BODY WEIGHT AND PSYCHOLOGICAL WELL-BEING: DO THE ASSOCIATION AND MECHANISMS DIFFER ACROSS ADULTHOOD?

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ABSTRACT

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In contemporary U.S. society, thinness is highly valued and excessive weight is denigrated. Obese individuals are often stigmatized and targets of discrimination. The stigma and discrimination can then result in poor psychological well-being. Although obesity is stigmatized, stigmatizing attitudes toward obese individuals and the subsequent consequences may change throughout the adult life course. The present study examines the association between body weight and psychological well-being among young, middle-aged, and older adults using Wave I (1995) of the Midlife Development in the United States study (N = 2,932). I also explore the extent to which different mechanisms, such as perceived discrimination and weight control behaviors, explain the association between body weight and psychological well-being and how these may differ for young, middle-aged, and older adults. Prior research has generally focused on one set of pathways that may be relevant for young adults but they may not necessarily apply to middle-aged or older adults. The present study fills this research gap by improving our understanding of the association between body weight and psychological well-being and whether different mechanisms explain the association for different age groups in adulthood. Gender differences in the association between body weight and psychological well-being and its mechanisms over the adult life course are also explored. Results show that high body weight was negatively associated with psychological well-being, and this association was significant for all age groups. However, there were general and age-specific mechanisms that explained the association between body weight and psychological well-being across adulthood. For all age groups, weight perception explained the association between body weight and psychological well-being. Physical health explained the association between body weight and

psychological well-being for young and middle-aged adults, but not for older adults. Although perceived discrimination had negative effects on psychological well-being for all age groups, it explained the association between body weight and psychological well-being for middle-aged adults only. Gender differences revealed that the association between body weight and psychological well-being and its mechanisms had a larger negative effect for women than men, and this finding was significant for young adults only.

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INTRODUCTION

The obesity prevalence rate in the United States has increased over the past three decades (Flegal et al. 2010). Nearly two-thirds of adults in the U.S. are overweight, and one in three adults are obese with a body mass index (BMI) of 30 or greater. Prevalence estimates, however, vary in adulthood by age. Young adults (20 to 39 years old) have the lowest obesity prevalence rate of 30.75 percent, followed by older adults (60 years and older) with 35.35 percent, and middle-aged adults (40 to 59 years of age) have the highest obesity prevalence rate of 36.25 percent. Although obesity is increasingly common in adulthood, obese individuals are still stigmatized and targets of discrimination (Puhl and Heuer 2009; Puhl and Brownell 2001). The stigma and discrimination that obese individuals experience, in turn, can have negative implications for psychological well-being (Carr, Friedman, and Jaffe 2007; Carr and Friedman 2005).

The present study contributes to the further understanding of the association between body weight and psychological well-being with particular attention to age differences in adulthood. I use data from Wave I (1995) of the Midlife Development in the United States (MIDUS) study, a nationally representative sample of individuals aged 25 to 74 in 1995, to address three questions. First, does the association between body weight and psychological well-being differ among young, middle-aged, and older adults? Second, do different mechanisms, such as perceived discrimination because of weight and height, weight perception, weight control behaviors, and physical health, mediate the association between body weight and psychological well-being differently for young, middle-aged, and older adults? Last, does the association between body weight and psychological well-being, along with its potential mechanisms, vary for men and women during young, middle, and older adulthood?

BACKGROUND

Stigma of Obesity

Goffman (1963:3) defined stigma as "an attribute that is deeply discrediting to its possessor." Goffman differentiated among three key types of stigma: 1) Abominations of the body; 2) Blemishes of an individual's character; and 3) Tribal stigma of race, nation, and religion. Prior research has documented that obese individuals are stigmatized for having an abomination of the body as they are perceived to be less attractive and less desirable than their nonobese counterparts (Puhl and Heuer 2009; Sobal 2005; Puhl and Brownell 2001; Harris 1990). Not only are obese individuals stigmatized for possessing an abomination of the body, but they are also stigmatized for having a blemish of their individual character (Allon 1982; DeJong 1980). The stigma of obesity is unique in the sense that obese individuals are often perceived to be responsible for their weight because they lack self-control or willpower (DeJong 1980), thus they are deserving of such stigma that is associated with obesity.

Obesity and Psychological Well-Being

Obesity is considered one of the most enduring social stigmas (Cahnman 1968). The stigma that obese individuals often face can have negative implications for psychological well-being. It is important to examine the association between body weight and psychological well-being because lower psychological well-being is often associated with an increased incidence of psychological disorders (Simon et al. 2006; Wang et al. 2006). Studies that have explored the association between obesity and psychological well-being, thus far, have found mixed results. Some research suggests that there is little or no association between obesity and psychological well-being (Friedman and Brownell 1995), while other studies have found morbidly obese (BMI ≥ 35) individuals have lower self-acceptance (Carr and Friedman 2005) and more negative affect

(Carr et al. 2007) compared to their thinner counterparts. These inconsistent findings in the literature are likely reflective of methodological oversights. Prior studies that have explored the association between body weight and psychological well-being have used clinical or community samples (O'Neil and Jarrell 1992; Stunkard and Wadden 1992). These samples are likely to bias the findings when studying the association between body weight and psychological well-being. Obese individuals who seek treatment and who are drawn from clinical samples are more likely to have lower psychological well-being than their respective counterparts (Stunkard and Wadden 1992), thus the association between body weight and psychological well-being is likely to be overestimated. Using community samples in which the sample is drawn from one specific region is likely to be nonrepresentative of the population, so the association between body weight and psychological well-being is likely to be underestimated or overestimated, depending on the exact nature of the sample.

Studies that have examined the association between body weight and psychological well-being using nationally representative samples have failed to distinguish between different age groups (Carr et al. 2007; Carr and Friedman 2005), or have combined young and middle-aged adults together (Heo et al. 2005). Furthermore, prior studies have defined psychological well-being differently. Previous research has generally used depression (Istvan et al. 1992), anxiety (Wadden et al. 1989), or body dissatisfaction (Brodie and Slade 1988) to gauge psychological well-being and have neglected other important dimensions of psychological well-being, such as positive relations with others or self-acceptance (e.g., Carr and Friedman 2005). Ryff (1989) posits that there are six distinct dimensions of psychological well-being: autonomy, purpose in life, positive relations with others, personal growth, self-acceptance, and environmental mastery. Recent research acknowledges that all six dimensions are associated with positive well-bieng,

but each dimension is not necessarily unique from one another (Spring, Hauser, and Freese 2006). Springer and colleagues argue that all six dimensions of Ryff's (1989) psychological well-being scale are highly correlated with one another, and that they are all not distinct from one another. Bookwala and Boyar (2008) examine psychological well-being by combining all six dimensions of Ryff's psychological well-being scale, and Bookwala and Boyar use the same data set that the present study uses. Thus, the present study incorporates all six dimensions of psychological well-being into one composite measure to help better understand the association between body weight and psychological well-being.

Obesity, Psychological Well-Being, and Potential Mechanisms in a Life Course Perspective

Previous research has also failed to consider the possibility that the association between body weight and psychological well-being and its underlying mechanisms may vary across different age groups. It is important to consider age differences in the association between body weight and psychological well-being and its mechanisms because the same events or experiences can affect individuals differently depending on when they occur in the life course (George 1993). The association between body weight and psychological well-being is likely to be negative throughout the adult life course given the stigma of obesity; but the social, psychological, and health factors that may explain the association between body weight and psychological well-being are likely to change over time.

Previous research suggests that the association between body weight and psychological well-being is larger for young and middle-aged adults compared to older adults because obesity is less likely to be stigmatized during old age (Hebl et al., 2008; Heo et al. 2005). Thus, young and middle-aged adults who are obese may endure more social and psychological consequences that, in turn, negatively affect their psychological well-being compared to older adults who are

obese. On the other hand, obesity may lead to more severe health consequences for older adults as the health risk factors of obesity are likely to accumulate over the life course (Ferraro and Kelly-Moore 2003), and thus the health consequences of obesity may be more important to understanding the association between body weight and psychological well-being among older adults than either young or middle-aged adults. It is important to examine the salience of these potential pathways that may influence the association between body weight and psychological well-being because they are likely to differ for young, middle-aged, and older adults. As obesity continues to be an important health and social issue for all ages, the need to clarify the association between body weight and psychological well-being and its mechanisms for different age groups will become an important issue. Mechanisms that may have particular importance for the association between body weight and psychological well-being for young, middle-aged, and older adults include perceived discrimination, weight perception, weight control behaviors, and physical health.

Different Mechanisms for Different Age Groups

Perceived Discrimination

Although obesity is stigmatized, stigmatizing attitudes toward obesity and its psychological consequences may change throughout the adult life course. Hebl and colleagues (2008) discuss how prejudicial attitudes toward obese individuals persist into old age, albeit they are much weaker for older adults than young or middle-age adults. But few studies have addressed how obese individuals themselves perceive discrimination and how this may vary throughout adulthood (Carr et al. 2007; Carr and Friedman 2005). Prior research suggests that perceived weight discrimination is much more salient for young and middle-aged adults than older adults (Andreyeva, Puhl, and Brownell 2008; Carr et al. 2008). The increased perception

of discrimination by young and middle-aged adults may be because of three factors. One, the stigma of obesity, and hence the increased perception of mistreatment for an individual's weight, is likely to be greater for young and middle-aged adults because weight is much more of a salient factor for the formation of relationships (Sobal 2005); and being overweight is generally associated with less support from family and friends (Carr and Friedman 2006). Two, both young and middle-aged adults are more engaged in work roles that may make them more susceptible for perceiving discrimination than older adults (Carr and Friedman 2005). Last, older adults may simply be less aware of discrimination than either young or middle-aged adults (Andreyeva et al. 2008; Carr, Jaffe, and Friedman 2008). Young and middle-aged adults are more aware of mistreatment, thus perceiving discrimination is likely to negatively affect their psychological well-being much more than older adults.

Despite evidence that suggests older adults are less likely to perceive weight discrimination (Andreyeva et al. 2008; Carr et al. 2008), the association is unclear as to whether young or middle-aged adults perceive more discrimination, and whether these perceptions affect psychological well-being similarly over the life course. Young adults have the lowest obesity prevalence rate than any other age group; however, individuals who are obese during this stage in the life course when obesity is relatively uncommon may be more highly visible targets and suffer increased discrimination because of their obesity. Furthermore, weight is much more of a salient factor for attractiveness among young adults than middle-aged or older adults (Harris 1990). Thus, obese individuals who are young may experience more negative social consequences for their obesity than middle-aged or older adults and result in decreased psychological well-being because of the increased denigration for their obesity. On the other hand, middle-aged adults may perceive more discrimination than young or older adults because

middle-aged adults have the highest obesity prevalence rate and may be more visible targets for discrimination, thus the increased perceived discrimination among middle-aged adults may then result in poor psychological well-being.

Weight Perception

Research has demonstrated that an individual's perception of self is influenced by others' appraisals (Cooley 1956). Discriminatory treatment by others can have a direct influence on an individual's self-concept, and in turn, influence an individual's psychological well-being (Friedman et al. 2002). As noted previously, young and middle-aged adults are more likely to report perceived discrimination because of their weight than older adults (Andreyeva et al. 2008; Carr et al. 2008). Thus, young and middle-aged adults may be more at risk of internalizing a negative perception of weight and suffering lower psychological well-being than older adults. But research suggests that obese individuals who are young are more likely to internalize the prejudicial attitudes toward obesity and develop negative perceptions of weight than either middle-aged or older adults (Davison and McCabe 2005; Sarwer, Thompson, and Cash 2005; Tiggemann 2004) as thinness is much more highly valued during young adulthood (Harris 1990). Negative perceptions of weight, and particularly perceiving oneself as overweight, can then negatively affect psychological well-being (Friedman et al. 2002), and this is likely to have more of an influence on young adults than either middle-aged or older adults.

Although thinness is valued during young adulthood, thinness may not operate in the same manner for older adults as it does for young and middle-aged adults. During young adulthood, thinness is valued for its role in the formation of romantic relationships (Sobal 2005), but during old adulthood thinness is often associated with frailty (Losonczy et al. 1995; Launer et al. 1994), thus perceiving an individual's weight as underweight may be associated with lower

psychological well-being in old adulthood. However, similar to individuals during young and middle adulthood, perceiving an individual's weight as overweight is also likely to be associated with lower psychological well-being because BMI is often related to weight perception (Paeratakul et al. 2008), and during old adulthood a higher BMI is typically linked to more limitations on daily activities (Jensen and Friedmann 2002; Galanos et al. 1994). Weight perception potentially plays a role in understanding the association between body weight and psychological well-being, but it needs to be interpreted with caution. Individuals who have lower psychological well-being may have a poorer weight perception of themselves, regardless of their actual weight (Pesa, Syre, and Jones 2000; Cash and Hicks 1990). Thus, there is potential for reverse causation between explaining the role of weight perception in understanding the association between body weight and psychological well-being.

Weight Control Behaviors

In an attempt to overcome the perceived discrimination and its effect on weight perception, obese individuals may engage in weight loss strategies. As mentioned previously, thinness is highly valued during young adulthood and even into middle adulthood; hence, individuals during young and middle adulthood may be more likely to engage in weight control behaviors that promote weight loss or a more desirable physique (Weiss et al. 2006; Kruger et al. 2004). The frequency of dieting, and in particular unsuccessful dieting, has been associated with increased depression among obese individuals (Ross 1994). Middle-aged adults may be more affected by unsuccessful dieting or weight maintenance than young or older adults because it may be more difficult for middle-aged adults to maintain their desired body weight due to such factors as decreased metabolism (Van Pelt et al. 1997) or less time to exercise because of familial or employment responsibilities (Nomaguchi and Bianchi 2004).

Despite the reason to maintain a healthy weight, the inability to successfully maintain weight loss for obese individuals may only serve to reinforce the stigma that obese individuals are lazy and lack self-control (Allon 1982; DeJong 1980). This reinforced stigma then may contribute to poorer psychological well-being much more among middle-aged adults than either young or older adults. Weight cycling is also associated with poorer health (Diaz, Mainous, and Everett 2005; Lee and Paffenbarger 1992), which may contribute to lower psychological well-being given physical health is strongly related to psychological well-being (Hayes and Ross 1986).

Physical Health

For older adults, the association between body weight and psychological well-being may have less to do with perceived discrimination, weight perception, or weight control behaviors than physical health. Research has documented the health consequences of obesity extensively (World Health Organization 2002), and physical health is strongly associated with psychological well-being (Hayes and Ross 1986). Obesity is often related to increased incidence of chronic conditions such as heart disease, diabetes, and certain types of cancers (WHO 2002). Obese individuals are also more likely than nonobese individuals to experience limitations on their daily activities (Jensen and Friedmann 2002; Galanos et al. 1994) and other health symptoms such as joint pain or trouble sleeping (Heo et al. 2010; Ferraro and Kelley-Moore 2003). These health consequences may be more salient among older adults than both young and middle-aged adults as the health consequences of obesity accumulate throughout the life course (Ferraro and Kelley-Moore 2003), thus they may contribute more to poorer psychological well-being than other factors for older adults in comparison to young and middle-aged adults (Sachs-Ericsson et al. 2007).

Furthermore, as opposed to thinness being valued during young and middle adulthood for purposes of mate selection (Sobal 2005; Harris 1990), for example, thinness takes on a different meaning during older adulthood. Thinness is often problematic when an individual is old because it is often a sign of poor health (Losonczy et al. 1995; Launer et al. 1994), thus poor health is more likely to explain the association between body weight and psychological well-being for older adults than either young or middle-aged adults. Alternatively, from a life course perspective, poorer health during older adulthood may be more of an "on-time" event given that poorer health among older adults is relatively common (Ferraro and Kelley-Moore 2003; Jensen and Friedmann 2002; Hoffman, Rice, and Sung 1996; Galanos et al. 1994; Perlmutter and Nyquist 1990). Research has shown that "on-time" events are less distressing and are associated with relatively more positive outcomes, whereas "off-time" events generally produce more negative consequences (Elder, Johnson and Crosnoe 2003; Settersten 1999; Elder 1994). Thus, poorer health during a stage in the life course where it is relatively uncommon (i.e., during young and middle adulthood) may contribute to lower psychological well-being than during a stage when it is more common (i.e., old adulthood).

Obesity and Gender Differences

In the present study, I also explore the potential moderating effect of gender. Research has documented that the effects of stigma and discrimination on the association between body weight and psychological well-being vary by gender in adulthood (Bookwala and Boyar 2008). Women are much more likely to be stigmatized for their obesity than men (Puhl, Andreyeva, and Brownell 2008; Carr et al. 2008) as thinness is often related to the perceived physical attractiveness and desireability of a romantic partner (Sobal 2005; Harris 1990). The increased denigration of obesity for women then may manifest itself into poorer weight perception and

elicit certain weight control behaviors to promote weight loss in an effort to reduce the stigma of obesity. Thus, perceived discrimination, weight perception, and weight control behaviors may be more important mechanisms for women than men in examining the association between body weight and psychological well-being. While perceived discrimination, weight perception, and weight control behaviors may be more important mechanisms between the association between body weight and psychological well-being for women, physical health may be more of an important factor for men when examining the association between body weight and psychological well-being because men are more prone to developing obesity-related illnesses than women (Must et al. 1999).

PRESENT STUDY AND HYPOTHESES

Given that the salience and extent to which the psychosocial and health consequences of obesity vary throughout adulthood, the examination of how the association between body weight and psychological well-being differs for young, middle-aged, and older adults deserves exploration. Moreover, the different possible mechanisms that may explain this association need to be better understood as they may differ over the adult life course. Research has shown that the prejudicial attitudes toward obesity are much stronger toward whites, women, and individuals of a higher socioeconomic status (Carr et al. 2008; Latner, Stunkard, and Wilson 2005). Furthermore, obese individuals are more likely to be women, Black, and individuals of a lower socioeconomic status compared to nonobese individuals (Flegal et al. 2010; Sobal and Stunkard 1989). Studies have shown that many of the characteristics associated with obesity are also associated with psychological well-being (Kessler and Neighbors 1986, Kessler 1982), thus I control for demographic characteristics that are likely to confound the association between body weight and psychological well-being. In the present study, I test the following hypotheses:

Hypothesis 1: Obesity will be negatively associated with psychological well-being. The association will be larger for young and middle-aged adults than for older adults.

Hypothesis 2: Perceived discrimination because of weight and height will weaken the association between obesity and psychological well-being. Perceived discrimination because of weight and height will be a larger mechanism that weakens the association between obesity and psychological well-being for young and middle-aged adults than for older adults, although it is

unclear whether perceived discrimination because of weight and height will be a larger mechanism for middle-aged or young adults.

Hypothesis 3: Weight perception will weaken the association between obesity and psychological well-being. Weight perception will be a larger mechanism that weakens the association between obesity and psychological well-being more for young adults than either middle-aged or older adults.

Hypothesis 4: Dieting and weight cycling will weaken the association between obesity and psychological well-being. Dieting and weight cycling will be larger mechanisms that weakens the association between obesity and psychological well-being more for young and middle-aged adults than older adults, but it will be larger for middle-aged than young adults.

Hypothesis 5: Physical health will weaken the association between obesity and psychological well-being. Physical health will be a larger mechanism that weakens the association between obesity and psychological well-being more for older adults than for either young or middle-age adults.

Hypothesis 6: The negative effect of obesity on psychological well-being will be stronger for women than men.

Hypothesis 7: Perceived discrimination because of weight and height, weight perception, and dieting and weight cycling will be larger mechanisms for women than men, whereas physical health will be a larger mechanism for men than women.

METHODS

Sample

Data are drawn from Wave I (1995) of MIDUS. MIDUS is a national multistage probability sample of noninstitutionalized, English-speaking adults, aged 25-74, in the coterminous United States that were selected from working telephone banks. MIDUS is appropriate for the present investigation for three reasons. First, MIDUS captures a wide age range that encompasses young, middle-aged, and older adults. Although newer data (Wave II of MIDUS, 2004-2006) are available, Wave II respondents are mostly middle-aged and older adults (ages range from 35 to 84), thus a large segment of young adulthood is neglected, which is imperative to study because important life milestones, such as completion of education or marriage, can have long-term consequences for the association between body weight and psychological well-being.

Second, many studies merely use the concept of stigma and discrimination to explain any group differences between stigmatized and non-stigmatized groups, and do not directly measure perceived discrimination. Moreover, many studies fail to assess an individual's own attribution for perceived discrimination. MIDUS, on the other hand, contains measures of perceived discrimination and the attribution for why an individual perceived the discrimination. Last, MIDUS contains rich data on potential mechamisms that may help explain the association between body weight and psychological well-being. The total main MIDUS sample includes 3,487 adults (1,721 men and 1,766 women). This analysis is limited to the 2,932 persons (950 young adults; 1,365 middle-aged adults; and 617 older adults) who completed both the telephone interview and self-administered questionnaire. Respondents who were underweight (2.15 % of the sample) were dropped from the analyses as they are not the focus of the current inquiry.

Dropping respondents who were classified as underweight (BMI < 18.5) is likely to be biased toward older adults because frailty and thinness is associated with being underweight (Losonczy et al. 1995; Launer et al. 1994), and this is likely to affect older adults much more than young and middle-aged adults. The response rates for the telephone interview and self-adminstered question were 70% and 86.8%, respectively.

Measures

Dependent variable. Ryff's (1989) assessment of psychological well-being was included in Wave I of MIDUS. A total of 18 items were included that measured six dimensions: positive relations with others (e.g., "I have not experienced many warm and trusting relationships with others"), self-acceptance (e.g., "In many ways I feel disappointed about my achievements in life"), autonomy (e.g., "I have confidence in my own opinions, even if they are different from the way most other people think"), personal growth (e.g., "I gave up trying to make big improvements or changes in my life a long time ago"), environmental mastery (e.g., "I am good at managing the responsibilities of daily life"), and purpose in life (e.g., "I sometimes feel as if I've done all there is to do in life"). Item responses were made on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Items were reverse coded as needed to reflect higher psychological well-being. Factor analysis was performed and all items loaded on one factor. In addition, recent research suggests that all six dimensions are highly correlated (Springer et al. 2006), and this measure is consistent with other research that has used the same data set (Bookwala and Boyar 2008). Thus, I combined and averaged the scores of these 18 items to form one scale that ranged from 1 to 7 ($\alpha = .80$).

Independent variables. Body mass index (BMI) is the focal variable in my analysis. BMI is calculated as weight (in kilograms) divided by height (in meters). Continuous BMI

scores were recoded into five weight categories using cutpoints defined by the guidelines set by the National Heart, Lung, and Blood Institute (2000). The weight categories include normal weight (BMI between 18.5 and 24.9), overweight (BMI between 25 to 29.9), obese I (BMI between 30 and 34.9), obese II (BMI between 35 and 39.9), and obese III (BMI of 40 or higher). Due to small cell sizes, obese II and obese III categories where combined. BMI was calculated from self-reports of weight and height. This estimate may be biased because individuals tend to overestimate their height while underestimating their weight (Bowman and DeLuca 1992). However, this bias is usually small and does not alter results greatly (Palta 1982).

Perceived discrimination is assessed by asking respondents whether they have ever experienced daily or lifetime discrimination. Daily discrimination captures discrimination due to such things as blemish of character (e.g., "People act as if they think you are not smart"), experience lack of respect (e.g. "You are treated with less courtesy than other people"), and experience harassment or teasing (e.g., "You are called names or insulted"). Lifetime discrimination appraises discrimination due to such things as perceived mistreatment in schooling or employment. Respondents who report either daily or lifetime discrimination are then asked what was the main reason for why they experienced it. Responses included things such as gender, race, sexual orientation, or height and weight. Two dichotomous indicators were created: (1) whether one has ever experienced any discrimination due to height and weight, and (2) whether one has ever experienced any discrimination due to other reasons. The reference group includes respondents who report never experiencing any type of discrimination.

Weight perception was examined by asking respondent on a scale from 1 to 5 about whether they considered themselves (1) very underweight to (5) very overweight. Responses were recoded into three dichotomous indicators: (1) underweight; (2) somewhat overweight; and

(3) very overweight. The reference group includes respondents who report their weight as about the right weight[1]. Weight control behaviors were assessed with two items. Weight cycling was examined by asking respondents about how many times in their lifetime they lost 10 pounds or more (excluding women after childbirth). This is a common question that has been used to measure weight cycling (Carr and Friedman 2006). Responses ranged from 0 to 500, but were top-coded at the 90th percentile, thus weight cycling ranged from 0 to 10[2]. Whether a respondent was on a special diet in the previous 12 months to treat a physical health problem, to treat an emotional or personal problem, to maintain or enhance your wellness, or to prevent the onset of illness was measured dichotomously (0=No; 1=Yes).

Physical health was examined with two domains: self-rated physical health and chronic conditions. Self-rated physical health was assessed by asking respondents how they would define their physical health. Response categories ranged from 1 (Poor) to 5 (Excellent), but were measured dichotomously (0=Good or better; 1=Poor/Fair). Chronic conditions were measured dichotomously (0=No; 1=Yes) by asking respondents if they had experienced any of the 29 chronic conditions in the past 12 months, such as asthma, thyroid disease, or high blood pressure, in the past 12 months. Items ranged from 0 to 27, but were top-coded at the 90th percentile and summed to create a scale that ranged from 0 to 6.

I also include 9 demographic variables that have been found to be related to either obesity or psychological well-being (Flegal et al. 2010; Lanter et al. 2003; Sobal and Stunkard 1989; Kessler and Neighbors 1986, Kessler 1982). Age was a continuous variable that ranged from 25 to 74, but was recoded into three categories: young adults (age 25 to 39), middle-aged adults (age 40 to 59), and older adults (age 60+). Sex was coded as a dichotomous variable with male as the reference category. Marital status was coded as four dichotomous variables: married (reference

group), divorced or separated, widowed, and never married. Race was coded as three dichotomous variables: white (reference group), African American, and other race. Whether respondents had children was coded dichotomously (0=No; 1=Yes). Socioeconomic status was assessed with three variables: current employment, education, and occupation status. Whether a respondent was currently employed was coded dichotomously (0=No; 1=Yes). Education was coded as four dichotomous variables: less than 12 years of education, 12 years of education (reference group), 13 to 15 years of education, and at least 16 years of education.

Current occupation was coded into two categories: upper white-collar (i.e., professional or executive occupations), and a combined category of lower white-collar (i.e., sales or clerical) and blue-collar (i.e., labor and farm occupations). The latter category is the reference group. This categorization has been used by other researchers using the same data set (e.g., Carr and Friedman 2006, 2005). BMI at the age of 21 was measured as a dichotomous variable with being classified with a BMI of 25 or greater as the reference group. BMI at the age of 21 was derived from retrospective self-reports of weight (in kilograms) at the age of 21 divided by current height (in meters). BMI at the age of 21 is controlled for because research has shown that one of the strongest predictors of adult obesity is if an individual was obese during childhood or adolescent (Ferraro and Kelly-Moore 2003), thus it is important to control for an individual's potential long-term trajectory of obesity. An earlier onset of obesity may expose an individual to a longer risk period of enduring the stigma of obesity, which can negatively affect psychological well-being (Carr and Friedman 2005). An earlier onset of obesity may also cause an individual's health to deteriorate sooner as the health consequences of obesity accumulate throughout adulthood (Ferraro and Kelly-Moore 2003), and poor health is associated with lower psychological well-being (Hayes and Ross 1986).

Analytical Strategy

I used ordinary least squares (OLS) for all of the analyses. This technique was appropriate because the dependent variable is continuous. Analyses were run separately for young, middle-aged, and older adults. I first assessed the zero-order relationship between body weight and psychological well-being. I then examined the extent to which the association between body weight and psychological well-being could be accounted for by demographic characteristics. I then tested whether the remaining association between body weight and psychological well-being could be explained by the potential mechanisms separately by using nested models. I next evaluated whether body weight and the potential mechanisms differ by respondent's gender. Clogg tests (Clogg, Petkova, and Haritou 1995) were conducted to examine individual coefficients between models for young, middle-aged, and older adults in order to analyze whether different factors are related to psychological well-being differently for young, middle-aged, and older adults.

Variance inflation factors (VIFs) for all predictors were checked for all age groups. For young adults, the VIF factors for all predictors were all below 2.5. For both middle-aged and older adults, VIF factors for all predictors were below 2.5, except for perceiving an individual's weight as very overweight and being classified as obese II/III (VIFs range from 2.60 to 2.95). Overall, the VIFs suggest little multicollinearity among predictors across age groups (Allison 1999). Missing data were estimated using multiple imputed data created from imputations using chained equations (ICE) program for Stata, Version 11 (Acock 2005; Royston 2005). The results presented below are based on ten replicates of imputed data.

RESULTS

Bivariate Analysis

Table 1 presents descriptive statistics for all variables in the analysis, by age group. Tables A1-A3 in the appendix show descriptive statistics for all variables in the analysis, by BMI and age group. All statistics were weighted to adjust for differences in the probability of selection and differential nonresponse. One middle-aged respondent was missing a valid sample weight; hence, the sample size for middle-aged adults is slightly different for the bivariate and multivariate analyses. Preliminary analyses revealed that unweighted results were similar to the weighted results that are presented. I conducted two-tailed *t* tests (for continuous variables) or chi-square analyses (for categorical variables) to evaluate whether each age group differed significantly from each other. Young, middle-aged, and older adults did not significantly differ in their reports of psychological well-being. In regards to BMI, young adults were more likely to be classified as normal weight (BMI 18.5 to 24.9) and less likely to be obese I (BMI 30 to 34.9) than both middle-aged and older adults. Specifically, nearly half (46.63%) of young adults were classified as normal weight, whereas 35.97% of middle-aged adults and 34.77% of older adults were classified as normal weight. On the other hand, only 12.02% of young adults were classified as obese I, while 16.95% of middle-aged adults and 18.08% of older adults were classified obese I. These percentages are consistent with national estimates where young adults are more likely to be of normal weight compared to middle-aged and older adults (Flegal et al. 2010); however, the results differ from national estimates in that older adults (27.3%) were more likely to be obese (including obese I and obese II/III categories) than middle-aged adults (26.0%).

[Table 1 about here]

Several characteristics varied by respondents' age. Young adults were less likely to be married than both middle-aged and older adults. Roughly 80 percent of the MIDUS sample was white; however, both middle-aged and older adults were more likely to be white than young adults. Young adults were less likely to have children compared to both middle-aged and older adults. Educational attainment also differed by age group. Young and middle-aged adults were significantly more likely to report obtaining at least some education post high school than older adults. In terms of employment, both young and middle-aged adults were more likely to be employed than older adults. Nearly 80 percent of the respondents reported that they had a normal or underweight BMI at the age of 21; however, middle-aged and older adults were significantly more likely to report a normal or underweight BMI at the age of 21 than young adults. These estimates may reflect cohort differences in the prevalence rate of obesity, given it has nearly doubled for U.S. adults in the past three decades (Flegal et al. 2010).

Age was also associated with ever experiencing perceived weight and height discrimination. Both young (10.23%) and middle-aged (7.28%) adults were more likely to report perceived discrimination due to weight and height than older (4.16%) adults. These figures are consistent with previous studies that have found older individuals are less likely to perceive mistreatment than their younger counterparts (Carr et al. 2008). These figures may also suggest young adults are more highly visible targets for discrimination because of their weight and height during the stage in the life course where the prevalence rate of obesity is relatively low (Flegal et al. 2010).

Furthermore, age group differences in weight perception may also reflect prevalence rate differences in obesity among young, middle-aged, and older adults. Young adults were more likely to report perceiving their weight as underweight compared to middle-aged adults, whereas

young and older adults did not significantly differ in perceiving their weight as underweight. Compared to middle-aged and older adults, young adults were more likely to perceive their weight as about right. Middle-aged adults were more likely than young adults to report perceiving their weight as somewhat overweight, whereas young and older adults did not significantly differ in perceiving their weight as somewhat overweight. Further, young adults were the least likely to report perceiving their weight as very overweight compared to middle-aged and older adults, while middle-aged and older adults did not significantly differ in their weight perception as very overweight.

Middle-aged and older adults were significantly more likely to engage in weight control behaviors than young adults. Middle-aged and older adults reported a greater frequency of losing 10 or more pounds over their lifetime (3.32 and 3.05, respectively). A larger percentage (13.42 %) of middle-aged adults also reported being on a special diet in the previous 12 months compared to young adults (9.62 %). Consistent with prior research (Losonczy et al. 1995; Launer et al. 1994; Perlmutter and Nyquist 1990), older adults were significantly more likely to report poor or fair health (27.89 %) compared to young (10.80 %) and middle-aged (16.57 %) adults. Older adults were also more likely than both young and middle-aged adults to suffer from chronic conditions. No age group differences were found among sex and occupation status.

Multivariate Analysis

Young Adults. In Table 2, I present OLS regression models to evaluate individually the extent to which the effect of psychological well-being on BMI (Model 1) is explained by demographic characteristics (Model 2), perceived discrimination (Model 3), weight perception (Model 4), weight control behaviors (Model 5), physical health (Model 6), and then all of the demographic characteristics and potential mechanisms (Model 7) for young adults. Model 1

shows obese II/III (BMI≥ 35) was associated with lower psychological well -being. Respondents who were classified as obese II/III reported psychological well-being scores that were 0.35 points lower than respondents who were normal weight ($p<.001$). The association between obese II/III and lower psychological well-being persisted once demographic characteristics were controlled (Model 2). Divorced or separated and never married respondents' psychological well-being scores were 0.34 ($p<.001$) and 0.26 ($p<.001$) points, respectively, lower on the psychological well-being scale compared to married respondents' scores. In addition, respondents who had less than a high school education were 0.33 points ($p<.01$) lower and respondents who had at least a bachelor's degree or higher were 0.27 points ($p<.001$) higher on the psychological well-being scale compared to respondents who had a high school degree.

The association between obese II/III and psychological well-being reduced only minimally when perceived discrimination was controlled; it declined from -0.38 to -0.33 (Model 3). Although perceived discrimination because of weight and height ($b = -0.24$) and other reasons ($b = -0.11$) had significantly negative effects on psychological well-being, they did not explain away obese II/III respondent's lower psychological well-being scores. Once weight perception was controlled, the association between obese II/III and psychological well-being was dramatically reduced and was no longer significant (Model 4). Respondents who perceived their weight as either underweight ($b = -0.23$) or very overweight ($b = -0.27$) experienced lower scores on the psychological well-being scale than respondents who perceived their weight as about right. Weight control behaviors did little to explain the association between obese II/III and psychological well-being (Model 5). The association between obese II/III and psychological well-being was reduced to nonsignificance once physical health was controlled (Model 6), thus physical health explained the lower psychological well-being scores reported by obese II/III

respondents. Young adults who reported poor or fair health was associated with 0.28 points lower on the psychological well-being scale compared to their counterparts who reported good or excellent health ($p<.001$). Each chronic condition experienced by young adults was also associated with a decrease on the psychological well-being scale by 0.09 points ($p<.001$). When all of the demographic characteristics and mechanisms were controlled, the association between obese II/III and psychological well-being disappeared (Model 7).

[Table 2 about here]

In sum, there was a significant association between body weight and psychological well-being for young adults, but it was only significant for respondents who were classified as obese II/III. Demographic characteristics, perceived discrimination, weight perception, and physical health all added significant explained variance to the association between body weight and psychological well-being for young adults but weight control behaviors did not. Standardized regression coefficients for Model 7 revealed that among demographic characteristics, marital status and educational attainment were the two most important factors to understanding the association between body weight and psychological well-being, whereas physical health and weight perception were the two most important mechanisms to explaining that relation (results not shown).

Middle-aged Adults. Table 3 presents similar analyses for middle-aged adults as described previously for young adults. Similar to young adults, middle-aged adults who were classified as obese II/III were 0.21 points lower on the psychological well-being scale than normal weight respondents (Model 1), and this association persisted when demographic characteristics were controlled (Model 2). Similar to young adults, middle-aged adults who were divorced or separated ($b = -0.23$) and never married ($b = -0.40$) had lower scores on the

psychological well-being scale than their married counterparts. Further, respondents who had less than a high school education reported psychological well-being scores that were 0.21 points lower than their counterparts who had a high school diploma; however, respondents who had at least a bachelor's degree reported 0.31 points higher on the psychological well-being scale than respondents who had a high school diploma. Once perceived discrimination was controlled, the association between obese II/III and psychological well-being reduced dramatically and it became nonsignificant; it declined from -0.21 to -0.06 (Model 3). Compared to respondents who reported experiencing no discrimination, respondents who reported perceiving discrimination because of weight and height and because of other reasons were 0.55 ($p<.001$) and 0.21 ($p<.001$) points lower on the psychological well-being scale, respectfully. Weight perception helped to further explain the association between obese II/III and psychological well-being. When weight perception was controlled, the association between obese II/III and psychological well-being reduced to nonsignificance (Model 4). Middle-aged adults who perceived their weight as underweight reported 0.42 ($p<.05$) points lower on the psychological well-being scale than respondents who reported their weight as about right, whereas those who perceived their weight as very overweight reported 0.30 ($p<.05$) points lower on the psychological well-being scale.

In examining whether weight control behaviors helped explain the association between obese II/III and psychological well-being, results showed that weight control behaviors reduced the association to nonsignificance but none of the weight control behaviors were significant (Model 5). Model 6 suggests physical health explained the association between obese II/III and psychological well-being. Middle-aged adults who reported poor or fair health was associated with 0.21 ($p<.001$) points lower on the psychological well-being scale than their counterparts who reported good or excellent health. Each chronic condition experienced by middle-aged

adults was also associated with a decrease in 0.10 ($p<.001$) points on psychological well-being scale. Again, similar to young adults, when all of the demographic characteristics and mechanisms were controlled, the association between obese II/III and psychological well-being disappeared (Model 7). Once again standardized regression coefficients for Model 7 revealed marital status and educational attainment were the most important demographic factors, whereas perceived discrimination and physical health were the most important mechanisms that explained the association between obese II/III and psychological well-being for middle-aged adults (results not shown).

[Table 3 about here]

In sum, like young adults, obese II/III was associated with lower psychological well-being for middle-aged adults. Similar to young adults, weight perception and physical health explained the association between obese II/III and psychological well-being for middle-aged adults. But unlike young adults in which perceived discrimination only partially explained the relation between obese II/III and psychological well-being, perceived discrimination explained away the association between obese II/III and psychological well-being for middle-aged adults. This latter finding provides evidence that despite middle-aged adults' high obesity prevalence rate and thus the normalcy of it, they are still highly visible targets for the stigma of obesity, and in turn targets of increased discrimination.

Older Adults. Table 4 displays unstandardized OLS coefficients from analyses that are similar to the analyses conducted for both young and middle-aged adults. Analogous to the findings for young and middle-aged adults, older adults who were classified as obese II/III reported psychological well-being scores that were 0.42 points ($p<.001$) lower than normal weight older adults (Model 1). This association still remained once demographic characteristics

were controlled; respondents who were classified as obese II/III were 0.43 points lower on the psychological well-being scale than normal weight respondents (Model 2). Unlike young and middle-aged adults, only older adults who were never married reported lower psychological well-being ($b = -0.47$; $p<.01$) than married respondents. But similar to young and middle-aged adults, older respondents who had less than a high school diploma were 0.18 ($p<.05$) points lower and those who had at least a bachelor's degree were 0.22 ($p<.05$) points higher on the psychological well-being scale than respondents who had a high school diploma. Perceived discrimination only slightly explained the association between obese II/III and psychological well-being (Model 3). Older adults who perceived weight and height discrimination were 0.49 ($p<.01$) points lower in psychological well-being than their counterparts who did not perceive any discrimination. Weight perception explained the association between obese II/III and psychological well-being for older adults much the same way it did for both young and middle-aged adults (Model 4). However, unlike young and middle-aged adults, it was only older adults who perceived their weight as very overweight ($b = -0.36$; $p<.01$) who reported lower psychological well-being scores than their counterparts who perceived their weight as about right.

And again, like young and middle-aged adults, weight control behaviors did little to explain the association between obese II/III and psychological well-being for older adults (Model 5). Contrary to the findings for young and middle-aged adults, physical health did not explain the association between obese II/III and psychological well-being for older adults, although it was a significant factor (Model 6). Older adults who reported their health as poor or fair reported psychological well-being scores that were 0.27 ($p<.001$) points lower than their good or excellent health counterparts. Furthermore, each chronic condition experienced by older adults

was associated with 0.06 ($p<.001$) points lower on the psychological well-being scale. When all of the demographic characteristics and mechanisms were controlled, the association between obese II/III and psychological well-being disappeared (Model 7). Standardized scores of Model 7 revealed that weight discrimination, perceiving one's weight as very overweight, and self-reported health as poor or fair were the most important mechanisms, whereas marital status and educational attainment were the two most important demographic factors in explaining the association between obese II/III and psychological well-being (results not shown).

[Table 4 about here]

In sum, parallel to the findings of young and middle-aged adults, there was a significant association between obese II/III and lower psychological well-being. Similar to young adults, perceived discrimination helped to partially explain the association between obese II/III and psychological well-being for older adults but not all of it. Moreover, consistent with the findings for both young and middle-aged adults, weight perception explained away the relationship between obese II/III and psychological well-being for older adults. On the other hand, unlike young and middle-aged adults, it was only older adults who perceived their weight as very overweight who suffered from lower psychological well-being compared to older adults who perceived their weight as about right. But unlike young and middle-aged adults, physical health did not explain away the association between obese II/III and psychological well-being for older adults.

The effects of BMI and mechanisms between age groups. I now explore whether the association between body weight and psychological well-being differs among young, middle-aged, and older adults, as well as examining whether the potential mechanisms differ between the age groups by testing coefficients across groups using Clogg tests (Clogg et al. 1995). As the

results show, the association between body weight and psychological well-being did not differ among young, middle-aged, and older adults (results not shown); however, there were some differences in the pathways between the association between body weight and psychological for young, middle-aged, and older adults. When demographic characteristics and perceived discrimination are controlled, BMI had a larger effect on psychological well-being for young ($b = -0.33$; $p<.01$) and older ($b = -0.37$; $p<.01$) adults who were classified as obese II/III compared to their middle-aged counterparts ($b = -0.06$; $p>.05$). On the other hand, when BMI and demographic characteristics were controlled, perceived discrimination had a larger effect on psychological well-being for middle-aged adults ($b = -0.55$; $p<.001$) who perceived weight and height discrimination than young ($b = -0.24$; $p<.01$) or older ($b = -0.49$; $p<.01$) adults who perceived weight and height discrimination (results not shown).

Analyses further revealed that chronic conditions experienced by middle-aged adults contributed more to lower psychological well-being scores than older adults who experienced chronic conditions, net of BMI and demographic characteristics (results not shown). Each chronic condition experienced by middle-aged adults was associated with a decrease in psychological well-being by 0.10 ($p<.001$) points, whereas it was only associated with a decrease in psychological well-being by 0.06 ($p<.001$) points for older adults This finding suggests the importance of considering the life course when examining the timing of events and its effect on psychological well-being. Events that occur "off-time" are often associated with poorer outcomes than events that occur "on-time" because "off-time" events are generally more distressing (Elder et al. 2003; Settersten 1999; Elder 1994). During old age, it is relatively common to suffer from chronic conditions (Hoffman et al. 1996) than during an earlier point in the life course, thus middle-age adults who suffer from chronic conditions during a stage in the

life course when it is relatively uncommon may tend to have lower psychological well-being as the event is likely to be more distressing.

Gender differences of BMI and mechanisms between age groups. Given body weight is a much more salient attribute for women's as opposed to men's well-being (Bookwala and Boyar 2008; Puhl et al. 2008; Carr et al. 2008), I examined whether the association between body weight and psychological well-being was moderated by gender for young, middle-aged, and older adults. Analyses revealed that gender did moderate the association between body weight and psychological well-being for young adults but not for middle-aged or older adults. Figure 1 presents the predicted psychological well-being scores for young adults, by current BMI for women and men (i.e., moderating effect of Model 1 in Table 2). For young adults, women who were classified as overweight, obese I, and obese II/III reported psychological well-being scores that were 0.29 ($p<.05$), 0.36 ($p<.05$), and 0.47 ($p<.05$) points lower than men, respectively. Once demographic characteristics were introduced into the model, the moderating effect of gender on the association between body weight and psychological well-being was reduced to nonsignificance[3].

[Figure 1 about here]

I also tested whether the potential mechanisms that may explain the association between body weight and psychological well-being were moderated by gender for all age groups. Analyses revealed that only one potential mechanism (out of nine) was moderated by gender among young adults. Gender did not moderate any of the potential mechanisms for middle-aged or older adults. Figure 2 shows the predicted psychological well-being scores for young adults by weight cycling (centered) for men and women, net of BMI and demographic characteristics (with all independent variables set equal to sample mean). For young adults, weight cycling had

a larger effect on women's as opposed to men's psychological well-being. Average weight cycling for young women was associated with a decrease in psychological well-being by 0.04 ($p<.05$) points. Thus, lower psychological well-being was associated with the more times women's weight cycled[4]. In sum, the nonsignificant moderating analyses of gender on the association between body weight and psychological well-being, along with its potential mechanisms, among middle-aged and older adults suggests that gender diminishes in importance to understanding the association between body weight and psychological well-being later in the life course.

[Figure 2 about here]

DISCUSSION

There has been much research examining the social, health, and psychological consequences of obesity. Research has demonstrated that obese individuals are often stigmatized and targets of discrimination (Carr et al. 2008; Carr and Friedman 2005; Allon 1982; DeJong 1980). The stigma and discrimination, in turn, can result in poor psychological well-being (Carr et al. 2007; Carr and Friedan 2005). Although obesity is stigmatized, stigmatizing attitudes toward obese individuals and the subsequent consequences may change throughout the adult life course. Prior research has generally focused on one set of pathways that may be relevant for young adults but they may not necessarily apply to middle-aged or older adults. The present study filled this research gap by improving our understanding of the association between body weight and psychological well-being and the extent to which different mechanisms explain the association between body weight and psychological well-being and how these may vary for different age groups during adulthood. Furthermore, the moderating effect of gender on the association between body weight and psychological well-being, along with its potential mechanisms, was examined for young, middle-aged, and older adults.

Obesity and Psychological Well-Being

The results reveal partial support for Hypothesis 1 in that the association between body weight was negatively associated with psychological well-being, yet the zero-ordered relation was not larger for young and middle-aged adults than for older adults as what was hypothesized. Respondents who were classified as obese II/III reported lower psychological well-being than normal weight respondents and this association was significant for all age groups. Results revealed that net of demographic characteristics and perceived discrimination, BMI had a larger

negative effect on psychological well-being for both young and older adults compared to middle-aged adults.

Different Mechanisms for Different Age Groups

Hypothesis 2 was supported given perceived discrimination weakened the association between body weight and psychological well-being, and perceived discrimination had a larger effect for middle-aged adults than both young and older adults. Partial support was found for Hypothesis 3 because weight perception weakened the association between body weight and psychological well-being; however, there were no significant age group differences. Weight control behaviors did little to explain the association between body weight and psychological well-being for any age group, thus the results did not support Hypothesis 4. Consistent with Hypothesis 5, physical health weakened the association between body weight and psychological well-being. But contrary to what was hypothesized, physical health did not have a larger effect on the association between body weight and psychological well-being for older adults compared to young and middle-age adults.

Obesity and Gender Differences

The findings also led support for Hypothesis 6 in that the effect of body weight on psychological well-being was larger for women than men, but the differences between men and women only occurred during young adulthood. Young women who were classified as overweight, obese I, or obese II/III reported lower psychological well-being than their normal weight counterparts, yet this finding was largely explained by demographic characteristics. However, different demographic characteristics explained the gender differences for the association between body weight and psychological well-being. Marital status explained the gender differences for young adults who were classified as obese II/III, whereas socioeconomic

status (net of marital status and race) explained the gender differences for young adults who were classified as obese I (results not shown). These finding have important implications for understanding the stigma of obesity. Research has extensively documented the consequences of the stigma of obesity for women, including the lower likelihood of having friends and engaging in romantic relationships (Sobal 2005) and employment discrimination (Puhl and Brownell 2001). For young women who are classified as obese II/III, it may be the bias toward romantic relationships and subsequent marriage that explains the association between body weight and psychological well-being, whereas it may be the bias in employment and the inability to obtain high socioeconomic status that explains the association for young women who are classified as obese I.

I also evaluated whether the association between body weight and psychological well-being differed for men and women. Only one potential mechanism, weight cycling, differed between men and women, but this finding was only significant for young adults. Thus, results provided partial support for Hypothesis 7. The findings revealed that weight cycling had a larger negative effect on psychological well-being for young women than young men. The greater frequency of weight cycling was associated with lower psychological well-being for young women. This finding may provide insights into why young women whose weight fluctuated reported lower psychological well-being. One of the reasons why obesity is stigmatized is because obese individuals are perceived to lack self-control and willpower (Crandall and Martinez 1996; Crandall 1994), thus the inability to control one's weight by weight cycling may reinforce or even increase the stigma of obesity. This reinforced or increased stigma of obesity is likely to affect women more than men as thinness is much more highly valued for women, especially during young adulthood (Sobal 2005; Harris 1990). However, the stigma of obesity

that women experience during young adulthood may be lessened if the attribution for why one is obese is considered. Previous research has demonstrated that if obesity is attributable to an internal mechanism, such as lack of willpower or self-control, the stigma of obesity is generally greater, whereas if it is attributed to an external mechanism, such as genetics, the stigma of obesity tends to be less (Hilbert, Rief, and Brachlet 2008; Saguy and Riley 2005; Crandall and Martinez 1996; Crandall 1994).

Summary

Results show that there are general and age-specific mechanisms that explain the association between body weight and psychological well-being among young, middle-aged, and older adults. For all age groups, weight perception explained the association between body weight and psychological well-being, yet differences did occur among young, middle-aged, and older adults in how weight perception varied within age groups. Specifically, young and middle-aged adults who perceived their weight as either underweight or very overweight was associated with lower psychological well-being than their respective counterparts who perceived their weight as about right. However, unlike both young and middle-aged adults, it was only older adults who perceived their weight as very overweight who reported lower psychological well-being. This finding likely reflects the fact that frailty is more common among older adults (Losonczy et al. 1995; Launer et al. 1994), and thus perceiving an individual's weight as underweight does not contribute to lower psychological well-being in the same way as it does for young and middle-aged adults because older adults' respective reference group is likely to be underweight as well.

For middle-aged adults, the age-specific mechanism that explained the association between body weight and psychological well-being was perceived discrimination. Middle-aged

adults have the highest obesity prevalence rate among adults (Flegal et al. 2010), and the findings suggest that they are larger targets for perceiving discrimination. For both young and middle-aged adults, physical health explained the association between body weight and psychological well-being but it did not for older adults. For instance, middle-aged adults who experienced chronic conditions reported lower psychological well-being than older adults, net of BMI and demographic characteristics. There are three possible reasons for explaining why physical health explained the association between body weight and psychological well-being. One, the health consequences of obesity, such as poorer physical health or chronic conditions, that are experienced earlier in the life course are likely to be more distressing because they occurred "off-time" as opposed to "on-time" (Elder et al. 2003; Settersten 1999; Elder 1994). Two, as the results show, young and middle-aged adults were less likely to be normal weight or thin at the age of 21, thus the health consequences of obesity may develop and accumulate earlier in the life course and contribute to poorer psychological well-being for these age groups. Last, the role of physical health in the association between body weight and psychological well-being may be weaker because there are other causes of poorer physical health besides obesity that may contribute to lower psychological well-being during older adulthood (Ormel et al. 1998).

Limitations and Future Directions

Although the present study helps to clarify the association between body weight and psychological well-being over the adult life course and its possible mechanisms for different age groups, it has several limitations to consider. First, because the MIDUS data are cross-sectional, causal order cannot be determined. For instance, it is unclear whether obese individuals report lower psychological well-being, or if the direction of the relation is in the opposite direction. Individuals who have lower psychological well-being may be more prone to gaining weight and

becoming obese than individuals with higher psychological well-being. Additionally, intra-individual changes cannot be assessed because life course studies require longitudinal data. Age is used in the present study as a proxy for aging, but it cannot be confirmed as to whether age or cohort effects are expressed in the results. Second, discrimination is based on individuals' perceptions, so it may not reflect actual incidents of discrimination. Last, the weight cycling measure used only asks respondents how many times in their lifetime they lost 10 or pounds and does not necessarily specify whether respondents regained the lost weight, or maintained their weight for a period of time and then subsequently lost more weight. These patterns of weight loss may have differential effects on psychological well-being. Despite these limitations, the present study sheds light on the heterogeneity among obese individuals with respect to psychological well-being, and advances research by clarifying the mechanisms among young, middle-aged, and older adults that explain the association between body weight and psychological well-being.

Future studies should employ longitudinal data to better understand individuals' weight trajectories on psychological well-being, along with understanding how the possible mechanisms operate throughout the adult life course. It is also important to examine race differences when trying to understand the association between body weight and psychological well-being and its mechanisms. Research has shown that the obesity prevalence rates are higher for racial minorities than whites (Flegal et al. 2010), thus the association between body weight and psychological well-being is likely to be different. Moreover, the mechanisms that help to explain the association are likely to be different because the social consequences of obesity are less severe for racial minorities than whites (Averett and Korenman 1999; Hebl and Heatherton 1998). Future research should also explore how the current high obesity prevalence rate among

both children and adolescence (Ogden et al. 2010) and adults (Flegal et al. 2010) will affect the association between body weight and psychological well-being and its mechanisms. Studies have suggested that the stigma of obesity has increased (Andreyeva et al. 2008), thus the consequences of obesity may develop eariler and persist throughtout the life course. On the other hand, obesity may become more normalized and the consequences may diminish or change in the future.

It is unlikely that obesity will decrease in importance in the years to come as it is associated with many social, psychological, and health outcomes. The present study helps to inform social policies that there are distinctive mechanisms that explain the association between body weight and psychological well-being for different age groups. Recogntion of these different mechanisms for different age groups by clinicians and through public education can help obese individuals increase their psychological well-being. For instance, improving an individual's physical health can help to increase psychological well-being for morbidly obese adults who are young and middle-aged. In addition to these two factors, it is also important to decrease weight-based discrimination to increase psychological well-being for morbidly obese individuals, particularly for middle-aged adults. This can be accomplished by introducing legislative changes that prohibits weight-based discrimination. Perhaps the ultimate strategy that would be helpful for improving obese individuals' psychological well-being is by promoting body diversity and challenging the conventional wisdom that overweight and obesity leads to poor outcomes (Saguy and Riley 2005).

NOTES

1. The correlation between the continuous BMI measure and continuous weight perception measure is 0.67 ($p<.001$).
2. In preliminary analyses, a categorical indicator was used to assess weight cycling where not ever experiencing weight cycling was the reference group. Three dichotomous indicators were created to assess low weight cycling (defined as 1 or 2 times), medium weight cycling (defined as 3, 4, or 5 times), and high cycling (defined as 6, 7, 8, 9, or 10 times). The results of these analyses are very similar to the results presented.
3. Different demographic characteristics explained the moderating effect of gender on the association between body weight and psychological well-being for different BMI categories. For respondents who were classified as obese II/III, the inclusion of marital status into the model explained the moderating effect of gender away, whereas for respondents who were classified as obese I, the moderating effect was explained by socioeconomic status (i.e., educational attainment and occupation status), net of marital status and race. Respondents who were classified as overweight, the moderating effect of gender was explained by an individual's BMI at the age of 21 or having a child, net of marital status, race, and socioeconomic status.
4. In preliminary analyses, an interaction term between gender and the categorical indicator of weight cycling was used. The results of these analyses revealed that only women who experienced high weight cycling, as opposed to low or medium weight cycling, reported lower psychological well-being. Women who experienced high weight cycling reported psychological well-being scores that were 0.25 points lower than men who experienced high weight cycling.

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Table 1 Means (and Standard Deviations) or Percentages of All Variables in the Analysis by Age Group

	Total Sample	Young[a] Adults (age 25-39)	Middle-Aged[b] Adults (age 40-59)	Older[c] Adults (aged 60+)	Significant Subgroup Differences
Dependent variable					
Psychological Well-Being (1-7)	5.45	5.49	5.49	5.47	
	(0.02)	(0.03)	(0.03)	(0.04)	
Independent variables					
Body Mass Index (BMI)					
Normal (18.5 – 24.9)	39.96	46.63	35.97	34.77	ab; ac
Overweight (25 – 29.9)	36.72	34.80	38.03	37.85	
Obese I (30 – 34.9)	15.22	12.02	16.95	18.08	ab; ac
Obese I/III (≥ 35)	8.10	6.54	9.05	9.29	
Demographics					
Sex					
Male	44.15	43.74	45.84	41.46	
Female	55.85	56.26	54.16	58.54	
Marital status					
Married	68.31	62.76	72.73	70.36	ab; ac
Divorced or separated	15.62	15.31	18.99	9.24	ab; ac; bc
Widowed	4.63	0.28	2.96	16.91	ab; bc; ac
Never married	11.44	21.65	5.32	3.49	ab; ac
Race					
White	83.95	80.31	85.40	88.33	ab; ac
African American	11.37	12.68	10.97	9.57	
Other race	4.67	7.02	3.63	2.10	ab; ac
Has any children (1=Yes)	80.27	68.29	87.99	88.45	
Education					
< 12 years	13.12	7.60	11.62	27.43	
12 years	38.33	37.76	37.80	40.60	
13-15 years	25.49	30.18	24.07	18.96	ab; bc; ac
≥ 16 years	23.05	24.45	26.51	13.01	ac; bc
Currently Employed (1=Yes)	61.20	73.37	68.63	21.02	ac; bc

Occupation					
Upper White-Collar	43.80	42.87	46.01	41.07	
Lower White-Collar/Blue-Collar	56.20	57.13	53.99	58.93	
BMI at age 21: normal/underweight (1=Yes)	78.36	74.56	79.64	83.37	ab; ac
Discrimination					
Ever experienced any discrimination, due to weight	7.84	10.23	7.28	4.16	ab; ac; bc
Ever experienced any discrimination, due to other reason	54.92	60.23	56.30	41.31	ac; bc
Weight Perception					
Underweight	4.29	5.83	3.27	3.29	ab
About the right weight	30.69	35.54	27.17	28.18	ab; ac
Somewhat overweight	51.56	48.58	54.32	51.83	ab
Very overweight	13.47	10.05	15.24	16.69	ab; ac
Weight Control Behaviors					
# times lose 10+ pounds (0-10)	2.94 (0.06)	2.48 (0.10)	3.32 (0.10)	3.05 (0.15)	ab; ac
Special diet (1=Yes)	11.78	9.62	13.42	12.74	ab
Physical Health					
Self-reported health (1=Poor/Fair)	16.50	10.80	16.57	27.89	ab; ac; bc
Chronic conditions (0-6)	2.28 (0.04)	1.85 (0.07)	2.39 (0.07)	2.92 (0.10)	ab; ac; bc
N	2931	950	1364	617	
%	100	39.7	40.8	19.6	

Notes: $N = 2{,}931$. Weighted results are presented. Column totals may not equal to 100 percent because of rounding error. Significant subgroup differences ($p \leq .05$) are denoted as ab: young adults versus middle-aged adults; ac: young adults versus older adults; bc: middle-aged adults versus older adults

Table 2 OLS Regression of Psychological Well-Being on BMI, Demographic Characteristics, Perceived Discrimination, Weight Perception, Weight Control Behaviors, and Physical Health, for Young Adults (age 25-39)

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Independent variables														
Body Mass Index														
(Normal weight is reference)														
Overweight (25-29.9)	-0.07		-0.08		-0.08		-0.08		-0.07		-0.08		-0.08	
	(0.07)		(0.06)		(0.06)		(0.07)		(0.06)		(0.06)		(0.06)	
Obese I (30-34.9)	-0.11		-0.11		-0.09		-0.05		-0.10		0.002		0.003	
	(0.09)		(0.09)		(0.09)		(0.10)		(0.09)		(0.10)		(0.10)	
Obese II/III (≥35)	-0.35	***	-0.38	***	-0.33	**[a]	-0.22		-0.34	**	-0.08		-0.08	
	(0.11)		(0.12)		(0.12)		(0.14)		(0.12)		(0.14)		(0.14)	
R^2 at Model 1	0.01													
Demographics														
Sex (1=Female)			-0.08		-0.06	[a]	-0.08		-0.07		-0.03		-0.03	[a]
			(0.05)		(0.05)		(0.06)		(0.05)		(0.05)		(0.05)	
Marital status														
(Married is reference)														
Divorced or separated			-0.34	***	-0.34	***	-0.32	***	-0.34	***	-0.27	***	-0.27	***
			(0.07)		(0.07)		(0.07)		(0.07)		(0.07)		(0.07)	
Widowed			-0.42		-0.43		-0.38		-0.40		-0.43		-0.43	
			(0.43)		(0.43)		(0.43)		(0.43)		(0.41)		(0.41)	
Never married			-0.26	***	-0.25	***	-0.25	***	-0.25	***	-0.23	***	-0.23	***
			(0.07)		(0.07)		(0.07)		(0.07)		(0.07)		(0.07)	
Race														
(White is reference)														
African American			0.17		0.20	*	0.19	*	0.17		0.17		0.17	
			(0.09)		(0.09)		(0.09)		(0.09)		(0.09)		(0.09)	
Other race			0.04		0.06		0.04		0.03		0.06		0.06	
			(0.09)		(0.09)		(0.09)		(0.09)		(0.09)		(0.09)	
Has any children (1=Yes)			-0.15	*	-0.15	*	-0.14	*	-0.15	*	-0.16	**[b]	-0.16	
			(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)	

Currently Employed (1=Yes)	0.02 (0.06)		0.02 (0.06)	[b]	0.02 (0.06)		0.02 (0.06)		0.001 (0.06)		0.001 (0.06)	
Education (High school is reference)												
< 12 years	-0.33 (0.11)	**	-0.33 (0.11)	**	-0.34 (0.11)	**	-0.33 (0.11)	**	-0.24 (0.10)	*	-0.24 (0.10)	*
13-15 years	0.09 (0.06)		0.10 (0.06)		0.08 (0.06)		0.09 (0.06)		0.11 (0.06)		0.11 (0.06)	
≥ 16 years	0.27 (0.07)	***	0.28 (0.07)	***	0.27 (0.07)	***	0.27 (0.07)	***	0.26 (0.07)	***	0.26 (0.07)	***
Occupation (1=Upper White-Collar)	0.08 (0.06)		0.07 (0.06)		0.08 (0.06)		0.08 (0.06)		0.06 (0.05)		0.05 (0.06)	
BMI at age 21: normal/underweight (1=Yes)	-0.06 (0.07)		-0.06 (0.07)		-0.05 (0.07)		-0.07 (0.07)		-0.05 (0.07)		-0.05 (0.06)	
Change in R^2 at Model 2	0.10	***										
Discrimination (No discrimination is reference)												
Ever experienced any discrimination, due to weight			-0.24 (0.09)	**[a]							-0.17 (0.09)	[a]
Ever experienced any discrimination, due to other reason			-0.11 (0.06)	*							-0.07 (0.05)	
Change in R^2 at Model 3			0.01	***								
Weight Perception (About the right weight is reference)												
Underweight					-0.23 (0.11)	*					-0.18 (0.10)	

Somewhat overweight							-0.04										-0.01					
							(0.06)										(0.06)					
Very overweight							-0.27	*									-0.18					
							(0.12)										(0.10)					
Change in R^2 at Model 4							0.01	***														
Weight Control Behaviors																						
# times lose 10+ pounds									-0.01								-0.001					
(0-10)									(0.01)								(0.01)					
Special diet (1=Yes)									-0.01								0.10					
									(0.08)								(0.08)					
Change in R^2 at Model 5									0													
Physical Health																						
Self-reported health													-0.29	***			-0.28	***				
(1=Poor/Fair)													(0.08)				(0.08)					
Chronic conditions (0-6)													-0.09	***			-0.09	***				
													(0.01)				(0.01)					
Change in R^2 at Model 6													0.07	***								
Change in R^2 at Model 7																	0.08	***				
Overall R^2	0.01		0.11		0.12		0.12		0.11		0.18		0.19									
Constant	5.58	***	5.72	***	5.79	***	5.74	***	5.74	***	5.87	***	-0.09	***								
	(0.04)		(0.11)		(0.11)		(0.11)		(0.11)		(0.11)		(0.01)									

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$ (two-tailed tests).

[a] Significant difference in coefficients between young and middle-aged adults.

[b] Significant difference in coefficients between young and older adults.

Source: Midlife Development in the United States 1995.

Notes: $N = 950$. Regression coefficients are unstandardized. Numbers in parentheses are standard errors.

Table 3 OLS Regression of Psychological Well-Being on BMI, Demographic Characteristics, Perceived Discrimination, Weight Perception, Weight Control Behaviors, and Physical Health for Middle-Aged Adults (age 40-59)

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Independent variables														
Body Mass Index (Normal weight is reference)														
Overweight (25-29.9)	-0.05		-0.05		-0.02		-0.05		-0.03		-0.02		-0.02	
	(0.05)		(0.05)		(0.05)		(0.06)		(0.05)		(0.05)		(0.06)	
Obese I (30-34.9)	-0.12		-0.11		-0.06		-0.02		-0.08		-0.03		0.04	
	(0.07)		(0.07)		(0.07)		(0.08)		(0.07)		(0.07)		(0.07)	
Obese II/III (≥35)	-0.21	*	-0.21	*	-0.06	ac	0.02		-0.16		-0.09		0.13	
	(0.09)		(0.09)		(0.10)		(0.12)		(0.10)		(0.10)		(0.12)	
R^2 at Model 1	0.01													
Demographics														
Sex (1=Female)			0.002		0.05	ac	0.02		0.02	c	0.05	c	0.08	a
			(0.05)		(0.05)		(0.05)		(0.05)		(0.05)		(0.05)	
Marital status (Married is reference)														
Divorced or separated			-0.23	***	-0.20	***	-0.23	***	-0.22	***	-0.17	***	-0.16	**
			(0.05)		(0.05)		(0.05)		(0.05)		(0.05)		(0.05)	
Widowed			0.17		0.16		0.16		0.17		0.19	c	0.18	
			(0.12)		(0.12)		(0.12)		(0.12)		(0.11)		(0.11)	
Never married			-0.40	***	-0.35	***	-0.39	***	-0.40	***	-0.39	***	-0.34	***
			(0.11)		(0.11)		(0.11)		(0.11)		(0.10)		(0.10)	
Race (White is reference)														
African American			0.15		0.20	*	0.13		0.14		0.14		0.18	
			(0.09)		(0.09)		(0.09)		(0.09)		(0.09)		(0.09)	
Other race			-0.03		0.003		-0.02		-0.04		-0.02		0.01	
			(0.11)		(0.11)		(0.11)		(0.11)		(0.10)		(0.10)	
Has any children (1=Yes)			-0.08		-0.06		-0.09		-0.08		-0.07		-0.07	

	(0.08)		(0.07)		(0.08)		(0.08)		(0.07)		(0.07)	
Currently Employed	0.07		0.07		0.07		0.06		0.01		0.02	
(1=Yes)	(0.05)		(0.05)		(0.05)		(0.05)		(0.05)		(0.05)	
Education												
(High school is reference)												
< 12 years	-0.21	*	-0.20	*	-0.20	*	-0.21	*	-0.10		-0.10	
	(0.09)		(0.09)		(0.09)		(0.09)		(0.09)		(0.09)	
13-15 years	0.10		0.13	*	0.10		0.11		0.09		0.11	*
	(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.05)	
≥ 16 years	0.31		0.34	***	0.30	***	0.31	***	0.22	***	0.24	***
	(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)	
Occupation (1=Upper	0.03		0.03		0.03		0.03		0.06		0.05	
White-Collar)	(0.05)		(0.05)		(0.05)		(0.05)		(0.05)		(0.05)	
BMI at age 21:	-0.001		-0.02		0.03		-0.01		0.01		0.02	
normal/underweight	(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)	
(1=Yes)												
Change in R^2 at Model 2	0.06	***										
Discrimination												
(No discrimination is reference)												
Ever experienced any discrimination, due to weight			-0.55	***[a]							-0.44	***[a]
			(0.10)								(0.10)	
Ever experienced any discrimination, due to other reason			-0.21	***[c]							-0.17	***
			(0.05)								(0.05)	
Change in R^2 at Model 3			0.03	***								
Weight Perception												
(About the right weight is reference)												
Underweight					-0.42	***					-0.30	*

						(0.13)								(0.13)		
Somewhat overweight						-0.02								0.001		
						(0.06)								(0.06)		
Very overweight						-0.30	***							-0.18		
						(0.10)								(0.10)		
Change in R^2 at Model 4						0.02	***									
Weight Control Behaviors																
# times lose 10+ pounds								-0.01						-0.001		
(0-10)								(0.01)						(0.01)		
								-0.01						0.14	*	
Special diet (1=Yes)								(0.06)						(0.06)		
Change in R^2 at Model 5								0								
Physical Health																
Self-reported health										-0.21	***			-0.21	***	
(1=Poor/Fair)										(0.06)				(0.06)		
Chronic conditions (0-6)										-0.10	***c			-0.10	***	
										(0.01)				(0.01)		
Change in R^2 at Model 6										0.09	***					
Change in R^2 at Model 7														0.11	***	
Overall R^2	0.01		0.07		0.10		0.09		0.07		0.16			0.18		
Constant	5.57	***	5.51	***	5.59	***	5.54	***	5.55	***	5.76	***		5.81	***	
	(0.04)		(0.11)		(0.11)		(0.11)		(0.11)		(0.11)			(0.11)		

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$ (two-tailed tests).

[a] Significant difference in coefficients between young and middle-aged adults.

[c] Significant difference in coefficients between middle-aged and older adults.

Source: Midlife Development in the United States 1995.

Notes: N = 1,365. Regression coefficients are unstandardized. Numbers in parentheses are standard errors.

Table 4 OLS Regression of Psychological Well-Being on BMI, Demographic Characteristics, Perceived Discrimination, Weight Perception, Weight Control Behaviors, and Physical Health for Older Adults (age 60+)

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Independent variables														
Body Mass Index (Normal weight is reference)														
Overweight (25-29.9)	-0.05		-0.09		-0.07		-0.03		-0.07		-0.08		-0.01	
	(0.07)		(0.07)		(0.07)		(0.09)		(0.07)		(0.07)		(0.09)	
Obese I (30-34.9)	-0.15		-0.16		-0.14		0.02		-0.12		-0.11		0.05	
	(0.09)		(0.09)		(0.09)		(0.12)		(0.10)		(0.09)		(0.12)	
Obese II/III (≥35)	-0.46	***	-0.43	***	-0.37	**c	-0.14		-0.38	**	-0.28	*	-0.02	
	(0.12)		(0.12)		(0.13)		(0.17)		(0.13)		(0.12)		(0.16)	
R^2 at Model 1	0.03													
Demographics														
Sex (1=Female)			-0.13		-0.12	c	-0.10		-0.12	c	-0.12	c	-0.09	c
			(0.07)		(0.07)		(0.07)		(0.07)		(0.07)		(0.07)	
Marital status (Married is reference)														
Divorced or separated			-0.18		-0.18		-0.17		-0.18		-0.21	*	-0.20	*
			(0.10)		(0.10)		(0.10)		(0.10)		(0.09)		(0.09)	
Widowed			-0.03		-0.04		-0.04		-0.03		-0.03	c	-0.04	c
			(0.08)		(0.08)		(0.08)		(0.08)		(0.08)		(0.08)	
Never married			-0.47	**	-0.36	*	-0.46	*	-0.47	*	-0.43	*	-0.37	*
			(0.18)		(0.18)		(0.18)		(0.18)		(0.18)		(0.18)	
Race (White is reference)														
African American			0.14		0.17		0.10		0.12		0.11		0.09	
			(0.14)		(0.14)		(0.14)		(0.14)		(0.13)		(0.14)	
Other race			-0.12		-0.08		-0.12		-0.13		-0.06		-0.04	
			(0.19)		(0.19)		(0.19)		(0.19)		(0.19)		(0.19)	
Has any children (1=Yes)			0.04		0.02		0.05		0.04		0.04	b	-0.03	b

	(0.11)		(0.11)		(0.11)		(0.11)		(0.11)		(0.11)	
Currently Employed	0.16	*	0.17	*b	0.16	*	0.16	*	0.10		0.10	
(1=Yes)	(0.07)		(0.07)		(0.07)		(0.07)		(0.07)		(0.07)	
Education												
(High school is reference)												
< 12 years	-0.18	*	-0.16		-0.19	*	-0.17		-0.10		-0.10	
	(0.09)		(0.09)		(0.09)		(0.09)		(0.09)		(0.09)	
13-15 years	0.09		0.10		0.09		0.09		0.06		0.07	
	(0.08)		(0.08)		(0.08)		(0.08)		(0.08)		(0.08)	
≥ 16 years	0.22	*	0.25	**	0.24	**	0.23	*	0.16		0.19	*
	(0.09)		(0.09)		(0.09)		(0.09)		(0.09)		(0.09)	
Occupation (1=Upper	0.04		0.03		0.03		0.04		0.07		0.06	
White-Collar)	(0.07)		(0.07)		(0.07)		(0.07)		(0.07)		(0.07)	
BMI at age 21:	-0.04		-0.03		-0.02		-0.05		-0.03		-0.01	
normal/underweight	(0.09)		(0.09)		(0.09)		(0.09)		(0.09)		(0.09)	
(1=Yes)												
Change in R^2 at Model 2	0.07	***										
Discrimination												
(No discrimination is reference)												
Ever experienced any discrimination, due to weight			-0.49	**							-0.41	*
			(0.17)								(0.17)	
Ever experienced any discrimination, due to other reason			-0.06	c							-0.04	c
			(0.06)								(0.06)	
Change in R^2 at Model 3			0.01	***								
Weight Perception												
(About the right weight is reference)												
Underweight					-0.18						-0.17	

						(0.19)							(0.19)			
Somewhat overweight						-0.08							-0.09			
						(0.09)							(0.09)			
Very overweight						-0.36	**						-0.30	*		
						(0.14)							(0.14)			
Change in R^2 at Model 5						0.01										
Weight Control Behaviors																
# times lose 10+ pounds								-0.01					-0.0002			
(0-10)								(0.01)					(0.01)			
								-0.03					0.08			
Special diet (1=Yes)								(0.09)					(0.09)			
Change in R^2 at Model 5								0								
Physical Health																
Self-reported health												-0.27	***	-0.26	***	
(1=Poor/Fair)												(0.08)		(0.08)		
Chronic conditions (0-6)												-0.06	***c	-0.06	***c	
												(0.02)		(0.02)		
Change in R^2 at Model 6												0.06	***			
Change in R^2 at Model 7														0.08	***	
Overall R^2	0.03		0.10		0.11		0.11		0.10		0.16		0.18			
Constant	5.58	***	5.61	***	5.63	***	5.60	***	5.64	***	5.82	***	5.83	***		
	(0.05)		(0.15)		(0.15)		(0.15)		(0.15)		(0.15)		(0.16)			

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$ (two-tailed tests).

[b] Significant difference in coefficients between young and older adults.

[c] Significant difference in coefficients between middle-aged and older adults.

Source: Midlife Development in the United States 1995.

Notes: $N = 617$. Regression coefficients are unstandardized. Numbers in parentheses are standard errors.

Figure 1. Predicted Psychological Well-Being for Young Adults, by Current BMI and Gender

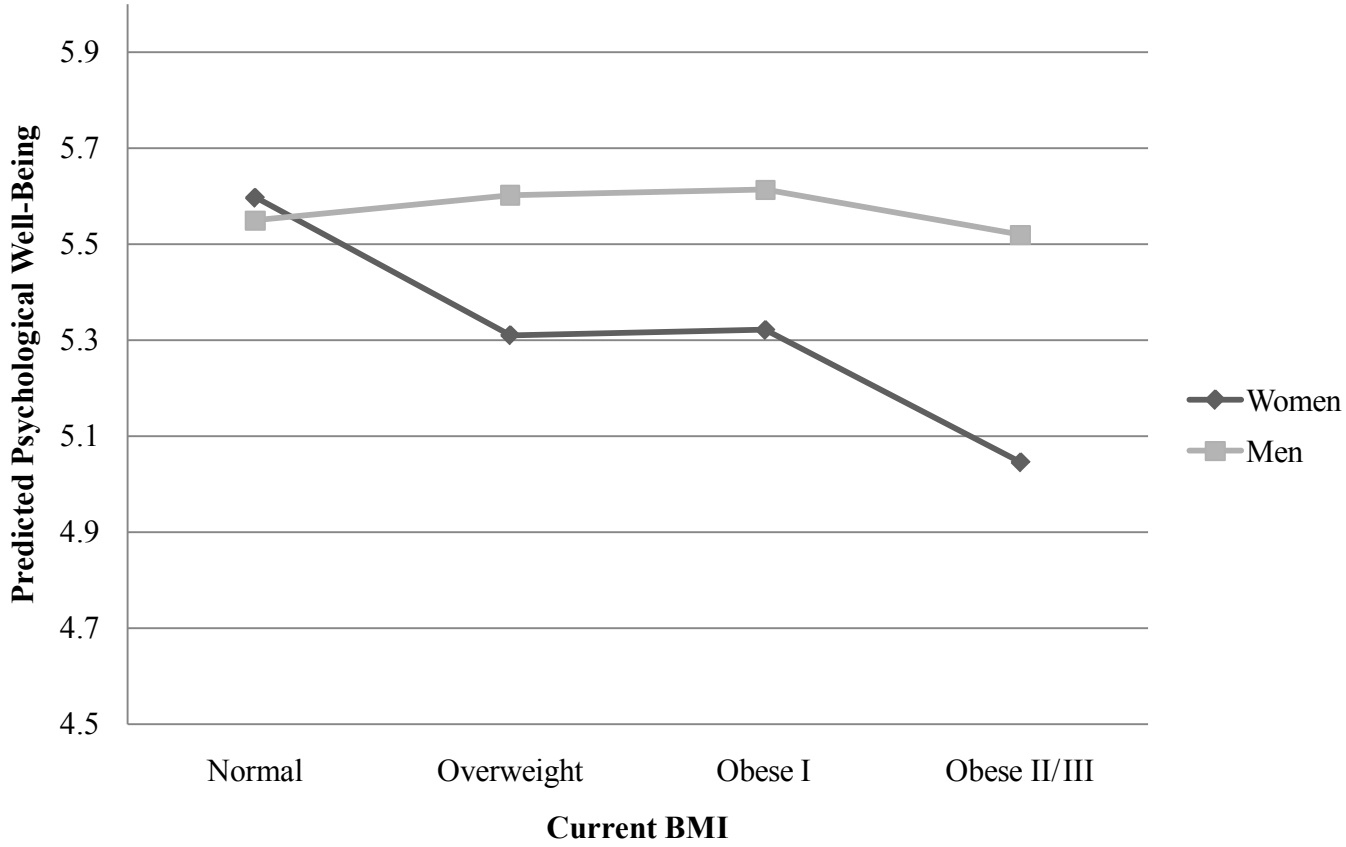
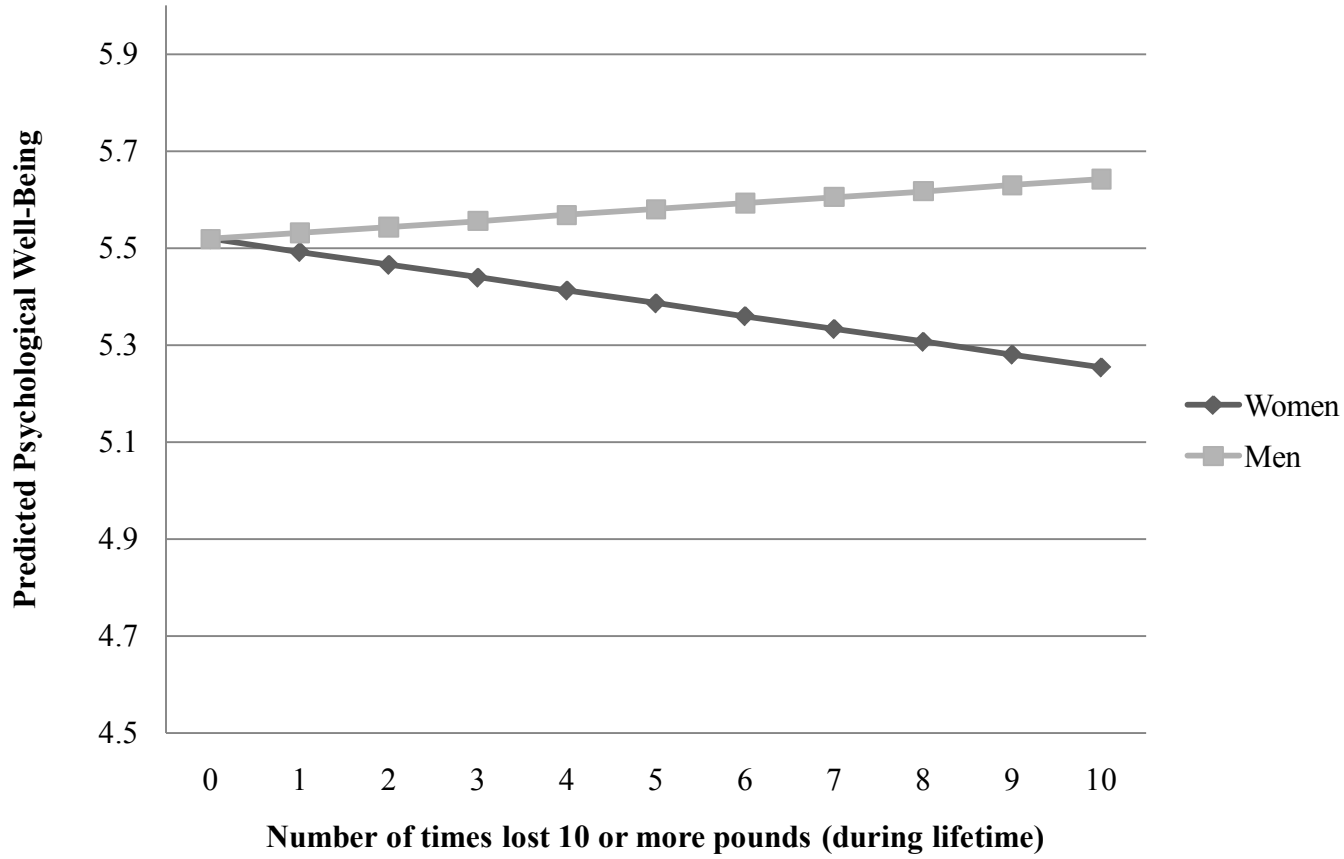


Figure 2. Predicted Psychological Well-Being of Young Adults, by Gender and Weight Cycling, Net of Demographic Characteristics



Note: Weight cycling variable has been centered.

APPENDIX

Table A1 Means (and Standard Deviations) or Percentages of All Variables in the Analysis by Body Mass Index for Young Adults (age 25-39)

	Total Sample	Normal[a] (18.5 – 24.9)	Overweight[b] (25 – 29.9)	Obese I[c] (30 – 34.0)	Obese II/III[d] (≥35)	Significant Subgroup Differences
Dependent variable						
Psychological Well-Being (1-7)	5.49	5.56	5.48	5.41	5.20	ad; bd
	(0.03)	(0.04)	(0.05)	(0.08)	(0.12)	
Independent variables						
Demographics						
Age	32.46	32.09	32.57	33.32	32.87	ac
	(0.15)	(0.21)	(0.24)	(0.48)	(0.64)	
Sex						
Male	43.74	36.85	55.29	46.61	26.24	ab; bd; cd
Female	56.26	63.15	44.71	53.39	73.76	ab; bd; cd
Marital status						
Married	62.76	62.93	64.01	63.32	53.92	
Divorced or separated	15.31	15.44	15.50	12.91	17.80	
Widowed	0.28	0.25	0.27	0.58	0	
Never married	21.65	21.38	20.23	23.19	28.28	
Race						
White	80.31	84.77	78.68	74.60	67.56	ac; ad
African American	12.68	7.84	14.62	18.56	26.00	ab; ac; ad
Other race	7.02	7.39	6.70	6.84	6.44	
Has any children (1=Yes)	68.29	65.80	71.67	73.55	58.40	
Education						
< 12 years	7.60	5.67	8.61	13.04	6.04	ac
12 years	37.76	36.72	37.74	40.74	39.88	
13-15 years	30.18	30.22	30.59	29.07	29.65	
≥ 16 years	24.45	27.39	23.06	17.15	24.42	ac

Currently Employed (1=Yes)	73.37	71.24	78.40	70.32	67.51	ab
Occupation						
Upper White-Collar	42.87	46.64	39.11	41.43	38.69	
Lower White Collar/Blue-Collar	57.13	53.36	60.89	58.57	61.31	
BMI at age 21: normal/underweight (1=Yes)	74.56	95.66	69.76	37.17	18.44	ab; ac; ad; bc; bd; cd
Discrimination						
Ever experienced any discrimination, due to weight	10.23	4.77	8.72	21.66	36.17	ac; ad; bc; bd
Ever experienced any discrimination, due to other reason	60.23	64.39	58.76	53.80	50.20	
Weight Perception						
Underweight	5.83	11.13	1.41	1.20	0	ab; ac
About the right weight	35.54	56.53	24.85	4.39	0	ab; ac; bc
Somewhat overweight	48.58	31.81	69.14	64.14	30.21	ab; ac; bd; cd
Very overweight	10.05	0.53	4.60	30.27	69.79	ab; ac; ad; bc; bd; cd
Weight Control Behaviors						
# times lose 10+ pounds (0-10)	2.48 (0.10)	1.64 (0.12)	2.61 (0.17)	3.86 (0.37)	5.29 (0.53)	ab; ac; ad; bc; bd; cd
Special diet (1=Yes)	9.62	8.60	8.10	14.10	16.78	bd
Physical Health						
Self-reported health (1=Poor/Fair)	10.80	9.11	7.74	17.39	26.83	ac; ad; bc; bd
Chronic conditions (0-6)	1.85 (0.07)	1.73 (0.09)	1.71 (0.11)	2.15 (0.22)	2.96 (0.30)	ad; bd; cd
N	950	443	331	114	62	

%	100	46.63	34.80	12.02	6.54

Notes: $N = 950$. Weighted results are presented. Column totals may not equal to 100 percent because of rounding error. Significant subgroup differences ($p \leq .05$) are denoted as ab: normal versus overweight; ac: normal versus obese I; ad: normal versus obese II/III; bc: overweight versus obese I; bd: overweight versus obese II/III; cd: obese I versus obese II/III.

Table A2 Means (and Standard Deviations) or Percentages of All Variables in the Analysis by Body Mass Index for Middle-Aged Adults (age 40-59)

	Total Sample	Normal[a] (18.5 – 24.9)	Overweight[b] (25 – 29.9)	Obese I[c] (30 – 34.0)	Obese II/III[d] (≥35)	Significant Subgroup Differences
Dependent variable						
Psychological Well-Being (1-7)	5.49 (0.03)	5.55 (0.04)	5.51 (0.04)	5.38 (0.06)	5.34 (0.10)	ac; ad
Independent variables						
Demographics						
Age	48.35 (0.18)	47.55 (0.29)	48.96 (0.29)	48.91 (0.45)	47.95 (0.55)	ab; ac
Sex						
Male	45.84	35.31	57.03	49.18	34.42	ab; ac; bd; cd
Female	54.16	64.69	42.97	50.82	65.58	ab; ac; bd; cd
Marital status						
Married	72.73	68.61	75.12	72.93	78.66	ab; ad
Divorced or separated	18.99	22.78	17.95	16.62	12.80	ad
Widowed	2.96	2.87	2.47	4.52	2.44	
Never married	5.32	5.74	4.46	5.92	6.10	
Race						
White	85.40	86.96	84.99	86.86	78.16	
African American	10.97	8.87	11.32	11.26	17.32	
Other race	3.63	4.17	3.69	1.88	4.52	
Has any children (1=Yes)	87.99	86.71	88.84	89.22	87.22	
Education						
< 12 years	11.62	13.97	9.38	14.01	7.22	
12 years	37.80	30.84	42.39	37.66	46.41	ab; ad
13-15 years	24.07	25.51	21.43	25.91	26.01	
≥ 16 years	26.51	29.68	26.79	22.42	20.36	ac
Currently Employed (1=Yes)	68.63	68.92	68.83	70.70	62.74	
Occupation						

Upper White-Collar	46.01	49.55	43.21	43.77	47.87	
Lower White Collar/Blue-Collar	53.99	50.45	56.79	56.23	52.13	
BMI at age 21: normal/underweight (1=Yes)	79.64	97.32	81.75	61.57	34.38	ab; ac; ad; bc; bd; cd
Discrimination						
Ever experienced any discrimination, due to weight	7.28	1.17	3.48	12.72	37.40	ab; ac; ad; bc; bd; bd
Ever experienced any discrimination, due to other reason	56.30	57.11	60.92	54.67	36.81	ad; bd; cd
Weight Perception						
Underweight	3.27	7.80	0.52	0.60	1.80	ab; ac; ad
About the right weight	27.17	57.37	15.79	2.32	1.46	ab; ac; ad; bc; bd
Somewhat overweight	54.32	33.93	77.18	65.55	18.26	ab; ac; ad; bc; bd; cd
Very overweight	15.24	0.90	6.51	31.53	78.47	ab; ac; ad; bc; bd; cd
Weight Control Behaviors						
# times lose 10+ pounds (0-10)	3.32 (0.10)	2.01 (0.12)	3.19 (0.15)	4.70 (0.24)	6.49 (0.36)	ab; ac; ad; bc; bd; cd
Special diet (1=Yes)	13.42	10.91	13.09	13.43	24.81	ad; bd; cd
Physical Health						
Self-reported health (1=Poor/Fair)	16.57	12.65	13.53	23.91	31.17	ac; ad; bc; bd
Chronic conditions (0-6)	2.39 (0.07)	2.21 (0.11)	2.28 (0.10)	2.70 (0.16)	2.97 (0.23)	ac; ad; bc; bd

N	1364	491	519	231	123
%	100	35.97	38.03	16.95	9.05

Notes: $N = 1{,}364$. Weighted results are presented. Column totals may not equal to 100 percent because of rounding error. Significant subgroup differences ($p \leq .05$) are denoted as ab: normal versus overweight; ac: normal versus obese I; ad: normal versus obese II/III; bc: overweight versus obese I; bd: overweight versus obese II/III; cd: obese I versus obese II/III.

Table A3 Means (and Standard Deviations) or Percentages of All Variables in the Analysis by Body Mass Index for Older Adults (age 60+)

	Total Sample	Normal[a] (18.5 – 24.9)	Overweight[b] (25 – 29.9)	Obese I[c] (30 – 34.0)	Obese II/III[d] (≥35)	Significant Subgroup Differences
Dependent variable						
Psychological Well-Being (1-7)	5.47	5.54	5.53	5.36	5.16	ad; bd
	(0.04)	(0.05)	(0.06)	(0.10)	(0.13)	
Independent variables						
Demographics						
Age	66.49	67.00	66.83	65.71	64.73	ac; ad; bc; bd
	(0.19)	(0.34)	(0.30)	(0.43)	(0.51)	
Sex						
Male	41.46	31.36	53.13	44.81	25.18	ab; bd; cd
Female	58.54	68.64	46.87	55.19	74.82	ab; bd; cd
Marital status						
Married	70.36	67.33	70.02	78.50	67.19	
Divorced or separated	9.24	8.77	10.28	6.84	11.43	
Widowed	16.91	20.39	17.14	12.31	11.94	
Never married	3.49	3.50	2.56	2.35	9.44	
Race						
White	88.33	94.16	88.99	82.55	75.05	ad; ac
African American	9.57	4.09	8.11	15.89	23.80	ac; ad; bd
Other race	2.10	1.75	2.90	1.56	1.15	
Has any children (1=Yes)	88.45	88.24	86.75	91.62	89.97	
Education						
< 12 years	27.43	23.82	24.61	39.62	28.71	ac; bc
12 years	40.60	44.06	41.13	34.48	37.39	
13-15 years	18.96	16.68	20.22	14.27	31.50	ad; cd
≥ 16 years	13.01	15.43	14.03	11.64	2.41	ad; bd; cd
Currently Employed (1=Yes)	21.08	20.64	19.80	22.58	24.92	
Occupation						

Upper White-Collar	41.07	39.98	43.10	39.26	40.37	
Lower White Collar/Blue-Collar	58.93	60.02	56.90	60.74	59.63	
BMI at age 21: normal/underweight (1=Yes)	83.37	94.60	86.48	69.85	54.94	ab; ac; ad; bc; bd
Discrimination						
Ever experienced any discrimination, due to weight	4.16	1.98	4.41	3.26	13.11	ad
Ever experienced any discrimination, due to other reason	41.31	34.99	46.61	45.73	34.70	ab
Weight Perception						
Underweight	3.29	7.04	1.13	0	4.50	
About the right weight	28.18	63.58	13.45	5.46	0	ab; ac
Somewhat overweight	51.83	28.12	81.05	56.38	12.66	ab; ac; ad; bc; bd; cd
Very overweight	16.69	1.26	4.38	38.16	82.84	ac; ad; bc; bd; cd
Weight Control Behaviors						
# times lose 10+ pounds (0-10)	3.05 (0.15)	1.88 (0.18)	2.62 (0.20)	4.74 (0.42)	5.88 (0.63)	ab; ac; ad; bc; bd
Special diet (1=Yes)	12.74	11.31	8.91	16.63	26.15	ad; bd
Physical Health						
Self-reported health (1=Poor/Fair)	27.89	22.30	27.56	30.78	44.53	ad
Chronic conditions (0-6)	2.92 (0.10)	2.77 (0.16)	2.69 (0.15)	3.22 (0.26)	3.89 (0.32)	ad; bd
N	617	215	234	112	57	
%	100	34.77	37.85	18.08	9.29	

Notes: $N = 617$. Weighted results are presented. Column totals may not equal to 100 percent because of rounding error. Significant subgroup differences ($p \leq .05$) are denoted as ab: normal versus overweight; ac: normal versus obese I; ad: normal versus obese II/III; bc: overweight versus obese I; bd: overweight versus obese II/III; cd: obese I versus obese II/III.