



Differences in Body Shape Representations among Young Adults from a Biracial (Black-White), Semirural Community

The Bogalusa Heart Study

A. R. Bhuiyan, J. Gustat, S. R. Srinivasan, and G. S. Berenson

From the Tulane Center for Cardiovascular Health, Tulane University Health Sciences Center, New Orleans, LA.

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In this study, the authors examined body image perception and body mass index (weight (kg)/height (m)²) among race-gender groups in a biracial (Black-White) population of young adults in Bogalusa, Louisiana. A mail-out survey was completed in 1994 by 3,698 (65%) participants aged 18.5–35 years in the Bogalusa Heart Study (mean age = 27.6 years). As part of the survey, body image perception was determined in terms of body shape representations from a figure rating scale. A body image discrepancy score was calculated from the difference between z-standardized values of body image perception and body mass index. A stepwise proportional odds model including the covariates income, employment, education, and physical activity was used to identify factors influencing lower perception of body shape. Mean body mass index was highest among Black females ($p < 0.001$). The odds of having a lower perception of body shape (vs. body mass index) were 1.72 times higher in Blacks ($p < 0.001$), 0.80 times lower in persons who were currently employed ($p < 0.001$), and 0.86 times lower in persons with a higher education ($p = 0.032$). Gender, income, and physical activity were not found to be significant predictors of body image perception ($p > 0.05$). The authors conclude that significant differences exist within racial groups concerning body image perception in relation to overweight status among young adults. This has implications for prevention and education programs.

blacks; body image; body mass index; body weight; perception; psychology; whites

Abbreviations: BID, body image discrepancy; BMI, body mass index; CARDIA, Coronary Artery Risk Development in Young Adults.

Over half of the US population is either overweight, defined as a body mass index (BMI) greater than or equal to 25, or obese, defined as a BMI greater than or equal to 30 (1). This is a major public health concern, given the association between obesity and many health conditions, including hypertension, type 2 diabetes mellitus, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, and other conditions (2). Higher body weights are also associated with increases in all-cause mortality (3). According to the National Center for Health Statistics, Black females have the highest prevalence of overweight (77.3 percent) in the United States, while slightly more than half of White females (57.3 percent) are overweight (1).

Many studies have demonstrated that the high prevalence of overweight in the Black population, especially among

Black females, may be attributed to low physical activity, fewer educational and financial resources, and cultural influences leading to a deemphasis of the thin body type in the Black community (4–8). In contrast, Whites, especially White females, appear to be more concerned about their body weight (9). This difference in body image perception may account for the racial differences seen in overweight prevalence. Although findings are suggestive of racial and gender differences in body image perception, many studies of body image perception are not population-based and draw on convenience samples from college campuses (10–12). In addition, they focus only on race or gender differences and not on both congruently in the form of race-gender groups. We addressed these issues by assessing

Correspondence to Dr. Gerald S. Berenson, Tulane Center for Cardiovascular Health, Tulane University Health Sciences Center, 1440 Canal Street, Room 1829, New Orleans, LA 70112 (e-mail: berenson@tulane.edu).

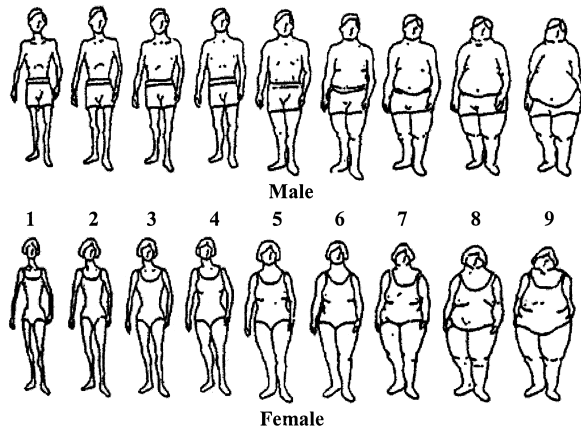


FIGURE 1. Images for perceived body shape from the Figure Rating Scale (adapted from the paper by Stunkard et al. (13)), Bogalusa Heart Study, 1994. Study participants were asked to rate how they perceived their current body shape by choosing an image that corresponded to their figure. Images 1 and 2 = underweight; images 3 and 4 = appropriate weight; image 5 = slightly overweight; images 6 and 7 = moderately overweight; images 8 and 9 = very overweight.

differences in body image perception among race-gender groups in a community-based study.

MATERIALS AND METHODS

Study population

The Bogalusa Heart Study is a community-based study of cardiovascular disease risk factors in early life and young adulthood in a biracial population (65 percent White and 35 percent Black) in Bogalusa, Louisiana. In 1994, a detailed questionnaire on health conditions and lifestyle habits was mailed to 5,717 Bogalusa Heart Study participants; of these, 3,698 (65 percent) were returned. The ages of respondents ranged from 18.5 years to 35.0 years (mean age = 27.6 years).

Measurement

Reported height, weight, and perceived body shape were selected as the variables of interest. Perceived body shape was determined from the Figure Rating Scale (figure 1), adapted from the paper by Stunkard et al. (13). Participants were asked to rate how they perceived their current body shape by choosing an image that corresponded to their figure on a scale ranging from 1 to 9, with 1 being the thinnest body type and 9 being the largest, most obese type. The numbers on the scale were then categorized into five groups: images 1 and 2 = underweight; images 3 and 4 = correct weight; image 5 = slightly overweight; images 6 and 7 = moderately overweight; and images 8 and 9 = very overweight. BMI was calculated as weight in kilograms divided by the square of height in meters. To validate reported BMIs, we analyzed a subgroup ($n = 1,150$) of participants who were screened in our field office during the following year and had their heights and weights measured in duplicate by trained examiners.

To determine the discrepancy between body image perception and actual BMI for the four race-gender groups, we first standardized both values to a z score. A body image discrepancy (BID) score was then calculated for each subject by subtracting the subject's standardized BMI value from his or her standardized body image perception value. A negative BID score indicated that the subject perceived him- or herself as thinner than he or she actually was, whereas a positive score indicated that the subject perceived him- or herself as fatter than he/she actually was. A score of zero indicated that the subject perceived his or her body shape as it actually was. All subjects were then aggregated into their respective race-gender groups, and a mean BID score was calculated for each group. The additional variables of income (low (<\$15,000/year) vs. high (\geq \$15,000/year)), education (low (completion of the 12th grade or less) vs. high (above completion of the 12th grade)), employment (yes vs. no), and physical activity (active vs. inactive) were included in the analysis. To be considered physically active, a respondent had to indicate participation in the following activities 2–3 times per week or more often: walking, jogging, swimming, weight lifting, bicycling, aerobic dancing, golf, tennis, basketball, soccer, and other activities. For the proportional odds model, we dichotomized BID scores into two groups. BID scores less than zero meant that participants perceived themselves as underweight. BID scores greater than or equal to zero meant that participants perceived themselves as the right weight or overweight.

Statistical analysis

All analyses were conducted using SAS software, version 6.10 (14). Descriptive statistics for the variables of interest were calculated for each race-gender group. Analysis of variance was used to test for differences and interactions between race-gender groups. The Pearson chi-squared test was used to test for differences between the categorical variables. The generalized linear modeling procedure was used to determine the BID score for each race-gender group. Both unadjusted and adjusted scores were determined. Results were adjusted for employment, education, income, and physical activity. We developed a stepwise proportional odds model to estimate the effect of certain variables on body image perception. Odds ratios and 95 percent confidence intervals were determined for each variable.

RESULTS

Of the 3,698 people who returned the questionnaire, 71.6 percent were White and 28.4 percent were Black (table 1). The average age was 27.6 years, with Whites being slightly older than Blacks ($p < 0.05$). Black females had the highest mean BMI (27.1), while White females had the lowest (24.2) (p for interaction < 0.001). Blacks earned less than Whites, with 69 percent of Black males and females earning less than \$15,000 per year ($p < 0.001$). Blacks had also spent less time in school than Whites, with only 35 percent of Black males and 50 percent of Black females having completed more than 12 years of education ($p < 0.001$). White males were more likely to be employed than members of the other race-

TABLE 1. Characteristics of the study population ($n = 3,698$), Bogalusa Heart Study, 1994

Variable	White males ($n = 1,186$)	Black males ($n = 409$)	White females ($n = 1,463$)	Black females ($n = 640$)	p for race \times gender interaction
Mean reported body mass index $\ddagger, \dagger\dagger$	25.4 (4.7) \S	26.0 (5.7)	24.2 (5.8)	27.1 (6.9)	<0.001
Mean age (years) \dagger	27.8 (5.0)	27.7 (5.4)	27.7 (5.0)	27.1 (5.3)	0.212
% with low income (<\$15,000/year) $\dagger\dagger$	36.8	69.0	32.9	69.0	0.288
% with higher education (>12th grade) $^*, \dagger\dagger$	56.6	34.5	64.6	49.5	0.052
% employed $^*, \dagger\dagger$	81.5	46.4	63.7	46.9	<0.001
% physically active *	52.3	58.4	46.6	43.6	<0.001

* $p < 0.001$ for gender difference.

\dagger $p < 0.05$ for race difference; $\dagger\dagger$ $p < 0.001$ for race difference.

\ddagger Weight (kg)/height (m) 2 .

\S Numbers in parentheses, standard deviation.

gender groups ($p < 0.001$). Males reported being more physically active than females ($p < 0.001$).

Figure 2 shows the percentage of participants in each category of body shape perception by race and gender. Over half of White females perceived themselves as being the right weight. Fewer than half (40.7 percent) of Black females and slightly more than one third of both Black males (36 percent) and White males (35 percent) perceived themselves as being the right weight. Nearly one third of both White males (31.7 percent) and Black males (32.3 percent) perceived themselves as slightly overweight, while only 24.5 percent of Black females and 19.4 percent of White females did.

Results of a subgroup analysis on persons whose weights and heights were measured during screening the following year ($n = 1,150$) showed that all race-gender groups underreported their BMIs (percentage differences: White males, 6.6 percent; Black males, 5.2 percent; White females, 8.2 percent; Black females, 10.4 percent). Measured BMI was

found to be highly correlated with reported BMI for every race-gender group ($r = 0.89$ – 0.92 , $p < 0.001$).

Table 2 shows the percentages of survey participants who were overweight and obese in each category of body image perception, by race-gender group. Of persons who reported being in the "right weight category," higher percentages of Blacks were overweight (7.6 percent of Black males and 6.8 percent of Black females vs. 4.0 percent of White males and 4.9 percent of White females) and obese (0.8 percent of Black males and 1.0 percent of Black females vs. 0.3 percent of White males and 0.5 percent of White females) in comparison with Whites ($p < 0.001$). Upon further examination, there were more overweight and obese (BMI ≥ 25) Black males and females who perceived themselves to be the right weight than Whites (males: 22.2 percent of Blacks vs. 10.2 percent of Whites, $p < 0.01$; females: 17.4 percent of Blacks vs. 8.8 percent of Whites, $p < 0.04$) (data not shown).

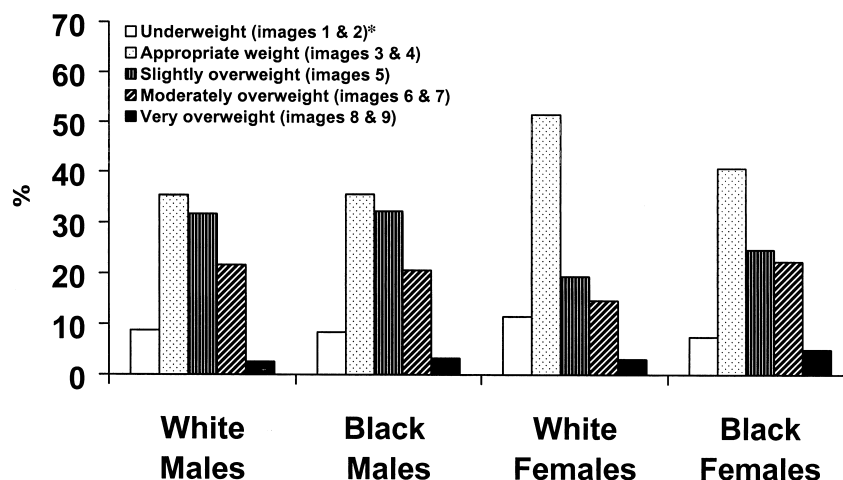


FIGURE 2. Body shape perceptions of young adults in the Bogalusa Heart Study ($n = 3,698$), by race-gender group, 1994. Chi-squared test: for each race-gender group, $p < 0.001$. (*For images, see figure 1.)

TABLE 2. Percentages of overweight* and obese† participants (n = 3,698) in each category of perceived body weight, by race-gender group, Bogalusa Heart Study, 1994

Perception of body weight‡	White males		Black males		White females		Black females	
	Overweight (n = 359)	Obese (n = 160)	Overweight (n = 112)	Obese (n = 64)	Overweight (n = 270)	Obese (n = 208)	Overweight (n = 146)	Obese (n = 159)
Underweight	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0
Correct weight	4.0	0.3	7.6	0.8	4.9	0.5	6.8	1.0
Slightly overweight	16.1	1.9	16.8	3.8	9.2	2.6	12.7	5.6
Moderately overweight	10.4	9.1	5.2	10.6	4.4	8.7	4.0	15.7
Very overweight	0.0	2.3	0.0	2.2	0.2	2.6	0.7	4.0

* Body mass index (weight (kg)/height (m)²) of ≥ 25 and < 30 .

† Body mass index of ≥ 30 .

‡ Chi-squared tests for perception of body weight by White males, Black males, White females, and Black females: $p < 0.001$.

After BID scores were examined (BID = z-body image perception minus z-BMI) (table 3), the direction of the scores was positive for Whites and negative for Blacks. A positive score indicates a perception of body image heavier than a standardized BMI. A negative score indicates a perception of body image lighter than a standardized BMI. After adjustment for income, education, employment, and physical activity, Black males and females perceived themselves as thinner than they actually were (as measured by BMI) (males: $p = 0.009$; females: $p < 0.001$). White males and females perceived themselves as fatter than they actually were (males: $p = 0.024$; females: $p = 0.175$).

To identify factors influencing lower perception of body shape, we constructed a stepwise proportional odds model (table 4). Race, gender, income, employment, education, and physical activity were included in the model-building. Gender, income, and physical activity were not found to be significant ($p > 0.05$) predictors of perception of body shape.

TABLE 3. Mean body image discrepancy scores of young adults in the Bogalusa Heart Study (n = 3,698), by race-gender group, 1994

	Body image discrepancy score*				
	Unadjusted		Adjusted‡		p value†
	Mean	SE§	Mean	SE	
White males	0.05	0.02	0.04	0.02	0.024
White females	0.03	0.01	0.02	0.02	0.175
Black males	-0.12	0.04	-0.09	0.04	0.009
Black females	-0.18	0.03	-0.16	0.03	<0.001

* Body image discrepancy (BID) score = z-body image perception minus z-body mass index. A positive BID score indicates a perception of body image heavier than a standardized body mass index (weight (kg)/height (m)²); a negative BID score indicates a perception of body image lighter than a standardized body mass index.

† p value for adjusted mean BID score.

‡ Adjusted for employment, education, income, and physical activity.

§ SE, standard error.

The odds of having a lower perception of body shape (than one's BMI) were almost 1.72 times higher in Blacks than in Whites ($p < 0.001$), 0.80 times lower in those currently employed than in those unemployed ($p < 0.001$), and 0.86 times lower in those with more than 12 years of education than in those with 12 years of education or less ($p = 0.032$).

DISCUSSION

In the Bogalusa Heart Study population, young Black adults had higher BMIs than Whites. This is consistent with the findings of many other studies (1, 5, 7, 15). Body shape perception also varied by race. In the present study, perception of body shape was found to vary between race, level of education, and employment. Blacks were found to perceive their bodies as lighter than their BMIs indicated, while Whites were found to perceive their bodies as heavier than their BMIs indicated.

This difference in body image perception is consistent with differences in ideal body shape found in other studies (8, 16). In a study of body image among 344 White and Black adolescent females in South Carolina, significant differences were found in the ideal female body shape selected, with Blacks selecting an ideal female shape larger than the one selected by Whites (8). Black females also perceived that their parents and male and female friends would select as ideal a female body shape significantly heavier than the shape White females perceived for their relatives and friends. In addition, Black adolescent females were 5.3 times more likely to desire larger hips/buttocks than White adolescent females. Thompson et al. (16) conducted a similar study among White and Black adolescent males aged 14–19 years. They found that Black males, their parents, and their female and male friends preferred a significantly heavier female body shape than Whites. Blacks were 1.9 times more likely to select a larger ideal female hip/buttock shape and 1.7 times more likely to choose a larger ideal female thigh shape than Whites. These findings suggest greater approval and social acceptance of a larger body shape for Black females by Black males and females.

Henriques et al. (17) investigated body satisfaction among 97 White women and 42 Black women at a midsize south-

TABLE 4. Sociodemographic variables influencing lower perception* of body image in a stepwise proportional odds model, Bogalusa Heart Study, 1994

Variable†	Estimate		Odds of lower perception		p value
	β	SE‡	OR‡	95% CI‡	
Black race	0.54	0.08	1.72	1.47, 2.00	0.001
Employed	-0.23	0.08	0.80	0.69, 0.92	0.001
Higher education	-0.15	0.07	0.86	0.75, 0.99	0.032

* Model-building for lower perception: $\beta_0 + \beta_1$ race + β_2 gender + β_3 income + β_4 employment + β_5 education + β_7 physical activity.

† Reference groups: White race, unemployment, and lower education (≤ 12 th grade).

‡ SE, standard error; OR, odds ratio; CI, confidence interval.

eastern US university. The Body Esteem Scale and four subscales from the Eating Disorders Inventory were used. White women weighed less than Black women and had significantly lower scores on the Body Esteem Scale and significantly higher scores on three of the four subscales of the Eating Disorders Inventory, indicating lower body satisfaction, more problematic eating behavior, and an increased drive for thinness.

In the Coronary Artery Risk Development in Young Adults (CARDIA) Study, Smith et al. (5) found that Black women were more satisfied with their body shape than White women. In another analysis of CARDIA Study participants, body shape satisfaction was assessed among Black women aged 24–42 years (4). It was found that, within their own subgroup, Black women exhibited a wide range of self-images. The most overweight women had the lowest body shape satisfaction, and the leanest women had the highest body shape satisfaction. Becker et al. (18) examined body image preferences among 927 Blacks and Whites in low-income communities. Results showed that, independently of sociodemographic variables, body image shapes for the current self, the ideal self, and the opposite gender's ideal were all significantly greater in Black women. Similarly, Powell and Kahn (19) found that White women chose a significantly thinner ideal body shape than did Black women and expressed more concern than Black women about weight and dieting. While body shape satisfaction and ideal shape were not assessed in the present study, misperception exists, as evidenced by the underreporting of weight and height as compared with measured weight and height. Misperception of one's own weight-related appearance is common (12, 20).

Gender differences in body image perception were not found in this study. Several studies have found gender differences in body image perception, with females perceiving their current shape as heavier than their perceived ideal shape or heavier than their perceived actual shape (5, 10–12). However, many of these studies were small classroom studies of college students and were not population-based. One study conducted in 1997 by the European Union using approximately 1,000 adults from each country found that males tended to perceive themselves as thin and females to perceive themselves as overweight and obese (20).

Limitations of this study include methodological concerns about our use of the Figure Rating Scale. Relevant issues include scale coarseness, restriction in the range of options, and constant height across different stimuli (21). However, this scale is one of the most widely used assessment devices in body-image and psychometric research (4, 5, 10, 11, 16).

BMI was calculated from reported height and weight. Reporting bias could be present if Blacks overestimated their heights and weights and Whites underestimated theirs. The subgroup analysis found that each race-gender group slightly underreported their weight. These measurements were found to be highly correlated with measured weight. Other investigators have found self-reported weight to be slightly lower (by 2–6 pounds (0.9–2.7 kg)) than directly measured weight (22). This could have caused a small degree of systematic error (23). Because this was found in all race-gender groups in our study, the bias would be nondifferential. A reported weight lower than actual weight should show less of a difference between perceived image and actual image. Any bias resulting from underreporting of BMI would be towards the null.

There is an obvious weight problem in the United States, where 64.5 percent of the population is overweight (BMI ≥ 25) (1), and in Bogalusa, where 43.3 percent of young adults in this study were overweight. The upward secular trend of obesity among schoolchildren and young adults in Bogalusa is well documented (24). Children in Bogalusa were 4.4 kg heavier in 1994 than in 1973. Tracking of obesity is also seen (25). Overweight and obese children are prone to develop into overweight and obese adults. Although obesity is considered a well-known risk factor for type 2 diabetes among adults, recent studies have shown increased incidence of type 2 diabetes among obese adolescents (26, 27). Additionally, obesity and its attendant insulin resistance/hyperinsulinemia underlie the metabolic syndrome ("syndrome X"), a potent risk factor for atherosclerotic cardiovascular disease (28, 29).

With 52.2 percent of Black men and 54.6 percent of Black women overweight as compared with 45.9 percent of White men and 34.5 percent of White women, there is a racial component to the obesity epidemic. Body image perception is likely to be a factor in this regard. Perceptual differences reflect what is accepted as normal in each racial group's community. Among Blacks, a larger body is considered acceptable, particularly for Black women (5, 8, 16, 18).

To reverse the trend toward increasing obesity, educational efforts will need to focus on changing the currently accepted larger body size among Blacks. Without a focus on changing people's understanding of a healthy body shape, interventions for reducing obesity will not be successful. As long as Blacks continue to accept a heavier body image, more Blacks will continue to become overweight and obese and to develop diseases related to the consequences of obesity.

In order for programs targeting obesity to be effective, people's cultural and social backgrounds must be considered. Future research should focus on Blacks and on changing their attitudes about preferred body image by helping them adopt healthy eating habits and gain an understanding of healthy body shapes and the risks associated with accepting a heavier body image.

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