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Kimberly McClure Brenchley  
*St. John Fisher College, kmclure@sjfc.edu*

Diane M. Quinn  
*University of Connecticut - Storrs*

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#### Publication Information

McClure Brenchley, Kimberly and Quinn, Diane M. (2016). "Weight-based rejection sensitivity: Scale development and implications for well-being." *Body Image* 16, 79-92.

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# Weight-based rejection sensitivity: Scale development and implications for well-being

## Abstract

We integrated theories of social stigma and rejection sensitivity to develop a new construct for understanding the effects of day-to-day experiences of interpersonal weight stigma: weight-based rejection sensitivity (W-RS), or a tendency to anxiously expect weight-based rejection. We created a new scale to measure W-RS. Studies 1 and 2 together established the scale as valid and reliable in a college student population. Study 3 examined the outcomes and predictive validity of W-RS by testing the effects of W-RS longitudinally across college students' first semester. Those who were high in W-RS were found to be at additional risk for compromised psychological and physical well-being over time. W-RS also predicted poorer adjustment to college. Overall, W-RS could help to explain individual reactions to stigma and to predict when weight stigmatization may have a greater likelihood of impacting a target.

## Keywords

fsc2016

## Disciplines

Psychology

## Comments

The final published version of this article is available through the publisher: <http://dx.doi.org/10.1016/j.bodyim.2015.11.005>.

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Running head: WEIGHT-BASED REJECTION SENSITIVITY

**IN PRESS- FINAL SUBMITTED DRAFT**

Weight-Based Rejection Sensitivity:  
Scale Development and Implications for Well-Being

Kimberly J. McClure Brenchley

St. John Fisher College

Diane M. Quinn

University of Connecticut

Author Note

Kimberly J. McClure Brenchley, St. John Fisher College, 3690 East Avenue, Rochester, NY 14618, USA; +1 585 385 8171; kmclure@sjfc.edu

Diane M. Quinn, Department of Psychology, University of Connecticut, 406 Babbidge Road, Unit 1020, Storrs, CT 06269, USA; diane.quinn@uconn.edu

### Abstract

We integrated theories of social stigma and rejection sensitivity to develop a new construct for understanding the effects of day-to-day experiences of interpersonal weight stigma: weight-based rejection sensitivity (W-RS), or a tendency to anxiously expect weight-based rejection. We created a new scale to measure W-RS. Studies 1 and 2 together established the scale as valid and reliable in a college student population. Study 3 examined the outcomes and predictive validity of W-RS by testing the effects of W-RS longitudinally across college students' first semester. Those who were high in W-RS were found to be at additional risk for compromised psychological and physical well-being over time. W-RS also predicted poorer adjustment to college. Overall, W-RS could help to explain individual reactions to stigma and to predict when weight stigmatization may have a greater likelihood of impacting a target.

*Keywords:* weight stigma, obesity, rejection sensitivity, well-being

Whenever I go to the dining hall with one of my friends and I go to get more food he asks if I really need it. He says that he is kidding but I continue to tell him that I do not think it was funny.

– *Research participant*

People who are overweight and obese are often targets of negative interpersonal treatment, including weight teasing and disapproving feedback from family and friends, romantic rejection, poorer service in restaurants, stores and health care settings, and employment discrimination (Puhl & Heuer, 2009). Research has elucidated adverse consequences of this devaluation, including an emotional, social, and physical toll on those to whom it is directed (Puhl & Heuer, 2009). In considering the experience of being stigmatized due to weight, previous research has primarily focused on whether instances of negative treatment due to one's weight have occurred (e.g., frequency counts of instances of discrimination; Myers & Rosen, 1999) or whether obese people devalue themselves (i.e., internalized feelings of low self-worth; e.g., Durso & Latner, 2008). What is missing is an understanding of how people navigate and react to the small, daily interpersonal experiences of rejection such as the occurrence highlighted in the quote above. People may be more or less sensitive to these types of daily macroaggressions, and their expectations and reactions to them may affect their psychological and physical outcomes.

In this article, we integrate a rejection sensitivity framework with theories of social stigma to elucidate the effects of day-to-day experiences of interpersonal weight stigma. Within this framework, we offer two primary contributions. First, we propose the construct of weight-based rejection sensitivity and develop a scale for its measurement (Studies 1 and 2). Second, we propose that those with increased weight-based rejection sensitivity are at additional risk for compromised psychological and physical well-being over time (Study 3).

### **The Stigma of Obesity**

Obesity is a devalued characteristic in today's society, and obese people are heavily discriminated against (Puhl & Brownell, 2001; Puhl & Heuer, 2009). Prejudice and discrimination are pervasive within multiple contexts of daily life for obese people, including employment, health care, media, and interpersonal relationships (Puhl & Heuer, 2009). Unlike stigmatized identities such as race or gender, weight is seen as controllable and originating from personal choice (Crandall, 1994; Weiner, Perry, & Magnusson, 1988). Due to perceived personal responsibility for weight, negative treatment of obese people is also often perceived as deserved (Feather, 1996; Lerner, 1980). Moreover, there is a popular notion that negative treatment will motivate obese people to change their behavior and lose weight (Hebl & Heatherton, 1998; Puhl & Heuer, 2010), going beyond notions of deservingness to be seen as benefitting the target. Thus, the stigma of obesity may be particularly pernicious because negative treatment is viewed as socially acceptable, deserved, and even beneficial.

Within this context, those who are obese are likely to experience numerous interpersonal interactions in which their weight is made salient, including from friends and family whose intentions may be to help them lose weight. Negative treatment due to weight is prevalent within interpersonal relationships, coming from romantic partners, friends, and family members, and is particularly prevalent for women (Puhl & Heuer, 2009; Sheets & Ajmere, 2005). In fact, obese people report that the most frequent source of stigmatization is from their family members, which often includes teasing and derogating comments (Puhl & Brownell, 2006; Puhl, Moss-Racusin, Schwartz, & Brownell, 2008). Given the prevalence of these stigmatizing interpersonal interactions, the interpersonal aspects of weight stigma may be a particularly important avenue for understanding its impact on those who are obese.

## **Experience of Stigma**

Those who have stigmatized identities have long been assumed to experience negative psychological outcomes (Allport, 1954; Goffman, 1963). However, more recent stigma theory and research has shown that the experience of stigma may be more variable, in that mere membership in a stigmatized group does not appear to affect people uniformly (Crocker & Major, 1989; Major, 2006). There are numerous factors that can determine who is most at risk for adverse consequences of possessing a stigmatized identity (Major, 2006). People may not only have differences in the amount of stigma they experience, but also differences in their emotional reactions and coping strategies that shape their outcomes.

Indeed, stigma theory has focused on at least three complementary but distinct mechanisms by which stigma can be experienced: experienced stigma, internalized stigma, and anticipated stigma (e.g., Earnshaw & Chaudoir, 2009; Earnshaw & Quinn, 2012; Link, 1987; Meyer, 1995). Experienced stigma is typically conceptualized as perceived acts of discrimination one has experienced. Internalized stigma is typically conceptualized as devaluing and/or stereotyping oneself as a result of possessing the stigmatized identity. Anticipated stigma is typically conceptualized as expecting rejection in interpersonal interactions and/or having concerns about experiencing stigma in the future. Although the terminology for these mechanisms varies across the literature, research has demonstrated that they are conceptually and empirically distinct processes that uniquely predict psychological and physical health (Earnshaw & Chaudoir, 2009; Earnshaw & Quinn, 2012; Link, 1987; Meyer, 1995). Together, they provide a better picture of who is most at risk when possessing a stigmatized identity.

Considering these three mechanisms in the weight stigma literature, two have been represented in research. First, experienced stigma has been represented, typically assessing the

frequency of stigmatizing situations over the lifecourse (e.g., the Stigmatizing Situations Inventory [SSI]; Myers & Rosen, 1999). Levels of weight stigma measured by frequency have been linked to depression, lower self-esteem, and body dissatisfaction (Friedman, Reichmann, Costanzo, Zelli, Ashmore, & Musante, 2005; Jackson, Grilo, & Masheb, 2000; Rosenberger, Henderson, Bell, & Grilo, 2007). Internalized stigma has also been represented through such measures as the Weight Bias Internalization Scale (WBIS; Durso & Latner, 2008) and the Weight Self-stigma Questionnaire (WSSQ; Lillis, Luoma, Levin, & Hayes, 2010). Scoring highly on internalized stigma has been correlated with poorer psychological well-being and physical quality of life (Durso & Latner, 2008; Latner, Durso, & Mond, 2013).

These measures of experienced stigma and internalized stigma have been very useful in showing potential negative outcomes of experiencing weight stigma, but the anticipated stigma mechanism is largely missing in the weight stigma literature. There is a gap in explaining people's day to day experiences with weight stigma. As noted by Goffman (1963) in his seminal book on stigma, stigma plays out between people – it is interpersonal. Moreover, recent research has highlighted the importance of concerns over weight-based rejection in predicting psychological and physical well-being (Hunger & Major, 2015). However, no published measures currently exist that have been psychometrically assessed. A scale to measure expectations and concerns over weight-based rejection could help to fill an important gap in understanding the experience in stigma.

### **Rejection Sensitivity**

Rejection is a negative experience that violates human needs of belongingness (Baumeister & Leary, 1995), but people vary in the extent to which they perceive rejection across situations. Rejection sensitivity is described as a personal tendency to anxiously expect

rejection and react strongly to it (Downey & Feldman, 1996), and develops from previous rejecting experiences (Feldman & Downey, 1994). People who are rejection sensitive are hypervigilant to cues of rejection in their environments: They readily perceive rejection in new and ambiguous situations, and experience anxiety over this rejection.

Given that devalued status characteristics are often key sources of rejection, people who possess them may be rejection sensitive within specific social situations in which the characteristic is salient, even if they are not rejection sensitive in general. Indeed, people who are socially stigmatized often expect and fear rejection (Link, 1987). Specific measures have been created to address this status-based rejection sensitivity. For example, race-based rejection sensitivity describes people who readily perceive rejection based on their race (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002). Other scales include age (Kang & Chasteen, 2009), gender (London, 2008), and appearance (Park, 2007). Status-based rejection sensitivity is thought to be activated within situations that have potential for rejection based on that status characteristic, not across all situations, and not for those who do not carry that status characteristic (Mendoza-Denton et al., 2002). Following from theory on stigma, constructs of status-based rejection sensitivity are particularly useful in ascertaining reactions to stigma because they encapsulate both a cognitive and affective component. Thus, the vigilance of expecting discrimination and the potential anxiety that accompanies that threat are both accounted for with these measures.

Status-based rejection sensitivity has been associated with numerous adverse outcomes, some of which may be specific to the particular status category. Those who are high in gender-based rejection sensitivity, for example, cope with gender-based threats by suppressing their thoughts and feelings, a reaction which can lead to feeling less belonging in an institution and

lower perceptions of competence (London et al., 2012). Similarly, high race-based rejection sensitivity has been found to lead to difficulty with college transition and even lowered educational outcomes after 2-3 years (Mendoza-Denton et al., 2002). These negative outcomes can span beyond psychological and academic outcomes, affecting physical health as well. Those high in appearance-based rejection sensitivity were found to possess greater symptoms of disordered eating (Park, 2007), and were more likely to seek cosmetic surgery (Park, Calogero, Harwin, & DiRaddo, 2009). In gay men, rejection sensitivity has been associated with accelerated HIV progression (Cole, Kemeny, & Taylor, 1997).

### **Weight-based Rejection Sensitivity**

Given the variety of outcomes associated with interpersonal rejection sensitivity and those specific to status-based rejection sensitivity, there are many predictions that can be made with a new rejection sensitivity construct that is specific to rejection based on weight. As with other forms of status-based rejection sensitivity, weight-based rejection sensitivity (W-RS) would be activated only within situations in which weight is salient, such as in stereotype-relevant situations. Evidence from recent research supports this notion: Within stereotype-relevant situations, overweight individuals are more likely to feel identity threat (Carels et al., 2013), and this threat can lead to increased blood pressure, stress, depletion of cognitive resources, and increased calorie consumption (Major, Eliezer, & Rieck, 2012; Major, Hunger, Bunyan, & Miller, 2014; Tomiyama, 2014).

Overall, the converging findings from rejection sensitivity research and stigma research suggest that there are many adverse outcomes that could occur over time for those who consistently have anxious expectations of being rejected based on their weight. First, we expect that this chronic threat of rejection based on weight predicts poorer psychological well-being

over time. Second, we expect weight-based rejection sensitivity to be associated with poorer adjustment to college. Third, we expect weight-based rejection sensitivity to be associated with poorer physical well-being over time. Not only could an anxious expectation of weight-based rejection contribute to disordered eating patterns, but it could contribute to poorer general physical health symptoms and status. Finally, because poorer psychological well-being may play a mediating role in predicting development of eating disorders and poorer overall health (e.g., Ashmore, Friedman, Reichmann, & Musante, 2008; Quinn & Chaudoir, 2009), we also expect poorer psychological well-being to mediate the relationship between weight-based rejection sensitivity and physical well-being. See Figure 1 for a conceptual model of primary hypotheses in the current study.

### **Overview of Research**

A rejection sensitivity scale that is tailored to weight may provide insight into a neglected area of research. Because rejection sensitivity develops from previous rejecting experiences (Feldman & Downey, 1994), and rejection due to weight is a common occurrence for those who are overweight (Puhl & Heuer, 2009), weight-based rejection sensitivity may be exceptionally prevalent. Weight-based rejection sensitivity (W-RS) could fill a gap in existing weight stigma measures, and could help to explain individual reactions to stigma and to predict when weight stigmatization may have a greater likelihood of impacting a target.

Three studies were conducted to develop a W-RS scale and examine its consequences over time. Study 1 involved creation of the W-RS scale and an examination of the underlying factor structure of the scale and its reliability. Studies 2a and 2b examined correlates of W-RS to determine convergent and divergent validity, respectively. Study 3 examined the long-term outcomes and indirect effects of W-RS in a longitudinal study spanning a college semester.

### **Study 1: Scale Development and Psychometrics**

The purpose of Study 1 was to develop a scale of weight-based rejection sensitivity. Consistent with other rejection sensitivity scales, we created written scenarios that had the potential for weight-based rejection. These scenarios were based on common stereotypes and experiences of rejection faced by overweight people. Previous research has shown that some of the most prevalent stereotypes of obese people are that they overeat, are inactive, and lack self-control (McClure, Heuer, & Puhl, 2011; Puhl & Heuer, 2009). Thus, several of the scenarios reflect situations in which obese people may be stereotyped in these ways. The scenarios also reflect the most frequently stigmatizing situations that obese people report experiencing, such as being laughed at by children (Myers & Rosen, 1999; Puhl & Brownell, 2006). Because of their previously established validity, some items from other status-based rejection sensitivity scales (e.g., Appearance-RS; Park, 2007) were adapted for use to reflect rejection based on weight. Overall, the scenarios also contain variability in terms of the sources of potential rejection, including from strangers, family, friends, and health care providers.

In total, 16 scenarios were created (see Table 1). Importantly, the scenarios are purposely ambiguous, such that the potential for rejection exists, but rejection is not made explicit. Participants then respond to each scenario based on whether they expect rejection to occur, and how anxious they feel about it. An example item is, “*Imagine that you are at work, and someone brings in a box of donuts for the office to share. As you are leaning to pick one up, your coworker walks by and comments on the number of calories in the donuts.*” Participants then respond to two parts of the item, one assessing anxiety over potential rejection, and the other assessing an expectation of rejection in that scenario. These are tailored to scenario; for example, on the item described above, participants responds to parts (a) *How concerned/anxious would*

*you be over whether your coworker was making this comment specifically to you, because of your weight?”* and (b) *“I would expect that my coworker would make the comment specifically to me.”* Responses range from 1 (*very unconcerned*) to 6 (*very concerned*) and 1 (*very unlikely*) to 6 (*very likely*), respectively. The W-RS scale is scored by calculating an aggregate of all expectation and anxiety items.<sup>1</sup>

## **Method**

Participants were 1686 undergraduates at a large Northeastern university. The sample was comprised of 57.3% women. The racial composition of the sample was 77.2% White, 8.6% Asian, 6.4% Black, and 5.5% other. Six percent of the sample identified as Hispanic/Latino. Mean age was 18.54 ( $SD = 1.65$ ), and mean body mass index (BMI;  $k/m^2$ ) was 22.62 ( $SD = 4.08$ ; range: 15.5 - 43.6).

Study 1 was conducted as part of a prescreening process for an introductory psychology participant pool. The W-RS scale was one of several surveys that participants took online at the beginning of the Fall semester. An exploratory factor analysis was computed in order to determine the factor structure of the W-RS. A confirmatory factor analysis was computed to conform the factor structure. Internal consistency was computed with Cronbach's alpha. Test-retest reliability was computed with a subsample of the participants from Study 1 ( $n = 220$ ) who completed the W-RS scale again at a second time point approximately 6-8 weeks later. See Study 2a for a description of this subsample.

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<sup>1</sup> Rejection sensitivity scales are typically scored in a multiplicative fashion, weighting expectations by anxiety to reflect an expectancy-value model. However, the statistical stability of cross-products based on arbitrary metrics has been called into question (Blanton & Jaccard, 2006). Aggregating the scale items is a solution that accounts for both the cognitive (expectation) and affective (anxiety) components of the scale while preventing statistical instability. We examined the W-RS scale using both methods, and discovered that the aggregation method was highly correlated with the cross-product method,  $r = .98, p < .001$ . Thus, we elected to score the W-RS using the aggregation method to yield higher statistical stability.

## Results & Discussion

The mean level of W-RS in the sample was 1.85 ( $SD = 0.79$ ; range: 1.0 - 5.9). The mean of the anxiety component of W-RS was 1.78 ( $SD = 0.79$ ), and the mean of the expectation component was 1.92 ( $SD = 0.89$ ). W-RS was not correlated with age,  $r = .04$ ,  $p = .09$ . Women scored significantly higher on W-RS than did men ( $M = 2.02$ ,  $SD = 0.85$ , and  $M = 1.62$ ,  $SD = 0.64$ , respectively),  $t(1683) = 10.48$ ,  $p < .001$ ,  $d = 0.53$ , 95% CI [.32, .47]. As expected, those who self-identified as overweight also scored significantly higher on W-RS ( $M = 2.44$ ,  $SD = 0.97$ ) than those who self-identified as normal weight ( $M = 1.70$ ,  $SD = 0.65$ ),  $t(1657) = 16.76$ ,  $p < .001$ ,  $d = 0.90$ , 95% CI [.65, .83].

The W-RS scale contains 16 items with two parts each. Each item's two parts (expectation and anxiety) were averaged together to create a single index of anxious expectations per item. Thus, 16 total items were analyzed within the factor analysis. The data were analyzed with an exploratory principal components factor analysis using Varimax rotation. Both the eigenvalues and the scree test supported a one-factor solution, which explained 55.43% of the variance. Factor loadings ranged from .62 to .84. No items were eliminated on the basis of the factor analysis. Due to the relevance of self-reported weight status on the construct of W-RS, separate factor analyses were also computed for normal weight and overweight participants. Findings were remarkably similar for each group. The loadings for the overall sample are presented in Table 1. A confirmatory factor analysis conducted with AMOS 17.0 (Arbuckle, 2008) also revealed that the one-factor solution was a good fit,  $\chi^2(94) = 1248.21$ ,  $p < .001$ , SRMR = .04, CFI = .93, RMSEA = .08, factor loadings  $> .59$  and  $p < .001$ , and that the model was gender invariant.

The scale had a high degree of internal consistency, Cronbach's  $\alpha = .94$ . No single item's

removal elicited a higher consistency. Thus, all items were retained. Again, these analyses were repeated separately for each weight status group, normal weight and overweight. Both alphas were consistent with that of the overall sample (normal weight:  $\alpha = .93$ ; overweight:  $\alpha = .95$ ), and no item's removal in either subsample would achieve a higher degree of internal consistency.

Test-retest reliability was evaluated with a subsample of participants in Study 1 ( $n = 220$ ). The amount of time between the initial test and the re-test was 6-8 weeks. The scale had a high degree of test-retest reliability,  $r = .75$ ,  $p < .01$ , which is consistent with other rejection sensitivity scales (Downey & Feldman, 1996; London, Downey, Romero-Canyas, Rattan, & Tyson, 2012; Mendoza-Denton et al., 2002).

In sum, the purpose of Study 1 was to examine the factor structure, internal consistency, and reliability of the W-RS scale. Together, the results of Study 1 indicate that the W-RS is a cohesive, reliable scale. A single-factor solution of the scale was supported by a principal components factor analysis and confirmatory factor analysis. Additionally, the W-RS scale had high internal consistency and test-retest reliability. The final scale consists of 16 items.

### **Study 2a: Construct Validity**

The purpose of Study 2a was to determine whether the newly created W-RS measure has construct validity. Specifically, the W-RS was compared with several measures to determine convergent and discriminant validity. There were two types of theoretically relevant categories that were examined for convergent validity in the current study: weight stigma and body/appearance concerns.

Weight stigma measures included two primary scales (SSI, Myers & Rosen, 1999; and WBIS, Durso & Latner, 2008) that measure history of stigmatizing experiences and self-

stigmatization, respectively. An additional scale was adapted from a popular perceived discrimination scale (Kessler, Mickelson, & Williams, 1999) to address perceived discrimination based on weight specifically. These measures were expected to correlate with the W-RS scale, but not so highly that they essentially capture the same construct.

Several different measures of body/appearance concerns were included (see section on measures below). Weight is one aspect of appearance, and attractiveness can play a role in the stigmatization of weight. However, weight and appearance are conceptually distinct. For instance, there are specific stereotypes in regards to overweight that are not merely about appearance, such as perceptions that people who are overweight are lazy and lack self-control. Moreover, weight is often the subject of health criticism (see Puhl & Heuer, 2010) in a way that appearance more broadly is not. Thus, it was expected that these body/appearance scales would correlate, but not so highly that they could be considered analogous. Notably, appearance-based rejection sensitivity was included in these measures (Park, 2007). Because both scales assess rejection sensitivity within these similar status categories, the correlation between them was expected to be high, particularly considering their shared method variance and the conceptual overlap of some of the items. However, the W-RS scale asks participants to assess their anxious expectations due to weight, whereas the appearance-based rejection sensitivity asks participants to assess their anxious expectations due to appearance. Thus, we expected these two measures to be both conceptually and empirically distinct in the constructs they capture.

Self-esteem and interpersonal rejection-sensitivity were also examined in relation to W-RS. Although W-RS was expected to be related to self-esteem on the basis of previous research (e.g., Ayduk, Downey, & Kim, 2001; Crocker, Cornwell, & Major, 1993), W-RS was expected to represent a distinct construct. Likewise, W-RS was expected to be discriminant from

interpersonal rejection-sensitivity (RSQ; Downey & Feldman, 1996). The source of rejection sensitivity for W-RS is a specific status-based characteristic, not a disposition toward rejection sensitivity in general (as measured by the RSQ). Thus, although these measures were expected to be correlated based on their shared method variance, this correlation was expected to be lower than correlations between W-RS and other weight and appearance-related measures.

### **Method**

Study 2a was a cross-sectional survey. Participants were recruited from the psychology participant pool. The study was administered online.

**Participants.** Participants were 220 students who had previously completed prescreening for the psychology participant pool. These participants were a subsample of those in Study 1 ( $n = 1592$ ) who agreed to participate in a separate study for course credit. Enrollment was monitored in order to obtain roughly equal numbers of overweight and non-overweight participants. This was done to ensure adequate variability on the W-RS and other measures, as these were expected to have increased relevancy for those who are overweight. In total, 52.7% of participants self-identified as overweight (BMI  $M = 26.90$ ,  $SD = 3.86$ ), and 46.8% identified themselves as non-overweight (BMI  $M = 21.96$ ,  $SD = 2.26$ ; total sample BMI  $M = 24.56$ ,  $SD = 4.04$ ; range: 17.97 - 41.82). There were 157 women (71.4%), and one person who did not indicate gender. The racial composition mirrored that of the participant pool, with 80.5% of the sample identifying as White, 6.8% as Black, 6.8% as Asian, and 3.2% as other. Of these participants, 7.3% identified as Hispanic/Latino. The mean age of the sample was 18.45 ( $SD = 1.06$ ).

**Measures.** In addition to the W-RS scale, interpersonal rejection sensitivity was assessed, which is a general disposition toward anxiously expecting rejection rather than rejection

specifically based on a status characteristic. Specifically, the 18-item Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996) was used and is the original scale from which the more recent status-based rejection sensitivity scales (e.g., race, appearance, weight) have been modeled. Responses ranged from 1 to 6 on each component, with higher numbers indicating higher concern and expectations. Scores were calculated in the traditional way of taking the cross-product between these components. Self-esteem was assessed with the 10-item Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965), ranging from 1 to 7, and averaged such that higher scores indicated higher self-esteem.

**Stigma.** Frequency of previous stigma experiences was assessed with 50-item Stigmatizing Situations Inventory (SSI; Myers & Rosen, 1999). Responses ranged from frequency of those situations from 0 (*never*) to 8 (*daily*), and an average frequency across all items is calculated. Internalized stigma was assessed with the 11-item Weight Bias Internalization Scale (WBIS, Durso & Latner, 2008). Responses ranged from 1 to 7 and were averaged such that higher scores reflected higher internalization. Because the scale is tailored to overweight people, it was subtly modified for the current study so that people of all sizes would be able to respond. For instance, the item, “*I don’t feel that I deserve to have a really fulfilling social life, as long as I’m overweight,*” was adapted to say, “*I don’t feel that I deserve to have a really fulfilling social life, because of my weight.*” The adapted version of the scale had high internal consistency in the current sample,  $\alpha = .93$ . Kessler, Mickelson, and Williams’s (1999) Perceived Discrimination Scale was also used, but modified to ask how much discrimination participants receive on a day-to-day basis due to weight specifically. Some items were added to address concerns related to weight stigma, such as, “*People act as if they think you are not attractive.*” ( $\alpha = .95$ ). Scores were calculated by averaging weight discrimination on a daily basis

from 0 to 6.

***Appearance and body concerns.*** Appearance-based rejection sensitivity was assessed with a 15-item rejection sensitivity scale that includes items about general appearance (A-RS, Park, 2007). Scores were calculated in the same manner as interpersonal rejection sensitivity, with cross-products based on responses to two components ranging from 1 to 6. Appearance-based self-worth was assessed using the 5-item Appearance subscale of the Contingencies of Self Worth scale, (CSW-Appearance; Crocker, Luhtanen, Cooper, & Bouvrette, 2003). Responses were scored by taking the average of responses that ranged from 1 to 7, with higher scores reflecting higher appearance-based self-worth. Body dissatisfaction was measured with the Body Dissatisfaction subscale of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983). Higher averaged scores ranging from 1 to 6 indicate higher dissatisfaction. The Surveillance subscale from the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996) was also included, as was the Body Shame subscale. Both subscales had responses ranging from 1 to 7, which were averaged with higher scores indicating higher surveillance and body shame, respectively.

## **Results & Discussion**

The mean W-RS in the current sample was 2.06 ( $SD = 0.98$ ; range: 1.0 - 5.0;  $M_{W-RS_{anxiety}} = 2.06$ ;  $M_{W-RS_{expectation}} = 2.06$ ). Among those who self-identified as overweight, the mean was 2.50 ( $SD = 1.02$ ). In addition to correlations between W-RS and measures of weight stigma and appearance/body concerns, separate partial correlations were also conducted controlling for interpersonal rejection sensitivity and self-esteem. The correlation between weight-based rejection sensitivity and interpersonal rejection sensitivity was significant ( $r = .59, p < .01$ ), as was the correlation between weight-based rejection sensitivity and self-esteem ( $r = -.45, p < .01$ ).

Correlation matrices for subgroups of gender and perceived weight status were also examined; the magnitude of the correlations was very similar for each group. All correlations and partial correlations between W-RS and other measures can be found in Table 2.

The W-RS scale was positively correlated with all weight stigma measures: perceived discrimination, internalized stigma, and past experiences with stigma<sup>2</sup>. These correlations ranged from .44 to .75 (all  $ps < .01$ ). Correlations between W-RS and weight stigma measures maintained a similar magnitude when controlling for interpersonal rejection sensitivity (.32 to .65, all  $ps < .01$ ) and self-esteem (.35 to .68, all  $ps < .001$ ).

The W-RS scale was also positively correlated with all measures of appearance and body concerns: appearance-based rejection sensitivity, appearance-based self-worth, body dissatisfaction, body surveillance, and body shame. These correlations ranged from .32 to .63 (all  $ps < .01$ ). Correlations between W-RS and appearance/body concerns maintained a similar magnitude when controlling for interpersonal rejection sensitivity (.20 to .51, all  $ps < .01$ ) and self-esteem (.20 to .53, all  $ps < .001$ ).

Recall that theoretically, we expected W-RS to be distinct from appearance-based rejection sensitivity (A-RS). The correlation between W-RS and A-RS was .62, suggesting that the W-RS is not merely a duplicate of A-RS. Notably, the reduced correlation between W-RS

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<sup>2</sup> In light of the high correlation between W-RS and the WBIS ( $r = .75$ ), we explored the interrelationships between these weight stigma variables further. In a separate cross-sectional sample not reported here ( $N = 60$ ), but with similar sample characteristics as in Studies 2a and 3, the correlation between W-RS and WBIS was .57 ( $p < .01$ ). In order to explore the predictive validity of W-RS on psychological well-being and health behaviors in comparison to the other weight stigma mechanisms, we also conducted regression analyses in which W-RS, WBIS, and SSI were entered as predictors of weight control behaviors (Neumark-Sztainer et al., 2002) and of self-esteem (RSE; Rosenberg, 1965). We also controlled for RSQ by entering it in Step 1 of the regression, and the weight stigma variables in Step 2. In the self-esteem model, RSQ and W-RS were the only significant predictors of self-esteem ( $\beta = -.45, p < .01$  and  $\beta = -.34, p < .01$ , respectively). SSI did not predict self-esteem. In the weight control models, W-RS emerged as the only significant predictor of healthy ( $\beta = .45, p < .01$ ) and unhealthy weight control behaviors ( $\beta = .39, p < .01$ ). Thus, the empirical distinction and unique predictive validity of W-RS was supported in this separate sample.

and appearance-based rejection sensitivity when controlling for interpersonal rejection sensitivity ( $r = .41$ ) may reflect the shared method variance and theoretical underpinnings of these three rejection sensitivity measures. In order to tease apart these measures more rigorously, we conducted a principal components factor analysis with Varimax rotation on all of the items from the W-RS and A-RS scales. Results revealed that all of the A-RS items loaded on one factor (loadings from .54 to .87) and all of the W-RS items loaded on a second factor (loadings from .48 to .81). Thus, in addition to being conceptually distinct, these measures appear to be empirically distinct.

Overall, the magnitude of each of the correlations was within an acceptable range for establishing construct validity. No measure overlapped with W-RS so highly that it would be considered a duplicate scale, yet all measures were related to W-RS enough so that it can be considered a theoretically similar construct. We will return in Study 3 to examine whether W-RS is a stronger predictor of long term outcomes than other appearance-based measures. The high correlation between W-RS and interpersonal rejection sensitivity was unexpected. Although a moderate correlation was expected between these scales due to shared method variance, the magnitude of the correlation suggests that the two constructs overlap on more than just their shared methodology. It is possible that respondents view multiple forms of rejection from the lens of their weight given the pervasiveness of weight discrimination across multiple contexts (e.g., Puhl & Heuer, 2009). Related, the high correlation may be partially due to the methodology of the current study. Because participants were answering many questionnaires about their weight and appearance, weight may have been salient for participants while they were answering more general questions about rejection.

### **Study 2b: Discriminant Validity**

In Study 2a, the correlation between weight-based rejection sensitivity and interpersonal rejection-sensitivity was unexpectedly high. Thus, the purpose of Study 2b was to further establish discriminant validity of the W-RS using additional measures.

The constructs examined in Study 2b were personality and social desirability. The Big-5 model of personality posits that there are five overarching components of personality: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience. It was expected that the W-RS would not be correlated with Extraversion, Agreeableness, Conscientiousness, or Openness to experience. However, a modest correlation was expected between W-RS and Emotional Stability, as W-RS is theorized to be related to psychological functioning, which is a component of Emotional Stability.

The W-RS scale was also examined in relation to social desirability. Social desirability scales capture the extent to which participants are engaging in deception in their questionnaire responses by responding in socially desirable ways. Social desirability was expected to be unrelated to W-RS.

### **Method**

Study 2b was conducted as part of a prescreening process for the introductory psychology participant pool. W-RS, social desirability, and personality measures were three of many surveys that participants took online at the beginning of the semester.

**Participants.** Participants were 612 introductory psychology students who received course credit for their participation. The sample was 54.3% women, with 72.7% identifying as White, 13.0% Asian, 6.9% Black, 1.0% Middle-Eastern, 0.2% Native American, and 6.4% other. Separately, 6.7% of the sample identified as Hispanic/Latino. The average age of the sample was

19.04 ( $SD = 1.52$ ) and the average BMI was 23.46 ( $SD = 4.03$ ; range: 15.3 - 53.1).

**Measures.** In addition to the W-RS scale, measures of social desirability and personality were included. Social desirability was assessed with the 10-item Impression Management subscale of Paulhus's (1984) social desirability scale ( $\alpha = .74$ ), which ranged from 1 to 9. Personality was assessed with the Ten Item Personality Measure (TIPI; Gosling, Rentfrow, & Swann, 2003), which represents each of the five personality traits: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience. These scores ranged from 1 to 7.

### **Results & Discussion**

The mean W-RS was 1.75 ( $SD = 0.69$ ; range: 1.0 - 5.1). The mean for the anxiety component of W-RS was 1.66 ( $SD = 0.77$ ) and the mean for the expectation component was 1.84 ( $SD = 0.69$ ). The data for Study 2b were analyzed using correlations. As predicted, the W-RS scale was not significantly correlated with social desirability ( $r = .07, p = .09$ ), nor with agreeableness ( $r = -.08, p = .07$ ). Also consistent with predictions, W-RS was negatively related to emotional stability ( $r = -.32, p < .01$ ). W-RS was significantly correlated with extraversion ( $r = -.15, p < .01$ ), conscientiousness ( $r = -.10, p = .03$ ), and openness to experience ( $r = -.14, p < .01$ ) but the correlations were quite low. Taken together, results show that the W-RS scale has discriminant validity.

### **Study 3: Long-term Consequences**

Studies 1 and 2 demonstrated that the 16-item W-RS scale is an empirically valid, reliable measure. The purpose of Study 3 was to examine the predictive utility of the W-RS scale. Study 3 was a longitudinal study, conducted toward the start and end of the Fall semester for two separate cohorts of first year college students spanning two consecutive years. This time

frame was chosen because the first semester of college is a notable transition period within the lifespan, and so the most change might be seen during this time.

Based on a synthesis of the literature on stigma, rejection sensitivity, and body concerns, we had four primary hypotheses regarding the outcomes that could occur over time for those who anxiously expect to be rejected based on their weight (see Figure 1).

### **Hypothesis 1: Poorer Psychological Well-being**

Our first hypothesis was that W-RS would be associated with poorer psychological well-being over time. Specifically, the anxiety and negative emotions that occur when one regularly expects status-based rejection could predict higher psychological distress, including depression (e.g., Ayduk et al., 2001; Marston, Hare, & Allen, 2010), lower self-esteem (e.g., Ayduk et al., 2001; Downey & Feldman, 1996), higher anxiety (e.g., Marston et al., 2010), higher stress (e.g., Major, Eliezer, & Rieck, 2012; Tomiyama et al., 2014), and higher social anxiety (e.g., London, Downey, Bonica, & Paltin, 2007; Park & Pinkus, 2009) over time.

### **Hypothesis 2: Poorer Adjustment to College**

Our second hypothesis was that those high in W-RS would not adjust to college as successfully as those low in W-RS. Over time, the chronic threat of rejection could lead to lower performance on tasks, lower grades in school, poorer work performance, and so forth (see Inzlicht & Good, 2006). Thus, those high in W-RS may be more likely to have difficulty adjusting to their academics when entering college. Moreover, it has been posited that institutions that espouse the values of a high-status group can lead those who are high in status-based rejection sensitivity to feel less belonging to that institution (Mendoza-Denton et al., 2002). Given that weight discrimination within educational institutions has been previously documented (e.g., Burmeister, Kiefner, Carels, & Musher-Eizenman, 2013; Canning & Mayer,

1966), it may likewise be more difficult for those high in W-RS to adjust to educational institutions.

### **Hypothesis 3: Poorer Physical Well-being**

Our third hypothesis was that W-RS would be associated with poorer physical well-being over time. We expected this to occur in context of disordered eating patterns and of general health status.

**Disordered eating patterns.** Weight stigma and appearance/body concerns have frequently been associated with disordered eating patterns (Grabe & Hyde, 2006; Puhl & Suh, 2015); likewise, we expected W-RS to influence the cognitive and behavioral components of disordered eating patterns as well: drive for thinness, restrained eating, general eating disorder symptoms, and bulimia symptoms. Notably, bulimia symptoms in particular are thought to be triggered by negative affect and negative feelings regarding weight (Alpers & Tuschen-Caffier, 2001; American Psychiatric Association, 2013; Hawkins & Clement, 1984; Puhl, Moss-Racusin, & Schwartz, 2007). Because a component of W-RS specifically targets negative affect regarding weight, we expected the strongest association amongst these disordered eating pattern measures to be between W-RS and bulimia symptoms.

**General health.** We predicted that W-RS would be associated with poorer general health, including lower health-related quality of life and physical illness symptoms. Previous studies that have examined those with either stigmatized identities or rejection sensitivity have similarly documented poorer health across a range of indices (e.g., Cole et al., 1997; Hunger & Major, 2015; Pascoe & Smart Richman, 2009; Quinn & Chaudoir, 2009; Sutin, Stephan, Luchetti, & Terracciano, 2014).

**Hypothesis 4: Mediation**

Our fourth hypothesis was that the relationship between weight-based rejection sensitivity and poorer physical well-being would be partially mediated by poorer psychological well-being. Many have posited that psychological distress is a mediator between experiencing stigma and poorer physical health, and have called for more research in this area (e.g., Pascoe & Smart Richman, 2009; Puhl & Latner, 2007; Williams & Mohammed, 2009). Recent research has begun to provide empirical evidence for this relationship. For instance, psychological distress has been found to mediate the relationship between experiences of weight stigma and such outcomes as binge eating (Ashmore et al., 2008), decreased self-rated health, increased BMI, and increased blood pressure (Rosenthal et al., 2015). In their studies of those with concealable stigmatized identities, Quinn and Chaudoir (2009) found that psychological distress partially mediated the relationship between anticipated stigma and illness symptoms, but anticipated stigma also directly predicted illness symptoms. Taken together, we expected psychological distress to mediate the relationship between W-RS and physical health.

**Predictive Utility**

In addition to testing our primary hypotheses, we also tested body dissatisfaction and appearance-based self-worth alongside W-RS in the tests of direct effects in order to ascertain their relative predictive validity. These measures were chosen because they have similar theoretical underpinnings in common with W-RS, and they represent popular constructs that have established value in predicting outcomes that W-RS was also expected to predict. Body dissatisfaction has been used extensively in both psychological and health research (Grabe & Hyde, 2006), and has been shown to predict poorer psychological functioning, especially depression (Johnson & Wardle, 2005; Rierdan, Koff, & Stubbs, 1989; Stice & Bearman, 2001).

It has also been assigned a causal role in the development of eating disorders (Grabe & Hyde, 2006; Stice & Shaw, 2002; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999).

Self-worth based on appearance (Appearance-CSW; Crocker et al., 2003) may be especially important in considering the anticipated weight-based rejection that those high W-RS would expect, because those who are high in Appearance-CSW require validation from others in order to boost their self-esteem (Crocker et al., 2003; Crocker & Knight, 2005). Moreover, Appearance-CSW has numerous costs in terms of learning, autonomy, self-regulation, psychological well-being, and physical health (Crocker & Knight, 2005; Crocker & Park, 2004). External contingencies of self-worth, such as appearance, have been shown to predict depressive symptoms (Crocker, 2002; Sargent, Crocker, & Luhtanen, 2006), psychological and physical well-being (Sanchez & Crocker, 2005), and appearance self-worth in particular has been related to disordered eating symptoms (Crocker, 2002). Overall, the inclusion of appearance-based self-worth and body dissatisfaction add theoretical value to the test of W-RS because their inclusion allows for comparisons of their respective utility.

### **Summary**

In sum, weight-based rejection sensitivity was hypothesized to predict psychological distress, poorer college adjustment, and poorer physical well-being over students' first semester in college. Moreover, psychological distress was hypothesized to play a mediating role in the relationship between weight-based rejection sensitivity and poorer physical health. Finally, similar model tests were conducted with body dissatisfaction and appearance-based self-worth as predictors in order to explore their relative predictive utility for the aforementioned hypothesized outcomes.

## Method

**Participants.** Data were collected for two cohorts in two consecutive years. Only first-semester college students were eligible. Enrollment was monitored and adjusted to obtain roughly equal numbers of overweight and non-overweight participants. In total, 292 undergraduates participated in at least one timepoint of data collection. Only those who completed the survey at both timepoints ( $n = 265$ ) were retained for analysis. Those completed the survey at one timepoint ( $n = 27$ ) did not differ meaningfully on any variable from those who completed the survey at both timepoints (all  $ps > .10$ ). Of the 265 participants retained for analysis, the mean age of the sample was 18.12 ( $SD = 0.96$ ) at Time 1. There were 210 women and 55 men who participated in the study. Mean BMI at Time 1 was 24.36 ( $SD = 4.71$ ; range: 16.9 - 44.5) and mean BMI at Time 2 was 24.38 ( $SD = 4.71$ ; range: 16.2 - 41.6). In the sample, 79.6% identified as White, 7.5% as African American, 12.5% as Asian or Pacific Islander, 2.3% as American Indian, and 1.5% as other. Of these, 7.5% also identified as Hispanic/Latino.

**Procedure.** The study was conducted online. Participants took a survey toward the beginning and end of the Fall semester (approximately 10 weeks apart). The survey contained the same questionnaires at both Times 1 and 2 with the exception of four measures that were included at a single timepoint for theoretical reasons. Body dissatisfaction and appearance-based self-worth were administered only at Time 1, and adjustment to college and physical illness symptoms were included only at Time 2. All study protocols were approved by the university's Institutional Review Board.

**Measures.** In addition to the W-RS scale, measures were included to assess psychological distress, adjustment to college, and physical well-being. In some instances, assessment of these constructs involved specifying and evaluating latent measurement models. In

these two-factor models, the Time 1 variables were specified as indicators on the first factor, and the Time 2 variables were specified as indicators on the second factor. Descriptions and model fit statistics for these models are presented below.

Body dissatisfaction and appearance-based self-worth were also included to examine their relative predictive validity. Measures of social support and physical activity were included in the survey, but are not presented here.<sup>3</sup> Finally, demographic information was collected.

***Body dissatisfaction.*** The Contour Drawing Scale (Thompson & Gray, 1995) was used to assess body dissatisfaction. The Contour Drawing Scale is a popular measure that displays drawings of nine adult body sizes to participants, numbered in order from 1 (thinnest) to 9 (heaviest). Males were shown figures of adult males, and females were shown figures of adult females. With the Contour Drawing Scale, participants first indicate which drawing best represents their current body size, and then indicate which drawing represents their ideal body size. The discrepancy between these sizes represents body dissatisfaction, and is calculated by taking the absolute value of the difference between the two reported sizes.

***Appearance-CSW.*** Appearance concerns were assessed using the Appearance subscale of the Contingencies of Self Worth scale (Appearance-CSW; Crocker et al., 2003;  $\alpha = .66$ ), described in Study 2a.

***Psychological distress.*** Measures within this category included self-esteem, depression, trait anxiety, social interaction anxiety, and stress. Self-esteem was assessed with the Rosenberg Self-Esteem Scale (RSE;  $\alpha = .77 - .88$ ; Rosenberg, 1965), described in Study 2a. Depression was assessed with the 20-item Center for Epidemiologic Studies Depression Scale (CES-D,  $\alpha = .84 - .91$ ; Radloff, 1977). Participants are asked to rate how frequently they felt or behaved like each

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<sup>3</sup> These constructs were excluded from the current study because they did not represent key tests of hypotheses; more information about these variables are available from the authors upon request.

item during the past week, ranging from 0 to 3 and summed. Trait-level anxiety was assessed with the State-Trait Anxiety Inventory (STAI-T, Spielberger, Vagg, Barker, Donham, & Westberry, 1980). The STAI-T has 20 items. Responses were averaged and ranged from 1 to 4 with higher numbers indicating higher anxiety. Perceived stress over the past month was assessed with the 10-item Perceived Stress Scale (PSS,  $\alpha = .84 - .86$ ; Cohen, Kamarck, & Mermelstein, 1983). Frequency of perceived stress is rated on a scale of 0 to 4, and responses are averaged such that higher scores indicate higher stress. Finally, social interaction anxiety was assessed using the Social Interaction Anxiety Scale (SIAS;  $\alpha = .94$ , Mattick & Clarke, 1998). These items are averaged on a scale of 1 to 5. A latent variable representing psychological distress was created using these five measures. After testing and respecifying the measurement model, the final specified latent variable was good fit to the data,  $CFI = .99$ ,  $\chi^2(18) = 35.64$ ,  $p = .008$ ,  $RMSEA = .06$  (90% CI = .03-.09),  $p_{close} = .25$ , factor loadings  $> .59$  and  $p < .001$ .

***Adjustment to college.*** Adjustment to college was assessed with the Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1989). The scale has 67 items and has the option of being broken down into four subscales: Academic Adjustment, Personal-Emotional Adjustment, Social Adjustment, and Institutional Attachment (full scale  $\alpha = .92 - .95$  in previous research). The full questionnaire was examined in the current study. Scores range from 67 to 603, with higher scores indicating better adaptation to college.

***Physical well-being.*** Physical well-being was conceptualized through two separate but important indices of health: disordered eating patterns and general health.

***Disordered eating patterns.*** Included in this category was restrained eating, drive for thinness, disordered eating patterns, and bulimia patterns. Restrained eating was measured with the Restraint Scale (Polivy, Herman, Younger, & Erskine, 1979). Responses range from either 0-

3 or 0-4 based on the specific item, and are summed to create a composite of restrained eating.

Drive for thinness represents a preoccupation and excessive concern with weight and was measured with the Drive for Thinness subscale of the Eating Disorder Inventory (EDI,  $\alpha = .80 - .91$ , Garner, Olmstead, & Polivy, 1983). Responses range from 0 to 5 and are averaged. General disordered eating patterns were measured with the EAT-26 (Garner, Olmsted, Bohr, & Garfinkel, 1982). The EAT-26 is used to obtain an assessment of potential for disordered eating rather than for diagnosis. Responses to the 26 items range from 0 to 3 and are summed. Bulimia patterns were measured with the Bulimia subscale of the Eating Disorder Inventory (EDI,  $\alpha = .83 - .90$ , Garner et al., 1983; current sample: Time 1  $\alpha = .88$ , Time 2  $\alpha = .89$ ). Responses on a scale of 0 to 5 are averaged such that higher scores reflect higher bulimia symptoms.

Drive for thinness, restrained eating, and eating disorder symptoms were examined together within a single latent variable representing general disordered eating patterns. We separated bulimia from the latent variable and allowed it to correlate instead. This allowed us to test our hypothesis that W-RS would predict bulimia symptoms more strongly than other disordered eating symptoms. The final specification of the latent variable elicited a good fit to the data,  $CFI = .99$ ,  $\chi^2(13) = 31.07$ ,  $p = .003$ ,  $RMSEA = .07$  (90% CI = .04-.11),  $p_{close} = .12$ , factor loadings  $> .74$  and  $p < .001$ .

**General health.** This category included self-report measures of health-related quality of life and physical illness symptoms. Health-related quality of life was assessed with the core version of the Healthy Days scale (Centers for Disease Control and Prevention, 2000), often used to study health disparities. Items include perceived overall health status (ranging from 1 to 5), number of poor mental health days per month, number of poor physical health days per month, and number of days in which daily life was impeded by poor health per month. The items

were combined into a single latent variable with higher scores indicating higher health-related quality of life. We report the means in their original metric in Table 3, but conducted analyses with scores reversed so that higher values would reflect higher health-related quality of life.

Physical illness symptoms were measured using the Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker, 1982). There were 54 symptoms with responses from 1 (*Have never or almost never experienced the symptom*) to 5 (*More than once every week*), which are subsequently summed. Because the PILL was included at Time 2 only, it was examined as a separate observed variable within this category and allowed to correlate with Time 2 health-related quality of life. The final model of general health was a good fit,  $CFI = .97$ ,  $\chi^2(21) = 38.39$ ,  $p = .012$ ,  $RMSEA = .06$  (90% CI = .03-.08),  $p_{close} = .33$ , factor loadings  $> .37$  and  $p < .001$ .

## Results & Discussion

**Descriptives.** Means and standard deviations for all variables at each time point can be found in Table 3. Intercorrelations between variables are available in the supplemental material. Test-retest reliability of W-RS was computed in order to further establish scale reliability, and was high in the current sample,  $r = .82$ ,  $p < .001$ .

**Analysis strategy.** The data for Study 3 were analyzed using structural equation modeling in AMOS 17.0 (Arbuckle, 2008). Due to missing data across several variables, maximum likelihood estimation was used. Model fit was assessed with Comparative Fit Index (CFI),  $\chi^2$ , Root Mean Square Error of Approximation (RMSEA) and a test of close fit (PCLOSE). All variables in the model were standardized prior to inclusion in order to maximize interpretability. Testing a full hybrid model including all interrelationships between variables was not achievable in the current study given its number of variables, sample size, and specific

aims (e.g., Kenny & McCoach, 2003); thus, we created separate models for each outcome, using a theoretically-driven approach to select key relationships to test. All references to W-RS are specific to its Time 1 properties unless otherwise specified.

***Models of key hypotheses.*** Conceptually, each model tested the central hypothesis that W-RS predicts constructs at Time 2 when controlling for those same constructs at Time 1. Separately, in order to rule out the alternative hypothesis that the variables specified as outcomes actually predict W-RS rather than the hypothesized reverse, alternate causality models were tested. In all models, the alternative hypothesis was rejected, and our hypothesized directionality was maintained<sup>4</sup>. Thus, we retained the models testing our key hypotheses.

**Model results.** Figure 2 shows the results of the tests of direct effects for our key hypotheses.

***Psychological distress.*** W-RS and psychological distress at Time 1 were correlated,  $r = .61$ . As expected, W-RS predicted Time 2 psychological distress when controlling for Time 1 psychological distress,  $\beta = .12$ ,  $p = .028$ . Specifically, students who scored higher in W-RS at the beginning of the semester had higher psychological distress at the end of the semester.

***Adjustment to college.*** In the hypothesized model, the path between W-RS and adjustment to college was significant,  $\beta = -.40$ ,  $p < .001$ . Those higher in W-RS at the beginning of the semester had poorer adjustment to college at the end of their first semester at college.

***Physical well-being.***

***Disordered eating patterns.*** Disordered eating at Time 1 was correlated with bulimia symptoms at Time 1,  $r = .65$ , and with W-RS at Time 1,  $r = .55$ . Contrary to the hypothesis, W-RS did not predict Time 2 disordered eating when controlling for Time 1 disordered eating,  $\beta = -$

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<sup>4</sup> Results available from the authors by request.

.03,  $p = .487$ . However, in support of the hypothesis, W-RS predicted Time 2 bulimia symptoms controlling for Time 1 bulimia symptoms,  $\beta = .11$ ,  $p = .032$ . Those who anxiously expected weight-based rejection at the beginning of the semester presented more bulimia symptoms at the end of the semester.

*General health.* Controlling for health-related quality of life at Time 1, higher W-RS predicted lower Time 2 health-related quality of life,  $\beta = -.15$ ,  $p = .040$ . Because the PILL was included at Time 2 only, we controlled for health-related quality of life at Time 1 when running the analysis. Controlling for health-related quality of life, W-RS predicted physical illness symptoms,  $\beta = .21$ ,  $p < .001$ . Those who were higher in W-RS reported having experienced more physical illness symptoms over the course of the semester.

**Predictive validity.** In separate tests that explored the predictive validity of W-RS, we added two additional predictors in each model: body dissatisfaction and appearance-based self-worth. When they were added to each model, W-RS consistently emerged as the strongest predictor across every measure of psychological distress, adjustment to college, and physical well-being (see Table 4). Moreover, in contrast to W-RS, body dissatisfaction and appearance-based self-worth never significantly predicted any outcomes when all three predictors were included in the models.

**Mediation.** It was hypothesized that psychological distress would mediate the relationship between W-RS and physical well-being. This hypothesis was tested by integrating the psychological distress model with the disordered eating model and with the general health model. In integrating the models, paths were added between Time 2 psychological distress and each of the Time 2 measures of physical well-being. We tested the hypothesis that psychological distress would mediate the relationship between W-RS and physical well-being. This involved

testing psychological distress as a mediator in the disordered eating and general health models. Sobel estimates of indirect effects were calculated with an online Sobel Test Calculator (Preacher & Leonardelli, 2012) to accommodate missing data.

***Disordered eating patterns.*** In the model testing psychological distress as a mediator between W-RS and disordered eating patterns, the path between psychological distress and bulimia symptoms was significant,  $\beta = .28, p < .001$ , such that higher psychological distress was associated with more bulimia symptoms. With the inclusion of psychological distress as a mediator between W-RS and bulimia, the direct effect between W-RS and bulimia was non-significant,  $\beta < .01, p = .936$ . The Sobel test indicated that indirect effect between W-RS and bulimia through psychological functioning was significant  $z = -2.08, p = .038$ . Thus, psychological distress was found to mediate the relationship between W-RS and bulimia symptoms.

***General health.*** In the model testing psychological distress as a mediator between W-RS and general health, the path between psychological distress and quality of life was significant,  $\beta = -.53, p < .001$ , such that higher psychological distress predicted lower health-related quality of life. The direct effect between W-RS and quality of life was no longer significant,  $\beta = .004, p = .96$ . The indirect effect between W-RS and quality of life through psychological distress was significant,  $z = -2.01, p = .04$ . Thus, psychological distress mediated the relationship between W-RS and health-related quality of life.

The path between psychological distress and the PILL was significant,  $\beta = .28, p < .001$ , such that higher psychological distress was associated with more physical illness symptoms at the end of the semester. In this case, with the inclusion of psychological distress as a mediator, the direct effect between W-RS and the PILL remained significant,  $\beta = .13, p = .04$ . There was a

significant indirect effect between W-RS and the PILL through psychological distress,  $z = 2.15$ ,  $p = .04$ . Thus, psychological distress partially mediated the relationship between W-RS and physical illness symptoms.

**Summary.** In the current study, those who were more likely to anxiously expect weight-based rejection at the beginning of the semester had higher psychological distress and poorer adjustment to college. W-RS also predicted poorer physical well-being in a number of ways, though the influence of W-RS was more complex in the context of disordered eating patterns. Anxiously expecting weight-based rejection at the beginning of the semester predicted increased bulimia symptoms, but not general disordered eating. Despite the nonsignificant relationship between W-RS and disordered eating, these results support our hypothesis that W-RS would more strongly predict bulimia symptoms because of their shared affective underpinnings. In a test of the indirect effect, the relationship between W-RS and bulimia symptoms was indeed found to be mediated by psychological distress. In the context of general health, those who anxiously expected weight-based rejection at the beginning of the semester experienced lower health-related quality of life and increased physical illness symptoms at the end of their first semester at college. Psychological distress played a role in mediating the relationship between W-RS and these outcomes as well. Taken together, W-RS adversely impacts many psychological and physical health outcomes, and can be considered an important factor in specifying who is most at risk for the negative consequences of living with the stigmatized identity of overweight.

### **General Discussion**

The goals of this research were two-fold. The first goal was to develop a new measure of weight-based rejection sensitivity and test its psychometric properties (Studies 1 & 2) in order to fill important gaps in the weight stigma literature. The second goal was to examine the long-term

outcomes and predictive validity of weight-based rejection sensitivity in a longitudinal study (Study 3). A new measure of weight-based rejection sensitivity was created and evaluated to assess anxious expectations of weight-based rejection. This measure was psychometrically evaluated in three cross-sectional studies. The final W-RS scale contained 16 items. Study 1 established the W-RS as a reliable, single-factor measure. Studies 2a and 2b established the construct validity of the W-RS scale. Specifically, Study 2a established convergent validity with theoretically related measures, and Study 2b established discriminant validity from theoretically unrelated measures. Taken together, Studies 1 and 2 demonstrated that W-RS scale is a valid, reliable measure of weight-based rejection sensitivity.

Study 3 tested the effects of W-RS longitudinally across college students' first semester. In a series of tests, W-RS at the beginning of the semester predicted higher psychological distress, poorer college adjustment, increased bulimia symptoms, and decreased physical health at the end of the semester. W-RS did not predict general disordered eating patterns over time. In order to examine potential mediation, analyses were conducted that tested psychological distress as a mediator. W-RS had indirect effects on bulimia symptoms, health-related quality of life, and physical health symptoms through psychological distress. Thus, psychological distress was shown to be an important mechanism through which W-RS leads to negative outcomes.

The results of Study 3 not only show the effects of W-RS over time, but also show its predictive value in relation to other current measures. Two additional predictors, body dissatisfaction and appearance self-worth, were also included in each model. For each outcome, W-RS was the strongest predictor. Moreover, body dissatisfaction and appearance self-worth never emerged as significant predictors. This is notable because they were included based on their established ability to predict outcomes that we hypothesized W-RS would predict. Thus, the

predictive validity of W-RS in comparison to these measures supports the notion that W-RS plays a unique and important role in psychological and physical well-being. Also of note is that levels of W-RS in each sample were relatively low overall. However, our research findings suggest that even these small levels of W-RS can have a profound impact on psychological and physical well-being, and predict these outcomes over and above other key measures.

The current work makes several contributions to literature on weight stigma. W-RS represents a personal characteristic that theoretically develops from previous experiences of weight-based stigmatization. It is the first measure of its kind to capture the day-to-day, dynamic interpersonal experience of living with the stigmatized identity of overweight. In doing so, W-RS addresses the stigma mechanism of anxiously anticipating rejection, a mechanism which has previously been ascribed theoretical and empirical significance (e.g., Earnshaw & Chaudoir, 2009; Earnshaw & Quinn, 2012; Hunger & Major, 2015; Link, 1987; Meyer, 1995) and which has been missing in the weight stigma literature. Moreover, W-RS may be a stigma mechanism that can help to explain who is more prone to the negative consequences of weight stigma, which is important because not all people living with a stigmatized identity experience harmful effects from that identity (see Major, 2006). Notably, W-RS is also able to capture the experience of stigma for those who are not necessarily overweight considering clinical standards, but who may consider themselves overweight in comparison to a thin ideal.

Experiences with rejection and stigma have often been associated with increased psychological distress, and W-RS is no exception. However, W-RS also predicted poorer adjustment to college at the end of college students' first semester in the current study. This finding lends more support for the notion that rejection sensitivity can negatively influence the college experience, given the precedent of similar findings in such rejection sensitivity domains

as race (Mendoza-Denton et al., 2002) and gender (London et al., 2012). To the extent that high rejection sensitivity based on any status characteristic can negatively influence adjustment to college, that status characteristic can further disadvantage marginalized groups in their attainment of higher education. Thus, those high in W-RS could have heightened risk for systematic disadvantage, beyond that which has previously been shown to occur for those who are overweight (Puhl & Heuer, 2009).

The finding that W-RS can increase risk for bulimia symptoms adds to a growing literature on the relationship between stigma and disordered eating patterns (see Puhl & Suh, 2015). The notion that weight stigma can lead to negative health outcomes generally is a particularly important contribution to the literature. Although recent studies have begun to show physical consequences of experiencing weight stigma, studies linking weight stigma with negative health outcomes are relatively rare, particularly longitudinal studies (see Puhl, Brownell, & DePierre, 2014; Puhl & Heuer, 2009). Moreover, our results challenge the notion that stigmatizing overweight people will lead them to adopt healthy behaviors in order to reduce their weight. The current work provides evidence that the experience of weight stigma can lead to negative health behaviors and consequences rather than positive ones. The broad implication of these findings is that over time, W-RS may contribute to health disparities (Hatzenbuehler, Phelan, & Link, 2013).

### **Limitations and Future Directions**

One of the major contributions of this research is that it assesses anticipated status-based rejection, an important stigma mechanism that had previously been missing in the weight stigma literature. As such, future research can explore the interrelationships and predictions of these stigma mechanisms more fully in the context of weight. For instance, it is possible that

internalized weight stigma predicts weight-based rejection sensitivity (e.g., Earnshaw & Quinn, 2012). However, it is also possible that those who anxiously expect weight-based rejection come to internalize stigma (e.g., Quinn, Williams, & Weisz, 2015). Future research can more clearly distinguish these pathways. Additionally, part of the theoretical basis of interpersonal rejection sensitivity is that it originates from previous rejecting experiences (Feldman & Downey, 1994). Thus, future research can also explore whether W-RS originates from increased weight-based stigmatizing experiences.

Apart from exploring stigma mechanisms, there are many exciting avenues for future research with W-RS. It is possible, for example, that W-RS could be particularly activated through weight-related social control, others' attempts to influence weight control behaviors. Weight-related social control has been associated with negative health and well-being outcomes (Brunson, Øverup, Nguyen, Novak, & Smith, 2014), and serves as a prime example of the type of interpersonal processes W-RS was designed to capture. These comments and attempts made by others may activate W-RS and together undermine psychological and physical well-being.

Despite the evidence we present of W-RS's adverse consequences within a college population, the generalizability of the results is limited in several ways. First, in light of the importance of weight in college populations and for consistency with other rejection sensitivity scales, we chose to focus on college students as our first step in developing the construct. However, it is unclear how W-RS may be experienced outside of a college population. Perhaps some weight-related concerns tend to decrease as people age (such as potential judgments of attractiveness), whereas other weight-related concerns might increase (such as potential judgments about laziness and/or health). One of the most important avenues for future research is to examine W-RS in a more representative sample. A representative sample would also address

our other limitations; namely, the lack of racial and ethnic diversity in our samples, the gender imbalance, and the few people with severe obesity in our samples. It is imperative to determine how W-RS is experienced in the broader population, particularly given the potential implications for psychological and physical well-being. However, the implications discovered in our college samples are still noteworthy, particularly for those who work to increase the well-being of college students.

Future research should also examine these processes within clinical weight-loss populations specifically, because identifying who is most at risk for the negative consequences of weight stigma can provide important information in designing interventions to promote healthy behaviors. Most behavioral weight loss interventions do not explicitly consider the effects of stigma, but the current work provides evidence that expecting stigma can be especially important in shaping the outcomes of those who experience it, and other recent research suggests that weight stigma may lead to weight gain (Sutin et al., 2014; Tomiyama, 2014). Interventions that address stigma may help increase the likelihood of treatment success.

## **Conclusions**

In summary, our findings provide insight into a previously neglected process in the experience of weight stigma. Weight-based rejection sensitivity was shown to lead to negative academic, psychological, and physical health outcomes. Given the high prevalence of overweight and obesity (Ogden et al., 2006) and the high prevalence of weight-based discrimination (Puhl & Brownell, 2001; Puhl & Heuer, 2009), a tendency to anxiously expect this weight-based rejection could adversely impact many. Future research can examine this important construct within broader populations and develop interventions to address its negative effects.

### Acknowledgements

We thank Amy Gorin, Kerry Marsh, Hart Blanton, Blair Johnson, and Ryan Thibodeau for their feedback on research design and/or for their comments on earlier versions of the manuscript. We thank David Kenny and Randi Garcia for their assistance with data analysis. We thank Associate Editor Rachel Calogero, Editor-in-Chief Thomas Cash, and two anonymous reviewers for their thoughtful feedback on the manuscript.

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Table 1

*Study 1 Factor Loadings for Exploratory Factor Analysis of W-RS*

Item		Overall	Non-Overweight	Overweight
WRS01	Imagine that at the first practice of an athletic team that you just joined, two captains start choosing players for their respective teams.	.645	.568	.672
WRS02	Imagine you have just completed a job interview over the telephone to be a fitness instructor. You are in good spirits because the interviewer seemed enthusiastic about your application. Several days later you complete a second interview in person. Your interviewer informs you that they will let you know about their decision soon.	.685	.641	.625
WRS03	Imagine that you have signed up for an online dating service. You post a photo of yourself.	.762	.710	.756
WRS04	Imagine that you are at work, and someone brings in a box of donuts for the office to share. As you are leaning to pick one up, your coworker walks by and comments on the number of calories in the donuts.	.789	.742	.780
WRS05	Imagine that your friend has signed up for Habitat for Humanity, a program that builds houses for charity. She is trying to get a team of people to do it with her.	.650	.633	.684
WRS06	Imagine that you are set up on a blind date. You thought that the date went well and you like the person but he or she has not called you for a couple days.	.822	.777	.824
WRS07	Imagine that you are visiting family for the holidays. Your relative greets you hello, and begins talking with you.	.671	.647	.648
WRS08	Imagine that you are at the grocery store, and you are purchasing chips, ice cream, and soda for a party you are throwing.	.811	.776	.815
WRS09	Imagine that you walk into a trendy shop to pick out a new shirt. The shop is fairly empty, and the salesperson sees you walk in.	.623	.613	.680
WRS10	Imagine that you have taken your seat on an airplane. After everyone has boarded, it appears as though there are a couple empty seats. You hear the person next to you ask the flight attendant whether he can switch seats.	.752	.736	.747
WRS11	Imagine that as you are walking up to your friends, you overhear them talking about a bike ride that they'd like to do over the weekend. They invite you to join them, but you can't go because you already have other plans.	.710	.682	.770
WRS12	Imagine that you are at the doctor's office for a routine visit. Before you see the doctor, a nurse measures your current height and weight.	.777	.749	.727
WRS13	Imagine that you are at the park. Two children are talking nearby, out of earshot. You notice that both are also staring at you and smirking.	.840	.812	.832
WRS14	Imagine that you are in a rush to get to a meeting that is two floors up. The stairs are right next to the elevator, but because you are in a rush, you decide to take the elevator.	.793	.765	.791
WRS15	Imagine that it is your birthday, and your friends decide to take you out to a buffet for dinner. You are in the buffet line and you put all of your favorite foods on your plate. You see a thin woman next to you glance at you and your plate.	.814	.777	.816
WRS16	You and several others approach your professor after class, because she has offered to let one person be her teaching assistant for the following semester.	.718	.722	.736

Table 2

*Study 2 Intercorrelations Between W-RS and Theoretically Related Variables*

Scale	<i>M (SD)</i>	Overall <i>n</i> = 221	Non- Overweight <i>n</i> = 103	Overweight <i>n</i> = 116	Men <i>n</i> = 62	Women <i>n</i> = 157	Controlling for RSQ <i>n</i> = 214	Controlling for RSE <i>n</i> = 214
Perc. Disc.	2.03 (0.96)	.468**	.279**	.407***	.361**	.573***	.316**	.346***
WBIS	2.89 (1.42)	.755**	.544***	.717***	.647***	.784***	.651**	.676***
SSI	0.48 (0.77)	.441**	.222*	.393***	.417**	.558***	.380**	.367***
A-RS	11.85 (8.02)	.622**	.428***	.601***	.562***	.628***	.405**	.527***
A-CSW	5.06 (1.16)	.323**	.160	.427***	.237†	.310***	.202**	.221***
Shame	3.66 (1.25)	.632**	.433***	.642***	.525***	.651***	.489**	.518***
Surveillance	4.78 (1.11)	.334**	.119	.394***	.202	.349***	.214**	.201***
Body Diss.	3.53 (1.15)	.636**	.388***	.610***	.564***	.650***	.508**	.516***
RSQ	7.88 (4.08)	.589**	.566***	.577***	.570***	.613***	---	.507***
RSE	5.14 (1.37)	-.453**	-.359***	-.429***	-.399**	-.480***	-.191**	---

*Note.* Intercorrelations between W-RS and theoretically related variables for the entire sample, controlling for RSQ, controlling for RSE, and as a function of weight and gender. † $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . Perc. Disc = Perceived Discrimination; WBIS = Weight Bias Internalization Scale; SSI = Stigmatizing Situations Inventory; RSQ = Interpersonal Rejection Sensitivity Questionnaire; A-RS = Appearance-based Rejection Sensitivity; A-CSW = Appearance Contingency of Self-Worth; Shame = Body Shame; Surveillance = Body Surveillance; Body Diss = Body Dissatisfaction; RSE = Self-Esteem.

Table 3

*Study 3 Means and Standard Deviations*

Scale	Time 1	Time 2
	<i>M (SD)</i>	<i>M (SD)</i>
Body Dissatisfaction	1.79 (1.43)	---
Appearance Self-Worth	4.94 (1.24)	---
W-RS <sub>total</sub>	2.06 (1.01)	1.99 (1.08)
W-RS <sub>anxiety</sub>	2.04 (1.14)	1.96 (1.19)
W-RS <sub>expectation</sub>	2.09 (0.99)	2.03 (1.09)
OW W-RS <sub>total</sub>	2.60 (1.08)	2.53 (1.20)
OW W-RS <sub>anxiety</sub>	2.63 (1.20)	2.54 (1.32)
OW W-RS <sub>expectation</sub>	2.56 (1.07)	2.52 (1.21)
Depression	14.05 (10.02)	14.79 (11.04)
Self-Esteem	5.51 (1.13)	5.40 (1.36)
Anxiety	2.00 (0.51)	2.06 (0.54)
Stress	1.55 (0.69)	1.55 (0.68)
Social Anxiety	2.07 (0.71)	2.20 (0.72)
College Adjustment	---	433.27 (79.18)
Bulimia Symptoms	1.18 (0.93)	1.06 (0.90)
Drive for Thinness	2.21 (1.39)	2.16 (1.42)
Restraint	5.78 (4.18)	12.53 (6.30)
EAT-26	13.00 (10.27)	12.62 (10.50)
QoL01	2.46 (0.83)	2.38 (0.73)
QoL02	3.88 (4.69)	3.94 (5.40)
QoL03	7.70 (7.80)	6.47 (6.49)
QoL04	2.60 (4.36)	3.09 (4.65)
PILL	---	101.08 (29.38)

*Note.* “---” indicates that the scale was not measured at that timepoint. OW refers to the means for those who self-identified as overweight at Time 1. QoL = Quality of Life, followed by item number.

Table 4

*Study 3 Standardized Coefficients Between Predictors and Outcomes*

Predictor	Psychological Distress	College Adjustment	Bulimia Symptoms	Disordered Eating Patterns	Health-Related Quality of Life	Physical Illness Symptoms
Weight-Based Rejection Sensitivity	.12*	-.33***	.08	-.05	-.16	.20***
Body Dissatisfaction	-.01	-.05	.06	-.01	.03	-.03
Appearance-based Self-worth	-.01	-.11	-.04	-.04	<.01	.05

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

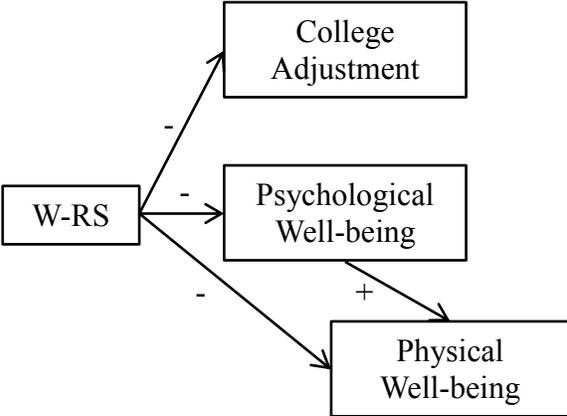


Figure 1. Conceptual Model of Weight-based Rejection Sensitivity (W-RS) Outcomes with Hypothesized Relationships

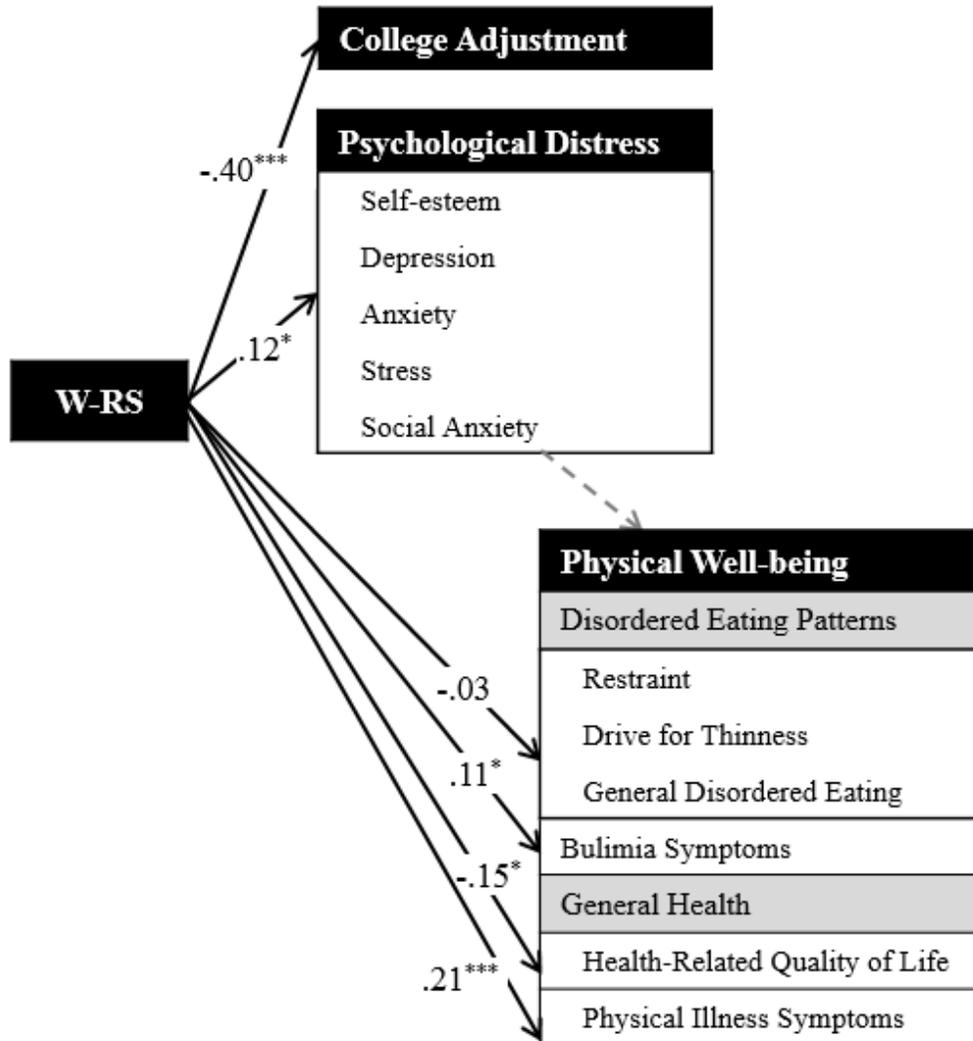


Figure 2. Direct Effect Model Tests of Key Hypotheses

Note.  $*p < .05$ ,  $**p < .01$ ,  $***p < .001$ . Standardized coefficients are presented and represent the direct effect of W-RS on the Time 2 variable while controlling for Time 1. The gray dotted line represents part of an indirect effect that is not presented here but can be found in the text.