Gender and Age Differences in the Relationship Between Body Mass Index and Perceived Weight: Exploring the Paradox

DONALD R. MCCREARY
Clinical Research and Development Program
Regina Health District

Past research has shown a gender-based paradox in the relationship between body mass index (BMI) and perceived weight. That is, even though males are more likely than females to be overweight, between 28% and 68% of normal-weight boys and young men perceive themselves to be underweight, while 30-67% of normal weight adolescent girls and young women perceive themselves to be overweight. It also has been suggested that these weight misperceptions may be stable in adult women, but may fluctuate in men, as they get older. The present study explored this possibility using a randomly selected subsample from the 1996-97 Canadian National Population Health Survey. Gender differences in perceived weight were examined separately for 3,000 men and 3,000 women between 20 and 64 years of age whose BMI classed them as either normal weight or overweight. Findings showed that, across age groups, an average of 43% of overweight men felt they were of normal weight, while, on average, 29% of normal weight women felt they were overweight. Implications for the study of men’s and women’s body image are discussed.

Key Words: body mass index, perceived weight, gender differences, age differences, adults
Over the past decade, the percentage of overweight North Americans has steadily increased, and statistics show that men are more likely than women to be overweight (Green et al., 1997; Holtzman, Powell-Griner, Bolen, & Rhodes, 2000; Kuczmarski, Flegel, Campbell, & Johnson, 1994; Must et al., 1999). Being overweight is an important health indicator; it has been shown to increase people’s risk for experiencing one or more weight-related illnesses, including coronary artery disease, Type II diabetes, sleep apnea, and some cancers (Gilmore, 1999; Must et al., 1999; Pi-Sunyer, 1991; Rabkin et al., 1997).

However, there is an interesting paradox in the relationship between people’s actual weight (typically measured by a Body Mass Index [BMI] score, which is the ratio of a person’s weight in kilograms divided by their height in meters-squared) and their perceived weight. That is, even though past research has shown that more men, compared to women, are overweight, 30-67% of normal-weight adolescent girls and young women perceive themselves to be overweight and may be on a calorie-reducing diet (e.g., Huon & Brown, 1986; Kelly & Patton, 1985; Rosen & Gross, 1987), while 28-68% of normal-weight male adolescents and college students perceive themselves to be underweight and are trying to become bigger by dieting to gain weight, taking nutritional supplements, engaging in strength training activities, and abusing anabolic-androgenic steroids (e.g., Cohn et al., 1987; Drewnowski & Yee, 1987; McCreary & Sasse, 2000; Moore, 1990; Rosen & Gross, 1987; Wang, Yesalis, Fitzhugh, Buckley, & Smiciklas-Wright, 1994).

These gender differences in weight misperceptions reflect gender-based stereotypes of what constitutes a socially desirable shape; for men, the desirable image is the muscular mesomorph (Mishkind, Rodin, Silberstein, & Striegel-Moore, 1986), while for women it is the slim fashion model with the Barbi doll curves (e.g., Norton, Olds, Olive, & Dank, 1996; Silverstein, Perdue, Peterson & Kelly, 1986). Thus, while this paradox can put many women at risk for developing an eating disorder, it can also put many men at risk for diseases related to being overweight. That is, if the trend for young men to think they are slimmer than they really are is extended to other weight groups, a large percentage of overweight men should perceive themselves as normal weight and, as such, would be less motivated to lose weight for health reasons (e.g., Komoroski & Rickert, 1992; Steen, Wadden, Foster, & Andersen, 1996).

Past research focusing on weight misperceptions and the gender paradox has typically used adolescents and college students as participants. The question remains as to whether the gender paradox is limited to these two groups or whether the percentage of men and women who misperceive their body weight remains stable across adulthood. A study of regular exercisers by Davis and Cowles (1991) suggests that, while women’s weight perceptions are similar across their twenties, men’s perceptions of their weight change as they get older. Their findings showed that those under 24 years of age felt they needed to gain weight, while those over 24 felt they needed to lose weight. Women of all ages, on the other hand, tended to be more concerned about losing weight (see, also, Green et al., 1997). Davis and Cowles (1991), however, did not examine these perceptions as a function of actual weight, so it is not known whether the gender paradox varies as a function of age. They did note, however, that the older men had a greater percentage of body fat compared to the
younger men, while there were no age differences in the percentage of body fat for women. Thus, younger men’s desires to gain weight might be a misperception while older men’s desire to lose weight might reflect a trend toward greater accuracy in their body image perceptions.

The present study takes Davis and Cowles’ (1991) findings of possible age and gender differences in weight misperceptions and tests them from within the same paradigm as the adolescent and college student gender paradox literature. That is, this study examines gender differences in the relationship between perceived weight (e.g., overweight, normal weight) and BMI weight categories (e.g., overweight, normal weight) in a general population sample of men and women between 20 and 64 years of age. Tested are the following assumptions: (1) that men will be more overweight than women in all age groups; (2) that men will underestimate their weight in such a way that a significant percentage of overweight men will perceive themselves to be normal weight; (3) that women will overestimate their weight in such a way that a significant percentage of normal-weight women will perceive themselves to be overweight; and (4) that these misperceptions will be stable across the adult years for women, but not for men.

METHOD

SAMPLE

The data for this study come from a subsample of respondents to the 1996-97 National Population Health Survey (NPHS), conducted by Statistics Canada for Health Canada. The NPHS is a bi-yearly telephone survey that assesses the health and well-being of Canadians in all provinces. The NPHS uses a stratified, random sampling technique and combines both cross-sectional and longitudinal methodologies in order to overcome the limitations of each individual method (see Tambay & Catlin, 1995, for more information about the survey design and methodology). Public use data files are made available to academics through the Data Liberation Initiative.

In the 1996-97 data wave, 81,804 respondents answered in-depth questions about their health. For the purposes of these analyses, cases were identified in which the respondents’ BMI and their answer to a question about perceived weight were not coded as missing. Next, a subsample of 3,000 men and 3,000 women were randomly selected from that pool using SPSS’s random case selection function. Pregnant women were not included in this subsample because the NPHS dataset does not include measures of BMI for this group. The demographic characteristics for this subsample were as follows: median income was between $40,000-$49,999; 63% were married, 23% were single, 14% were widowed; 25% rated themselves in excellent health, 41% in very good health, 25% in good health, 7% in fair health, and 2% in poor health. Comparisons were made between this random subgroup and those who were not selected. There were no significant differences on any of the demographic variables or on either the BMI or perceived weight variable described next.
MEASURES

Body Mass Index Categories. Using self-reported heights and weights from the NPHS, the height-adjusted body weight was computed in the form of the Body Mass Index (BMI; weight in kilograms divided by height in meters-squared). The World Health Organization (1995; 1998) and an Expert Panel of the National Institutes of Health (1998) have established cut-off points for categorizing BMIs into four groups: underweight (18.50 kilograms or less), normal weight (18.51 to 24.99), overweight (25.00 to 29.99), and obese (30.00 or higher). The BMI cut-offs are the same for men and women. For the purposes of the present study, the obese category was collapsed into the overweight category.

Perceived Weight Category. Respondents to the NPHS were asked which category they felt their weight best fell into: underweight, just about right, and overweight. As can be seen, these response options are similar to the three BMI categories used to measure relative weight.

RESULTS

GENDER DIFFERENCES IN BMI

The first question to be explored was whether men were more likely than women to be overweight. Mean BMI scores were calculated for men and women in each of the nine age groups; independent samples t-tests examined the statistical significance of these gender differences (to reduce the probability of making a Type I error, a minimum p-value of .006 was established for this section by dividing .05 by 9, the number of age groups). These analyses showed that men’s BMI scores were significantly higher at all ages but the 60-64 year old group (see Table 1). Because many other studies report the percentage of men and women in each of the three BMI weight categories (underweight, normal weight, overweight), Table 1 also breaks down BMI scores in this manner. As can be seen, for men, 50% or more are overweight beginning in the 25-29 age group; for women, the 50% mark is reached in the 50-54 age group. For both men and women, there is a steady age-related increase in the percentage of those overweight.

MEN’S AND WOMEN’S WEIGHT MISPERCEPTIONS

The gender paradox says that, even though men are more often overweight compared to women (as shown in Table 1), a large number of overweight men should perceive themselves to be of normal weight while a large number of normal weight women should perceive themselves as overweight. To explore this issue, the relationships between gender, age, BMI weight categories, and perceived weight categories were examined using a series of 2 (Gender) X 2 (perceived normal weight, overweight) chi-square analyses, separately by BMI weight category (i.e., normal weight, overweight) and age category (to reduce the probability of making a Type I error, a minimum p-value of .003 was established for these analyses by dividing .05
Table 1
Average BMI Scores and Percentage of Normal Weight and Overweight Men and Women as a Function of Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Average BMI Scores</th>
<th>BMI Weight Categories b</th>
<th>Men (N = 3000)</th>
<th>Women (N = 3000)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average BMI Scores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Men (N) 3000</td>
<td>Women (N) 3000</td>
<td>% Under</td>
<td>% Normal</td>
</tr>
<tr>
<td>20-24</td>
<td>24.64 (3.43)</td>
<td>22.88 (4.06)</td>
<td>5.46 (554)°</td>
<td>1</td>
</tr>
<tr>
<td>25-29</td>
<td>25.77 (3.84)</td>
<td>23.73 (4.58)</td>
<td>6.32 (685)°</td>
<td>0</td>
</tr>
<tr>
<td>30-34</td>
<td>25.82 (3.39)</td>
<td>23.95 (4.14)</td>
<td>7.17 (838)°</td>
<td>1</td>
</tr>
<tr>
<td>35-39</td>
<td>26.35 (3.93)</td>
<td>23.93 (4.12)</td>
<td>9.08 (913)°</td>
<td>0</td>
</tr>
<tr>
<td>40-44</td>
<td>26.37 (3.84)</td>
<td>24.81 (4.31)</td>
<td>5.44 (807)°</td>
<td>1</td>
</tr>
<tr>
<td>45-49</td>
<td>27.05 (4.33)</td>
<td>25.66 (5.10)</td>
<td>3.80 (655)°</td>
<td>0</td>
</tr>
<tr>
<td>50-54</td>
<td>27.57 (4.35)</td>
<td>26.25 (4.95)</td>
<td>3.36 (566)°</td>
<td>0</td>
</tr>
<tr>
<td>55-59</td>
<td>27.46 (4.34)</td>
<td>26.07 (4.62)</td>
<td>3.42 (490)°</td>
<td>1</td>
</tr>
<tr>
<td>60-64</td>
<td>27.19 (3.92)</td>
<td>26.62 (5.06)</td>
<td>1.37 (474)°</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes: ° p < .001; Following the rules of rounding means that not all numbers will add up to 100%; BMI = Body Mass Index; Under = Underweight; Normal = Normal Weight; Over = Overweight.
Table 2

Percentage of Normal-Weight and Overweight People Who Perceive Themselves as Normal Weight and Overweight, Separately by Gender and Age Category

<table>
<thead>
<tr>
<th>Age</th>
<th>PWC</th>
<th>Normal Weight</th>
<th>Overweight</th>
<th>Normal Weight</th>
<th>Overweight</th>
<th>χ²</th>
<th>PWC</th>
<th>Normal Weight</th>
<th>Overweight</th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Men % (N)</td>
<td>Women % (N)</td>
<td>Women % (N)</td>
<td></td>
<td></td>
<td>Men % (N)</td>
<td>Women % (N)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-24</td>
<td>Normal</td>
<td>98 (111)</td>
<td>79 (167)</td>
<td></td>
<td>Normal</td>
<td>59 (63)</td>
<td>16 (12)</td>
<td>21.44b</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>2 (2)</td>
<td>21 (43)</td>
<td>21.44b</td>
<td>Overweight</td>
<td>41 (43)</td>
<td>84 (50)</td>
<td>25.43b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-29</td>
<td>Normal</td>
<td>92 (134)</td>
<td>74 (158)</td>
<td></td>
<td>Normal</td>
<td>54 (99)</td>
<td>10 (10)</td>
<td>19.08b</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>8 (11)</td>
<td>26 (55)</td>
<td>19.08b</td>
<td>Overweight</td>
<td>46 (86)</td>
<td>90 (92)</td>
<td>53.33b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-34</td>
<td>Normal</td>
<td>89 (135)</td>
<td>68 (171)</td>
<td></td>
<td>Normal</td>
<td>48 (113)</td>
<td>12 (16)</td>
<td>23.99b</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>11 (16)</td>
<td>32 (81)</td>
<td>23.99b</td>
<td>Overweight</td>
<td>52 (125)</td>
<td>88 (117)</td>
<td>47.27b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-39</td>
<td>Normal</td>
<td>91 (151)</td>
<td>72 (210)</td>
<td></td>
<td>Normal</td>
<td>41 (116)</td>
<td>9 (12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>9 (15)</td>
<td>28 (82)</td>
<td>23.00b</td>
<td>Overweight</td>
<td>59 (170)</td>
<td>91 (116)</td>
<td>40.26b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-44</td>
<td>Normal</td>
<td>86 (125)</td>
<td>65 (147)</td>
<td></td>
<td>Normal</td>
<td>35 (87)</td>
<td>8 (13)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>14 (20)</td>
<td>35 (79)</td>
<td>20.22b</td>
<td>Overweight</td>
<td>65 (163)</td>
<td>92 (141)</td>
<td>35.55b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-49</td>
<td>Normal</td>
<td>88 (93)</td>
<td>70 (110)</td>
<td></td>
<td>Normal</td>
<td>36 (84)</td>
<td>12 (16)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>12 (13)</td>
<td>30 (48)</td>
<td>11.72b</td>
<td>Overweight</td>
<td>64 (148)</td>
<td>88 (123)</td>
<td>26.93b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-54</td>
<td>Normal</td>
<td>87 (60)</td>
<td>64 (85)</td>
<td></td>
<td>Normal</td>
<td>31 (61)</td>
<td>11 (16)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>13 (9)</td>
<td>36 (48)</td>
<td>11.91b</td>
<td>Overweight</td>
<td>69 (133)</td>
<td>89 (135)</td>
<td>21.29b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55-59</td>
<td>Normal</td>
<td>86 (50)</td>
<td>71 (77)</td>
<td></td>
<td>Normal</td>
<td>40 (70)</td>
<td>14 (19)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>14 (8)</td>
<td>29 (32)</td>
<td>5.04</td>
<td>Overweight</td>
<td>60 (105)</td>
<td>86 (113)</td>
<td>23.97b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-64</td>
<td>Normal</td>
<td>93 (51)</td>
<td>75 (79)</td>
<td></td>
<td>Normal</td>
<td>47 (72)</td>
<td>14 (20)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>7 (4)</td>
<td>25 (27)</td>
<td>7.71</td>
<td>Overweight</td>
<td>53 (82)</td>
<td>86 (125)</td>
<td>38.09b</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: a percentages refer to proportion of column total, per age group; b p < .003; BMI = Body Mass Index; PWC = Perceived Weight Category; Normal = Normal Weight.
Those whose BMI or perceived weight category was “underweight” were not included because their extremely small numbers (N = 327 or 5.5% of the subsample) resulted in a large number of empty cells in the analyses.

**Normal Weight Individuals.** As Table 2 shows, for those whose BMI score showed them to be of normal weight, between 21% and 36% of the women perceived themselves to be overweight (M = 29%). For normal-weight men, only between 2% and 14% thought they were overweight (M = 10%). These weight misperceptions were relatively stable until approximately 55 years of age, when the magnitude of the gender differences dropped below a statistically significant level.

**Overweight Individuals.** For all ages groups, there were significant gender differences in perceived weight. For overweight men, between 31% and 59% (M = 43%) perceived themselves to be normal weight (see Table 2). Age differences in men’s weight misperceptions also were apparent: overweight men under 35 years of age had the highest rates of thinking they were normal weight (48% to 59%; M = 54%) while the misperceptions of those between 35 and 59 years of age were somewhat less (31% to 41%; M = 37%). One anomaly is the group of overweight men between 60-64 years of age. For these men, the rates of weight misperception were more similar to the younger men’s misperceptions (47%). Relatively few overweight women perceived themselves to be of normal weight (8% to 16%; M = 12%); for women, this type of misperception was relatively stable across adulthood.

**DISCUSSION**

Past research with adolescents and college students has shown that many normal-weight boys think they are underweight and want to be bigger, while many normal-weight girls think they are overweight and are dieting to become more slender. In addition, a study by Davis and Cowles (1991) suggested that, while women’s weight misperceptions remains stable across early adulthood, men’s misperceptions vary as a function of age (i.e., younger or older than 24 years). The present study supported and extended these findings to a community sample of adults between the ages of 20-64 years. The findings showed that, even though men were more overweight than women in all age groups, (a) an average of 43% of overweight men perceived themselves to be of normal weight, and (b) these weight misperceptions were highest in men under 35 years of age, or in those between 60-64 years. In addition, the findings revealed that (a) an average of 29% of normal-weight women believed they were overweight, and (b) that this percentage was fairly consistent across the nine age groups.

These findings have several important implications for both health practitioners and basic or applied researchers. One of the first concerns is the obvious gender difference in the direction of body weight misperceptions. That is, a significant percentage of overweight men believe they are normal weight, while a significant percentage of normal-weight women think they are overweight. This gender difference presents a challenge to those designing interventions that teach healthy lifestyle behaviors, such as an appropriate diet and exercise. Consider, for example, those
with Type II diabetes (for which men are more at risk because they are more likely to be overweight; Courtenay, 2000; Rabkin et al., 1997). Type II diabetes can be managed in most people by changing their diet and increasing their exercise. But, if men do not perceive themselves to be overweight, they will lack the motivation to maintain these lifestyle changes. Because women appear to be more receptive to the notion of losing weight and dieting, they should have more success in managing their illness. Thus, people designing programs like a diabetes management or cardiac rehabilitation program will have to focus on developing gender-specific interventions.

On a related issue, the findings also show that traditional body image interventions are not broad enough. That is, interventions have typically centered around an emphasis on eating disorders (i.e., anorexia, bulimia). However, girls and women are the ones typically experiencing these illnesses; the number of anorexic or bulimic boys or men is small (Olivardia, Pope, Mangweth, & Hudson 1995; see also Drummond, 2002 in this issue). As this study and others have shown, men’s body image problems typically focus on perceptions that they are not as big or muscular as they really are (i.e., the drive for muscularity; McCreary & Sasse, 2000). These perceptions put boys and men at greater risk for a wide variety physical and psychological problems, including steroid abuse, muscle dysmorphia, depression, suicide, and all the other health problems associated with being overweight (e.g., Carpenter, Hasin, Allison, & Faith, 2000; Chen & Millar, 1999; Komoroski & Rickert, 1992; McCreary & Sadava, 2001; McCreary & Sasse, 2000; Pope, Gruber, Choi, Olivardia, & Phillips, 1997). Thus, when designing body image interventions, programs, and research, the focus should be on acknowledging and addressing men’s and women’s separate body image concerns.

One example would be to combine an education program that addresses anorexia and bulimia for women with a program for men that tackles anabolic steroid abuse. It has recently been noted that men’s rate of steroid abuse is equal to women’s rate of bulimia and greater than women’s rate of anorexia (Spitzer, Henderson, & Zivian, 1999). Furthermore, steroid abuse is common in both non-athletes and athletes (e.g., Perry, Wright, & Littlepage, 1992; Peters, Copeland, & Dillon, 1999), in part because the former group desires to gain weight and strength so that they can become physically more like the latter group (Wang et al., 1994). The high risk nature of these drugs (e.g., heart disease, kidney failure, reduced immune function, addiction, aggression, death), combined with findings that show that steroid users engage in other health risk behaviors (e.g., needle-sharing; Melia, Pipe, & Greenberg, 1996), provide an excellent starting point for intervention programs designed to address men’s body image problems.

A second issue that emerged from the data reported here is the fact that the rate of weight misperceptions is fairly high across adulthood. This suggests that interventions and treatment programs should not consider one single age group as being most at risk. Unfortunately, this has been the typical pattern: people have assumed that adolescents and young adults (most typically college students) are most at risk for developing body image problems. Thus, practitioners develop educational interventions (e.g., Body Image Awareness Week) and programs designed for those age groups. However, the findings from this study show that these interventions need to be addressed to the entire population, not just adolescents.
Further research needs to explore why men’s weight misperceptions are highest in those under 35 years and those between 60-64 years of age. Because this is a cross-sectional analysis, it cannot be determined whether the age differences are developmentally based or whether they are the result of cohort differences in body image perception. That is, do people’s perceptions of their body weight change as a function of getting older (e.g., are older people more accurate in their self-perceptions?) or could younger men feel more social pressure to be bigger or more muscular because social attitudes about men’s bodies have become more focused on muscularity (e.g., it has been shown that both men and women feel that a muscular body is the most attractive form for men; e.g., Cohn & Adler, 1992; Maisey, Vale, Cornelissen, & Tovée, 1999)? In addition, what are the correlates of men’s and women’s body image misperceptions, and do they change as people get older? Longitudinal investigation is required to answer these questions.

Finally, there are two main limitations of this study that need to be addressed. Because BMI scores were the major dependent variable in this investigation, the first limitation concerns the reliability and validity of self-reported height and weight. Past research has shown that, in general, self-reports of height and weight are reliable and valid; they tend to vary only by 1%-3.5% from people’s actual height and weight (e.g., Bowman & DeLucia, 1992; Imrhan, Imrhan, & Hart, 1996; Roberts, 1995). However, when there is inaccuracy, men tend to underestimate their weight and overestimate their height, while for women the opposite pattern is found (e.g., Bowman & DeLucia, 1992; Imrhan, Imrhan, & Hart, 1996; Roberts, 1995). This would bias their BMI categorizations by reducing men’s overall BMI and increasing women’s overall BMI. As a result, fewer men and more women would be in the overweight category. However, as can be seen in Table 1, that would mean even more overweight men than at present. Future research might want to use more direct methods to measure height and weight.

A second limitation is that, because of the nature of the NPHS, actual body fat and muscle mass indices could not be included. Because muscle weighs more than fat, it may very well be that part of the younger men’s body weight misperceptions could be a result of increased muscle mass. However, we live in a highly sedentary culture (Brownson, Jones, Pratt, Blanton, & Heath, 2000; Caspersen, Pereira, & Currant, 2000; Courtenay, 2000), and the percentage of men who increase their muscle mass through strength-training or as a result of occupational demands is quite low (Caspersen et al., 2000). Still, the extent to which actual muscle mass (as opposed to perceived muscle mass) influenced perceptions of weight and self-reported weight needs to be determined.

REFERENCES


40


