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Body mass index as a moderator of the association between weight status misperception and disordered eating behaviors

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ABSTRACT

Weight status under-perception is protective against disordered eating behaviors and weight gain; however, it is unclear whether under-perception may confer protection across all weight classes. This work explored body mass index as a moderator of the association between weight status perception accuracy and disordered eating behaviors among adults with overweight or obesity. A total of 572 adults (58.7% female; age $M = 39.50$, $SD = 11.57$) with overweight or obesity (body mass index $M = 31.50$, $SD = 6.24$) completed a series of online questionnaires assessing uncontrolled, emotional, and restrained eating, eating disorder symptoms, weight status perception, and demographics. Controlling for race/ethnicity, age, and sex, linear and negative binomial regressions were used to test hypotheses. Compared to accurate weight status perception, under-perception was associated with less uncontrolled ($p = .003$) and restrained eating ($p = .002$). Under-perception was particularly protective against emotional eating ($p = .022$) and eating disorder symptoms ($p = .017$) for individuals of overweight or Class I obesity. In general, weight status under-perception was associated with fewer disordered eating behaviors. The protective effects of under-perception of weight status may be maximized for individuals of overweight or Class I obesity statuses.

1. Introduction

Worldwide obesity rates remain high, with 39% of adults meeting criteria for overweight (Hales, Carroll, Fryar, & Ogden, 2017) and approximately 13% meeting criteria for obesity (World Health Organization, 2016). Individuals with overweight or obesity often report high levels of disordered eating behavior (e.g., restrained eating and binge eating: Darby, Hay, Mond, Rodgers, & Owen, 2007; uncontrolled and emotional eating: Konttinen, Haukkala, Sarlio-Lähteenkorva, Silventoinen, & Jousilahti, 2009), and show increased risk for future binge-related eating disorder diagnoses (e.g., binge eating disorder and night eating syndrome; McCuen-Wurst, Ruggieri, & Allison, 2018). An emerging literature supports weight status under-perception as protective against weight gain and disordered eating behaviors among adolescents (Deschamps, Salanave, Chan-Chee, Vernay, & Castetbon, 2015; Eichen, Conner, Daly, & Fauber, 2012), including those of overweight and obese status (Duncan et al., 2011). Fewer studies, however, have examined whether this process is protective for adults with overweight or obesity (see review by Haynes, Kersbergen, Sutin, Daly, & Robinson, 2017). Therefore, it is unclear whether the associations between weight status under-perception and weight-related behaviors persist beyond adolescence to adults with overweight/obesity.

Weight status misperception is defined as the discrepancy between an individual's actual weight status and perception of their objective weight status. Broadly, weight status perception represents how an individual perceives their body weight as a weight status category, rather than a specific number. Data indicate that weight status perception, rather than self-reported or measured body weight, is associated with a host of mental health indicators (Jansen, van de Looij-Jansen, de Wilde, & Brug, 2008) and eating disturbances (Kagawa et al., 2007; Smolak, 2004) among adolescents.

Much of the weight status perception research with adults is descriptive, focused on weight status perception accuracy, and often limited to the primary outcome variables of weight loss intention or attempt (Haynes et al., 2017). For example, there is evidence that general accuracy of weight status perception may differ by race/ethnicity and sex (Brener, Eaton, Lowry, & McManus, 2004; Sivalingam et al., 2011), with racial/ethnic minorities and males being more likely to misperceive – either under- or over-perceive – their weight status compared to their respective counterparts (Park, 2011; Sarafrazi, Hughes, Borrud, Burt, & Paulose-Ram, 2014). Research on individuals with Class II obesity indicates that those who under-perceived their weight status generally reported less disordered eating behavior, as well

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as less depression and higher self-esteem (Jones, Grilo, Masheb, & White, 2010). Similarly, a recent cross-sectional investigation of young adults with overweight/obesity (Sonneville, Thurston, Milliren, Gooding, & Richmond, 2016) suggests that individuals who under-perceived their weight status as healthy reported less disordered eating behavior, specifically fasting for weight control. Notably, few of these studies examined behaviors that may contribute to continued overweight/obese status, including overeating and restrained eating, among individuals across *all* overweight and obesity classes.

Disordered eating behaviors, including restrained eating, are supported as risk factors for weight gain and overweight/obese status (Neumark-Sztainer et al., 2007) and are under-assessed in individuals with overweight or obesity. While caloric restriction is an empirically-supported component of successful weight loss and control among adults with overweight/obesity (National Task Force on the Prevention and Treatment of Obesity, 1996), there also is evidence that individuals with overweight/obesity are less likely to be accurately diagnosed with an eating disorder, especially restrictive eating disorders (Sim, Lebow, & Billings, 2013). Further, accurate weight status perception is associated with intention to lose weight, but not necessarily healthy weight loss behaviors (Haynes et al., 2017). Thus, understanding the extent to which weight status perception is associated with a range of behaviors that may contribute to continued overweight/obese status is relevant to prevention and treatment efforts.

In 2000, the World Health Organization expanded the weight status categories to include additional obesity categories (i.e., Class I, II, and III; World Health Organization, 2000). There is evidence to suggest that individuals with Class II and III obesity experience worse psychosocial (see review by Puhl & Heuer, 2009) and medical (Must et al., 1999; Pi-Sunyer, 2002) outcomes compared to individuals with overweight or Class I obesity. Little work, however, has considered the extent to which accurate perception of weight status among individuals with obesity may be associated with increasingly worse psychological outcomes. Further, it is unclear whether the protective benefits of weight status under-perception extend through all obesity classes. Notably, data suggest that the strength of the estimates of the association between weight status under-perception and psychological outcomes increased when analyses controlled for participants' body mass index (Jones et al., 2010). Taken together, it is important to examine whether there is a threshold at which weight status under-perception no longer may be protective for individuals with overweight/obesity.

This study sought to address this gap in the current literature by examining the extent to which accurate versus under-perception of weight status may differ in its association with a range of disordered eating behaviors among adults with overweight or obesity Classes I–III. It is possible that weight status under-perception is protective simply because cultural expectations of “healthy weight” have shifted to encompass higher weight status (Burke, Heiland, & Nadler, 2010; Maximova et al., 2008; Robinson & Kirkham, 2014). Alternatively, individuals with higher obesity classes simply may not experience the protective effects of weight status under-perception. Based on existing findings, individuals for whom weight status under-perception is not protective likely would be at greater risk of engaging in a range of problematic eating behaviors including uncontrolled and emotional eating, restrained eating, and endorsement of eating disorder symptoms more generally.

2. Material and methods

2.1. Participants and procedures

The study was deemed exempt by the institution's review board. Participants were recruited via Amazon's Mechanical Turk (MTurk) and completed a series of questionnaires online lasting approximately 45 min for $0.50 compensation. MTurk represents the dominant crowdsourcing market used by academic researchers (Buhrmester, Kwang, & Gosling, 2011; Mason & Suri, 2012), allowing for rapid and inexpensive data collection of attentive (Hauser & Schwarz, 2016) and diverse populations (Gosling & Mason, 2015; Mason & Suri, 2012; Weinberg, Freese, & McElhattan, 2014). Three attention checks were inserted throughout the questionnaire (e.g., “I have been to every country in the world”; Meade & Craig, 2012). During data cleaning, 169 cases were excluded due to suspicious responding (e.g., duplicate IP addresses) or for discontinuing the survey after informed consent. An additional 129 individuals were excluded from analyses for failing two or more attention checks, leaving a total of 1121 individuals. Of these, 582 participants met criteria for overweight or obesity. Over-perception of weight status was rare; only six participants reported weight status over-perception and these individuals were removed from the sample. Three individuals did not provide sufficient information to calculate weight status perception and one identified their sex as non-binary, leaving a final sample of 572.

This sample was 58.7% female (n = 336) and ranged in age from 18 to 65 (M = 39.50, SD = 11.57). Participants' mean body mass index (BMI) was 31.50 (SD = 6.24), with the majority (52.3%) of participants falling in the overweight range, 26.0% in obesity Class I, 12.2% in obesity Class II, and 9.4% in obesity Class III. The majority of participants (93.5%) identified as non-Hispanic, Spanish or Latino (5.9% Hispanic, Spanish, or Latino, 0.5% unknown). Of those who identified as Non-Hispanic, Spanish or Latino, 79.9% identified as White, 6.6% as Black, 3.8% as Asian, 0.7% as American Indian or Alaskan Native, and 2.4% as other/multiracial. Of those who identified as Hispanic, Spanish or Latino, 3.5% identified as White, 0.2% as Black, 0.2% as Asian, and 1.9% as other/multiracial.

2.2. Measures

2.2.1. Demographics

Demographic data including age, sex, race/ethnicity, height and weight, were collected via self-report. Body mass index (BMI) was used as an index of body weight adjusted for participant height, and calculated by using the equation BMI = Weight (kg)/Height $(m)^2$. Research suggests a high agreement between self-reported and objectively measured BMI (Himes, Hannan, Wall, & Neumark-Sztainer, 2005); therefore, these self-reported results are likely an accurate estimate of the current sample's BMI.

2.2.2. Weight status perception

Each participant's weight status was calculated using BMI classifications as recommended by the Center for Disease Control (CDC) for adults, indicating the proportion of participants with overweight (between 25.0 and 29.9), obese Class I (between 30.0 and 34.9), obese Class II (between 35.0 and 39.9), and obese Class III (> 40.0) weight status. Self-reported weight status (SRW) was assessed by asking participants “How would you describe your weight?” Responses included: *very underweight*, *underweight*, *average*, *overweight*, *very overweight*. Based on the BMI class categories and coding strategies used in previous literature (Pasch et al., 2011), weight perception was coded as 1) *under-perception* for individuals who reported their SRW at least one category below their actual weight status, or 2) *accurate* for individuals who reported a SRW that matched their actual weight status.

2.2.3. Uncontrolled and emotional eating

Eating behavior was assessed using the uncontrolled and emotional eating subscales of the revised Three Factor Eating Questionnaire (TFEQ-R18V2; Cappelleri et al., 2009). The 9-item uncontrolled eating subscale reflects difficulty in regulation or loss of control while eating. A sample item is “Sometimes when I start eating, I just can't seem to stop” with responses ranging from 1 (*definitely true*) to 4 (*definitely false*). The 6-item emotional eating subscale measures overeating that occurs during dysphoric mood states. A sample item is “When I feel blue, I often overeat” with responses ranging from 1 (*definitely true*) to 4