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## Optimism, pessimism, and bias in self-reported body weight among older adults

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### Abstract

**Objective**—Body Mass Index (BMI) and obesity (BMI  $\geq 30$ ) are often derived from self-reported weight and height; psychological dispositions may bias how participants report these physical characteristics. The present research uses a large national sample of U.S. adults to examine the correspondence between reported and measured body weight and height and to test whether optimists and pessimists misreport their weight/height in ways that are consistent with their worldviews.

**Methods**—Participants in the Health and Retirement Study ( $N=11,207$ ) reported their weight and height and completed a measure of dispositional optimism and pessimism; trained interviewers measured participants' weight and height.

**Results**—There was a high correlation between measured and reported weight ( $r=.98$ ) and height ( $r=.92$ ). Consistent with their positive and negative worldviews, respectively, optimists underreported and pessimists over-reported their weight. There was not a consistent association with misreported height. Optimism and pessimism were also associated with actual BMI and risk of obesity, but the protective/risk effects were amplified when using reported weight to derive BMI.

**Conclusions**—These findings suggest that reported body weight tends to be accurate, but that biases associated with psychological dispositions may inflate the relation between the disposition and obesity. Such biases may extend to associations with other self-reported factors thought to be related to optimism and pessimism.

Although a pop culture cliché, the answer to the question “Is the glass half empty or half full?” is revealing of meaningful psychological differences between individuals. Indeed, a large literature shows that dispositional optimism and pessimism are consequential for health-related behaviors and outcomes. Pessimists, for example, face greater risk of coronary heart disease (1) and cardiovascular death (2) than optimists. These associations may be due, in part, to differences in health-risk behaviors. Optimists, for example, report healthier lifestyles, such that they tend to smoke less and exercise more than pessimists

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Conflict of Interest

The author has no conflicts of interest to report.

(3). Although self-reports of health behaviors and physical health are fairly accurate, the worldview of optimists and pessimists may also lead to subtle biases in how they report health-related information.

Self-reported body weight and height are among the most common questions in health research, especially in large-scale epidemiological studies. Although measured and reported weight/height are highly correlated (4), discrepancies are also apparent. Perhaps not surprisingly, individuals generally tend to underestimate their weight and overestimate their height (5, 6, 7). These inaccuracies are associated with characteristics of the individual. For example, women are more likely than men to underestimate their weight (6) (but not all find this association, see (8)), whereas men are more likely to overestimate their height (6). These discrepancies become more pronounced with age (5). Such misreports in weight and height lead to biases in body mass index (BMI), such that BMI tends to be underestimated (9). Previous research has primarily focused on how demographic factors and health status are associated with discrepancies in reported versus measured weight and height; psychological factors may be equally important.

The present study uses a large national sample to examine whether optimists and pessimists misreport their weight and height in ways that are consistent with their worldviews. Specifically, it is expected that optimists will report that they weigh less than their actual weight, whereas pessimists will report that they weigh more than they actually do. In addition, this study examines whether these misreports bias the association between optimism/pessimism and BMI and obesity when BMI is derived from reported versus measured weight and height.

## Method

### Participants

Participants were drawn from the Health and Retirement Study (HRS), a nationally representative longitudinal study of Americans ages 50 and older (10). Since its inception, participants have self-reported their height and weight at each assessment. Starting in 2006, HRS implemented an enhanced face-to-face interview that included measured height and weight (11) and a psychosocial questionnaire (12). Half of the HRS participants completed the enhanced interview in 2006; the other half completed it in 2008. Across the 2006 and 2008 interviews, a total of 11,207 participants ( $M_{\text{age}}=67.75$ ,  $SD=10.13$ ; 60% female) had valid reported and measured height and weight and completed the questionnaire. Descriptive statistics for all study variables are given in the Table.

### Measures

Participants reported their height and weight in the health status module; later in the interview, trained staff took anthropometric measurements. Height was measured without shoes and recorded to the nearest quarter inch. Weight was measured without shoes and with light clothing using a Healthometer 830 kiloliter scale (Jarden Corporation, Rye, NY) and recorded to the nearest half pound. BMI was derived ( $\text{kg}/\text{m}^2$ ) from both measured and reported height and weight.

At the face-to-face interview in either 2006 or 2008, participants also received a psychosocial questionnaire that they completed and returned by mail to the University of Michigan. Within this questionnaire was the Life Orientation Test-Revised (13), a measure of dispositional optimism (3 items; “In uncertain times, I usually expect the best”) and pessimism (3 items; “I hardly ever expect things to go my way”). Participants rated each item on a scale from 1 (*strongly disagree*) to 6 (*strongly agree*). The correlation between the optimism and pessimism scales in this sample was  $-.24, p < .01$ .

## Analysis

Measured weight was subtracted from reported weight to assess misreported weight. Logistic regressions were used to predict participants who underestimated ( $n=3,789$ ) and overestimated ( $n=939$ ) their weight by at least five pounds compared to more accurate participants who reported weight within five pounds of their actual weight ( $n=6,479$ ), controlling for age, age squared, sex, ethnicity, and education. Similarly, measured height was subtracted from reported height and logistic regressions were used to predict participants who underestimated ( $n=296$ ) and overestimated ( $n=3735$ ) their height by at least 1 inch. These cut points were chosen because previous research has indicated that the average reported weight is within five pounds of measured weight and the average reported height is within one inch of measured height. Because these cutoffs were relatively arbitrary, the analyses were rerun using misreported weight/height as continuous measures. The optimism and pessimism scales were entered as continuous variables.

The association between optimism/pessimism and BMI was assessed in two ways. First, partial correlations were used to assess the linear relations between these two worldviews and BMI derived from both measured and reported weight and height. Second, logistic regressions were used to predict risk of obesity (BMI  $\geq 30$ ) compared to normal weight (BMI  $< 25$ ) categorized from measured and reported BMI. All analyses controlled for age, age squared, sex, ethnicity, and education.

## Results

On average, participants misreported their weight by 2.52 kg (SD=3.18; 5.57 pounds). A similar percentage of women and men underreported their weight (33% and 34% of women and men, respectively), but fewer women over-reported their weight (6% versus 11%, respectively for men and women), which led to greater accuracy among women than men (60% versus 55%;  $\chi^2=79.78, p < .01$ ). There was, however, a high correspondence between measured and self-reported weight ( $r=.98, p < .001$ ). This correspondence indicated that even with inaccurate reporting, the rank order of individuals generally remained the same. Despite this high correlation, there were discrepancies between measured and reported weight and these discrepancies were related to optimism and pessimism. Those who scored higher in optimism were more likely to report that they weighed at least five pounds less than their actual weight (OR=1.06, 95% CI=1.02–1.10) and were less likely to over-report their weight (OR=.93 95% CI=.87–.99). Those who scored higher in pessimism, in contrast, were more likely to report that they weighed at least five pounds more than their actual weight (OR=1.18, 95% CI=1.10–1.26); pessimism was unrelated to underreporting

(OR=1.00, 95% CI=.96–1.04). When discrepancy was considered as a continuous variable, this effect held for optimism ( $\beta = -.03, p < .01$ ), but not pessimism ( $\beta = .01, ns$ ), controlling for the demographic factors. Although there were sex differences in the tendency to misreport weight, the associations between optimism/pessimism and misreported weight did not vary by sex. There was an interaction between optimism and measured BMI, such that the effect of optimism on underreporting weight increased slightly in strength as BMI increased ( $\beta = -.02, p < .05$ ). That is, obese participants who scored higher on optimism misreported their weight slightly more than normal-weight optimists. The effect of pessimism on misreported weight did not vary by BMI, which indicated that there was similar misreporting across normal weight, overweight, and obese participants.

On average, participants misreported their height by 2.97 cm (SD=3.68; 1.17 inches). The correlation between reported and measured height was slightly lower than for weight: .92 ( $p < .001$ ). Similar to height, accuracy was greater among women than men (69% versus 56%, respectively) and a lower percentage of women over-reported their height (6% versus 11%;  $\chi^2 = 216.89, p < .01$ ). In contrast to weight, optimism was unrelated to overestimating (OR=.98, 95% CI= .95–1.02) or underestimating (OR=.91, 95% CI= .83–1.10) height. Participants who scored higher in pessimism were more likely to report that they were shorter than measured (OR=1.17, 95% CI=1.07–1.28) and somewhat more likely to report themselves taller than measured (OR=1.05, 95% CI= 1.01–1.08). This latter association was moderated by sex, such that it only held for women (OR<sub>sex×pessimism</sub> =1.08, 95% CI=1.02–1.16). Similar effects emerged when misreported height was entered as a continuous variable ( $\beta_{\text{pessimism}} = .04, p < .01$ ;  $\beta_{\text{optimism}} = .00, ns$ ;  $\beta_{\text{sex×pessimism}} = .03, p < .05$ ).

In addition to overestimating their weight, participants who scored higher in pessimism did actually have a higher BMI: Controlling for the demographic factors, there was a positive correlation between pessimism and measured BMI ( $r = .07, p < .01$ ) and every SD increase in pessimism increased risk of obesity by about 10% (OR=1.12, 95% CI=1.06–1.18). Participants who scored in the top quartile of pessimism weighed, on average, almost 2.5 kg (5.27 pounds) more than participants in the lowest quartile. These associations were similar when reported height and weight were used to calculate BMI instead of measured height and weight ( $r = .07, p < .01$ ), except that the risk of obesity associated with pessimism was about one-third larger when obesity was derived from reported weight and height (OR=1.18, 95% CI=1.10–1.26).

Optimism was primarily unrelated to measured BMI. Although there was a small association with measured BMI ( $r = -.02, p < .05$ ), optimism was unrelated to obesity (OR=.99, 95% CI=.94–1.04). As such, there were minimal differences in weight between participants in the lowest and highest quartiles of optimism (.28 kg or .62 pounds). A somewhat different pattern emerged for reported BMI. There was a slightly stronger association with continuous BMI ( $r = -.03, p < .01$ ) than when derived from measured weight and height, but a nearly 10% reduced likelihood of obesity (OR=.93, 95% CI=.89–.98) associated with each standard deviation increase in optimism.

## Discussion

The present research indicated a high correspondence between measured and reported body weight and height. Despite correlations of nearly 1.00, discrepancies did emerge and those discrepancies were associated with meaningful psychological differences across individuals. Optimists and pessimists are known to approach life with different worldviews: Optimists expect the best, pessimists the worst. These worldviews are not limited to expectations about the future, but also color the way optimists and pessimists perceive their body weight: Optimists see themselves a little thinner, pessimists see themselves a little heavier. Discrepancies in reported and measured weight/height have been previously linked with a number of demographic factors (4, 7). Indeed, algorithms have been developed to adjust self-reported BMI to account for differences attributable to age and sex (5). The present research suggests that algorithms to improve the accuracy of self-reported BMI may also need to consider adjusting for individual differences in psychological functioning.

There are a variety of reasons why people may misreport their weight. Individuals are motivated to maintain a coherent self (14) and this may extend past psychological coherence to aspects of the physical self, such as weight. For some individuals, the misreporting of weight may be a strategic, if not necessarily conscious, choice. For example, optimists may underreport their weight because they believe that they will lose weight in the near future. Pessimists, in contrast, may over-report their weight to feel a little better about themselves when the scale reads lighter than their perceptions. There are also very conscious reasons why individuals may misreport their weight. Weight discrimination is common in the U.S. (15) and individuals may fear negative evaluations if they think that they weigh too much. And, of course, some individuals may simply guess. The present research was not able to disentangle willful misreporting and guesses from genuine beliefs.

In addition to perceiving themselves as heavier, pessimists did actually weigh more. A growing literature implicates psychological traits in weight gain (16) and obesity (17). The present research suggests that pessimism is an additional psychological factor that is associated with obesity. Pessimism may be linked to obesity through variety of mechanisms. This association, for example, may be the result of a self-fulfilling prophecy: Pessimists see themselves as heavier and so they may become heavier. That is, pessimists may be less motivated to maintain a healthy weight and may engage in behaviors that increase risk of weight gain because they already seem themselves as heavier. For example, they tend to have behavioral patterns that are conducive to weight gain, including unhealthy diets and alcohol consumption (18). Pessimists may be less motivated to stick to a healthy diet because they do not believe it will help them to maintain a healthy weight. In addition, pessimism is associated with depressive symptoms (12) and depressive symptoms are associated with weight gain (19). Pessimism has also been linked to physiological factors that may increase risk for obesity, including higher levels of inflammation (20). It may also be the case that obese individuals come to be more pessimistic. The temporal relations between pessimism and obesity could not be disentangled with the cross-sectional data used in the current study. Interestingly, despite pessimists' bias toward misreporting their weight and height, the associations between pessimism and continuous BMI were virtually identical when considering either measured or reported weight/height.

Although pessimists tended to be more accurate in their self-reported weight than optimists, the bias associated with pessimism did lead to an overestimation of its relation to obesity: Pessimists' self-reports amplified the risk of obesity by about one-third, compared to measured obesity. An even larger discrepancy emerged for optimism. By their own accounts, optimists weigh less and have a lower risk of obesity. Optimism, however, was unrelated to obesity risk derived from measured weight and height. A sole reliance on reported BMI would have thus led to an overestimated protective effect of optimism. These findings also suggest that when using BMI derived from self-reported weight, continuous BMI yields more accurate associations than the clinical BMI categories (9).

The present study had several strengths, including a large sample, measured, as well as reported, weight and height, and a well-validated measure of optimism and pessimism. There are several limitations that could be addressed in future research. First, as acknowledged above, it was not possible to distinguish between willful misreporting, guesses, and genuine beliefs. Future research could examine the motivations behind misreported weight. Second, future research could examine these biases in different age groups. The present research used data from the Health and Retirement Study, which is a study of adults ages 50 and older. The misreporting of weight and height tends to change with age (5), and it would be worthwhile to examine how these associations change across the lifespan. It is of note, however, that the misreports in the current sample were consistent with the worldviews of optimists and pessimists and it is expected that these same associations would emerge in younger populations. Third, it would be of interest to examine how these worldviews bias reports of other health-related and income/career-related measures. Optimism and pessimism have pervasive effects on nearly every domain of functioning, from health to relationships to economics (21). It is unlikely that the bias related to these worldviews only has an effect on body weight and it would be interesting to identify how far these biases reach.

The high correlation between measured and reported weight/height indicated a high degree of accuracy, despite the biases. Given its relative accuracy, self-report is certainly a time- and cost-effective method to gain important health-related information. Yet, even modest biases can have consequences for associations of interest. Care needs to be taken when interpreting associations between psychological factors and subjective health indicators, particularly factors that can be open to interpretation, such as body weight (by contrast, individuals are less likely to misreport a cancer diagnosis). Psychological dispositions may systematically bias subjective perceptions of health (22, 23), and two individuals may interpret an identical objective health status in two very different ways. The psychological disposition of interest may bias the association with subjective reports of health in the direction consistent with the content of that disposition. Identifying transactions between psychological factors and body weight will reveal much about psychological functioning and the ways in which psychological dispositions increase risk/promote resilience to obesity.

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## References

1. Kubzansky LD, Sparrow D, Vokonas P, Kawachi I. Is the glass half empty or half full? A prospective study of optimism and coronary heart disease in the normative aging study. *Psychosom Med.* 2001; 63:910–916. [PubMed: 11719629]
2. Giltay EJ, Kamphuis MH, Kalmijn S, Zitman FG, Kromhout D. Dispositional optimism and the risk of cardiovascular death - The Zutphen Elderly Study. *Arch Intern Med.* 2006; 166:431–436. [PubMed: 16505263]
3. Steptoe A, Wright C, Kunz-Ebrecht SR, Iliffe S. Dispositional optimism and health behaviour in community-dwelling older people: Associations with healthy ageing. *Br J Health Psychol.* 2006; 11:71–84. [PubMed: 16480556]
4. Jeffery RW. Bias in reported body weight as a function of education, occupation, health and weight concern. *Addict Behav.* 1996; 21:217–222. [PubMed: 8730524]
5. Nyholm M, Gullberg B, Merlo J, Lundqvist-Persson C, Råstam L, Lindblad U. The validity of obesity based on self-reported weight and height: Implications for population studies. *Obesity.* 2007; 15:197–208. [PubMed: 17228048]
6. Krul AJ, Daanen HA, Choi H. Self-reported and measured weight, height and body mass index (BMI) in Italy, the Netherlands and North America. *Eur J Public Health.* 2011; 21:414–419. [PubMed: 20089678]
7. Gorber SC, Tremblay M, Moher D, Gorber B. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. *Obes Rev.* 2007; 8:307–326. [PubMed: 17578381]
8. Spencer EA, Appleby PN, Davey GK, Key TJ. Validity of self-reported height and weight in 4808 EPIC-Oxford participants. *Public Health Nutr.* 2002; 5:561–565. [PubMed: 12186665]
9. Meng H, He XZ, Dixon D. Self-reported versus measured height and weight in the health and retirement study. *J Amer Geriatr Soc.* 2010; 58:412–413.
10. Health and Retirement Study, 2006 and 2010 Core public use dataset. Produced and distributed by the University of Michigan with funding from the National Institute on Aging (grant number NIA U01AG009740). Ann Arbor, MI: 2012.
11. Crimmins, EM.; Guyer, H.; Langa, KM.; Beth, OM.; Wallace, R.; Weir, DR. Documentation of Biomarkers in the Health and Retirement Study. Ann Arbor, MI: University of Michigan; 2008.
12. Clarke, P.; Fisher, G.; House, J.; Smith, J.; Weir, D. Guide to content of the HRS psychosocial leave-behind participant lifestyle questionnaires: 2004 & 2006. Ann Arbor, MI: University of Michigan; 2008.
13. Scheier MF, Carver CS, Bridges MW. Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the life orientation test. *J Pers Soc Psychol.* 1994; 67:1063–1078. [PubMed: 7815302]
14. Greenwald AG. The totalitarian ego: Fabrication and revision of personal history. *Amer Psychol.* 1980; 35:603–618.
15. Puhl RM, Andreyeva T, Brownell KD. Perceptions of weight discrimination: prevalence and comparison to race and gender discrimination in America. *Int J Obes.* 2008; 32:992–1000.
16. Sutin AR, Ferrucci F, Zonderman AB, Terracciano A. Personality and obesity across the adult lifespan. *J Pers Soc Psychol.* 2011; 101:579–592. [PubMed: 21744974]
17. Khullar D, Oreskovic NM, Perrin JM, Goodman E. Optimism and the Socioeconomic Status Gradient in Adolescent Adiposity. *J Adolesc Health.* 2011; 49:553–555. [PubMed: 22018574]
18. Kelloniemi H, Ek E, Laitinen J. Optimism, dietary habits, body mass index and smoking among young Finnish adults. *Appetite.* 2005; 45:169–176. [PubMed: 16009454]
19. Sutin AR, Zonderman A. Depressive symptoms are associated with weight gain among women. *Psychol Med.* 2012; 42:2351–2360. [PubMed: 22475128]
20. Roy B, Diez-Roux AV, Seeman T, Ranjit N, Shea S, Cushman M. Association of Optimism and Pessimism With Inflammation and Hemostasis in the Multi-Ethnic Study of Atherosclerosis (MESA). *Psychosom Med.* 2010; 72:134–140. [PubMed: 20100888]

21. Carver CS, Scheier MF, Segerstrom SC. Optimism. *Clin Psychol Rev.* 2010; 30:879–889. [PubMed: 20170998]
22. Costa PT Jr, McCrae RR. Neuroticism, somatic complaints, and disease: is the bark worse than the bite? *J Pers.* 1987; 55:299–316. [PubMed: 3612472]
23. Sutin AR, Terracciano A, Ferrucci L, Costa PT. Teeth grinding: Is Emotional Stability related to bruxism? *J Res Pers.* 2010; 44:402–405. [PubMed: 20835403]

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**What is already known about this subject**

- Psychological dispositions contribute to BMI and obesity
- Individuals are not always accurate when asked to report their body weight; there is great variability across individuals in their tendency to misreport their weight and by how much

**What this study adds**

- Despite a high correlation between reported and measured body weight, misreported weight was common and the discrepancy between reported and measured weight was associated with meaningful psychological differences across people: optimists underreported their weight, whereas pessimists overreported their weight.
- In addition to this bias, pessimism was actually associated with higher BMI and obesity, whereas optimism was generally unrelated when BMI/obesity was derived from measured weight/height
- The association between optimism/pessimism and BMI/obesity was exaggerated when using reported weight compared to measured weight

**Table**

## Means (SD) or Percentages for Study Variables

Variable	Descriptive Statistic
Age	67.75 (10.13)
Sex (female)	60%
Ethnicity (white)	85%
Ethnicity (Black)	12%
Education (years)	12.73 (3.04)
Body Mass Index (kg/m <sup>2</sup> )	
Reported	27.97 (5.33)
Measured	29.26 (5.83)
Obesity	
Reported	30%
Measured	39%
Optimism	4.55 (1.14)
Pessimism	2.57 (1.29)

*Note.*  $N=11,207$ . Obesity is defined as body mass index  $\geq 30$ . Optimism and pessimism were measured with the Life Orientation Test-Revised (Scheier, Carver, & Bridges, 1994)