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You *can* be too thin (but not too tall): Social desirability bias in self-reports of weight and height

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ABSTRACT

Previous studies of survey data from the U.S. and other countries find that women tend to understate their body weight on average, while both men and women overstate their height on average. Social norms have been posited as one potential explanation for misreporting of weight and height, but lack of awareness of body weight has been suggested as an alternative explanation, and the evidence presented to date is inconclusive. This paper is the first to offer a theoretical model of self-reporting behavior for weight and height, in which individuals face a tradeoff between reporting an accurate weight (or height) and reporting a socially desirable weight (or height). The model generates testable implications that help us to determine whether self-reporting errors arise because of social desirability bias or instead reflect lack of awareness of body weight and/or other factors. Using data from the National Health and Nutrition Examination Survey (NHANES) from 1999 to 2010, we find that self-reports of weight offer robust evidence of social desirability bias. However, lack of awareness of weight may also contribute to self-reporting biases, and this factor appears to be more important within some demographic groups than others. Among both women and men, self-reports of height exhibit significant social desirability bias only among those of below-average height, and very few individuals underreport their height. Implied self-reports of BMI exhibit gender-specific patterns similar to those observed for self-reporting of weight, and the inferred social norms for BMI (20.8 for women and 24.8 for men) are within the "normal" range established by public health institutions. Determining why individuals misreport their weight has important implications for survey design as well as for clinical practice. For example, our findings suggest that health care providers might take additional steps to increase self-awareness of body weight. The framework also helps to explain previous findings that the degree of self-reporting bias in weight is stronger in telephone surveys than it is in in-person surveys.

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1. Introduction

It is widely recognized that self-reports of body weight and height are often inaccurate.[1] In the U.S. as well as in a number of other countries, BMI values based on self-reported weight and height tend to be too low on average, and population obesity rates that rely on self-reported data may be significantly lower than obesity rates that are based on direct measurements of weight and height (Yun et al., 2006). Despite the importance for public health policy of obtaining accurate estimates of obesity, many local and/or national governments continue to rely on self-reported data for weight and height because the cost of collecting such data is much lower than the cost of measuring weight and height via in-person examinations. Self-reports of weight and height from telephone surveys are used in the U.S. to estimate state-level and county-level obesity rates, and are used in many countries (including Italy and France) to estimate national obesity rates.

A leading possible explanation for misreporting of weight and height in surveys is that individuals exhibit social desirability bias: they report a value of weight (or height) that conforms to a social norm for weight (or height) in an effort to make a good impression, even if the reported value is inaccurate. Social desirability bias has been observed in numerous other contexts, such as in surveys of

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[1] For studies of U.S., see for example, Connor Gorber et al., 2007, Cawley et al., 2015, Engstrom et al., 2003, Cawley, 2004.

voting behavior, household income, and drug use.[2] However, lack of awareness of body weight has been suggested as an alternative explanation for misreporting of weight, and the evidence presented to date does not clearly favor one of these explanations (such as social desirability bias) over the other (lack of awareness). Only a handful of studies to date have tried to assess the reasons for misreporting of weight and/or height and each of these studies has significant limitations, as discussed in Section 2.

This paper aims to identify the underlying reasons for misreporting of weight and height in a novel and rigorous way. To do this, we construct a theoretical model of self-reporting behavior for weight and height that explicitly incorporates social desirability bias, and we test the model's predictions using data from the National Health and Nutrition Examination Survey (NHANES) from 1999 to 2010. We also identify a proxy for weight awareness that helps us determine whether lack of awareness contributes to self-reporting errors. We find that self-reports of weight offer robust evidence of social desirability bias among both women and men. Any strategic attempts by subjects to gain or lose weight in between the interview and the exam—for example to achieve a more socially desirable weight for the examination—would make it harder to detect social desirability bias, and therefore the evidence of social desirability bias among women arises despite this potential endogeneity of weight rather than because of it.

However, our findings indicate that lack of awareness of weight may also contribute to self-reporting biases, and this factor appears to be more important among men than women, and also more important among Blacks as compared with either Whites or Hispanics. Also, a limitation of our conceptual framework is that it is stylized and therefore does not capture more complex aspects of self-reporting behaviors that may arise in the real world.

Among both women and men, social desirability bias in self-reported values of height is observed primarily among individuals of below-average height—who report that they are taller than they actually are—whereas those of average and above-average height give approximately accurate reports. Implied self-reports of BMI exhibit patterns that are similar to those observed for self-reporting of weight—women exhibit strong evidence of social desirability bias and men do not. The conceptual framework also yields a method of estimating social norms for BMI using the data. The estimated BMI norms for women and men both fall within the "normal" range established by the WHO and CDC, but the female BMI norm (at 20.8) is lower than the male BMI norm (at 24.8).[3]

Our insights into the reasons for misreporting have important implications for survey design as well as for clinical practice. For example, our findings suggest that weight-reporting errors in surveys might be reduced by reminding individuals of the importance of providing accurate reports. Our findings suggest further that health care providers might take additional steps to increase self-awareness of body weight because unrecognized weight gains might place individuals at greater risk of developing serious health problems such as diabetes and heart disease.

In our theoretical framework individuals face a tradeoff between wanting to provide an accurate value of weight and wanting to report a value that is close to the social norm for weight.

This tradeoff helps to explain previous findings that the degree of self-reporting bias in weight is stronger in telephone surveys, where accountability for inaccuracy is low, than it is in in-person surveys, where such accountability is relatively high. For the sole purpose of correcting for the measurement error in self-reported values of weight and height on an *ex post* basis, it is not necessary to understand the reasons for misreporting. Nonetheless, knowledge of the reasons for misreporting may help to predict the validity of correction equations across time and place. For example, to the extent that social norms contribute to misreporting, correction equations may need to be adapted based on the origins of the self-reported data with respect to both time and place.

Section 2 discusses the related literature. Section 3 discusses the data and sample selection. Section 4 presents the theoretical model and describes the empirical strategy. Section 5 presents the main results. Section 6 discusses the robustness of the main results to alternative explanations, Section 7 considers differences in self-reporting behavior by race and ethnicity, and Section 8 concludes.

2. Related literature

A large literature has examined the accuracy of self-reported weight, height, and body mass index, using data such as the NHANES, which includes both direct measures and self-reported measures. This literature is reviewed in Connor Gorber et al. (2007). Reviewing over 60 articles, they find that individuals on average overreport their height and underreport weight, and as a result tend to underreport BMI. In addition they find that the degree of misreporting varies significantly across individuals with factors including age, race, sex, and objective weight status. In particular, women are more likely to underestimate their weight than men, and men are more likely to overreport their height.[4]

More recently, Cawley et al. (2015) describe misreporting biases for weight, height, and BMI in U.S. data from the NHANES for the years 2003–2010, noting in particular the "non-classical" nature of the self-reporting errors for weight. While not primarily concerned with explaining the observed biases, the authors mention both social desirability bias and lack of knowledge of own health status as potential factors contributing to self-reporting errors in weight and/or height.[5] In fact, many previous studies have either speculated or asserted that self-reports of body weight and height are influenced by social norms for weight and height, but only a relatively small set of papers (discussed below) have attempted to test this hypothesis. Instead, many papers in the previous literature on self-reported weight and height have focused on developing methods of adjusting for biases in self-reported data on weight and height so that researchers can better take advantage of such data.[6]

Among these bias-correction efforts, both Courtemanche et al. (2015) and Pinkston (2016), find that self-reporting biases for weight appear to be more severe in data collected in telephone surveys (such as the BRFSS) than in data pertaining to the same population but collected in face-to-face interviews and subsequently validated in physical examinations (such as in the NHANES).[7] Courtemanche et al. (2015) infer that self-reported

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[2] Holbrook and Krosnick (2010) and Karp and Brockington (2005) both find that voting rates are overstated based on self-reports of voting. Tourangeau and Yan (2007) and Kelly (2015) find that household incomes may be either overstated or understated, depending on actual income. Krumpal (2013) and van de Mortel (2008) find that rates of illegal drug use are likely to be significantly understated in surveys.

[3] The literature on ideal physiques is too voluminous to cite comprehensively. Examples pertaining to ideals for men include Leit et al., 2001 and Leit et al., 2002; examples pertaining to women include Bordo, 2003 and Groesz et al., 2002.

[4] Among individual papers, see, for example, Engstrom et al. (2003), Rowland (1990), and Cawley (2002).

[5] The paper's main goals are to describe the demographic and socioeconomic correlates of self-reporting biases and to examine the nature of the biases that arise when using self-reported anthropometric data as explanatory variables for economic outcomes such as healthcare utilization.

[6] Some examples of papers that develop correction equations for self-reported weight and height data include Courtemanche et al. (2015), Pinkston (2016), Stommel and Schoenborn (2009), Connor Gorber et al. (2008), Cawley (2004) and Cawley (2002).

[7] Courtemanche et al. (2015) also observe a similar pattern in self-reporting of height within select demographic groups.