experience or credit. If you consent to observe the research experience

without providing any data, please check the box below labeled "Research Observation". Please note that you may choose to change your Research Experience from Participation to Observation at any time before submitting the final page of the online survey without loss of experience or credit.

Reporting of Results:
The data collected from this survey will be utilized for a doctoral dissertation (main project) as well as a masters and undergraduate honours thesis (sub-projects). Once completed, these works will be available at Memorial University's Queen Elizabeth II Library and may be accessed online at http://collections.mun.ca/cdm/search/collection/theses. These works may also be presented and published in peer-reviewed forums. Any published information will include a summary of all information obtained from all participants and will not include any individual responses or identifying information.

Sharing of Results with Participants:
Participants may access the final theses at Memorial University's Queen Elizabeth II Library using this link to search: http://collections.mun.ca/cdm/search/collection/theses

Questions:
You are welcome to ask questions at any time during your participation in this research. If you would like more information about this study, please contact Darcie Valois or Dr. Jacqueline Carter-Major using the contact information provided on this form.

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

Consent:
By choosing to complete this study, you agree that:

- You have read the information about the research.
- You have been advised that you may ask questions about this study and receive answers prior to continuing.
- You are satisfied that any questions you had have been addressed.
- You understand what the study is about and what you will be doing.
- You understand that you are free to withdraw participation from the study by closing your browser window or navigating away from this page, without having to give a reason and that doing so will not affect you now or in the future.
- You understand the difference between Research Participation and Research Observation, and that you may freely choose which Research Experience option you prefer.
- You understand that you are free to change your Research Experience option from Participation to Observation at any time before submitting the final page of the survey, without having to give a reason, and that doing so will not affect you now or in the future. You will be asked below and again on the final page of the survey which research option you prefer.

- You understand that any data collected from you up to the point of your choice to participate as a Research Observer will be destroyed.
- You understand that this data is being collected anonymously and therefore your data **cannot** be removed once you submit this survey.

By consenting to this online survey, you do not give up your legal rights and do not release the researchers from their professional responsibilities.

Please retain a copy of this consent information for your records.

Research Participation vs. Research Observation

Your participation in this study was intended to be an educational Research Experience. You therefore have the choice of whether or not to provide data to researchers for inclusion in their analysis. If you consent to provide your data for analysis, please check the box below labeled "Research Participation". However, if you wish to observe the process of research participation without providing data to researchers for inclusion in their analysis, then you may choose to do so, without any loss of experience or credit. If you consent to observe the research experience without providing any data, please check the box below labeled "Research Observation".

☐ Research Participation: I consent to provide data from my research experience to researchers for analysis.

☐ Research Observation: I do not consent to provide data from my research experience to researchers for analysis.

Clicking CONTINUE **below and submitting this survey constitutes consent and implies your agreement to the above statements.**

Appendix B

Debriefing Form

Thank you for participating in the study! Your participation and the data that you contribute are valuable for our research. This feedback sheet is intended to explain to you the purpose and hypotheses of the study in which you have just participated.

The main specific purpose of this study was to understand relationships between weight stigma, body esteem, eating behaviours, psychological well-being (symptoms of depression, anxiety, and stress), shame, perfectionism, and self-compassion. Specifically, we aimed to look at whether weight stigma (which include the attitudes you hold toward those living in larger bodies, the extent to which you internalize these attitudes and apply them to your own self-image, and your experiences of being discriminated against due to your weight) was related to body image, eating behaviour and psychological well-being, and whether these relationships could be explained by shame and perfectionism. We also aimed to examine whether self-compassion could buffer against the negative effects of weight stigma, shame, and perfectionism on body image, eating behaviours, and psychological well-being. We hypothesized that weight stigma will be related to lower body image, greater disordered eating, and lower psychological well-being and that these relationships will be explained by shame and perfectionism. We also hypothesized that self-compassion will buffer against (in other words alleviate some of the negative effects) of weight stigma on body image, disordered eating, and psychological well-being resulting in more positive body image, less disordered eating, and greater psychological well-being in those who have greater self-compassion compared to lower-self-compassion.

A secondary purpose of the study was to examine whether perceptions and experiences of weight stigma differ between cultures, and whether the relationships between weight stigma, body esteem, and eating behaviours differ due to culture and acculturation (the extent to which an individual from a different culture adopts the views and practices of another culture). It was hypothesized that weight stigma will be positively correlated with body image dissatisfaction and disordered eating, though we made no specific predictions on how they would differ between cultural groups. We also hypothesized that greater acculturation would be positively correlated with internalized weight stigma and that higher levels of weight stigma will be associated with greater body image dissatisfaction and disordered eating.

Another secondary purpose of the study was to investigate the relationship between weight stigma and health-related behaviours, such as substance use, physical activity, and eating behaviour. Through the present study, we aimed to examine the role of weight bias internalization (i.e., the extent to which negative weight-related attitudes are internalized and applied to the self) and shame in this relationship. That is, a goal of the study was to assess if this internalization and shame associated with experiencing weight bias, would predict maladaptive health behaviours, including substance abuse, decreased physical activity, and disordered eating. Further, the study sought to evaluate whether self-compassion and social-safeness (i.e., experiencing and perceiving one's social world as warm, comforting and safe, yielding feelings of belongingness, acceptance and warmth from others), act as antidotes against the impacts of weight stigma on health-related behaviours. We hypothesized that more exposure and

experiences of weight stigma would be associated with increased substance use, decreased physical activity and increased disordered eating. We further hypothesized that shame and weight bias internalization would propel this relationship between weight stigma and maladaptive health related behaviours. Lastly, we hypothesized that self-compassion and social-safeness would buffer the relationship between weight stigma and shame, as well as the relationship between weight stigma and maladaptive health-related behaviours, such that those who have experienced weight stigma but have high self-compassion and/or social safeness will engage in less maladaptive health behaviours than those who have experienced weight stigma but have lower self-compassion or social-safeness.

You completed measures designed to assess weight stigma, self-compassion, body image, disordered eating behaviour, shame, perfectionism, psychological wellbeing. The *Anti-fat Attitudes Questionnaire (AFA), the Modified Weight Bias Internalization Scale (WBIS-M), and the Stigmatizing Situations Inventory-Brief (SSI-B)* all measured different aspects of weight bias including attitudes toward others in larger bodies *(AFA),* the extent to which one applies weight bias to one's own self-image *(WBIS-M),* and actual experiences of weight discrimination (*SSI-B)*. The *Self-Compassion Scale Short Form (SCS-SF)* measured your ability to engage in compassionate responses toward your own negative experiences or feelings. Body image and disordered eating were measured by the *Eating Disorder Examination Questionnaire (EDE-Q)* and the *Body Dissatisfaction Subscale of the Eating Disorder Inventory 3 (EDI-3).* The *Stunkard Figure Rating Scale (SFRS)* measured your perception of your current body size. The *Experiences of Shame Scale* measured feelings of shame you may have experienced about your thoughts, behaviours, and physical appearance. The *Revised Almost Perfect Scale (APS-R*) measured perfectionism. The *Depression, Anxiety, and Stress Scale (DASS-21)* assessed mood, anxiety and stress. You also completed measures designed to assess drug and alcohol use, physical activity, and social safeness. The *Car, Relax, Alone, Forget, Friends, Trouble (CRAFFT)* measured substance-related risks and problems you may be experiencing. The *International Physical Activity Questionnaire – Short Form (IPAQ-SF)* measured your health-related physical activity. The *Social Safeness and Pleasure Scale (SSPS)* evaluated the extent to which you feel soothed, warm and connected within your social relationships. Lastly, the *Multigroup Ethnic Identity Measure (MEIM)* and *Vancouver Acculturation Index (VIA)* measured the extent to which you feel connected to your cultural identity and acculturation (if you indicated you were born outside of Canada).

Some of the questions you answered may have brought up difficult feelings around experiences of weight discrimination, self-image, eating behaviour, and mood which may have led to some distress. If you have any concerns about your mental health and would like to talk with anyone about this experience, you may contact Jacqueline Carter-Major, a registered clinical psychologist, at jacquelinec@mun.ca. You may also call or text the Warm Line to speak with a peer support worker, at 647-557-5882 (text) or 416-960-WARM (call). For in-person services, Memorial University's Counselling Centre can be reached 709-864-8500.

With this information in mind, please indicate whether you consent to have your responses included in the final dataset for this study:

- I would like my data included in the study.
- I do not want my data included in the study.

If you have any ethical concerns about your participation in this study (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

We appreciate your participation in this study and hope that this has been an interesting experience. If you have any additional questions about this research or other research conducted in this lab, please contact the Primary Investigator Darcie Valois at dvalois@mun.ca.

If you would like to learn more about self-compassion or weight stigma in relation to body image, eating behaviours, and culture please see the following articles:

Puhl, R. M., & Heuer, C. A. (2009). The stigma of obesity: a review and update. *Obesity*, *17*(5), 941–964.

Pepper, A. C., & Ruiz, S. Y. (2007). Acculturation's influence on antifat attitudes, body image and eating behaviors. *Eating Disorders*, *15*(5), 427–447. https://doi.org/10.1080/10640260701667912

Turk, F., Kellett, S., & Waller, G. (2021). Determining the potential link of self-compassion with eating pathology and body image among women: a longitudinal mediational study. *Eating and Weight Disorders*, 1-9. https://doi.org/10.1007/s40519-021-01144-1

Tylka, T. L., Russell, H. L., & Neal, A. A. (2015). Self-compassion as a moderator of thinness-related pressures' associations with thin-ideal internalization and disordered eating. *Eating Behaviors*, *17*, 23–26. https://doi.org/10.1016/j.eatbeh.2014.12.009

Appendix C

Demographic Questionnaire

Age:

Gender:

Level of Study: ___undergraduate ___graduate

Year of study: _____

Ethnicity: _____

Height: ____feet ____inches

Weight (pounds): _____

Appendix D

Stigmatizing Situations Inventory-Brief (SSI-B; Vartanian, 2015)

Instructions: Below is a list of situations that people encounter because of their weight. Please indicate whether, and how often, each of these situations happens to you.

	Never	Once in your life	Several times in your life	About once a year	Several times per year	About once a month	Several times per month	About once a week	Several times per week	Daily
Being singled out as a child by a teacher, school nurse, etc., because of your weight.	0	1	2	3	4	5	6	7	8	9
Being stared at in public.	0	1	2	3	4	5	6	7	8	9
Children loudly making comments about your weight to others.	0	1	2	3	4	5	6	7	8	9
Having a doctor recommend a diet, even if you did not come in to discuss weight loss.	0	1	2	3	4	5	6	7	8	9

Having a romantic partner exploit you, because she or he assumed you were 'desperate' and would put up with it.	0	1	2	3	4	5	6	7	8	9
Overhearing other people making rude remarks about you in public.	0	1	2	3	4	5	6	7	8	9
Not being hired because of your weight, shape or size.	0	1	2	3	4	5	6	7	8	9
Having family members feel embarrassed by you or ashamed of you.	0	1	2	3	4	5	6	7	8	9
Having people assume you overeat or binge eat because you are overweight.	0	1	2	3	4	5	6	7	8	9

Being glared at or harassed by bus passengers for taking up 'too much' room.	0	1	2	3	4	5	6	7	8	9

In addition to the above situations, are there any other situations you encountered over your life where you were discriminated against because of your weight? _____

Appendix E

Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008)

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully.

Questions 1 to 12: Please select the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

On how many of the past 28 days…	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	0	1	2	3	4	5	6
Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?	0	1	2	3	4	5	6
Have you had a definite desire to have a totally flat stomach?	0	1	2	3	4	5	6

Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
Have you had a definite fear of losing control over eating?	0	1	2	3	4	5	6
Have you had a definite fear that you might gain weight?	0	1	2	3	4	5	6
Have you felt fat?	0	1	2	3	4	5	6
Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past 28 days, how many times have you eaten what other people would regards as an unusually large amount of food (given the circumstances)?	
On how many of these times did you have a sense of having lost control over your eating (at the time you were eating)?	
Over the past 28 days, on how many DAYS have such episodes of overeating occurred (i.e. you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?	

Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight?	
Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight?	
Over the past 28 days, how many times have you exercised in a "driven" or "compulsive" way as a means of controlling your weight, shape or amount of fat, or to burn off calories?	

Questions 19 to 21: Please select the appropriate number. Please note that for these questions the term "binge eating" means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
Over the past 28 days, on how many days have you eaten in secret (ie, furtively)? ... Do not count episodes of binge eating.	0	1	2	3	4	5	6
On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight? ... Do not count episodes of binge eating.	0	1	2	3	4	5	6
Over the past 28 days, how concerned have you been about other people seeing you eat? ... Do not count episodes of binge eating.	0	1	2	3	4	5	6

Questions 22 to 28: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past 28 days…	Not at all	Slightly		Moderately		Markedly	
Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?	0	1	2	3	4	5	6
How dissatisfied have you been with your weight?	0	1	2	3	4	5	6
How dissatisfied have you been with your shape?	0	1	2	3	4	5	6
How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	0	1	2	3	4	5	6
How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	0	1	2	3	4	5	6

Appendix F

International Physical Activity Questionnaire – Short Form (IPAQ-S; Lee et al., 2011)

Instructions: We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the last **7 days.** Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days. Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

1. During the last **7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

   _____ **days per week**

   ☐ No vigorous physical activities… **Skip to question 3**

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

   _____ **hours per day**

   _____ **minutes per day**

   ☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days. Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

   _____ **days per week**

   ☐ No moderate physical activities … **Skip to question 5**

4. How much time did you usually spend doing moderate physical activities on one of those days?

   _____ **hours per day**

   _____ **minutes per day**

   ☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

   _____ days per week

   ☐ No walking … **Skip to question 7**

6. How much time did you usually spend **walking** on one of those days?

_____ hours per day

_____ minutes per day

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ hours per day

_____ minutes per day

☐ Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

Appendix G

The CRAFFT Questionnaire (Version 2.1; Knight, 2020)

Instructions: Please answer all questions **honestly**; your answers will be kept **confidential**.

During the PAST 12 MONTHS, on how many days did you:

1. Drink more than a few sips of beer, wine, or any drink containing **alcohol**? Put "0" if none. _____
2. Use any **marijuana** (cannabis, weed, oil, wax, or hash by smoking, vaping, dabbing, or in edibles) or "**synthetic marijuana**" (like "K2," "Spice")? Put "0" if none._____
3. Use anything else to get high (like other illegal drugs, pills, prescription or over-the-counter medications, and things that you sniff, huff, vape, or inject)? Put "0" if none._____

Read these instructions before continuing:

- If you put "0" in ALL of the boxes above, ANSWER QUESTION 4, THEN STOP.
- If you put "1" or higher in ANY of the boxes above , ANSWER QUESTIONS 4-9.

4. Have you ever ridden in a CAR driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	No	Yes
5. Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?	No	Yes
6. Do you ever use alcohol or drugs while you are by yourself, or ALONE?	No	Yes
7. Do you ever FORGET things you did while using alcohol or drugs?	No	Yes
8. Do your FAMILY or FRIENDS ever tell you that you should cut down on your drinking or drug use?	No	Yes
9. Have you ever gotten into TROUBLE while you were using alcohol or drugs?	No	Yes

Appendix H

Experiences of Shame Scale (ESS; Andrews et al., 2002)

Instructions: Everybody at times can feel embarrassed, self-conscious or ashamed. These questions are about such feelings if they have occurred **at any time in the past year**. There are no 'right' or 'wrong' answers. Please indicate the response which applies to you.

	Not at all	A little	Moderately	Very Much
Have you ever felt ashamed of any of your personal habits?	1	2	3	4
Have you worried about what other people think of any of your personal habits?	1	2	3	4
Have you tried to cover up or conceal any of your personal habits?	1	2	3	4
Have you felt ashamed of your manner with others?	1	2	3	4
Have you worried about what other people think of your manner with others?	1	2	3	4
Have you avoided people because of your manner?	1	2	3	4
Have you felt ashamed of the sort of person you are?	1	2	3	4
Have you worried about what other people think of the sort of person you are?	1	2	3	4
Have you tried to conceal from others the sort of person you are?	1	2	3	4
Have you felt ashamed of your ability to do things?	1	2	3	4
Have you worried about what other people think of your ability to do things?	1	2	3	4
Have you avoided people because of your inability to do things?	1	2	3	4

Do you feel ashamed when you do something wrong?	1	2	3	4
Have you worried about what other people think of you when you do something wrong?	1	2	3	4
Have you tried to cover up or conceal things you felt ashamed of having done?	1	2	3	4
Have you felt ashamed when you said something stupid?	1	2	3	4
Have you worried about what other people think of you when you said something stupid?	1	2	3	4
Have you avoided contact with anyone who knew you said something stupid?	1	2	3	4
Have you felt ashamed when you failed in a competitive situation?	1	2	3	4
Have you worried about what other people think of you when you failed in a competitive situation?	1	2	3	4
Have you avoided people who have seen you fail?	1	2	3	4
Have you felt ashamed of your body or any part of it?	1	2	3	4
Have you worried about what other people think of your appearance?	1	2	3	4
Have you avoided looking at yourself in the mirror?	1	2	3	4
Have you wanted to hide or conceal your body or any part of it?	1	2	3	4

Appendix I

Self-Compassion Scale Short Form (SCS-SF; Raes et al., 2011)

Instructions: Please read each statement carefully before answering. Indicate how often you behave in the stated manner, using the following scale:

	Almost never				Almost always
When I fail at something important to me, I become consumed by feelings of inadequacy.	1	2	3	4	5
I try to be understanding and patient towards those aspects of my personality I don't like.	1	2	3	4	5
When something painful happens, I try to take a balanced view of the situation.	1	2	3	4	5
When I'm feeling down, I tend to feel like most other people are probably happier than I am.	1	2	3	4	5
I try to see my failings as part of the human condition.	1	2	3	4	5
When I'm going through a very hard time, I give myself the caring and tenderness I need.	1	2	3	4	5
When something upsets me, I try to keep my emotions in balance.	1	2	3	4	5
When I fail at something important to me, I tend to feel alone in my failure.	1	2	3	4	5
When I'm feeling down, I tend to obsess and fixate on everything that's wrong.	1	2	3	4	5
When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	1	2	3	4	5
I'm disapproving and judgmental about	1	2	3	4	5

my own flaws and inadequacies.					
I'm intolerant and impatient towards those aspects of my personality I don't like.	1	2	3	4	5