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One Size Doesn't Fit All: Racial/Ethnic Differences in How Women Perceive Their Bodies and Health

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One Size Doesn't Fit All:

Racial/Ethnic Differences in How Women Perceive Their Bodies and Health

A thesis submitted in partial satisfaction

of the requirements for the degree of Master of Science

in Community Health Sciences

by

Catherine Idema

2016

ABSTRACT OF THE THESIS


One Size Doesn't Fit All:

Racial/Ethnic Differences in How Women Perceive Their Bodies and Health


by


Catherine Idema

Master of Science in Community Health Sciences

University of California, Los Angeles, 2016

Professor Dawn M. Upchurch, Chair

Rates of obesity in the United States continue to rise and there is an increased need for obesity

prevention programs. Such programs often do not consider how social and psychological factors

influence the way women view their bodies and overall physical health. How one perceives her

weight (weight perception), how satisfied she is with her body (body satisfaction), and how one

rates her physical health (self-rated health) varies across racial and ethnic groups. The present

study used binary and ordinal logistic regression to assess the relationships among race/ethnicity,

socioeconomic status (SES), and other demographic factors on the outcomes of accuracy of

weight perception, perceived attractiveness, and self-rated health among a sample of young

women (n=7,131) from Wave IV of the National Longitudinal Survey of Adolescent to Adult

Health (Add Health). Racial/ethnic and SES differences in accuracy of weight perception,

perceived attractiveness, and self-rated health were found. Compared to normal weight White

women, normal weight African American women had lower odds of inaccurately perceiving

themselves as overweight. African American women, regardless of weight perception, also had the lowest odds of perceiving themselves as "not at all attractive." Being Hispanic, African American, or Asian was associated with greater odds of reporting poorer health compared to White women. Compared to those with less income and education, having more income and education was associated with greater odds of inaccurately perceiving herself as overweight, less attractive, and reporting better health. These results suggest that the relationships among weight perception, body satisfaction, and self-rated health are complex and differ according to a woman's race/ethnicity. Public health professionals should be conscious of the fact that the experience of weight status is not the same for all women and ensure that messaging and programmatic efforts, particularly in relation to obesity prevention, are sensitive to such differences.

The thesis of Catherine Idema is approved.

Carol S. Aneshensel

May-Choo Wang

Dawn M. Upchurch, Committee Chair

University of California, Los Angeles

2016

DEDICATION

This thesis is dedicated to my grandmother, Jane Hibbard Idema, a woman who boldly fought for

all women to have equal rights and access to education. Her kindness, tenacity, and sense of

adventure inspire me to live fearlessly and with conviction. I carry her memory with me in all

that I do.

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Completing my masters and this thesis has been a difficult yet rewarding journey. I am deeply grateful to the numerous individuals that have supported me along the way. I would first like to offer my sincerest thanks to Dr. Dawn Upchurch, my advisor and committee chair. Her mentorship, unyielding support, and unwavering faith in me gave me the confidence to take on this challenge, and I am indebted to her and grateful for her generosity. I also want to thank my committee members, Dr. Carol Aneshensel and Dr. May Wang, for their suggestions, support, and guidance throughout this process. I offer a special thanks to Adrienne Greer, who selflessly read numerous drafts, offered many suggestions, and supported me in every way during my time at UCLA. To Christopher Dela Pole I offer thanks for his endless patience and support as I end this journey and begin another. Finally, I am deeply grateful for my family, Fred, Carey, Chris and Meagan Idema, whose support and faith in me gave me the courage to embark on this adventure.

**Introduction**

Rates of obesity in the United States continue to rise (Ogden et al., 2016), resulting in an increased need for obesity prevention programs. Yet such programs often do not consider how social and psychological factors influence the way women view their bodies and overall physical health. How one perceives her weight (weight perception), how satisfied she is with her body (body satisfaction), and how one rates her physical health (self-rated health), varies from woman to woman and has an impact on her overall health and wellbeing (DeSalvo et al., 2006; Dorsey, Eberhardt, & Ogden, 2009; Frisco, Houle, & Martin, 2010; Gaskin et al., 2013; Jylha, 2009; Keel et al., 1997; Latham & Peek, 2013; Stice et al., 2002; Stice & Bearman, 2001). However, how these constructs relate to each other is not well understood. Even less understood is how each construct, much less the dynamics of their relationships with each other, manifest within a racially and ethnically diverse population of women.

Body image is defined as "a multifaceted psychological construct that pertains to subjective attitudes and perceptual experiences of one's body, particularly its appearance" (Cash & Pruzinsky, 2004). Negative body image is so prevalent among American women it has been termed a "normative discontent" (Rodin et al., 1985). Weight perception and body satisfaction are two key components of body image. Weight perception is defined as the estimation of one's body size (Gardner, 1996) and is often measured by the question, "In general, how do you think of yourself in terms of weight?" (Chang et al., 2003; Dorsey et al., 2009). Body satisfaction is defined as the extent to which one is pleased with his/her body (Thompson, et al., 1999). There are over 100 valid measures of body satisfaction (Thompson et al., 1995), including body-part satisfaction inventories (Graber at al., 1994; Thompson, 1990; Wardle, Waller, & Rapoport, 2001), body image surveys (Annis et al., 2004; Buddeberg-Fisher, 1999; Frederick et al., 2007),

body weight dissatisfaction surveys (Matthisadottir et al., 2012; Neighbors & Sobal, 2007), body satisfaction evaluations (Cash & Henry, 1995; Johnson & Wardle, 2005), and perceived attractiveness (Chithambo & Huey, 2013; Page et al., 2009). For the present study, body satisfaction is conceptualized as perceived attractiveness, which is measured by the question, "How attractive are you?," with responses ranging on a 5-point Likert scale from *1 = very attractive* to *5 = not at all attractive*.

Subjective health, or self-rated health, is defined as "an individual's perceived physical or mental health over time" (Taylor, 2000). It is a multidimensional, subjective construct that is developed based on various sources of information, including current psychological and physical states and functioning (Krause and Jay, 1994; Schuz et al., 2011). It is a significant predictor of mortality and morbidity (DeSalvo et al., 2006; Jylha, 2009; Latham & Peek, 2013). Self-rated health is measured by the question, "In general, how is your health?" (answers ranging from *1 = excellent* to *5 = poor*) and is a stronger indicator of poor health than many biological health factors (Herman et al., 2013; Heshmat et al., 2015; Idler & Benyamini, 1997).

Both weight perception and body satisfaction have significant implications for health outcomes. Weight perception, accurate or inaccurate, is associated with an increased risk of eating disorders, depression, and obesity (Dorsey, Eberhardt, & Ogden, 2009; Frisco, Houle, & Martin, 2010; Gaskin et al., 2013). Similarly, low body satisfaction is associated with greater emotional distress (Johnson and Wardle, 2005), an increased risk of eating disorders (Keel et al., 1997; Stice et al., 2002) and depression (Stice & Bearman, 2001). Weight perception and body satisfaction are also related to self-rated health. Both the perception of being overweight and low body satisfaction are associated with poor ratings of health (Herman et al., 2013; Heshmat et al., 2014; Page et al., 2009).

In addition to the accuracy of weight perception, the direction (over or under-estimation) of perception also affects health outcomes. For example, the inaccurate perception of oneself as overweight is associated with eating disorders and dieting behaviors (Frisco et al., 2010; Gaskin et al., 2013; Liechty, 2010). A study using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) found among healthy-weight adolescent girls, those who viewed themselves as overweight were more likely to engage in unsafe dieting behaviors (e.g., vomiting, laxatives, and diet pills), compared to those who viewed themselves as normal weight (Liechty, 2010). Conversely, the inaccurate perception of oneself as a healthy weight when overweight is associated with obesity (Dorsey, Eberhardt, & Ogden, 2010). For example, a study using data from the National Health and Nutrition Examination Survey (NHANES) found overweight and obese individuals who perceived themselves as normal or healthy weight were less likely to engage in weight management behaviors (e.g., diet and exercise) (Dorsey, Eberhard, & Ogden, 2010).

Similar to weight perception, the direction of body satisfaction (high versus low) has an impact on health. A prospective study of adolescents found low levels of body satisfaction at time one predicted symptoms of depression and low self-esteem at follow-up (Paxton, Neumark-Sztainer and Eisenberg, 2006). Furthermore, a study of adolescent girls found low body satisfaction predicted the future onset of eating disorders (McKnight Investigators, 2003). In contrast, high body satisfaction can be a protective health factor, particularly in overweight adolescents. One study of overweight adolescents found compared to those with lower levels of body satisfaction, those with higher satisfaction had a decreased likelihood of engaging in unhealthy weight control behaviors, had higher levels of self-esteem, and lower rates of depression and anxiety symptomology (Cromley et al., 2012). Additionally, a study of

overweight adolescent girls found those with higher body satisfaction were at a lower risk of an increased body mass index (BMI) at 5-year follow-up than those girls with lower body satisfaction (ven den Berg & Neumark-Sztainer, 2007).

The valence self-rated health (poor to excellent) is also predictive of health outcomes, including mortality and future chronic disease morbidity, and studies have shown poor self-rated health is a strong predictor of mortality across populations. For example, a meta-analysis of the self-rated health literature found across 22 eligible cohorts persons with poorer self-rated health had two-times the mortality risk compared to those with health ratings of "excellent" (DeSalvo et al., 2005). Furthermore, a recent study of US adults found poor self-rated health predicted the onset of cardiovascular heart disease, diabetes, stroke, lung disease, and arthritis, independent of other factors (Latham & Peek, 2013).

Taken together, the research on weight perception, body satisfaction, and self-rated health suggests that each construct has a role in driving particular health behaviors and outcomes. However, the risk associated with each construct is not distributed evenly across all populations. More specifically, gender, race and ethnicity, and socioeconomic status place individuals at a differential risk of having inaccurate weight perception, low body satisfaction, and poor self-rated health.

**Gender Differences in Weight Perception, Body Satisfaction, and Self-Rated Health**

A large proportion of adults have inaccurate weight perceptions (Chang & Christakis, 2003) and such inaccuracies have become even more prevalent in recent years (Johnson-Taylor et al., 2008). As the average American weight has increased, so too has the general perception of what is a "normal" weight (Kuk et al., 2009). Patterns of weight perception, however, differ across gender. Compared to men, women, regardless of weight, are more likely to perceive

themselves as overweight (Christensen, 2012, 2008; Gillen & Lefkowitz, 2011; Wardle et al., 2006). Similarly, girls are more likely than boys to perceive themselves as overweight, regardless of measured weight (Fuchs et al., 2012; Martin et al., 2009).

As with inaccurate weight perception, low body satisfaction is chronic in Western cultures (Neumark-Stziner et al., 2002; Ricciardelli & McCabe, 2001) and can be problematic for both genders. One recent study of American adolescents found that at age 14, 57.1% of girls and 44.0% of boys were dissatisfied with their bodies (Dion et al., 2014). By age 18, 64.8% of girls were dissatisfied with their bodies, yet the change in the percentage of boys with increased body dissatisfaction from age 14 to 18 was not significant (Dion et al., 2014). Additionally, a study of US adults (aged 19-34) found that overweight men perceived themselves as significantly more attractive than did overweight women (McCreary & Sadava, 2001). Though men and boys do experience body dissatisfaction, the rate of body dissatisfaction in women and girls is consistently higher than that in men (Bucchianeri et al., 2013; Lawler & Nixon, 2011; Meland, Haugland, & Breidablik, 2007). Indeed, as much as 75% of women report concerns related to their weight and body shape affect their level of happiness (Reba-Harrelson et al., 2009).

Similarly, there are gender differences in self-rated health, such that women tend to report poorer health than men. A study of American and Canadian adults found American women reported poorer health than American men, while there were no significant differences among the Canadian adults (Prus, 2011). Furthermore, a study of adults across the European Union found that in every country women reported worse health than men (Olsen & Dahl, 2007). Finally, studies investigating gender differences in self-rated health among adolescents found girls were more likely than boys to report poorer health (Almgren et al., 2009; Udry, 2003).

Overall, these findings demonstrate a clear gender disadvantage when it comes to weight perception, body satisfaction, and self-rated health. Women are more likely to inaccurately perceive themselves as overweight and to have lower levels of body satisfaction and poorer self-rated health compared to men. However, whether women of different race/ethnicities are adversely affected equally is less clear.

**Racial/Ethnic Differences in Weight Perception, Body Satisfaction, and Self-Rated Health Among Women**

Researchers generally conclude that compared to African American women, White, Hispanic and Asian women are more likely to perceive themselves as overweight (Aruguete et al., 2004; Bennet & Wolin, 2006; Boyd et al., 2011; Gillen & Lefokowtiz, 2011; Jiang et al., 2014; Kronenfeld et al., 2010; Kuchler & Variyam, 2003; Paeratakul et al., 2002; Yost et al., 2010). However, differences in weight perception among White, Hispanic, and Asian women are less consistent. Some studies find, regardless of weight, Hispanic women are just as likely as White women to perceive themselves as overweight (Aruguete et al., 2004; Boyd et al., 2011; Gillen & Lefokowtiz, 2011; Kronenfeld et al., 2010; Langellier et al., 2014), while others find Hispanic women are less likely to perceive themselves as overweight (Chang & Christakis, 2003; Dorsey, Eberhardt, & Ogden, 2009). A longitudinal study of adolescents found Hispanic and White girls did not differ in their likelihood of perceiving themselves as overweight (Gillen & Lefkowtiz, 2011), while a study using NHANES found Hispanic women were less likely than White women to perceive themselves as overweight (Chang & Christakis, 2003). Similarly, Asian American women have shown to be both more and less likely than White women to perceive themselves as overweight. One study using Waves I and II of Add Health found that over time compared to White girls, Asian American girls were more likely to underestimate their

weight (Martin et al., 2009), yet this effect was driven only by those Asian girls who were overweight. Conversely, a study using Wave I of Add Health found, compared to White girls, Asian girls were more likely to perceive themselves as overweight (Boyd et al., 2011). Such conflicting findings point to a need for a clearer understanding of the role of race/ethnicity in shaping weight perceptions.

Overall, African American women and girls tend report higher levels of body satisfaction than White, Hispanic, and Asian women and girls (Ali et al., 2013; Anderson et al., 2002; Boyd et al., 2011; Gluck et al., 2002). One study using Wave IV of Add Health found that African American women, regardless of BMI, were more likely than White women to perceive themselves as "very attractive" (Chithambo & Huey, 2013). Another national study found that African American women reported higher levels of body satisfaction than all other racial/ethnic groups in the sample (White, Asian, Hispanic, and Native American/Alaskan Native) (Anderson et al., 2002). However the evidence is not consistent in demonstrating African Americans always experience high levels of body satisfaction (Henrickson et al., 2010; Mama et al., 2011). For example, one study found African American women who idealized thinness had lower levels of body satisfaction than those who did not (Henrickson et al., 2011), while another study found *healthy weight* African American women experienced lower levels of body satisfaction compared to their overweight counterparts (Mama et al., 2011). Even so, there is more support for the finding that, generally, African American women have higher body satisfaction compared to other racial/ethnic groups (Ali et al., 2013; Anderson et al., 2002; Boyd et al., 2011; Chithambo & Huey, 2014; Gluck et al., 2002). Yet even after accounting for differences in body satisfaction compared to African Americans, differences among Hispanic, Asian, and White women remain. Some research has shown Hispanic women have similar levels of body

satisfaction compared to White women (Frederick et al., 2007; Grabe & Hyde, 2006; Gillen & Lefkowitz, 2011), while others have shown they have higher levels of body satisfaction (Anderson et al., 2002; Barry & Grilo, 2002; Demarest & Allen, 2000). Similarly, compared to White women, Asian American women tend to have lower, (Nouri, Hill, & Orrell-Valente, 2011), higher (Forbes & Frederick, 2008) or similar levels of body satisfaction (Gluck & Geliebter, 2002; Shaw et al., 2004). Given such inconsistent findings, it is evident the effect of race/ethnicity on body satisfaction is not yet entirely clear.

As with weight perception and body satisfaction, self-rated health is impacted by race and ethnicity (Almgren et al., 2009; Benjamins et al., 2012; Boardman, 2004; Franks et al., 2003; McGee et al., 1999). In general, compared to Whites, racial/ethnic minority groups tend to report poorer health (Benjamins et al., 2012; Boardman, 2004; Franks et al., 2003). This is particularly true for racial/ethnic minority women and girls. A study of adolescents found a significant interaction between gender and race/ethnicity, such that boys, regardless of race/ethnicity, were more likely than girls to report "very good" or "excellent" health (Almgren et al., 2009). In contrast, racial/ethnic minority girls reported poorer health than White girls (Almgren et al., 2009). Similarly, a study using the National Health Interview Survey (NHIS) found African American, Hispanic, and Native American women were more likely to report poorer health than White and Asian women (McGee et al., 1999).

Though race and ethnicity are associated with poor ratings of health, research has shown foreign-born Blacks, Asians, and Hispanics have better health outcomes than their US-born counterparts (Franzini et al., 2001; Hummer et al, 1999; Hummer et al., 1999; Singh & Siahpush, 2002), a phenomenon known as the "healthy immigrant hypothesis" or "healthy immigrant paradox" (Franzini et al., 2001; Hummer et al., 1999). Given this relationship between nativity

status and health, we expect foreign-born women to report better health than their US-born counterparts.

**The Thin Ideal**

Weight perception, body satisfaction and their consequences are largely driven by social norms and gender expectations (Christensen, 2012, 2008; Gaskin et al., 2013; Gillen & Lefkowitz, 2011). As such, the gender and racial/ethnic differences in weight perception and body satisfaction are likely due, in part, to differences in social norms and expectations across gender and racial/ethnic groups. More specifically, these differences are a result of the extent to which women internalize a thin ideal (Gillen & Lefkowitz, 2011; Warren et al., 2005). For American women, the idealization of thinness is pervasive (Frederick et al., 2007; Gillen & Lefkowitz, 2011; Thompson et al., 1999) but not ubiquitous across all racial/ethnic groups. As Warren and colleagues (2005) detail, the thin ideal in Western culture is reflective of European-American ideals of beauty, which may not be relevant to racial or ethnic minority women. That is, a thin ideal may not be salient to minority women from a group whose body ideal reflects a different standard (Warren et al., 2005).

Even though African American and Hispanic women exhibit different patterns of weight perception and body satisfaction, evidence suggests both African Americans and Hispanics idealize a curvier woman compared to Whites (Arguete, Nickleberry, & Yates, 2004; Chamorro & Florez-Ortis, 2000; Flynn and Fitzgibbon, 1998; Freedman, Carter, Sbrocco, & Gray, 2004; Wade & DiMaria, 2003; Warren et al., 2005). If both African Americans and Hispanics idealize larger women then why do Hispanic women exhibit patterns of weight perception and body satisfaction similar to White women? The explanation may be due to the fact that while some studies have shown Hispanic culture idealizes a larger woman (Chamorro & Florez-Ortiz, 2000)

and Hispanic ethnic identity can be a protective factor against the thin ideal (Warren et al., 2005), there is still a prevalence of the thin ideal and disordered eating among Hispanic women in the US (Ganem et al., 2009; Gillen & Lefkowitz, 2011). Ganem and colleagues (2009) suggest that while the idealization of a fuller figure for Hispanic women may serve as a buffer against body dissatisfaction, they are still affected by a pressure to adhere to the dominant European-American ideal.

In contrast, both White and Asian American women endorse a thin ideal (Boyd et al., 2011; Frederick et al., 2007; Mintz & Kashubeck, 1999). A recent study found Asian American women have similar thin-ideal internalization scores as White women (Rakhkovskaya & Warren, 2014), and another found Asian women are just as likely as White women to invest in an ideal of thinness (Boyd et al., 2011). This internalization of a thin ideal is likely one contributing factor to the similar patterns of weight perception and body satisfaction among White and Asian American women.

**Weight Perception and Body Satisfaction: Social Comparison and Objectification Theories**

The psychological consequences of weight perception, both accurate and inaccurate, lie in whether or not the perception results in body dissatisfaction (Fuchs et al., 2012; Gillen et al., 2011). From a sociocultural perspective, ideal body sizes are driven by cultural norms and gender expectations, and preferences of body type are learned socially (Grogan, 2008). One mechanism through which weight perception and body satisfaction are shaped is through social comparison to others.

Social Comparison Theory (Festinger, 1954) proposes people are driven to compare themselves to others in order to evaluate their standing on a particular attribute. Downward social comparisons, those made to individuals considered "worse off" than oneself, result in

positive self-evaluations and can be psychologically protective (Marsh & Parker, 1984; Testa & Major, 1990). In contrast, upward social comparisons (comparing oneself to someone "better") result in poorer self-evaluations and have negative psychological consequences, including body dissatisfaction (Bessenof, 2006). Festinger (1954) originally argued people will discontinue upward social comparison if negative outcomes are the result, yet research has shown when making appearance-based comparisons, people continue to make upward comparisons even when doing so results in negative consequences (Fitzsimmons-Craft, 2011). Throughout their lifetime, women consistently make appearance-based social comparisons (Leahey, Crowther, & Mickelson, 2007), and contrary to Festinger's prediction, women are unlikely to stop even in the face of negative psychological consequences (Strahan et al., 2006). This persistence may explain, in part, why many women are plagued by poor body satisfaction (Christensen, 2012). The question then remains why women continue to make upward social comparisons when the consequences can be so deleterious? The answer may lie in the extent to which women internalize gender norms and expectations, as explained by Objectification Theory.

Objectification Theory (Fredrickson and Roberts, 1997) posits that societies generally emphasize women's appearance more than men's, a reality that is reflective of a culture's gender norms and the sexual objectification of women (e.g., viewing a woman in terms of the utility of her body). The emphasis placed on women's appearance then leads women and girls to define themselves not only in terms of their physical appearance but also in relation to a society's ideal standard. As a result, women and girls often internalize unattainable physical ideals (Grogan, 2008). This internalization of unattainable standards contributes to a disconnection between women and their bodies, leading them to emphasize the appearance of their body over their personal self-concept and unique identity (Frederickson and Roberts, 1997). Such self-

objectification subsequently leads to persistent body monitoring, which is associated with increased shame, anxiety, body dissatisfaction, and poor self-rated health (Moradi, 2010; Page et al., 2009; Tiggeman, 2002).

While initially used to understand the experience of White women in light of a thin ideal, Objectification Theory can also be applied to other racial/ethnic groups (Buchanan et al., 2008; Christensen, 2012, 2008; Moradi, 2010), as it places an emphasis less on the thin ideal per se, and more on the general social and sexual expectations of all women and their bodies (Moradi, 2010). Thus according to Objectification Theory, women internalize social norms surrounding various ideal body types based on the particular social pressure and expectations they face. Taken together, Social Comparison Theory offers an explanation for *how* women compare themselves to others, while Objectification Theory explains *why* such comparisons persist in the face of negative psychological consequences.

**Socioeconomic Differences in Weight Perception, Body Satisfaction, and Self-Rated Health**

Beyond race/ethnicity and gender, socioeconomic status (SES) is also associated with weight perception, body satisfaction, and self-rated health. Studies have shown individuals with higher income and/or educational attainment, regardless of race/ethnicity and gender, are more likely to perceive themselves as overweight, despite, on average, having a lower BMI (Johnston & Lordan, 2013; Langellier et al., 2014; Ogden et al., 2014; Paeratakul et al., 2002; Wardle & Griffith, 2001). One study using a nationally representative sample of adults found individuals with higher incomes and educational attainment were more likely to perceive themselves as overweight, independent of BMI, gender, and race/ethnicity (Langellier et al., 2014). One explanation offered for the differences in weight perception across SES is one of social comparison, such that because individuals of low SES are more likely to be obese, they are also

more likely to perceive themselves as normal weight compared to their peers (Johnston & Lordan, 2014). Meanwhile, compared to individuals of low SES, individuals of high SES hold themselves to a stricter weight standard (e.g., thin ideal), and thus, compared to individuals of low SES, are more likely to perceive themselves as overweight (Blanchflower et al., 2009; Johnston & Lordan, 2014; Wardle & Griffith, 2001).

The impact of socioeconomic status on body satisfaction is inconsistent and largely unexplored (Wang, Byrne, Kennedy, & Hill, 2005). Some authors have shown higher SES is related to lower body satisfaction among girls (Paxton, Eisenberg, & Neumark-Sztainer, 2006; van den Berg et al., 2010; Wang et al., 2005) while others have found no relationship among girls (Kelly et al., 2005; O'Dea, 1994). One study evaluating the relationship between neighborhood affluence and body satisfaction in Canadian women found, regardless of personal income, living in a more affluent neighborhood was significantly related to low levels of body satisfaction (McLaren & Gauvin, 2002). The authors suggest this may occur because social norms are magnified at the neighborhood level and that in highly affluent communities social expectations of image and appearance are more salient (McLaren & Gauvin, 2002). However there has yet to be further investigation into this possibility.

While the body of literature exploring SES, weight perception and body satisfaction is still fairly new, SES is an established predictor of self-rated health, such that individuals with high income and education generally report better health than those with low income and education (Kennedy et al., 1998; Kondo et al., 2009; Mirowsky & Ross, 2008; Prus, 2011; Ross & Wu, 1995). A meta-analysis of nine cohort and 19 cross-sectional studies on income inequality and health outcomes found low income consistently predicted poor ratings of health (Kondo et

al., 2009). Similarly, a longitudinal study found declines in self-rated health with age were slower among those with higher levels of education (Mirowsky & Ross, 2008).

**Understanding Weight Perception, Body Satisfaction, and Self-Rated Health in Young Adulthood**

Extensive attention has been paid to body image and self-esteem during adolescence in part because of the negative health outcomes associated with poor adolescent body image later in life (e.g., depression and eating disorders) (Bucchianeri et al., 2012). However, negative health outcomes related to body image are not only consequential during adolescence.

Young adulthood spans from late teens to the early thirties and adolescents often struggle making this transition (Settersten & Ray, 2010). This is particularly true for today's young adults, whose transition to adulthood, compared to previous generations, is more gradual and varied and can often be financially and socially strenuous (Settersten & Ray, 2010). Young adulthood is now a prolonged period of transition marked by rapid change while individuals develop their sense of self (Benson & Elder, 2011; Settersten & Ray, 2010). Furthermore, this period is no longer guided by strict social norms of what it means to be an adult (Shanahan, 2000), giving young adults more autonomy in their path to adulthood. With greater levels of autonomy, social psychological resources, such as self-esteem and self-identity, become integral for a healthy transition to adulthood (Benson & Elder, 2011). Since the transition to young adulthood is now longer than ever before and is a crucial time for identity development (Benson & Elder, 2011), there should be an understanding of how body image manifests during this time.

While traditionally adolescence has received the most attention in body image research (Tiggeman & Lynch, 2001), more recent longitudinal studies have begun to explore how body satisfaction may change over time, specifically during the young adulthood transition

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(Bucchianeri, et al., 2012; Tiggeman & McCourt, 2013). This literature, however, is inconsistent. For girls transitioning into young adulthood, studies have found decreases body satisfaction (Bearman et al., 2006; Bucchianeri et al., 2012; Gardner et al., 2000), stable levels of body satisfaction (von Soest & Wichstrom, 2009) or increases in body satisfaction (Eisenberg et al., 2006). Furthermore, many of the investigations of body satisfaction in young adulthood have focused on White populations and are not nationally representative, creating an incomplete picture of body satisfaction among all young Americans.

Additionally, to date there is no literature exploring weight perception or self-rated health in the specific period of young adulthood. However, research has shown the contributing factors to self-rated health (e.g., psychological vs. physical) differ between adolescents and adults (Zullig et al., 2009), suggesting young adulthood may be a transitional time for the impact of psychological constructs on self-rated health.

**The Impact of Weight Perception and Body Satisfaction on Self-Rated Health**

While self-rated health is often used as an indicator of physical health, it is a dynamic construct that involves both psychological and physical components (Vingilies et al., 2015). This is particularly true among adolescents, as psychological, rather than physical, wellbeing contributes more to their self-rated health (Zullig et al., 2005). As psychological constructs, both weight perception and body satisfaction likely contribute to overall ratings of health.

While it is understood that inaccurate weight perception negatively impacts health outcomes, there is not an abundance of literature exploring the relationship between weight perception and self-rated health. However, the literature that does exist suggests that weight perception is a better predictor of self-rated health than BMI. One study of US adults found that weight perception among overweight/obese women was contingent on self-rated health, such that

overweight or obese women who rated their health as "very good" or "excellent" were twice as likely to perceive themselves as "normal" weight (Gregory et al., 2008). Similarly, other studies found those who perceived themselves as overweight or obese, regardless of BMI, reported poorer health compared to those who perceived their weight as normal (Herman et al., 2013; Heshmat et al., 2014). A major limitation to the generalizability of these studies is their sample populations. Gregory and colleagues (2008) and Herman and colleagues (2013) both had predominately White North American samples, while Heshmat and colleagues (2014) used a sample of Iranian adolescents. While the findings above suggest an important relationship between weight perception and self-rated health, there remains a large gap in the literature in regards to understanding this relationship in diverse racial/ethnic and socioeconomic groups.

Similarly, there is limited investigation into the relationship between body satisfaction and self-rated health. One study using a Norwegian national sample of adolescents found lower body satisfaction was associated with poorer ratings of health compared to those with higher body satisfaction (Meland et al., 2007). Additionally, a study of American women and another of Norwegian adolescents both found low levels of body satisfaction predicted poor self-rated health (Anderson et al., 2002; Breidablik et al., 2008). Finally, a study of 3,123 adolescents in Central and Eastern Europe found among both boys and girls, those who perceived themselves as less attractive reported poorer health than those who perceived themselves as more attractive, independent of other factors (Page et al., 2009). Thus, while the existing literature points to a relationship between body satisfaction and self-rated health, there is not sufficient evidence to allow for a firm conclusion. Moreover, a significant limitation to this literature is the lack of diverse samples, both in regards to race/ethnicity and socioeconomic status. Such limitations call

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for a more thorough investigation in order to elucidate the nature of the relationship between self-rated health, body satisfaction, and other socio-demographic factors.

**Summary**

Currently, there are conflicting findings regarding body satisfaction in young adult women and a scarcity of literature exploring weight perception, body satisfaction, and self-rated health in diverse samples of young adults. This state of the literature, coupled with the importance of young adulthood in identity creation and self-perception, points to a need for a clearer understanding of how young adult women perceive their bodies and health. There are a myriad of physical and psychological consequences associated with inaccurate weight perception, low body satisfaction, and poor self-rated health. To date, the majority of research exploring weight perception, body satisfaction, and self-rated health has been conducted in middle-class White adolescent or adult populations, yet the consequences of these factors affect women of all race/ethnicities and across all socioeconomic lines. Furthermore, young women transitioning from adolescence to adulthood are faced with unique financial and social stressors, and must rely on healthy psychological resources (e.g., self-esteem) to effectively make this transition. As the United States faces a continuing obesity epidemic, it is crucial that we understand whether young women perceive their weights accurately and whether these perceptions may also relate to body satisfaction and perceptions of health.

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**Conceptual Framework and Research Questions**

</div>

Using the conceptual frameworks presented below, the present study seeks to address the following research questions using the Wave IV data of the National Longitudinal Study of Adolescent to Adult Health (Add Health).

**Conceptual Framework 1**
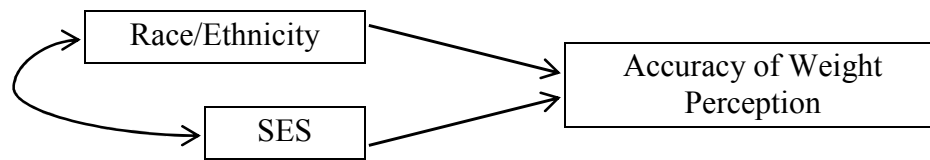


**Figure 1. Conceptual Framework of Relationships Among Race/Ethnicity, SES, and Accuracy of Weight Perception**

The first conceptual framework shows the relationships among race/ethnicity, socioeconomic status (SES), and accuracy of weight perception. There is a correlational relationship between race/ethnicity and SES, yet both are expected to have independent effects on the accuracy of weight perception.

**Research Question 1.** What are the relationships among race/ethnicity, SES, and the accuracy of weight perception?

*Hypothesis 1a.* There are racial/ethnic differences in the accuracy of weight perception, such that normal weight White, Asian, and Hispanic women are more likely than normal weight African American women to perceive themselves as overweight, and that overweight African American women are more likely to perceive themselves as normal weight than overweight White, Asian, and Hispanic women.

*Hypothesis 1b.* There are SES differences in accuracy of weight perception, such that normal weight women of higher SES will be more likely to perceive themselves as overweight compared to women of lower SES.

**Conceptual Framework 2.**
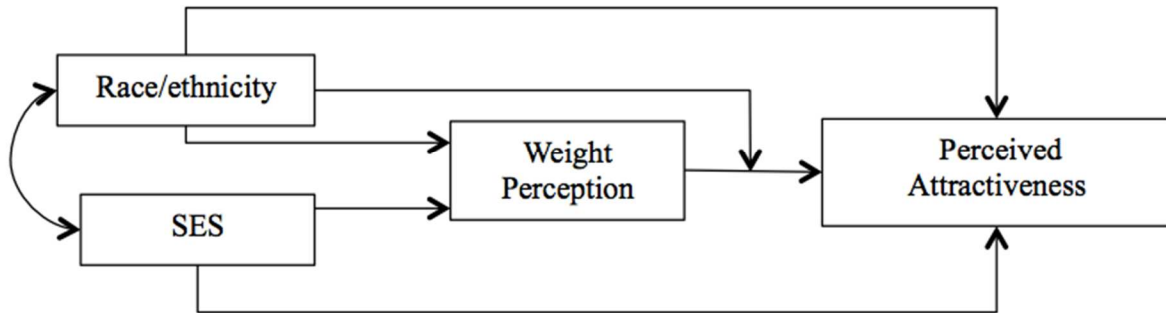


**Figure 2. Conceptual Framework of the Relationships Among SES, Weight Perception, Race/Ethnicity and Perceived Attractiveness**

The second conceptual framework builds upon Conceptual Framework 1 by showing the relationships among race/ethnicity, SES, weight perception and perceived attractiveness. As seen previously, there is a correlational relationship between race/ethnicity and SES, and each has an independent effect on weight perception. New to Conceptual Framework 2 are the relationships with perceived attractiveness. There is an independent effect of SES on perceived attractiveness, however the relationship between weight perception and perceived attractiveness is dependent upon race/ethnicity.

**Research Question 2.** What are the relationships among race/ethnicity, SES, weight perception, and perceived attractiveness?

*Hypothesis 2a.* There are racial/ethnic differences in perceived attractiveness, such that African American women report higher levels of attractiveness than White, Asian, and Hispanic women.

*Hypothesis 2b.* There are SES differences in perceived attractiveness, such that women of higher SES report lower levels of attractiveness than women of lower SES.

*Hypothesis 2c.* The effect of weight perception on perceived attractiveness is dependent upon race/ethnicity, such that White, Asian, and Hispanic women who perceive themselves as

overweight will have lower ratings of attractiveness than White, Asian, and Hispanic women who perceive themselves as normal weight, while among African American women there will be no difference in perceived attractiveness across weight perception.

**Conceptual Framework 3**
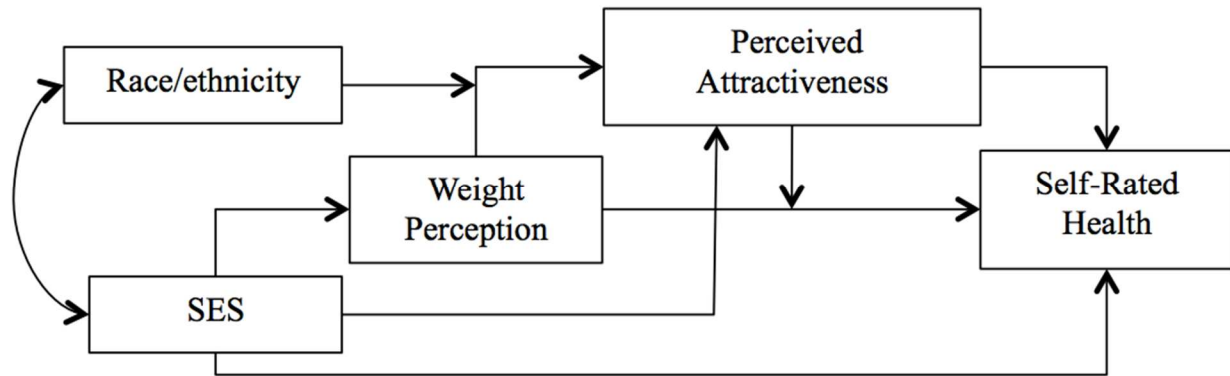


**Figure 3. Conceptual Framework of the Relationships Among Race/Ethnicity, SES, Weight Perception, Perceived Attractiveness, and Self-Rated Health**

The third conceptual framework builds upon Conceptual Frameworks 1 and 2, depicting the relationships among race/ethnicity, SES, weight perception, perceived attractiveness, and self-rated health. Again there is a correlational relationship between race/ethnicity and SES, and race/ethnicity and SES have direct relationships with weight perception. Race/ethnicity and SES also have direct relationships with perceived attractiveness, however the relationship between weight perception and perceived attractiveness is dependent upon race/ethnicity. New to Conceptual Framework 3 are the relationships with self-rated health. Race/ethnicity, SES, and perceived attractiveness all have direct relationships with self-rated health. However, the relationship between weight perception and self-rated health is dependent upon perceived attractiveness.

**Research Question 3.** What are the relationships among race/ethnicity, SES, weight perception, perceived attractiveness, and self-rated health?

***Hypothesis 3a.*** There are racial/ethnic differences in self-rated health, such that African American, Hispanic, and Asian women report poorer health compared to White women.

***Hypothesis 3b.*** There are SES differences in self-rated health, such that women of higher SES report better health than women of lower SES.

***Hypothesis 3c.*** There are perceived attractiveness differences in self-rated health, such that women who perceive themselves as more attractive report better health than those who perceive themselves as less attractive.

***Hypothesis 3d.*** The effect of weight perception on self-rated health is dependent upon perceived attractiveness, such that women who perceive themselves as overweight and more attractive report better health than women who perceive themselves as overweight and less attractive.

## Methods

**Survey Description and Study Design**

Seeking insights into the relationships among weight perception, body satisfaction, and self-rated health in young adult women, the present study is an analysis of Wave IV data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) (Harris et al., 2009). The Add Health survey, conducted by the University of North Carolina Chapel Hill, is a nationally representative sample of adolescents in school that began during the 1994-1995 school year when respondents were in grades 7-12. Respondents were subsequently followed to adulthood. To date, four waves of data collection have occurred: Wave I in 1994-1995, Wave II in 1996, Wave III in 2001-2002 and Wave IV in 2007-2008. A fifth wave of data collection is planned for 2016-2018. The original sample (Wave I) included 80 high schools and 52 "feeder" middle schools, which were selected with unequal probabilities of selection. From this original population, a probability sample of students, referred to as the "in-home" sample, also completed

the longitudinal component of the study, involving the completion of a more detailed questionnaire (n = 20,745). During Wave IV, in-home sample respondents were 24-34 years old (n = 15,701). Survey administrators contacted 92.5% of the Wave IV sample and interviewed 80.3% of the eligible sample (n = 15,701). The 90-minute interviews were conducted in the respondent's home using either the computer-assisted personal interview (CAPI) instrument for less sensitive questions or the computer-assisted self-interview (CASPI) for more sensitive questions.

**Human Subjects Approval**

The present study used de-identified, secondary data, which are managed by the University of North Carolina Chapel Hill. Dr. Dawn Upchurch, the chair of this thesis committee, has full-access to all necessary components of the data. The University of North Carolina requires a data security agreement, for which Dr. Upchurch and I have both signed and been approved. The Office for Protection of Research Subjects IRB at University of California, Los Angeles has approved the present research.

**Study Variables**

**Outcome Variables.**

***Accuracy of Weight Perception.*** The first outcome variable of interest was *accuracy of weight perception.* Consistent with previous work, (Martin, Frisco, & May, 2009), *accuracy of weight perception* was a measure of the intersection between a woman's weight status and her weight perception. As further detailed below, weight status was measured by standard weight categories based on an individual's body mass index (BMI), and weight perception was measured by the question, "How do you think of yourself in terms of weight?"

*Accuracy of weight perception* was originally a categorical variable with four levels: 1) *accurate, normal weight,* 2) *perceived overweight when normal weight,* 3) *accurate, overweight,* and 4) *perceived normal weight when overweight.* While originally a four-factor variable, *accuracy of weight perception* was converted into two dichotomous variables, 1) *accurate, normal weight,* and 2) *accurate, overweight.* This dichotomization was necessary given that the independent variable, *weight status,* precluded women from having an equal likelihood of falling into one of the four accuracy categories. That is, it is impossible for a normal weight woman to have the outcome "perceived normal weight when overweight," since she is not overweight. Similarly, it is impossible for an overweight woman to have the outcome "perceived overweight when normal," since she is not normal weight. Therefore, the sample was stratified into two groups, 1) underweight or normal weight and 2) overweight or obese. For each strata, a dummy variable was created, where 0 = accurate perception, 1 = inaccurate perception.

**Perceived Attractiveness.** Consistent with previous work using Add Health (Chithambo & Huey, 2013), the present study operationalized body satisfaction as *perceived attractiveness,* that is, how attractive the respondent perceived herself to be. It was measured by the standard question, "How attractive are you?" Responses ranged from *1 = very attractive, 2 = moderately attractive, 3 = slightly attractive, 4 = not at all attractive.* For the present analyses, *perceived attractiveness* was treated as an ordinal variable, and for consistency of interpretation, it was reverse coded where *1 = not at all attractive* and *4 = very attractive.*

**Self-rated health.** Consistent with the WHO standard measure of self-rated health (Subramanian et al., 2010), *self-rated health* was measured by the question, "In general, how is your health?" Potential responses ranged from one to five: *1 = excellent, 2 = very good, 3 = good, 4 = fair, 5 = poor.* This question is a valid and reliable measure of health and has been

validated in diverse populations (Allen et al., 2015; Finch, Hummer, Reindl, et al., 2005; Idler & Benyamini, 1997; Mossey & Shapiro, 1982). Rather than used as an objective measure of health, *self-rated health* was operationalized as the subjective perception of personal health (Smith et al., 2014). For the present analyses, *self-rated health* was treated as an ordinal variable with five levels and was reverse coded, where *1 = poor* and *5 = excellent.*

**Independent variables.**

*Race/ethnicity. Race/ethnicity* was measured in Wave I. Respondents were asked whether or not they were of Hispanic origin as well as which single racial category described them best. For the present study, the single race category and Hispanic or Latino origin were used to create a single *race/ethnicity* variable. Because the American Indian or Native American group was so small (n = 236) it was dropped from analysis (see Figure 4). For those whose race/ethnicity was missing, interviewer-identified race/ethnicity was used. With this inclusion, all remaining respondents had a race/ethnicity (see Figure 4). Respondents were then coded into one of four standard Census Bureau categories: *Hispanic, Non-Hispanic African American, Non-Hispanic Asian*, and *Non-Hispanic White*. Thus, *race/ethnicity* was a categorical variable with four levels.

*Nativity status. Nativity status* was a nominal variable with two levels. During Wave I, *nativity status* was measured by asking, "Were you born a US citizen?" (*0 = no, 1 = yes*). There were no missing observations.

*Age. Age* was not asked of respondents in Wave IV. Therefore, to calculate the age of the Wave IV respondents, birthdate (DOB) was subtracted from the interview date and divided by 365. For those observations for which this procedure was not successful (n = 11), DOB was obtained from Wave III. This DOB was used to calculate *age* for five of the eleven remaining observations. The six observations without a DOB were dropped from the sample (see Figure 4).

In the statistical models, *age* was used as a continuous variable, however for bivariate analyses it was converted to an ordinal variable (*age group)* with two levels based on a median split: 24 through 28 years and 29 through 34 years.

Weight Status. To get an estimate of body mass index (BMI), respondent height and weight were measured during the in-home survey. *Height* was measured to the nearest 0.5 cm after shoes and accessories that could affect measurement were removed. Using a calibrated, digital scale, *weight* was measured to the nearest 0.1 kg. *BMI* was then computed with the formula *Weight (kg) / Height$^2$ (m$^2$).* Add Health created BMI categories based on the following standard body weight status categories: "underweight" = BMI below 18.5, "normal or healthy weight" = BMI 18.5 to 24.9, "overweight" = BMI 25.0 to 29.9, "obese I" = BMI 30.0 to 34.9, "obese II" = BMI 35.0 to 39.9, "obese III" = BMI 40.0 or greater. For the present study, the three obese categories were coded into a single "obese" category. Given the small sample of underweight women in the sample population (n=149, 2.19% of the sample) and concerns of statistical power, "underweight" and "normal" BMI were coded into a single group: "underweight/normal." Therefore, *weight status* was an ordinal variable with three levels: underweight/normal, overweight, and obese. While variability may be lost using *weight status* rather than a continuous measure of BMI, nominal BMI variables have been used in weight perception research and are clinically meaningful (CDC, 2015; Chang & Christakis, 2003; Langellier et al., 2014).

Household Income. *Total household income (variable name: H4EC1)* was measured by the following question: "Thinking about your income and the income of everyone who lives in your household and contributes to the household budget, what was the total household income before taxes and deductions in {2006/2007/2008}? Include all sources of income, including non-

legal sources." There were 15 potential income ranges. For those observations missing responses in *H4EC1* (N=931), a continuous income variable, *personal income (variable name: H4EC2),* was used to assign a household income for any respondents who indicated that they lived alone. This was successful for 167 respondents, leaving the sample with 764 missing values. For those who still did not have an income variable, multiple regression imputation was used with *age, race/ethnicity, gender, nativity status,* and *education* entered as covariates. For the present study, *household income* categories were collapsed into four categories, making it an ordinal variable with four levels: *less than $25,000 a year, between $25,000 and $49,999 a year, between $50,000 and $74,999 a year,* and *$75,000 or more a year.*

     ***Education.*** *Education (variable name: H4ED2)* was measured using highest education level achieved. For those observations with missing education information (n=4), a second education variable *(variable name: H4ED3)* capturing the highest degree the respondent received was used to see if data could be extracted to complete *H4ED2*. However those observations missing *H4ED2* also had missing data in *H4ED3*. Therefore, it was decided to assign these four respondents' education levels to the majority category ("some college," 34% of the sample). As a result, *education* was an ordinal variable with four levels: *less than high school*, *high school or GED*, *some college*, and *four year college degree or more*.

     ***Weight Perception.*** *Weight perception* was measured by the standard question, "How do you think of yourself in terms of weight?" (*1 = very underweight, 2 = underweight, 3 = about the right weight, 4 = slightly overweight, 5 = very overweight*). Consistent with previous work using Add Health (Harris et al., 2005; Liechty, 2010; Pesa et al., 2000), the present study compared *weight perception* and *weight satus.* In order to do so, *weight perception* categories were aligned with *weight status* categories, such that "very" and "slightly underweight" were

grouped together and coded as "underweight, and "very overweight" was coded as "obese." Thus, *weight perception* was an ordinal variable with three levels, where *1 = perceived underweight, 2 = perceived about the right weight,* and *3 = perceived overweight.*

**Analytic Strategy**

Stata 13.1 was used for all data cleaning and analyses (StataCorp, 2013). Sampling weights and the *svy* command were used in all analyses, and the *subpop* command was used for the binary logistic regression analyses since they used a stratified sample. The *svy* command applies sampling weights in each analysis to adjust for unequal selection probabilities, attrition, and to yield robust estimates of standard errors.

**Univariate Analyses.**

Descriptive statistics and frequencies of all study variables were used to identify missing cases and assess characteristics of the sample (Tables 1, 2). As illustrated in Figure 1, *age, measured weight, measured height, weight perception,* and *perceived attractiveness* all had missing observations that were dropped from the sample (n = 7,131).

**Bivariate Analyses.**

Design-based F-tests were used to assess the relationship between each independent and outcome variable (Tables 3, 4, 5). Significance was determined at the alpha = .05 level.

**Binary Logistic Regression.**

Binary logistic regression was used to evaluate the relationship between the independent variables and the outcome of *accuracy of weight perception.* For these analyses, the sample was stratified into two groups, 1) underweight or normal weight and 2) overweight or obese. The first logistic regression model evaluating the accuracy of weight perception included only women with an underweight or normal BMI. For this model, *accurate, normal* was the outcome variable,

where *1 = inaccurate, perceived overweight, 0 = accurate, perceived normal weight*. The second logistic regression model included only women who were overweight or obese. *Accurate, overweight* was the outcome variable, where *1 = inaccurate, perceived normal weight, 0 = accurate, perceived overweight*. The following key independent variables were included in each model: *race/ethnicity, nativity status, age, income,* and *education.*

**Ordinal Logistic Regression.**

Ordinal logistic regression was used to evaluate the relationship between key independent variables and *perceived attractiveness. Perceived attractiveness* was the outcome variable, where *1 = not at all attractive, 2 = slightly attractive, 3 = moderately attractive,* and *4 = very attractive.* They key independent variables included in the model were *race/ethnicity, nativity status, age, weight status, household income, education, weight perception,* and the interaction between *race/ethnicity* and *weight perception.* A post-hoc omnibus test for the interaction found it was significant at p < .001, and so it was included in the model.

Ordinal logistic regression was also used to evaluate the relationship between key independent variables and *self-rated health. Self-rated health* was the outcome variable, where *1 = poor, 2 = fair, 3 = good, 4 = good,* and *5 = excellent.* The key independent variables included in this model were *race/ethnicity, age, nativity status, weight status, household income, education, weight perception,* and *perceived attractiveness.* The interaction between *perceived attractiveness* and *weight perception* was included in the original model, however post-hoc omnibus tests did not find the interaction significant at p < .05, so it was dropped from the model.

28

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┌─────────────────────────────────────────────────────────────┐
│              Add Health Wave IV Total Sample                 │
│                       n=15,701                               │
└─────────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────────┐
│        Dropped 901 observations missing sample weights       │
│                       n=14,800                               │
└─────────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────────┐
│            Dropped 6 observations missing *age*              │
│                       n=14,789                               │
└─────────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────────┐
│  Dropped 236 observations because sample of American Indian  │
│          or Native American was too small                    │
│                       n=14,558                               │
└─────────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────────┐
│      Dropped 519 observations because respondent was         │
│                       pregnant                               │
│                       n=14,069                               │
└─────────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────────┐
│    Dropped 213 observations missing *measured weight*        │
│                       n=13,856                               │
└─────────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────────┐
│  Dropped 5 missing observations missing *measured height*    │
│                       n=13,851                               │
└─────────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────────┐
│   Dropped 5 observations missing *weight perception*         │
│                       n=13,846                               │
└─────────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────────┐
│  Dropped 30 observations missing *perceived attractiveness*  │
│                       n=13,816                               │
└─────────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────────┐
│                 Dropped male respondents                     │
│               **Final sample: n=7,131**                      │
└─────────────────────────────────────────────────────────────┘
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**Figure 4. Analytic Sample**

# Results

## Demographic Characteristics, Weight Status and Weight Perception

In our sample of women (n = 7,131), ages ranged from 24 to 34, with an average age of 28.73 years (Table 1). BMI ranged from 14.4 to 97.4 kg/m$^2$, with an average BMI of 29.16 kg/m$^2$. The majority of women were White (68.23%), followed by African American (16.58%), Hispanic (12.05%), and Asian (3.14%). Over 95% of women were born in the United States. The majority of women (31.28%) made between $25,000 and $49,999 a year, with 20-25% of the women falling into each of the other income categories. The majority of women in our sample had either some college (35.25%) or a four-year college degree or more (33.23%), although nearly a quarter of the sample had only a high school diploma or GED. Nearly two-thirds of the women had a weight status of overweight or obese (62.58%), with only slightly more than a third having a normal weight status (35.23%). Overall, the distribution of income among the women was fairly even. Finally, the majority of women perceived themselves as "overweight" (65.31%) and roughly a third perceived themselves as "about the right weight." Only 4.86% of the women perceived themselves as "underweight."

**Table 1: Demographic Characteristics, Weight Status, and Weight Perception Among Women 24-34 Years Old, Add Health, 2007-2008 (n=7,131)**

|  | Mean (SD)[1] |
|---|---|
| *Age (years)* | 28.73 (1.79) |
| *BMI (kg/m²)* | 29.16 (8.27) |
|  | Percentage of Women[1] |
| *Race/Ethnicity* |  |
| Hispanic | 12.05 |
| African American | 16.58 |
| Asian | 3.14 |
| White | 68.23 |
| *Nativity Status* |  |
| Born in the US | 95.87 |
| Foreign-born | 4.13 |
| *Household Income* |  |
| Less than $25,000 | 20.17 |
| $25,000 to $49,999 | 31.28 |
| $50,000 to $74,999 | 23.03 |
| $75,000 or more | 25.52 |
| *Education* |  |
| Less than high school | 7.59 |
| High school / GED | 23.93 |
| Some college | 35.25 |
| 4-year college or more | 33.23 |
| *Weight Status[2]* |  |
| Underweight | 2.19 |
| Normal | 35.23 |
| Overweight/obese | 62.58 |
| *Weight Perception* |  |
| Underweight | 4.86 |
| About the Right Weight | 29.83 |
| Overweight | 65.31 |

Notes: [1] Weighted means and percentages
[2] Weight status determined by CDC-defined BMI cut-points

**Distribution of Outcome Variables**

The present study had three principal outcome variables of interest: *accuracy of weight perception, perceived attractiveness,* and *self-rated health*. As shown in Table 2, the majority of women had accurate weight perception (underweight/normal = 28.16%, overweight = 56.05%).

However, among women who inaccurately perceived their weight, a higher percentage was underweight/normal weight (9.26%). Less than 15% of women rated themselves as "very attractive," while over 80% rated themselves as "moderately" or "slightly attractive." Finally, the over 50% of women rated their health as "very good" or "excellent," with less than 10% of women rating their health as "fair" or "poor."

**Table 2: Distribution of Accuracy of Weight Perception, Perceived Attractiveness, and Self-Rated Health Among Women 24-34 Years Old, Add Health, 2007-2008 (n=7,131)**

|  | Percentage of Women[1] |
| --- | --- |
| *Accuracy of Weight Perception* |  |
| Underweight/Normal BMI |  |
| Accurate Perception | 28.16 |
| Perceived Overweight | 9.26 |
| Overweight/Obese BMI |  |
| Accurate Perception | 56.05 |
| Perceived Normal Weight | 6.54 |
| *Perceived Attractiveness* |  |
| Not at all Attractive | 2.90 |
| Slightly Attractive | 30.54 |
| Moderately Attractive | 52.18 |
| Very Attractive | 14.39 |
| *Self-Rated Health* |  |
| Poor | 1.56 |
| Fair | 8.55 |
| Good | 34.51 |
| Very good | 38.30 |
| Excellent | 17.08 |

Note: [1] Weighted percentages

**Bivariate Analyses of Key Independent and Outcome Variables**

**Accuracy of Weight Perception.**

Among normal weight women, *race/ethnicity, income,* and *education* were all significantly associated with *accuracy of weight perception* at the bivariate level (Table 3). Results of Design-Based F-tests found significant racial/ethnic differences in weight perception (p<.01), such that among normal weight women, African American women had the lowest

percentage of inaccurately perceiving themselves as overweight (13.05%). Similarly, there were significant differences in perception by *income* and *education,* such that women with the lowest income (p=.0013) and educational attainment (p=.0346) had the lowest percentages of inaccurately perceiving themselves as overweight (16.45% and 13.91% respectively).

Among overweight/obese women, *race/ethnicity* and *income* were significantly associated with *accuracy of weight perception.* Results of Design-Based F-tests found racial/ethnic differences in perception, such that Hispanic and African American women had the highest percentage of inaccurately perceiving themselves as normal weight (12.27%, 15.05%; p<.001). Similarly, there were significant differences in perception by *income* (p=.0357), with the highest percentage of inaccurate perception of normal weight among women with an annual income less than $50,000. *Education* was marginally significant (p=.0574), with the highest percentage of inaccurate perception of normal weight among women with less than a high school degree (15.72%). *Nativity status* and *age* were not significantly associated with *accuracy of weight perception* among overweight/obese women.

**Table 3: Accuracy of Weight Perception by Demographics Among Women 24-34 Years Old, Add Health, 2007-2008 (n=7,131)**

| | Accuracy of Weight Perception (%)[1] | | | | | |
|---|---|---|---|---|---|---|
| | Underweight/Normal BMI | | Significance[2] | Overweight/Obese BMI | | Significance[2] |
| | Accurate Perception | Perceived Overweight | | Accurate Perception | Perceived Normal Weight | |
| *Race/Ethnicity* | | | | | | |
| Hispanic | 75.08 | 24.92 | p=.0028 | 87.73 | 12.27 | p<.001 |
| African American | 86.95 | 13.05 | | 84.95 | 15.05 | |
| Asian | 66.68 | 33.32 | | 90.59 | 9.41 | |
| White | 74.19 | 25.81 | | 91.37 | 8.63 | |
| *Nativity Status* | | | | | | |
| Born in the US | 75.46 | 28.74 | p=.4915 | 87.85 | 12.15 | p=.5371 |
| Foreign-born | 71.26 | 24.54 | | 89.62 | 10.38 | |
| *Age group (years)* | | | | | | |
| 24 through 28 years | 76.73 | 23.27 | p=.1127 | 88.80 | 11.20 | p=.1827 |
| 29 through 34 years | 73.19 | 26.81 | | 90.42 | 9.58 | |
| *Household Income* | | | | | | |
| Less than $25,000 | 83.55 | 16.45 | p=.0113 | 86.53 | 13.47 | p=.0357 |
| $25,000 to $49,999 | 74.80 | 25.20 | | 89.24 | 10.76 | |
| $50,000 to $74,999 | 73.22 | 26.78 | | 91.09 | 8.91 | |
| $75,000 or more | 72.91 | 27.09 | | 91.62 | 8.38 | |
| *Education* | | | | | | |
| Less than HS | 86.09 | 13.91 | p=.0346 | 84.28 | 15.72 | p=.0574 |
| HS / GED | 71.99 | 28.01 | | 88.37 | 11.63 | |
| Some college | 72.82 | 27.18 | | 91.40 | 8.60 | |
| 4-year college or more | 76.90 | 23.10 | | 89.94 | 10.06 | |

Notes: [1] Weighted percentages
[2] Significance of the Design-Based F-Test

**Perceived Attractiveness.**

There were significant bivariate differences in perceived attractiveness for all covariates except *nativity status* (Table 4). There were significant racial/ethnic differences in perceived attractiveness (p<.001), with over 46.% of African American women reporting they were "very attractive," compared to 14% of Hispanics, 8.5% of Asians, and 7% of Whites. There were modest, though significant, differences in *perceived attractiveness* by age (p=.0212). Across both age groups, the majority of women perceived themselves to be only "moderately attractive" (p=.0249). However a larger percentage of the women rated themselves as "very attractive" than "not at all attractive." There was no significant relationship between *nativity status* and *perceived attractiveness* (p=.2343)*.

There were significant bivariate differences (p<.001) in *perceived attractiveness* by *income*, with higher percentages reporting "very attractive" among those with lower incomes. Similarly, there were significant differences (p<.001) in *perceived attractiveness* by educational attainment with higher percentages reporting "very attractive" among those with less education. Last, significant differences in *perceived attractiveness* by *weight status* were observed (p<.001). Surprisingly, women who were overweight/obese reported the highest percentage of "very attractive."

**Table 4: Perceived Attractiveness by Demographics and Weight Status Among Women 24-34 Years Old, Add Health, 2007-2008 (n=7,131)**

| | *Perceived Attractiveness* (%)[1] | | | | |
| | Not at all attractive | Slightly attractive | Moderately attractive | Very attractive | Significance[2] |
|---|---|---|---|---|---|
| *Race/Ethnicity* | | | | | |
| Hispanic | 4.64 | 34.25 | 47.12 | 13.99 | p<.001 |
| African American | 1.22 | 12.37 | 40.04 | 46.37 | |
| Asian | 2.33 | 40.64 | 48.51 | 8.52 | |
| White | 3.02 | 33.84 | 56.19 | 6.95 | |
| *Nativity Status* | | | | | |
| Born in the US | 2.81 | 30.45 | 52.46 | 14.28 | p=.2343 |
| Foreign-born | 4.81 | 32.68 | 45.66 | 16.85 | |
| *Age group (years)* | | | | | |
| 24 through 28 years | 2.25 | 28.52 | 54.65 | 14.59 | p=.0212 |
| 29 through 34 years | 3.69 | 33.02 | 49.15 | 14.14 | |
| *Household Income* | | | | | |
| Less than $25,000 | 3.71 | 28.69 | 44.45 | 23.15 | p<.001 |
| $25,000 to $49,999 | 3.69 | 31.38 | 50.24 | 14.70 | |
| $50,000 to $74,999 | 2.94 | 32.18 | 53.68 | 11.20 | |
| $75,000 or more | 1.25 | 29.50 | 59.30 | 9.96 | |
| *Education* | | | | | |
| Less than high school | 5.53 | 35.69 | 33.87 | 24.90 | p <. 001 |
| High school / GED | 4.62 | 31.29 | 46.66 | 17.43 | |
| Some college | 2.99 | 32.47 | 51.71 | 12.83 | |
| 4-year college or more | 0.95 | 26.78 | 60.82 | 11.45 | |
| *Weight Status[3]* | | | | | |
| Underweight/Normal | 0.77 | 26.32 | 61.04 | 11.87 | p<.001 |
| Overweight | 1.49 | 29.71 | 54.20 | 14.60 | |
| Obese | 5.91 | 35.24 | 42.12 | 16.73 | |

Notes: [1] Weighted percentages
[2] Significance of the Design-Based F-Test
[3] Weight status determined by CDC-defined BMI cut-points

**Self-Rated Health.**

Design-based F-tests found significant differences in *self-rated health* for all covariates except *nativity status* and *age* (Table 5)*.* There were significant racial/ethnic differences in *self-rated health* (p<.001), with higher percentages reporting "fair" health among African American (12.02%) and Hispanic women (13.91%), compared to 7.6% of Asians and 6.8% of Whites. There were also significant differences (p<.001) in *self-rated health* by *income* with higher percentages reporting "excellent" health among those with a higher annual income. Similarly, there were significant differences (p<.001) in *self-rated health* by educational attainment with higher percentages reporting "excellent" health among those with more education. Last, significant differences in *self-rated health* by *weight status* were observed (p<.001). Women who were obese reported the lowest percentage of "excellent" health and the highest percentage of "poor" and "fair" health.

**Table 5: Self-Rated Health by Demographics and Weight Status Among Women 24-34 Years Old, Add Health, 2007-2008 (n=7,131)**

| | Poor | Fair | Good | Very good | Excellent | Significance[2] |
|---|---|---|---|---|---|---|
| | | | *Self-Rated Health* (%)[1] | | | |
| *Race/Ethnicity* | | | | | | |
| Hispanic | 2.34 | 13.91 | 37.85 | 30.64 | 15.26 | p<.001 |
| African American | 1.65 | 12.02 | 39.43 | 32.74 | 14.16 | |
| Asian | 1.47 | 7.60 | 40.36 | 35.27 | 15.30 | |
| White | 1.40 | 6.80 | 32.46 | 41.15 | 18.19 | |
| *Age group (years)* | | | | | | |
| 24-26 years | 1.75 | 8.07 | 34.98 | 38.43 | 16.77 | p=.6154 |
| 27-29 years | 1.33 | 9.13 | 33.94 | 38.15 | 17.46 | |
| *Nativity Status* | | | | | | |
| Born in the US | 1.57 | 8.51 | 34.71 | 38.33 | 16.87 | p=.5000 |
| Foreign-born | 1.19 | 9.35 | 29.90 | 37.72 | 21.84 | |
| *Household Income* | | | | | | |
| Less than $25,000 | 2.93 | 13.47 | 41.40 | 30.14 | 12.06 | p<.001 |
| $25,000 to $49,999 | 1.61 | 9.62 | 38.08 | 36.84 | 13.85 | |
| $50,000 to $74,999 | 1.25 | 7.49 | 33.63 | 41.64 | 16.00 | |
| $75,000 or more | 0.69 | 4.30 | 25.49 | 43.55 | 25.97 | |
| *Education* | | | | | | |
| Less than high school | 5.68 | 14.07 | 42.74 | 27.72 | 9.79 | p<.001 |
| High school / GED | 1.69 | 13.82 | 41.23 | 31.58 | 11.67 | |
| Some college | 1.59 | 8.97 | 38.40 | 36.90 | 14.14 | |
| 4-year college or more | 0.49 | 3.04 | 23.67 | 47.05 | 25.75 | |
| *Weight Status[3]* | | | | | | |
| Underweight/Normal | 0.88 | 2.97 | 23.59 | 45.72 | 26.83 | p<.001 |
| Overweight | 0.53 | 6.78 | 34.69 | 41.04 | 16.97 | |
| Obese | 2.89 | 15.19 | 45.16 | 29.22 | 7.54 | |

Notes: [1] Weighted percentages
[2] Significance of the Design-Based F-Test
[3] Weight status determined by CDC-defined BMI cut-points

**Multivariate Analyses of Key Independent and Outcome Variables**

  **Weighted Binary Logistic Regression.**

   ***Accuracy of Weight Perception: Underweight/Normal Weight Women***

   This analysis was stratified into two subsamples, 1) underweight or normal weight

women (n=2,644) and 2) overweight or obese women (n=4,487). Binary logistic regression was

used to test the hypotheses that there are racial/ethnic and SES differences in the accuracy of

weight perceptions among underweight/normal weight women. For this model, the outcome was

*1 = inaccurate, perceived overweight, 0 = accurate, perceived normal weight*. Results of the

model showed that among underweight/normal weight women, *race/ethnicity*, *income*, and

*education* were all significantly associated with weight perception (Table 6). More specifically,

compared to White women, African American women had significantly lower odds of perceiving

themselves as overweight (adjusted OR = 0.44, p<.001). There were no significant differences in

weight perception for Hispanic and Asian women compared to White women. Compared to

women with an annual income of $25,000 or less, those with a household income of $50,000 to

$74,999 and $75,000 or more had greater odds of perceiving themselves as overweight (adjusted

OR = 1.60, p=.032; adjusted OR = 1.67, p=.036). Compared to women with less than a high

school education, only women with a high school degree or GED had significantly greater odds

of perceiving themselves as overweight (adjusted OR = 2.07, p=.039). Compared to women with

less than a high school education, there were no significant differences in weight perception

among women with some college or a 4-year college degree or more.

**Table 6: Binary Logistic Regression of Independent Variables on Accuracy of Weight Perception Among Underweight or Normal Weight Women, Add Health, 2007-2008 (n=2,644)**

| | Coefficient | Odds Ratio | Adjusted Odds Ratio 95% CI |
|---|---|---|---|
| *Race/Ethnicity* | | | |
| Hispanic | -0.081 | 0.92 | [0.58, 1.45] |
| African American | -0.800*** | 0.44 | [0.30, 0.68] |
| Asian | 0.378 | 1.46 | [0.80, 2.65] |
| White | -- | 1.00 | -- |
| *Nativity Status* | | | |
| Foreign-born | -0.027 | 0.97 | -- |
| Born in the US | -- | 1.00 | [0.51, 1.86] |
| *Age* | 0.042 | 1.04 | [0.97, 1.12] |
| *Household Income* | | | |
| Less than $25,000 | -- | 1.00 | -- |
| $25,000 to $49,999 | 0.409 | 1.51 | [0.97, 2.33] |
| $50,000 to $74,999 | 0.471* | 1.60 | [1.04, 2.46] |
| $75,000 or more | 0.515* | 1.67 | [1.04, 2.71] |
| *Education* | | | |
| Less than high school | -- | 1.00 | -- |
| High school / GED | 0.726* | 1.84 | [1.04, 4.12] |
| Some college | 0.612 | 1.84 | [0.90, 3.78] |
| 4-year college or more | 0.299 | 1.35 | [0.66, 2.75] |

Note: * p<.05

        *** p < .001

### *Accuracy of Weight Perception: Overweight/Obese Women.*

Binary logistic regression was used to test the hypotheses that there are racial/ethnic and SES differences in the accuracy of weight perception among overweight/obese women. For this model, the outcome *1 = inaccurate, perceived normal weight* and *0 = accurate, perceived overweight*. Results from the model showed that among overweight/obese women, *race/ethnicity* and *education* were the only significant predictors of weight perception (Table 7). Compared to White women, overweight/obese African American women had greater odds of perceiving themselves as normal weight (adjusted OR = 1.75, p<.001). Compared to White women, there

were no significant differences in perception among Hispanic and Asian women. Additionally, compared to women with less than a high school education, those with some college had significantly lower odds of inaccurately perceiving themselves as normal weight (p<.05). Among overweight/obese women, *nativity status*, *age*, and *income* were not significantly associated weight perception.

**Table 7: Logistic Regression of Independent Variables on Accuracy of Weight Perception Among Overweight or Obese Women, Add Health, 2007-2008 (n=4,487)**

|  | Coefficient | Odds Ratio | Adjusted Odds Ratio 95% CI |
|---|---|---|---|
| *Race/Ethnicity* |  |  |  |
|  Hispanic | 0.357 | 1.43 | [0.95, 2.14] |
|  African American | 0.560*** | 1.75 | [1.29, 2.38] |
|  Asian | 0.111 | 1.12 | [0.48, 2.61] |
|  White | -- | 1.00 | -- |
| *Nativity Status* |  |  |  |
|  Foreign-born | 0.114 | 1.12 | [0.55, 2.30] |
|  Born in the US | -- | 1.00 | -- |
| *Age* | -0.012 | 0.99 | [0.92, 1.06] |
| *Household Income* |  |  |  |
|  Less than $25,000 | -- | 1.00 | -- |
|  $25,000 to $49,999 | -0.010 | 0.90 | [0.65, 1.25] |
|  $50,000 to $74,999 | -0.282 | 0.75 | [0.48, 1.19] |
|  $75,000 or more | -0.329 | 0.72 | [0.47, 1.11] |
| *Education* |  |  |  |
|  Less than high school | -- | 1.00 | -- |
|  High school / GED | -0.279 | 0.76 | [0.48, 1.20] |
|  Some college | -0.570* | 0.57 | [0.32, 0.99] |
|  4-year college or more | -0.308 | 0.74 | [0.39, 1.38] |

Note: * p<.05
  *** p < .001


**Ordinal Logistic Regression**

*Perceived Attractiveness.*

Ordinal logistic regression was used to test the hypotheses that the effects of *race/ethnicity* on *perceived attractiveness* were contingent on *weight perception*. The post-hoc

omnibus test for the interaction was significant (p<.001), so the interaction term was included in the model (Table 8). For ease of interpretation, Figure 5 shows the predicted probabilities of *perceived attractiveness* by *weight perception* and *race/ethnicity*. Note that the predicted probabilities reflect predicated probabilities for perceiving oneself "not at all attractive." As can be seen, African American women had the lowest probability of reporting themselves as unattractive, regardless of weight perception. In contrast, Asian women had the highest probability of reporting themselves as unattractive when underweight. This probability decreased at normal weight and increased again at overweight. The predicted probabilities for Whites and Hispanics were intermediate between African Americans and Asians. For both White and Hispanics, predicted probabilities were lowest for those reporting they were underweight, and increased substantially among those reporting they perceived themselves to be overweight.

*Age* and *weight status* were also significantly associated with *perceived attractiveness*, such that older women had lower odds of perceiving themselves attractive (adjusted OR = 0.95, p=.026). Compared to underweight/normal weight women, overweight (but not obese) women had greater odds of perceiving themselves as attractive (adjusted OR = 1.26, p=.023). *Nativity status, income,* and *education* were not significant predictors in the model.

**Table 8: Ordinal Logistic Regression of Independent Variables on Perceived Attractiveness, Add Health, 2007-2008 (n=7,131)**

| | Coefficient | Odds Ratio | Adjusted Odds Ratio 95% CI |
|---|---|---|---|
| *Race/Ethnicity* | | | |
| Hispanic | 0.089 | 1.09 | [0.73, 1.63] |
| African American | 1.794*** | 6.02 | [4.30, 8.41] |
| Asian | -0.382 | 0.68 | [0.39, 1.19] |
| White | -- | 1.00 | -- |
| *Nativity Status* | | | |
| Foreign-born | 0.190 | 1.21 | [0.83, 1.75] |
| Born in the US | -- | 1.00 | -- |
| *Age* | -0.055* | 0.95 | [0.90, 0.99] |
| *Household Income* | | | |
| Less than $25,000 | -- | 1.00 | -- |
| $25,000 to $49,999 | -0.036 | 0.97 | [0.80, 1.16] |
| $50,000 to $74,999 | -0.063 | 0.94 | [0.74, 1.19] |
| $75,000 or more | 0.080 | 1.08 | [0.89, 1.32] |
| *Education* | | | |
| Less than high school | -- | 1.00 | -- |
| High school / GED | 0.119 | 1.13 | [0.80, 1.58] |
| Some college | 0.037 | 0.83 | [0.72, 1.49] |
| 4-year college or more | 0.225 | 1.00 | [0.88, 1.79] |
| *Weight Status[1]* | | | |
| Underweight/Normal | -- | 1.00 | -- |
| Overweight | 0.234* | 1.26 | [1.03, 1.55] |
| Obese | -0.172 | 0.84 | [0.68, 1.04] |
| *Weight Perception* | | | |
| Underweight | -0.039 | 0.96 | [0.55, 1.68] |
| Overweight | -0.755** | 0.47 | [0.40, 0.55] |
| Normal | -- | 1.00 | -- |
| *Race * Weight Perception* | | | |
| Hispanic—Underweight | 0.306 | 1.36 | [0.39, 4.78] |
| Hispanic—Overweight | 0.028 | 1.03 | [0.61, 1.74] |
| African American—Underweight | -0.627 | 0.53 | [0.22, 1.27] |
| African American—Overweight | 0.614*** | 1.85 | [1.35, 2.53] |
| Asian—Underweight | -0.773 | 0.46 | [0.13, 1.67] |
| Asian—Overweight | 0.225 | 1.25 | [0.60, 2.61] |

Notes: * $p<.05$
     *** $p<.001$
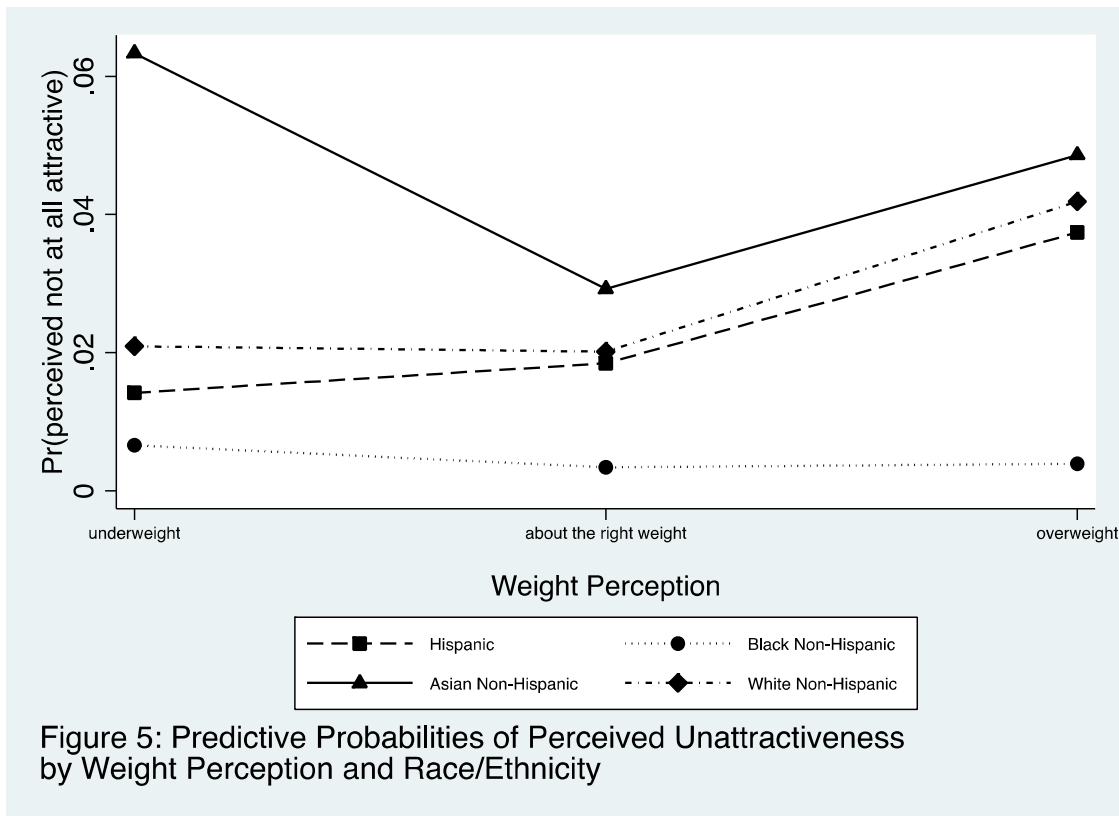[1] Weight status determined by CDC-defined BMI cut-points

Figure 5: Predictive Probabilities of Perceived Unattractiveness by Weight Perception and Race/Ethnicity

**Self-Rated Health.**

Ordinal logistic regression was used to examine the effect of demographic factors, *weight status*, *weight perception*, and *perceived attractiveness* on *self-rated health*. Table 9 shows the results of the final model, where all independent variables were significantly associated with *self-rated health*. The interaction between *weight perception* and *perceived attractiveness* was tested but not found significant and was dropped from the model. Compared to White women, Hispanic, African American, and Asian women had significantly lower odds of reporting better health (adjusted OR = 0.65, p=.006; adjusted OR = 0.75, p=.003; adjusted OR = 0.43, p<.001 respectively). Foreign-born and older women had greater odds of reporting better health (adjusted OR = 1.77, p=.006; adjusted OR = 1.05, p=.011). All levels of income were significant. Compared to women with an annual income less than $25,000, women with higher annual incomes had greater odds of reporting better health (adjusted OR = 1.25, p=.021; adjusted OR =

1.37, p=.003; adjusted OR = 1.82, p <.001). Similarly, all levels of education were significant.

Compared to women with less than a high school degree, women with some college or a 4-year

college degree or more reported better health (adjusted OR = 1.54, p=.021; adjusted OR = 2.79,

p<.001).

All levels of *weight status* were also significant. Compared to underweight or normal

weight women, those who were overweight or obese had lower odds of reporting better health

(adjusted OR = 0.77, p=.013; adjusted OR = 0.38, p<.001). Furthermore, compared to women

who perceived themselves as normal weight, women who perceived themselves as underweight

or overweight had lower odds of reporting better health (adjusted OR = 0.35, p<.001; adjusted

OR = 0.56, p<.001). Last, women who rated themselves as more attractive had greater odds of

reporting better health, and the effect was greater with each increase in attractiveness (adjusted

OR = 2.05, p=.039; adjusted OR = 2.95, p=.002; adjusted OR = 3.65, p<.001).

**Table 9: Ordinal Logistic Regression of Independent Variables on Self-Rated Health, Add Health, 2007-2008 (n=7,131)**

| | Coefficient | Odds Ratio | Adjusted Odds Ratio 95% CI |
|---|---|---|---|
| *Race/Ethnicity* | | | |
| Hispanic | -0.428** | 0.65 | [0.48, 0.88] |
| African American | -0.289** | 0.75 | [0.62, 0.90] |
| Asian | -0.854*** | 0.43 | [0.28, 0.65] |
| White | -- | 1.00 | -- |
| *Nativity Status* | | | |
| Foreign-born | 0.572** | 1.77 | [1.18, 2.66] |
| Born in the US | -- | 1.00 | -- |
| *Age* | 0.045* | 1.05 | [1.01, 1.08] |
| *Household Income* | | | |
| Less than $25,000 | -- | 1.00 | -- |
| $25,000 to $49,999 | 0.220* | 1.25 | [1.03, 1.50] |
| $50,000 to $74,999 | 0.317** | 1.37 | [1.12, 1.69] |
| $75,000 or more | 0.606*** | 1.83 | [1.52, 2.20] |
| *Education* | | | |
| Less than high school | -- | 1.00 | -- |
| High school / GED | 0.247 | 1.28 | [0.85, 1.93] |
| Some college | 0.429* | 1.54 | [1.07, 2.21] |
| 4-year college or more | 1.025*** | 2.79 | [1.95, 3.99] |
| *Weight Status[1]* | | | |
| Underweight/Normal | -- | 1.00 | -- |
| Overweight | -0.260* | 0.77 | [0.63, 0.95] |
| Obese | -0.976* | 0.38 | [0.31, 0.46] |
| *Weight Perception* | | | |
| Underweight | -1.041*** | 0.35 | [0.27, 0.46] |
| Overweight | -0.572*** | 0.56 | [0.48, 0.67] |
| Normal | -- | 1.00 | -- |
| *Perceived Attractiveness* | | | |
| Not At All Attractive | -- | 1.00 | -- |
| Slightly Attractive | 0.718* | 2.05 | [1.04, 4.06] |
| Moderately Attractive | 1.082** | 2.95 | [1.50, 5.82] |
| Very Attractive | 1.294*** | 3.65 | [1.82, 7.29] |

Note: * $p<.05$
    ** $p<.01$
    *** $p<.001$
[1] Weight status determined by CDC-defined BMI cut-points

## Discussion

Understanding the relationships among weight perception, body satisfaction, and self-rated health in a diverse population of women is an important step in designing effective interventions addressing psychological and physical outcomes related to weight status among

young women. The present analysis contributes to the literature by expanding our understanding of the impact of race and ethnicity and socioeconomic status on these relationships among young women. Furthermore, the present study offers a unique perspective on the relationships among weight perception, body satisfaction and self-rated health that has implications for clinicians and public health professionals alike.

**Accuracy of Weight Perception.**

The results support our hypothesis that there are racial/ethnic differences in the accuracy of weight perception. These results replicated previous work (Boyd et al., 2011; Chithambo & Huey, 2008; Langellier et al., 2014) on weight perception by demonstrating, compared to White women, African American women have lower odds of perceiving themselves as overweight, even when overweight themselves. These results lend support to the idea that African Americans idealize larger body sizes, and subsequently African American women are less likely to perceive themselves as overweight compared to White women. While previous research has shown that Hispanic women are less likely than White women to perceive themselves as overweight (Chang & Christakis, 2003; Dorsey, Eberhardt, & Ogden, 2009), our findings are consistent with another set of literature that has shown Hispanic women to be just as likely as White women to perceive themselves as overweight (Aruguete et al., 2004; Boyd et al., 2011; Gillen & Lefokowtiz, 2011; Kronenfeld et al., 2010). Our findings could be due, in part, to the extent to which the Hispanic women in our sample have acculturated and internalized the American ideal of thinness. Given that 19.3% of the Hispanic women in our sample were born in the US, perhaps they have internalized the thin ideal more than others in previous studies. Without a more comprehensive measure of acculturation it is impossible to know for sure. Our findings also add to the literature on weight perception among Asian American women, supporting previous findings that Asian

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American women are as likely as White women to inaccurately perceive themselves as overweight (Rakhkovskaya & Warren, 2014).

Additionally, our results support our hypothesis that socioeconomic differences exist in the accuracy of weight perception among women who are underweight or normal weight. However, there were no real effects of SES on accuracy of weight perception for women who were overweight or obese. When controlling for race/ethnicity, the effects of income and education were minimal, suggesting that race/ethnicity is correlated with SES. Consistent with previous work (Johnston & Lordan, 2013; Paeratakul et al., 2002; Wardle & Griffith, 2001), for normal weight women we found higher SES is associated with a greater odds of perceiving oneself as overweight. Paeratakul and colleagues (2002) found that the effects of SES remained after controlling for race/ethnicity, consistent with our findings. However, the significant effects of education on accuracy of weight perception were only for those with high school/GED, although all effects did go in the expected direction. Similarly, among overweight and obese women, the effects of income and education were reduced in multivariate analysis, but again their effects were in the expected direction. Future studies should explore other components of SES (e.g., whether income and education changes over time) and the ways in which these effects may be contingent on women's BMI.

**Body Satisfaction.**

Consistent with previous work on body satisfaction (Chithambo & Huey, 2013; Page et al., 2009), the present study conceptualized body satisfaction as *perceived attractiveness*. To date, there are few investigations of racial/ethnic differences in perceived attractiveness among young women, and to our knowledge no research has examined the interaction between weight perception and race/ethnicity on perceived attractiveness. Our results support the hypothesis that

the effect of race/ethnicity is dependent on weight perception, such that regardless of weight perception, African American women have the lowest odds of perceiving themselves as "not at all attractive," while White and Hispanic women have the greatest odds of perceiving themselves as "not at all attractive" if they perceived themselves as overweight. Asian women, however, have the highest odds of rating themselves as "not at all attractive" when they perceive themselves as underweight *or* overweight. These findings are novel as no research has explicitly examined the interaction between weight perception and race/ethnicity on perceived attractiveness or body satisfaction. However, our results are consistent with previous findings that compared to White women, African American women report lower perceived weight and higher perceived attractiveness (Chithambo & Huey, 2013). Additionally, our findings are in contrast to other work that has shown the magnitude of the difference in body satisfaction between White and African American women is small (Grabe & Hyde, 2006) and when controlling for age, weight, and education, race/ethnicity have no impact on body satisfaction (Cachelin et al., 2002). Furthermore, Asian women are most likely to rate themselves as "not at all attractive" if they perceive themselves underweight, which is surprising since some prior research has suggested that Asian women are as likely as Whites to invest in an ideal of thinness (Boyd et al., 2011).

Age is also a significant predictor of perceived attractiveness, demonstrating that even among a sample of women within a decade of each other, a woman being in or closer to her 30s resulted lower odds of perceiving herself as attractive. Very few studies on body image have explicitly studied the young adult age groups (mid-20s to early 30s), however some research found that body satisfaction decreases during young adulthood (Bearman et al., 2006; Bucchianeri et al., 2012; Gardner et al., 2000), while others have found increases in body

satisfaction during this time (Eisenberg et al., 2006). A review of the body image literature across the lifespan concluded that body dissatisfaction among women remains stable across their lifetime (Tiggeman, 2004), and so why body satisfaction decreased with age within our population is unclear. It is possible that the significance of turning 30 and its association with "getting older" impacted the older women in our population, especially since fear of aging has been associated with eating disorder symptomology in older women (Lewis & Cachelin, 2010). However, without a strong body of research on body satisfaction in young adult women, it is impossible to make a firm conclusion.

Unexpectedly, compared to underweight or normal weight women, overweight (but not obese) women have *greater* odds of rating themselves as attractive. This is particularly surprising given that 68% of the overweight women in our sample are White. It may be that, compared to women with lower BMI, women with higher BMI have become more comfortable with their bodies over time and do not view larger size (e.g., overweight) as a disadvantage. In fact, as presented earlier, studies suggest that as Americans have gotten larger, there is more acceptance of somewhat larger body sizes (Johnson-Taylor et al., 2008; Langellier et al., 2014).

Finally, our results do not support our hypothesis that there are socioeconomic differences in perceived attractiveness. However, at the bivariate level there are significant differences across income and education, such that women with higher income and education are more likely to perceive themselves as more attractive. These findings suggest that SES differences in perceived attractiveness are, by and large, explained by race/ethnicity, weight perception, and their interaction.

**Self-Rated Health.**

Our results support the hypothesis that self-rated health differs across race/ethnicity, such that compared to White women, African American, Hispanic, and Asian women report poorer health. This finding is consistent with previous work on self-rated health that found compared to Whites, African Americans reported poorer health (Benjamins et al., 2012; Franks et al., 2003). Our results also found that women who are foreign-born are more likely to report better health, consistent with the notion of the "healthy immigrant paradox" (Franzini et al., 2001; Hummer et al., 1999). Also, as hypothesized, SES is significantly associated with self-rated health in the expected direction. That is, women with higher levels of income and education have significantly better health compared to those with lower levels of income and education. These results are confirmed in numerous prior studies (Kennedy et al., 1998; Kondo et al., 2009; Mirowsky & Ross, 2008; Prus, 2011; Ross & Wu, 1995).

Our results suggest that weight perception is a significant predictor of self-rated health, such that compared to normal weight women, those who are overweight or underweight report poorer health. Though the literature on the relationship between weight perception and self-rated health is scarce, our study has replicated the finding that weight perception is a stronger predictor of self-rated health than BMI. In particular, women who perceive themselves as overweight are more likely to have lower self-rated health, after controlling for BMI (Herman et al., 2013; Heshmat et al., 2014). One possible explanation for this finding is the heightened awareness of overweight/obesity as a risk factor for many chronic illnesses in American society. Previous work has identified obesity as a culture-bound syndrome (Ritenbaugh, 1982), meaning that the extent to which obesity is seen as a disease is dependent upon how a particular culture has conceptualized it. Ritenbaugh (1982) and others have noted that as the ideal body size in Western

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culture has tended towards a preference for thinness, clinical definitions of obesity have made a parallel shift (Bray, 1987). As such, a weight status "larger" than the ideal is equated with poorer health. Thus, it follows that women who perceive themselves as overweight also perceive their physical health as poor, possibly regardless of clinical health indicators. Future research should seek to further elucidate the impact of obesity as a culture-bound syndrome on weight perception and self-rated health.

Last, and new to this study, perceived attractiveness is significantly associated with self-rated health, such that higher levels of perceived attractiveness are associated with better self-rated health in a dose-response fashion. Our findings are consistent with the limited previous research on body satisfaction and self-rated health. To date, only one study explicitly examined the relationship between perceived attractiveness and self-rated health (Page et al., 2009), and two others examined other measures of body satisfaction and self-rated health, all finding women with poor body satisfaction reported poor health (Anderson et al., 2002; Meland & Breidablik, 2006). While we are just beginning to explore this relationship, it is possible that the psychological component of self-rated health plays a crucial role in a woman's view of her own health (Meland & Breidablik, 2006; Page et al., 2009), or that being in poor health results in low body satisfaction (Meland & Breidablik, 2006). Future investigations should seek to further clarify the driving forces of this relationship.

**Limitations**

Though both the external and internal validity of the present study seem strong, the study is not without its limitations. First, while the present study utilized nationally representative survey data, due to small sample sizes, our analyses did not include Native American or Alaskan Native women. The present study sought to address a previous lack of racial/ethnic diversity in

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weight perception and body image work, however there is an even greater lack of research exploring these phenomena in Native American and Alaskan Native women. Future work in this area should include a significant sample of these women.

Additionally, our data was collected in 2007-2008, which means the generalizability of our findings to the young women of 2016 may be limited. Obesity rates have increased, as has the use of social media, leading to the possibility that social norms and expectations surrounding both the ideal and "normal" body size have changed. Furthermore, due to sample size constraints, for some analyses women who had an underweight BMI were grouped with women who had a healthy BMI. By combining these groups it is possible meaningful outcomes among underweight women were missed. Ideally this study would be replicated in a sample with a larger population of underweight women.

Additionally, we added to the body satisfaction literature by measuring perceived attractiveness, rather than other measures of body satisfaction. However, given that perceived attractiveness has not been used extensively in the weight perception literature, the comparability of our findings to other studies exploring weight perception and body satisfaction may be limited. However the list of possible measures of body satisfaction is extensive (Coker et al., 2014; Thompson & Gray,1995), therefore this limitation is likely minimal. Finally, ideally the present study would have included measures on the women's idea of an ideal body size. Without such a measure we are left to speculate on the role social expectations played in shaping body satisfaction. Future research should include such measures in order to more clearly demonstrate the impact of social expectations on not only body satisfaction but weight perception and subjective health as well.

**Conclusion**

In conclusion, the present study offers a unique examination of the relationships among weight perception, perceived attractiveness, and self-rated health, and how they are shaped by race/ethnicity and socioeconomic status. It was found that psychological factors, such as weight perception and body satisfaction, play important roles in how young adult women perceive their physical health. Additionally, our findings suggest that racial/ethnic and SES differences exist in relation to each of these outcomes, lending support to the notion that social expectations of women vary and have significant implications for their psychological and physical health. These findings also have implications for future health promotion programs relating to obesity. Our findings suggest that the experience of any weight status differs among women of various races, ethnicities, and socioeconomic statuses, indicating the social and cultural factors play a crucial role shaping women's perceptions of their own health. Public health professionals should be sensitive to these differences by ensuring that messaging and interventions are tailored to meet both the psychological and physical health needs of their population of focus and do not unintentionally adversely affect a woman's body image. Given that a woman's weight perception and body satisfaction may affect her perception of her overall health, public health professionals should seek to address not only physical health outcomes but outcomes relating to body image as well. Physical health does not function in isolation from psychological and social factors, and public health programs must reflect that reality.

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