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CHANGES IN PREDICTORS OF OBESITY PREVALENCE AMONG U.S. SUBPOPUALTION GROUPS OVER THE PAST DECADE

VOLUME I

By

Saori Obayashi

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ABSTRACT

CHANGES IN PREDICTORS OF OBESITY PREVALENCE
AMONG U.S. SUBPOPUALTION GROUPS OVER THE PAST DECADE

By

Saori Obayashi

Obesity is a leading public health issue in the U.S., and its prevalence continues to increase. The prevalence of obesity and its rate of increase, however, vary widely among sociodemographic subpopulation groups. With an ultimate goal to design effective nutrition intervention programs specific to the targeted populations, we aimed to examine differences in obesity prevalence among the subpopulation groups by gender, income, and race/ethnicity, and to identify differences in predictors of obesity prevalence among the subpopulation groups over the past decade. Used in the study were NHANES 1988-94 and 1999-2002; and SAS Callable SUDAAN in order to adjust for sample weights and the complex survey design. The prevalence of obesity from 23.6 to 31.1% between the two surveys was minimally accounted for by aging U.S. population, and recorded highest in black middle-income women (53.3%) and lowest in black low-income men (21.7%) in 1999-2002. The variability in obesity prevalence among the subpopulation groups was explained by lifestyle, reproductive, and psychosocial variables, specifically smoking, hours of TV watching or computer use, alcohol intake, leisure-time and non-leisure-time activity, the number of live births, age at first menarche, perception and attitudes about own weight status, attempt to lose weight, energy intake, fat intake, breakfast intake, and the number of eating occasions. The change in obesity prevalence was the highest in Mexican-American high-income women (25.1 to 39.3%), whereas lowest in Mexican-American low-

income men (23.6 to 23.4%). These changes were associated with smoking, alcohol intake, leisure-time activity, age at first menarche, energy intake, fat intake, and breakfast intake. In developing nutrition intervention programs to reduce obesity prevalence, one must consider these predictors that are specific for subpopulation groups in the U.S.

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INTRODUCTION

Obesity continues to be a leading public health issue in the U.S. Between 1980 and 2002, the prevalence of obesity in adults aged 20 years and over doubled (Flegal et al., 2002; Flegal and Troiano, 2000) and continues to increase (Ogden et al., 2006). Obesity increases the risk for many health conditions such as cardiovascular disease, hypertension, type 2 diabetes, and several types of cancer (Kenchaiah et al., 2002; Field et al., 2001). The estimated medical expenses attributed to overweight and obesity in the U.S were $92.6 billion in 2002 (Finkelstein et al., 2003).

Some sociodemographic subpopulation groups have higher obesity prevalence than others; the prevalence of obesity has been associated positively with age and inversely with socioeconomic status (SES). Higher prevalence of obesity is seen in women and certain racial/ethnic minority subpopulation groups than in men and Caucasians. However, not every woman or subject with low-SES is at high risk of obesity; when both SES and gender were simultaneously examined in the U.S., the prevalence of obesity was inversely associated with SES only in women (Hathaway and Foard, 1960; Lowenstein, 1977; Garn and Clark, 1977; National Center for Health Statistics, 1986; Stephenson et al., 1987; Benbrook, 1976; Forman et al., 1986).

Lifestyles (Binkley et al., 2000; Hu et al., 2003; Wamala et al., 1997; King et al., 2001; Albanes et al., 1987; Cooper et al., 2000; Lahti-Koski M et al., 2002; Fisher and Gordon, 1985; Gruchow et al., 1985; Colditz et al., 1991; Breslow and Smothers, 2005; Human Nutrition Information Service, 1993; Chang et al, 1990; Salmon and Flatt, 1985; Rolls and Shide, 1992), psychosocial issues (McArthur et al., 2001; Speakman et al., 2005; Faith et al., 2002; Friedman and Brownell, 1995; Roberts et al., 2000; Istvan et al.,

1992; Sullivan et al., 1993; Hallstrom and Noppa, 1981; Faubel, 1989), reproductive health (Lahmann et al., 2000; Bastian et al., 2005; Williamson et al., 1994; Wamala et al., 1997; Mandel et al., 2004; Laitinen et al., 2001), pre-adult weight history (Guo et al., 2002; Biro et al., 2001; Freeman et al., 1995; Ferraro et al., 2003), and genetic background (Maes et al., 1997; Comuzzie and Allison, 1998) have been reported as predictors of obesity. These predictors were identified from populations, gender, income, or racial/ethnic subpopulation groups. However, they failed to recognize that the subjects within subpopulation groups defined by single sociodemographic characteristic are diverse and their risks of obesity vary. Thus, predictors obtained from these subpopulation groups may apply to some individuals but not to the others within the same group. Effective nutrition intervention programs to prevent or control obesity need to be culturally sensitive and specific to the targeted population (Galasso et al., 2005; Resnicow et al., 2000; Brown and Hanis, 1995; Shintani et al., 1994). Identifying predictors of obesity that account for varying obesity prevalence among subpopulation groups is the first step to develop effective obesity prevention or control programs for different subpopulation groups.

Many of the past studies also fail to address the associations among variables when identifying the predictors of obesity. Since obesity results from complex interactions of various variables, predictors of obesity identified without considering their interactions with other variables can be misleading.

While obesity prevalence among low-SES women is still highest, recent national studies have reported that the prevalence of obesity has increased among high-SES women at a higher rate than for low-SES women, decreasing the discrepancy of the

prevalence of obesity by SES in women in the U.S. over the past three decades (Zhang and Wang, 2004). Many investigators have suggested the numerous possible factors associated with the recent increase in the prevalence of obesity in the U.S. Few studies, however, have delineated the changes in the predictors of obesity among subpopulation groups over the past three decades. Use of ongoing U.S. national surveys such as the National Health and Examination Survey (NHANES), which inquired about a wide range of information relevant to the risk of obesity, can facilitate our understanding of predictors that account for the differences in prevalence of obesity among subpopulation groups and their changes over a period of time.

OBJECTIVES AND HYPOTHESES

The objectives of the present study were: 1) to compare the prevalence of obesity among the U.S. subpopulation groups by gender, SES, race/ethnicity, and their combinations over the past decade; 2) to identify the predictors that account for differences in prevalence of obesity among the subpopulation groups; and 3) to identify the predictors associated with the changes in the prevalence of obesity among the subpopulation groups.

We hypothesized that: 1) The prevalence of obesity differs by gender, SES, race/ethnicity, and their combinations as well as by the year in the U.S., when the age structure is standardized to the 2000 population; 2) Lifestyle, psychosocial, and reproductive variables account for differences in prevalence of obesity among the subpopulation groups; and 3) Lifestyle, psychosocial, and reproductive variables are associated with differential changes in the prevalence of obesity among the subpopulation groups.

WORKING DEFINITIONS

Accuracy of self-reported weight status: The respondents were categorized by comparison of perceived one's weight status (see the definition of "Perceived one's weight status" above) vs. BMI calculated from the measured height and weight.

		Perceived weight status		
		Underweight	About right	Overweight
BMI	Normal weight	Under-assessor	Accurate-assessor	Over-assessor
	Overweight	Under-assessor	Under-assessor	Accurate-assessor
	Obese	Under-assessor	Under-assessor	Accurate assessor

Component score: Respondent's score regarding the components that were extracted by the principal component analysis. It is calculated as: $\sum$ (response to ordinal category that constructs a component).

Desired weight status: A person's response to the question, "Like to weigh more, less or same".

Energy intake: Calculated from respondents' self-reported one-day 24-hr dietary recall.

Energy intake under-reporters: Individuals whose reported energy intake was below 90% of the Basic Metabolic Rate (BMR) (Goldberg et al., 1991; Briefel et al., 1997) which was calculated based on the individual's weight, age, and gender by Schofield (1985):

Adults 20-30 yr: Male BMR= 0.063 wt (kg) + 2.896; Female BMR= 0.062 wt + 2.036
Adults 30-60 yr: Male BMR=0.048 wt + 3.653; Female BMR= 0.034 wt + 3.538
Adults over 60 yr: Male BMR=0.049 wt + 2.459; Female BMR=0.038 wt + 2.755

Energy intake over-reporters: Individuals whose reported energy intake was over 240% of the BMR which was calculated based on the individual's weight, age, and gender (see Energy intake under-reporters). The cut point of 240% was adopted from Black et al. (1996).

Leisure-time activity: A subset of total physical activity that describes leisure-time physical activity. It is a summed product of frequency by intensity of various moderate and severe level leisure-time physical activities. Duration of each activity was not considered.

Non-leisure-time activity: To the question, "Please tell me which of these four sentences best describes {your/sample person's} usual activities?", the respondent needs to select

one of the following responses: 1) {you sit/he/she sites} during the day and {do/does}not walk about very much; 2) {you stand or walk/he/she stands or walks} about a lot during the day, but {do/does} not carry or lift things very often; 3) {you/he/she} lift(s) light load or {have/has} to climb stairs or hills often; and 4) {you/he/she} {do/does} heavy work or {carry/carries} heavy loads. Usual activities include both work and housework but not leisure-time activity.

Number of eating occasions: Number of eating occasions in a day estimated from one-day 24-hr dietary recall.

Perceived one's weight status: Self-reported responses (underweight, about right, and overweight) to the question, "How do you consider your weight?".

Risk for obesity: The likelihood of being obese (BMI≥30) relative to the reference group (18.5≤BMI<30). Risk of obesity is determined statistically by odds ratio, which is calculated as a ratio of the prevalence of obesity among the group of interest over that of the reference group.

Socioeconomic status (SES): In the present study, measured was poverty index ratio (PIR), an index for the self-reported family income level after accounting for the number of household members. PIR has been used in determining eligibility of federal nutrition programs such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC; PIR≤1.85) or Food Stamp Program (PIR≤1.30).

Weight status: A weight status based on the BMI which was calculated by measured weight and measured height: BMI= weight in kilograms/height in meters squared. Weight status is categorized into: underweight (BMI<18.5), normal weight (18.5≤BMI<25), overweight (25≤BMI<30), and obese (BMI≥30).

REVIEW OF LITERATURE

This chapter summarizes the literature on: public health issues related to obesity, changes in the prevalence of obesity in the U.S. population and sociodemographic subpopulation groups, predictors of obesity, sociodemographic differences in the predictors of obesity, and the gap in the current knowledge on the disparity of obesity prevalence among subpopulation groups in the U.S.

OBESITY, A SERIOUS PUBLIC HEALTH ISSUE IN THE U.S.

Obesity is defined as having a body mass index (BMI) which is calculated by weight in kilograms divided by height in meters squared, equal to or above 30. Obesity increases the risks of many chronic diseases such as cardiovascular disease (Kenchaiah et al., 2002), hypertension, type 2 diabetes, and several types of cancer (Field et al., 2001). The estimated medical expenses attributed to overweight and obesity were $92.6 billion in 2002 in the U.S (Finkelstein et al., 2003).

The prevalence of obesity among U.S. adults aged 20-74 years has increased from 13.3 % in 1960-62 to 30.9% in 1999-2000 and continues to increase (Centers for Disease Control and Prevention, 2002; Flegal et al., 2002; Flegal and Troiano, 2000; Ogden et al., 2006). Consequently, the Healthy People 2010 has set a goal to reduce the prevalence of obesity to 15% among adults aged 20 years and older in the U.S. (Healthy People 2010, 2000). The goal poses serious challenges to the public health professionals, including nutritionists.

The prevalence of obesity varies among sociodemogprahic subpopulation groups in the U.S. Women aged 20 years and over have had a higher prevalence of obesity than

men of the same age since 1960 (Centers for Disease Control and Prevention, 2002). Age is positively associated with the prevalence of obesity except for women 65 years and over and men 75 years and over (Centers for Disease Control and Prevention, 2002). The decrease in the obesity prevalence in the older (Flegal et al., 1998; Centers for Disease Control and Prevention, 2002) has been explained as due to the high morbidity of the old and obese.

The prevalence of obesity also differs depending on subjects' socioeconomic status (SES). SES has been measured by income (King et al., 2001; Flegal et al., 1988), education (Zhang and Wang, 2004; Schoenborn et al., 2002; Flegal et al., 1988; Freedman et al., 2002), or occupation (Power and Moynihan, 1988; King et al., 2001; Sarlio-Lähteenkorva and Lahelma, 1999). Researchers generally agree that each of these SES measurements is conceptually distinct and makes separate and unique contributions to the health outcomes (Turrell et al., 2003; Mishira et al., 2001; Liberatos et al., 1988). Income is associated with accessibility to medical care resources, diet quality, and access to social amenities (Marmot et al., 1987). Education is associated with problem solving capacity (Pincus et al., 1987) and values (Zurayk et al., 1987). Occupation is associated with psychologically stressful environments (Keighley et al., 1976). Correlations between income, education, and occupation were moderate to weak (Winkelby et al., 1992; Abramson et al., 1982). A few studies used two or more of the SES measurements, but failed to adjust for potential effects of each measurement on the other. This might have resulted in one of two types of bias: overestimated effect of one indicator or underestimation of total SES effects. In order to reduce biases, Liberatos et al. (1988) recommended multidimensional methods of assigning SES through principal component

analysis or use of several SES indicators after adjusting for the unmeasured effects of each indicator. Many studies in the U.S. reported that subjects with low-SES have a higher prevalence of obesity than those with high-SES, regardless of the SES measurements used (Stephenson et al., 1987; King et al., 2001; Crespo et al., 1999; Zhang and Wang, 2004). In 1994-96, the percent of obese subjects aged 18 years and older were 23% in low-income vs. 17% of high-income group (Paeratakul et al., 2002). Food insecurity is more likely to be experienced among subjects with low-SES than those with high-SES. Paradoxically, a prevalence of obesity was higher in women who reported having had experienced food insecurity in the past 12 months than others (Adams et al., 2003). The Centers for Disease Control and Prevention (CDC) has established the Healthy People 2010 objective to eliminate disparities in the obesity prevalence by income and education (Healthy People 2001, 2000).

Highly associated with SES is race/ethnicity (Kumanyika, 1994). In the U.S., the prevalence of obesity among racial/ethnic minority groups (i.e. Black, Mexican-, and Native-Americans) has been higher than that of Caucasians (Kumanyika, 1994; Kumanyika, 1987; Young et al., 1989; Flegal et al., 1998; Hedley et al., 2004). In 1999-2002, the prevalence of obesity among non-Hispanic white, non-Hispanic Black, and Mexican-American adults aged 20 years and over was 29.4%, 39.4%, and 32.6%, respectively (Hedley et al, 2004). A few researchers who controlled for SES also demonstrated the higher obesity prevalence among racial/ethnic minority groups (Harrell and Gore, 1998; Zhang and Wang, 2004; Winkleby et al., 1996). Effective nutrition intervention programs are culturally sensitive. Controlling for SES when identifying the

racial/ethnic predictors of obesity is critical to distinguish economic factors associated with obesity from cultural factors.

Contrary to the findings that the prevalence of obesity is higher among subjects with low-SES than those with high-SES, subjects classified by more than one soicodemographic variables reveal contrasting information. When gender and SES were examined simultaneously, the inverse association between prevalence of obesity and SES remained true only for women (Hathaway and Foard, 1960; Lowenstein, 1977; Garn and Clark, 1977; National Center for Health Statistics, 1986; Stephenson et al., 1987; Benbrook, 1976; Forman et al., 1986). In addition, several researchers suggested that the reported association may hold true only for white women, although the results varied across studies (Kumanyika, 1987; Gillum, 1987; Zhang and Wang, 2004; Robert and Reither, 2004). Furthermore, Sobal and Stunkard (1989) reported that socioeconomic difference in the prevalence of obesity by gender does not appear until adolescence.

Over the past three decades in the U.S., the prevalence of obesity has increased in all races, ages, gender (Flegal et al., 1998) and education subpopulation groups (Zhang and Wang, 2004). The rate of increase in the prevalence of obesity among the subpopulation groups, however, differs. Between 1960-62 and 1999-2000, the prevalence of obesity increased by 18.3% (15.7% to 34%) in women vs. 17% (10.7% to 27.7%) in men aged 20-74 yrs of age. Thus, the difference in the prevalence of obesity between men and women did not really change between 1960-62 and 1999-2000 (5% in 1960-62 and 6.3% in 1999-2000). On the other hand, between 1976-80 and 1999-2000, the prevalence of obesity in women increased by 14.2% (15.4 % to 30.6%) for Caucasians, 19.8% (31% to 50.8%) for Blacks, and 13.5% (26.6% to 40.1%) for

Mexican-Americans. Thus, the difference in the prevalence of obesity between white women and Black women increased from 15.6% to 20.2%, while it decreased from 11.2% to 9.5% between white women and Mexican American women. During the same period of time, the prevalence of obesity in men increased by 15.3% (12.4% to 27.7%) for Caucasians, 12.3% (16.5% to 28.8%) for Blacks, and 13.7% (15.7% to 29.4%) for Mexican-Americans (Centers for Disease Control and Prevention, 2002). Thus, the differences in the prevalence of obesity between white and Black men and white and Mexican-American men both decreased (4.1% to 1.1% and 3.3% to 1.7%, respectively). Between 1971-74 and 1999-2000, the prevalence of obesity in women increased faster in women with higher education (7.3% to 29.9%) than in women with lower education (24.9% to 37.8%). As a result, the disparity in the prevalence of obesity by education decreased in women (17.6% to 7.9%). The prevalence of obesity in men with high education, on the other hand, increased from 7.4% to 23.6%, while it increased from 12% to 26.7% in men with low education. Thus, decrease in the disparity in the prevalence of obesity by education in men was much smaller (4.6% to 3.1%) than that in women's (Zhang and Wang, 2004).

Clearly the prevalence of obesity differs by several major sociodemographic variables alone: age, gender, SES, and race/ethnicity. However, examining the difference in the prevalence of obesity among subpopulation groups categorized by the combination of these sociodemographic variables (i.e. SES and gender) identified more specific obesity risk group than by single sociodemographic variable.

The observed difference in the association between SES and the prevalence of obesity for men vs. women may partly be explained by biological differences. The

differences in the rate changes in the prevalence of obesity among subpopulation groups categorized by the combination of gender and SES, however, suggests different environmental changes having affected on subpopulation groups categorized by the combination of gender and SES in addition to the differences in the biology between men and women. Thus, the present study will compare subpopulation groups categorized by the combinations of gender, SES, and/or race/ethnicity.

PREDICTORS OF OBESITY

Obesity results from complex interactions of various variables. Thus, understanding various variables associated with obesity (predictors of obesity) and how they differs among sociodemographic subpopulation groups is important to decrease the discrepancy of the prevalence of obesity among various subpopulation groups as well as to decrease the overall prevalence of obesity in the U.S. This section describes the predictors of obesity, and how they differ among sociodemographic subpopulation groups. Predictors of obesity identified in the literature are lifestyle, psychosocial, and reproductive variables, pre-adult weight history, and genetic factors.

Lifestyle variables: Lifestyle variables that have been associated with obesity include smoking, drug use, alcohol consumption, physical activity, and dietary behaviors. Literature supports that weight gain is associated with non-smoking and use of some types of illegal drugs. Although smoking increases the risk for lung cancer, some individuals smoke to control weight (Perkins et al., 1990). Wamala et al. (1997) reported that the prevalence of smoking was higher in normal weight women (40%) compared to overweight (30%) and obese women (22%) in a cross-sectional study in Sweden. Similarly, in the cross-sectional study conducted in the U.S. national sample, smokers

were less likely to be obese (OR=0.63; 95% CI=0.46, 0.88) than non-smokers (King et al., 2001). In this study, the risk of obesity for ex-smokers did not differ from non-smokers (OR=1.01, 95% CI=0.77, 1.34), while other study (Ball et al, 2003) reported that ex-smokers have a higher risk of obesity than non-smokers ($p<0.05$). In the last three decades while the prevalence of obesity increased, tobacco consumption decreased in the U.S. (Galuska et al., 1996). This may potentially suggest the decreased percentage of smoking as a possible contributor to the recent increase in the prevalence of obesity at the population level. Therefore, smoking as a predictor of obesity and its relation to the recent increase in the obesity prevalence in the U.S will be examined in the present study.

Illegal drug use such as marijuana has been reported to promote calorie intake, yet its association with weight gain is inconsistent: positive (Greenberg et al., 1976; Mendelson, 1976) and negative (Smit and Crespo, 2001). Marijuana use in the U.S. started to increase in the 1960s and reached its peak in 1973, after which a steady decline has been reported (Gfroerer and Brodsky, 1992). Between 1991-1992 and 2001-2002, the prevalence of marijuana use remained stable at about 4% of the U.S. adults aged 18 years and over (Compton et al., 2004). Thus, it is unlikely that marijuana use has contributed to the recent increase in obesity prevalence, and it will not be examined in the present study.

Whether or not alcohol consumption is a contributor to the recent increase in the prevalence of obesity is controversial. Alcohol intake increased energy intake in short-term laboratory studies (Yeomans et al., 2003; Caton et al., 2004) but not in longer-term studies (Cordain et al., 1997; Cordain et al., 2000). Epidemiological studies report mixed associations between alcohol consumption and BMI (Lahti-Koski et al., 2002; Fisher and

Gordon, 1985; Gruchow et al., 1985; Colditz et al., 1991; Wamala et al., 1997). These inconsistent findings may be partially due to differences in measurements of alcohol consumption (i.e. quantity, frequency, or a product of quantity and frequency) and obesity (e.g. the risk of obesity, mean BMI) utilized across the studies. Recently, the review article by Suter (2005) concluded that alcohol energy intake of moderate non-daily consumers may increase the risk of obesity, while alcohol energy intake of moderate daily and all heavy consumers may not. This article suggests that neither frequency nor quantity of alcohol intakes alone may sufficiently represent alcohol consumption as a predictor of obesity. In addition, various variables have been suggested to confound the relationship between body weight and alcohol intakes (i.e. concomitant food intake, body composition, smoking, liver function, ethnicity, age, gender). Some individuals may have over- and/or underreport their alcohol intakes, biasing the results (Suter, 2005). Enns and colleagues (1997) reported that the intake of beer and ale in the U.S. increased between 1977-78 and 1994-95. Therefore, alcohol intake may be a possible contributor to the recent increase in the prevalence of obesity and it will be examined in the present study.

Obesity results from long-term imbalance of energy intake and expenditure. Physical activity is a major variable of energy expenditure, and it is well documented that physical inactivity increases the risk of obesity (Binkley et al., 2000; Hu et al., 2003; King et al., 2001; Cooper et al., 2000). Physical activity occurs both during leisure-time and non-leisure time. Between 1987 and 1993 in the U.S., the percentage of adults who reported being regularly engaged in leisure-time physical activity increased slightly from 40.5 to 43.7% (Galuska et al., 1996). Others have suggested that the upsurge of obesity

prevalence in the past three decades is partially due to our increasingly sedentary lifestyles, with more people having less physically demanding jobs, watching TV or using a computer (Skidmore and Yarnell, 2004; Seidell, 2000; Jebb and Moore, 1999; Hu et al., 2003). Lack of information on non-leisure time physical activity has delayed testing this hypothesis (Prentice et al., 2004). Considering both leisure-time and non-leisure-time physical activity is important to understanding the energy expenditure, because even though one is actively engaged in leisure-time activities, if he/she does not participate in non-leisure-time activities, his/her overall physical activity expenditure might not be enough to reduce his/her risk of developing obesity. In Australia, Proper et al. (2007) reported that there was no relationship between the length of sitting in leisure time activity and the total non-leisure time activity. In U.S., Barness et al. (2003) reported that individuals, who walked, lifted or carried light or heavy loads during non-leisure time, are more likely to be engaged in regular leisure-time physical activities than those who sat during their non-leisure time. Additional studies are needed to evaluate changes in the overall physical activity in relation to recent increase in obesity prevalence in the U.S.

Dietary behaviors can be assessed by dietary composition (macronutrients, energy, energy density, and specific food/food group consumption), meal patterns (i.e. breakfast consumption), and other eating behaviors including dietary patterns and eating food away from home. Average dietary energy intake increased by 335 kcal in women and by 168 kcal in men aged 20-74 years old (Briefel and Johnson, 2004) between 1971-1974 and 1999-2000. Thus, energy intake might have contributed to the recent increase in the prevalence of obesity by tipping the energy balance, and it will be examined in the

present study. Energy density has recently been suggested as a contributing factor to obesity prevalence (Rolls et al., 1999; Willet, 1998; Truong and Sturm, 2005). However, the information on water consumption, key information to estimate energy density, is lacking in the dataset used in the present study, and therefore, energy density will not be examined in the present study.

Both human and animal studies support that a high fat diet (> 30% of the total calorie from fat) promotes obesity (Chang et al., 1990; Salmon and Flatt, 1985; Rolls and Shide, 1992). Mean fat intake in the United States, however, decreased from 36% to 33% of calorie intake between 1971-1974 and 1999-2000 when the prevalence of obesity has increased. Thus, it is unlikely that the diet high in fat is a contributor to the recent increase in the prevalence of obesity. However, with increasing public awareness of high fat intake in relation to the risk of chronic diseases in the U.S., this mean fat intake decrease might be a reflection of selective underreporting of high fat foods among respondents. Although there is no means to detect the possible bias of selective underreporting of high fat foods in cross-sectional studies, due to the strong evidence of high fat intakes as a predictor of obesity in experimental studies, the present study will examine the changes in fat intake in relation to the recent increase in obesity prevalence.

Consumption of both food and beverages high in fructose corn syrup paralleled with the increase in the prevalence of obesity in the U.S. between 1977 and 1998 (Rizek, 1978; Tippett et al., 1995; Tippett et al., 1998; United States Department of Agriculture, 2000). High fructose corn syrup intake increased from < 0.5 grams per day per capita in 1970 to 53.9 grams per day per capita in 2003 (Economic Research Services, 2004). Fructose intake could increase food intake because fructose alters the section of ghrelin,

leptin, and insulin, which results in decreased satiety (Bray et al., 2004). Fructose ingestion also favors de novo lipogenesis, which could increase adiposity (Teff et al., 2004). Although consumption of food and beverages high in fructose corn syrup might be associated with the recent obesity epidemic in the U.S (Bray et al., 2004), the information on fructose intake as well as total sugar intake is not available in the present study and will not be examined.

Daily vegetable consumption has been inversely associated with the risk of obesity (Lahti-Koski et al., 2002). However, Enns and colleagues (1997) reported that no clear trend in vegetable intake among adults 20 years and over was observed between 1989-91 and 1994-95. Estimating vegetable intakes is a challenge as vegetables are widely distributed as parts of grain and meat mixtures (Enns et al., 1997), and it will not be examined in the present study.

People receive benefits from the synergistic effects between various foods and nutrients. Multivariate analysis such as factor analysis has been recently employed as a tool to examine the relationship between the combination of food and nutrient intakes (dietary patterns) and obesity (Togo et al., 2001). Authors of the review article on dietary patterns and obesity concluded that no consistent associations were identified between BMI or obesity and food intake patterns derived from factor analysis or cluster analysis (Togo et al., 2001). However, the majority of studies in their review article was conducted in other countries or used selected samples. Recently, an additional study was conducted with the U.S. population by Kerver et al (2003), in which Western dietary pattern that was characterized by high consumption of refined grains, meat, and potatoes, and American-Healthy pattern that was characterized by high consumption of fruits and

vegetables. These two patterns were also associated with BMI. Unfortunately, since a comprehensive food frequency questionnaire (FFQ), a prerequisite to dietary pattern study, is not available in the NHANES 1999-2002, dietary patterns in relation to obesity will not be examined in the present study.

Skipping breakfast is associated with higher BMI (Keski-Rahkonen et al., 2003; Lin et al., 2004) or risk of obesity (Ma et al., 2003). In addition, recent studies (Cho et al., 2003; Song et al., 2005) emphasized the importance of the type of breakfast foods in relation to BMI in cross-sectional studies; Mean BMI of those who had quick breads for breakfast was statistically significantly lower compared to that of breakfast skippers and those who ate meat and eggs for breakfast (Cho et al., 2003). Since breakfast consumption decreased from 86% to 75% for U.S. adults between 1965 and 1991 (Haines et al., 1996), the present study will examine breakfast consumption in relation to recent increase in the prevalence of obesity.

Other aspects of dietary behaviors that have been suggested to associate with the risk of overweight and obesity include: larger portion size (Young and Nestle, 2002), snacking (Forslund et al., 2005), low variety in fruits and vegetable groups (McCrory et al., 1999), number of eating occasions (Drummond et al., 1998; Ma et al., 2003; Forslund et al., 2002), timing of food intake such as later meals (Forslund et al, 2002), and eating food away from home such as fast food restaurants and other types of restaurants (French et al., 2000; McCrory et al., 2000). Studies have reported that the portion size has increased both at and away from home between 1977 and 1996 (Young and Nestle, 2002; Nielsen and Popkin, 2003). Zizza and colleagues (2001) reported that snacking, which increases the number of eating occasions, increased between 1977-78 and 1994-96. In

addition, the frequency of eating food away from home has dramatically increased; the percentage of the household food dollar spent on food away from home increased from 20% in 1970s to 40% in 1995 (Putnam et al., 1996). Fast food sales increased from 4% of total sales of food away from home in 1953 to 34% in 1997 (Putnam et al., 1996; USDA, 1997). Thus, the number of eating occasions and eating restaurant foods will be examined in the present study as potential contributors to the recent increase in obesity.

Many cross-sectional studies on dietary behaviors depend on self-reported information. However, some individuals, including obese subjects, tend to underreport their food intakes, making the relationship between dietary behaviors and weight status difficult to determine (Briefel et al., 1997; Klesges et al., 1995; Price et al., 1997). The method and criteria to identify energy intake under-reporters was developed by Schofield (1985). The criteria to identify energy intake over-reporters were also determined by Black et al. (1996). These improvements are not perfect solutions, however, since the information regarding how the true dietary behaviors of under-reporters or over-reporters would have impacted on the results is often not available. However, the difference between results based on the accurate reporters only and those based on the mixture of accurate and inaccurate reporters need to be addressed in the study of dietary behaviors.

Psychosocial factors: Psychosocial factors that were found to be associated with the risk of obesity include nutrition knowledge, weight perception, and other mental characteristics of subjects such as attitudes toward changing their weight. Perception about one's weight status and desired weight status may be important variables to reduce the risk of obesity. This is because those who do not perceive themselves as overweight or obese may less likely to desire (desired weight status) or try to change their weight

(attempt to lose weight or attempt not to gain weight). On the contrary, Kuchler and Variyam (2002) reported that 87% of U.S. obese adults reported that they are overweight (BMI≥25, thus include obesity), while 59.4% of those who are overweight but not obese and 17.4% of those who are normal weight reported that they are overweight in 1994-96. This indicates that the majority of obese subjects in the U.S. recognize themselves as overweight, while 40% of overweight subjects did not realize that they have a potential to develop obesity depending on their behaviors. Thus, the present study will examine these psychosocial variables (perceived one's weight status and desired weight status) in relation to the risk of obesity as well as other variables related to obesity risk.

Depression also has been suggested to be associated with weight gain. The results are, however, inconsistent (Faith et al., 2002; Roberts et al., 2000); Some found an association (Roberts et al., 2000; Istvan et al., 1992; Sullivan et al., 1993), while others did not (Hallstrom and Noppa, 1981; Faubel, 1989; Roberts et al., 2000). Furthermore, the relationship between obesity and depression may be gender specific; While some studies found an association between obesity and a higher prevalence of depression in women only (Istvan et al., 1992; Onyike et al., 2003), others found a negative association between obesity in depression in both men (Carpenter et al., 2000; Crisp et al., 1980; Crisp et al., 1976) and women (Crisp et al., 1980; Crisp et al., 1976). Varying definition of depression or obesity across studies may have contributed to these inconsistencies; Friedman and Brownell (1995) indicated that most population-based studies did not define depression according to established psychiatric diagnostic criteria. Whether depression or stress causes overweight/obesity, or vice versa, or both has been also difficult to conclude (Solomon, 2001; Stunkard et al., 2003). Little information is

available regarding the trend of the prevalence of depression in the U.S. over the past three decades. In addition, depression has been measured for only selected age groups in the dataset used in the present study, thus will not be examined.

Reproductive history: Women experience a higher prevalence of obesity than men. Reproductive variables unique to women such as parity, age at first menarche, and breastfeeding, have been suggested to contribute to obesity in women. Many reported that high parity is positively associated with obesity (Lahmann et al., 2000; Bastian et al., 2005; Williamson et al., 1994; Wamala et al., 1997), while Lee et al. (2005) found a negative relationship among white women living in non-metropolitan areas. Extra weight gain, which women fail to lose after delivering their babies, has been suspected as a reason for the positive relationship between parity and obesity. Fertility rate (number of births per 1000 women aged 15-44 years) in the U.S. declined between1990 and 2002 (Martin et al., 2005). However, little information is available on the trend of parity in the U.S. Thus, the present study will examine parity as a possible contributor to the recent increase in the prevalence of obesity.

The age at first menarche of obese women was statistically significantly lower than that of non-obese women (Mandel et al., 2004; Laitinen et al., 2001; Wamala et al., 1997). Since this finding is based on the cross-sectional studies, it is difficult to determine whether the age of first menarche causes obesity or menarche starts at early age among subjects who are already obese. In the large cohort study in Scotland, Pierce and Leon (2005) reported the odds ratio for being obese in adulthood was 0.82 (CI=0.76, 0.86) compared with not being obese per 1 year increase in age at menarche and was unchanged by adjusting for childhood BMI and other covariates. On the other hand,

Freedman et al. (2002) reported that the adjustment of childhood BMI reduced the effect of age at menarche on adulthood BMI substantially in their study conducted in Bogalusa (Louisiana) in the U.S.A. This contradictory conclusion between these two studies is partially due to the age of childhood BMI measured in the studies (ages 4 and 6 years old in Pierce and Leon's study [2005] and 9 and 11 years old in the study by Freedman et al. [2002]). A number of recent studies suggested that the average age at the first menstruation of U.S. girls has decreased over the past 20 years (Wattigney et al., 1999; Freedman et al., 2002; Anderson et al., 2003; Chumlea et al., 2003). For example, the median age at the first menstruation of U.S. girls in 1963-66 was 12.75 years, while it was 12.5 years in 1988-94 (Anderson et al., 2003; Chumlea et al., 2003). Thus, it is possible that the lower average age of the first menarche may be associated with the recent increase in obesity, and this hypothesis will be examined in the present study.

Breastfeeding has been suggested to promote earlier return to pre-pregnancy weight (Dewey et al., 1993). However, the association of breastfeeding and obesity, weight gain, or mean BMI has been inconsistent; null (Bastian et al., 2005; Potter et al., 1991), positive (Rookus et al., 1987), and negative (Ohlin and Rossner, 1990; Jen et al., 1988). These inconsistencies are partially due to differences in postpartum behaviors among studies such as physical activity and dietary behaviors, gestational weight gain, pre-pregnancy weight, number of parity, and the duration or intensity of breastfeeding. Although the breastfeeding initiation rate decreased from 60% to 52% between 1984 and 1989, the rate returned to its high of 60% in 1995 (Ryan, 1997) and continued to increase up to 69.5% in 2001 (Ryan et al., 2002). However, the number of those who breastfeed their child(ren) at 6 months or at 1 year postpartum is much lower (29% and 16%,

respectively in 1998; Healthy People 2010, 2000). If breastfeeding truly has a protective effect on weight gain, it is unlikely that it contributed to the recent increase in the prevalence of obesity based on the trend in breastfeeding practices over the past two decades. However, changes in breastfeeding trends over time need to be examined, controlling for other behaviors that would impact on the development of obesity. Thus, this variable will be examined in the present study.

Pre-adult weight history: Pre-adult weight history is a weight history before subjects reach adulthood. Birth weight, which has been used as a measure of growth in utero, was positively associated with BMI, risk of being overweight, and/or obesity in childhood (O'Callaghan et al., 1997) and adulthood (Charney et al., 1976; Curhan et al., 1996; Sørensen et al., 1997), while others did not find these relationships (Allison et al., 1995; Hulman et al., 1998). Other studies also indicated the association of low-birth weight with later central obesity (Oken and Gillman, 2003).

Several studies reported that childhood BMI or weight status is a predictor for adult BMI or weight status (Guo et al., 2002; Biro et al., 2001; Freeman et al., 1995; Ferraro et al., 2003). For example, 38% of boys and 44% of girls above the 95th BMI percentile at age 7 in the 1958 British birth cohort became obese at age 33 (Power et al., 1997). Thus, factors associated not only with adulthood obesity but those associated with childhood obesity may promote adult obesity. On the other hand, only a small portion of fat adults are fat during childhood (Parsons et al., 1999). These studies suggest that pre-adult weight history and its associated variables need to be considered as predictors of adult obesity. However, reliability, validity, and the sample size of these variables in the

dataset used in the present study are questionable. Thus, these variables will not be examined in the present study.

Genetic effects: According to the review article by Maes and colleagues (1997), results from studies on twins suggest that genetic factors explain 50-90% of the variance in BMI, while studies on families and studies on adoptee explain 20-80% and 20-60% of the variance in BMI, respectively. Several single-gene mutations that are associated with obesity have been discovered in humans (Comuzzie and Allison, 1998). However, researchers have suggested that it is unlikely that the human gene pool has changed substantially over the last three decades to increase the prevalence of obesity. Environmental changes might be the main contributor to the recent increase in the prevalence of obesity (Hill and Peters, 1998). Thus, the present study will not examine genetic effects as a predictor of obesity.

ADDITIONAL LIMITATIONS OF THE STUDIES ON PREDICTORS OF OBESITY

Many of the studies mentioned above used multiple regression models to identify the obesity predictors to control the effects of other potential confounding variables. However, few mentioned how these predictors relate to each other except high correlations between SES and race/ethnicity or among SES variables (i.e. education and income). Thus, additional explanation for the inconsistent results among past studies is potential multicollinearity among predictors of obesity. If predictors are highly correlated with each other, standard errors of the regression coefficient for these predictors become large, decreasing the likelihood of predictors to be significant for the risk of obesity, even though, in fact, they are important predictors of obesity. Thus, the

interrelationship among predictors needs to be examined when identifying the predictors of obesity.

SOCIODEMOGRAPHIC DIFFERENCES IN THE PREDICTORS OF OBESITY

The prevalence of obesity in the U.S. differs among subpopulation groups categorized by one or more than one sociodemographic variables presumably because of the differences in the predictors of obesity among these subpopulation groups. Thus, a large number of studies examined the sociodemographic differences in the predictors of obesity. This section, therefore, will discuss about the differences in the predictors of obesity among subpopulation groups categorized by one sociodemographic variable (gender, SES, and race/ethnicity) and those categorized by more than one sociodemographic variables (e.g. SES and gender, race/ethnicity and gender, and SES, gender, and race/ethnicity). In particular, the primary focus will be on studies that might be important to understand socioeconomic differences in the prevalence of obesity between men and women.

Gender differences in the predictors of obesity: Compared to men, women in the U.S. have a higher prevalence of obesity and lower prevalence of smoking (Winkleby, 1997; Centers for Disease Control and Prevention, 2004; Escobedo and Peddicord, 1996). Since smoking is inversely associated with the prevalence of obesity, lower prevalence of smoking in women than in men might be associated with the higher prevalence of obesity for women than for men. The difference in the prevalence of obesity between men and women has not changed between 1988-94 and 1999-2000 (6.6% in 1988-94 and 6.3% in 1999-2000, respectively; Centers for Disease Control and Prevention, 2002). Thus, we

hypothesize that the difference in smoking between men and women also did not change in the past decade.

Perception of one's own weight status and desired weight status has been extensively studied because of the difference in these psychosocial variables between men and women. Women are more likely to describe themselves as fat and to be dissatisfied with their physical appearance than men (Fallon and Rozin, 1985; Kuchler and Variyam, 2003; Paeratakul et al., 2002; Sobal and Stumkard, 1989; Gray, 1977). These negative attitudes already exist among girls at a young age, while they are relatively absent among boys (Feldman et al., 1988; Sobal et al., 1988). In response to these psychosocial variables, dieting has been more common among women than men (Gray, 1977; Serdula et al., 1999). Others also reported that women are more knowledgeable about nutrition than men (Baker and Wardle, 2003) and eat healthier (Guo et al., 2004; Kerver et al., 2003; Osler et al., 2002). While women are more weight conscious and eat healthier than men, however, some reported that women are more likely to have sedentary lifestyles than men; men are more likely to engage in regular leisure-time physical activity and to lift moderate or heavy loads during their usual daily activities than women (Barnes et al., 2003; Crespo et al., 2000). Drewnowski and Yee (1987) reported that the most popular method as a way to lose weight for women is to diet and to exercise for men in the study conducted at a large university in the Midwest of U.S. with 226 freshman students. On the other hand, Serdula et al. (1999) reported that the percent of subjects who increased the physical activities to lose or maintain weight was similar between men and women. Since obesity results from energy imbalance, gender differences in the variables associated with energy intakes and expenditures need

to be examined simultaneously. Since there is little change in the difference in the prevalence of obesity between men and women in the past decade, we hypothesize that little changes may have occurred in the past decade regarding the difference in these psychosocial variables, energy intake variables, and energy expenditure variables between men and women.

Other predictors that differentiate between men and women are reproductive variables. Higher parity (Lahmann et al., 2000; Bastian et al., 2005; Williamson et al., 1994; Wamala et al., 1997), earlier age at first menarche (Mandel et al., 2004; Laitinen et al., 2001; Wamala et al., 1997), and possibly not breastfeeding one's own child(ren) are all associated with increased risk of obesity. Thus, they may have contributed to the higher prevalence of obesity among women than men. The number of women who breastfeed their child(ren) has increased since 1989 and the age of first menstruation has decreased in the past 20 years. Thus, these two variables may have contributed to the change in the difference in the prevalence of obesity between men and women. However, their contributions must not have been large enough to make a difference in the prevalence of obesity between men and women in the past decade or cancelled out by other predictor changes in the past decade.

SES differences in the predictors of obesity: The prevalence of obesity in subjects with low-SES has been higher than that of those with high-SES. However, the rate of increase in the prevalence of obesity among subjects with high-SES, especially women, increased at higher rate than that of subjects with low-SES in the past three decades (Zhang and Wang, 2004). In general, subjects with low-SES have poorer nutrition knowledge and attitudes and practice unhealthier behaviors compared to subjects with high-SES. For

example, low-SES subjects are more likely to be smokers (Gilman et al., 2003; Molarius, 2003; Wardle and Steptoe, 2003; Winkleby et al., 1998) than high-SES subjects. Since smoking is inversely associated with the prevalence of obesity, smoking is not likely to have contributed to the higher prevalence of obesity among subjects with low-SES than those with high-SES. Little information is available regarding the change in the difference in smoking by SES in the past decade. However, based on the changes in the prevalence of obesity by SES in the past three decades, we hypothesize that decrease in the prevalence of smoking in high-SES might have been larger than that of low-SES, resulting in the higher increase in the prevalence of obesity among high-SES subjects than that of low-SES subjects.

Little information is available regarding differences in energy intakes by SES in the U.S. No statistically significant difference was observed in total energy intake between U.S. adults aged 20-29 years old from food sufficient and food insufficient families (9.8±0.1 vs. 9.6±0.4 MJ, P=0.57), while adults aged ≥60 years old from food insufficient families consumed significantly lower total energy intakes (5.8±0.4 MJ) than those from food sufficient families (7.3±0.1 MJ) at $p<0.05$ (Dixon et al., 2001). The association between energy intake underreporting and SES (Briefel et al, 1997; Klesges et al, 1995) makes the difference in energy intakes by SES difficult to understand. Studies have supported that subjects with low-SES are less likely to consume a healthy or low fat diet compared to high-SES subjects (Jeffery and French, 1996; Smith and Owen, 1992; Federation of American Societies for Experimental Biology, 1995). Drewnowski (2004) indicated the low cost of foods high in energy and fat as a reason why low-income subjects eat energy-dense foods compared to high-income subjects. In fact, subjects from

low-income households reported food price as the most important consideration in making food choices (Reicks et al., 1994; Quan et al., 2000; Bradbard et al., 1997). Morland et al. (2002) indicated the limited access to supermarkets that offer a wide variety of foods at lower price in poor communities. Thus, we hypothesize that the energy intake of the low-SES population is higher than that of the high-SES population, resulting in the higher prevalence of obesity among low-SES subjects than high-SES subjects in the past decade. We also hypothesize that the increase in energy intake and fat intakes among high-SES in the past decade might have been higher than those of low-SES subjects, resulting in higher increase in the prevalence of obesity among high-SES subjects than among low-SES subjects.

Low-SES subjects had a greater tendency to be breakfast skippers than high-SES subjects (Siega-Riz et al, 2000). Since breakfast skipping is associated with increased risk of obesity, breakfast skipping may have contributed to the higher prevalence of obesity among subjects with low-SES than those with high-SES. In addition, since the prevalence of obesity increased at a higher rate among subjects with high-SES than those with low-SES in the past three decades, we hypothesize that breakfast skipping may have become more prevalent among high-SES subjects than low-SES subjects in the past decade.

Lower levels of leisure-time physical activity among subjects with low-SES than subjects with high-SES have been reported (Crespo et al., 1999). Since physical inactivity is associated with increased risk of obesity, difference in leisure-time physical activity between subjects with low-SES and those with high-SES may have contributed to the higher prevalence of obesity among subjects with low-SES than those with high-SES.

On the other hand, subjects with low-status occupations are likely to be engaged in more occupational physical activity than high-status occupations in England (Colhoun et al., 1996), especially in case of men, reducing one's risk of becoming obese. Little is known about the contribution of leisure-time and non-leisure time physical activity to the overall physical activity (i.e. Is the activity level of individuals who participate on regular leisure-time physical activity enough to reduce their risk of obesity even though they are not active during non-leisure time?). In Australia, lower education decreased the sitting time on weekdays, while it increased the sitting time on weekend and in leisure time (Propoer et al., 2007). In the U.S., Barnes et al. (2003), which examined both non-leisure and leisure-time activity by SES, reported that the number of subjects with low overall physical activity was higher among low-income subjects than high-income subjects in 2000. Thus, we hypothesize that the lower overall physical activity in subjects with low-SES than those with high-SES may have contributed to the higher prevalence of obesity among subjects with low-SES than those with high-SES. Unfortunately, non-leisure-time physical activity measurement is not available in one of the dataset in the present study. Thus, whether the difference in the overall physical activity by SES has changed in the past decade or not cannot be examined in the present study.

The number of subjects who perceived that they are overweight was smaller among lower-SES subjects than higher-SES subjects (Paeratakul et al., 2002; Kuchler and Variyam, 2003; Jalkanen et al., 1987; Jeffery, 1996). As described earlier, not perceiving oneself as overweight may increase one's risk of obesity. Thus, subjects with low-SES not perceiving that they are overweight may have contributed to the higher prevalence of obesity among subjects with low-SES than those with high-SES.

Reproductive variables unique to women also differ by SES. Low-SES has been associated with high parity and early age at first menarche (Wamala et al., 1997; Bailey and Garn, 1979). In fact, these predictors explained the largest proportion of the social gradient in obesity in middle-aged Swedish women (R^2=45%). Sobal (1991) noted that parity might be a possible mediating variable to explain the low-SES-obesity relationship in the U.S and needs to be examined in the future studies. Since these two predictors increase the risk of obesity, they may have contributed to the higher prevalence of obesity among women with low-SES than women with high-SES. In addition, mothers with their incomes below the poverty level are less likely to breastfeed their babies than other mothers (Federation of American Societies for Experimental Biology, 1995). Since breastfeeding may possibly decrease the risk of obesity, this predictor may also have contributed to the higher prevalence of obesity among women with high-SES than women with low-SES.

Racial/ethnic differences in the predictors of obesity: The prevalence of obesity among racial/ethnic minority groups has been higher than among Caucasians since 1960-62 (CDC, 2002; Schoenborn et al, 2002; Flegal et al, 2002). Whether racial/ethnic disparity of the prevalence of obesity has changed over the past decade has been difficult to determine due to the differences in age subcategories used across studies.

In 1999-2001, the smoking prevalence among Caucasians, Blacks, and Hispanics aged 18 years and older were 27.4, 25.7, and 23.1%, respectively (CDC, 2004). Similar results were obtained from the selected subjects in North Carolina (Harrell and Gore, 1998). Since smoking has been inversely associated with the risk of obesity, lower

smoking prevalence among racial/ethnic minorities may have contributed to their higher prevalence of obesity than Caucasians.

There is a greater tendency among Blacks to think that work-related or recreational activities they are engaged in are sufficient (US Department of Health and Human Services, 1992). However, the percentage of subjects with low overall physical activity was higher among Blacks (18.4%) and Mexican-Americans (17.6%) than among Caucasians (14.5%) (Barnes et al., 2003). Thus, the inadequate perception about physical activity levels and lower physical activity levels among racial/ethnic minority groups may have contributed to their higher prevalence of obesity than Caucasians.

Some studies reported that Black women consumed lower energy intakes than white women (Gartside et al., 1984; National Center for Health Statistics, 1977), while others reported that Blacks consumed higher energy intake than Caucasians (Slattery et al., 1992; Burke et al., 1992). Interestingly, researchers have reported that Blacks have the lower metabolic rate than Caucasians, suggesting that Blacks may be at higher risk of obesity than Caucasians even though they consume lower calories than Caucasians (Weyer et al., 1999; Geissler et al., 1985). In the present study, the information on the metabolic rate among race/ethnic groups is not available. Thus, only energy intake differences among race/ethnic groups will be examined in relation to the difference in the risk of obesity.

The percentage of obese or overweight subjects aged 20 years and over who think that their weight is about right is higher among Blacks (30.4%) and Hispanics (26%) than Caucasians (18.6%) (Kuchler and Variyam, 2002). Similar results were obtained by

Paeratakul et al. (2002). Thus, misperception about one's own weight status might have contributed to the higher prevalence of obesity in racial/ethnic minorities than Caucasians.

A higher percentage of Blacks (24.7%) skipped breakfast than Caucasians (16.2%) (Siega-Riz et al., 2000). Since breakfast skipping is associated with increased risk of obesity, difference in breakfast skipping among racial/ethnic minority groups may have contributed to their higher prevalence of obesity than Caucasians. Snacking is associated with increased risk of obesity. The difference in snacking habits among race/ethnic groups differed among studies. In 1977-78 and 1994-96, the prevalence of snacking among Blacks was lower than Caucasians and Hispanics in the U.S. However, in 1989-91, the prevalence of snacking was lowest among Hispanic adults (Zizza et al., 2001). Whether these differences in snack consumption among racial/ethnic groups correspond to the differences in the prevalence of obesity is questionable since no information regarding to the weight status has been provided in these studies.

Kant and Graubard (2004) reported that the higher percent of Caucasians consume commercially prepared meals than Blacks. Since eating out is associated with increased risk of obesity, this difference in consumption of commercially prepared meals between racial/ethnic minorities and Caucasians is less likely to have contributed to the higher prevalence of obesity among racial/ethnic minorities than Caucasians.

Finally, studies have reported that parity has been higher among Blacks than Caucasians (US Department of Health and Human Services, 1985; Mosher and Bachrach, 1996; Burke et al., 1992). Freedman et al. (2002) reported that age of menarche is earlier in Black girls than white girls and this difference is widening over the past few decades. Others reported that Black and Mexican-American girls had menarche at earlier age than

white girls even after adjusting for their socioeconomic status (Wu et al., 2002; Sun et al., 2002). The lower percent of initiation and duration of breastfeeding among Blacks than Caucasians have been also reported (Li et al., 2003; Life Science Research Office, 1995). These differences could be cultural or confounded by SES differences as described earlier. Since high parity, early age of menarche, and possibly lack of breastfeeding are associated with higher risk of obesity, differences in these predictors among race/ethnic groups may have contributed to the higher prevalence of obesity among racial/ethnic minorities women than white women.

Subpopulation differences in the predictors of obesity categorized by more than one sociodemographic variable: As indicated earlier, the prevalence of obesity has been inversely associated with SES in women but not in men. In addition, the prevalence of obesity in women with high-SES increased at faster rate than that of women with low-SES in the past three decades, making the discrepancy of obesity prevalence by SES much smaller for women than for men. Thus, this section first reviews the studies which examined the differences in predictors of obesity by gender and SES combined.

Both men and women with low-SES are more likely to smoke compared to those with high-SES (Winkleby, 1997). Based on the changes in SES differences in the prevalence of obesity for men vs. women in the past three decades, we hypothesize that the changes in the SES difference in the rate of smoking for women must have been larger than that for men in the past decade.

Both men and women with low-SES are less likely to be engaged in leisure-time activity than those with high-SES (Crespo et al., 1999; Crespo et al., 2000). Both men and women with less-SES had a lower percentage of individuals with high overall

physical activity than those with high-SES in 2000 (Barnes et al, 2003). Based on the changes in SES differences in the prevalence of obesity for men vs. women in the past three decades, we hypothesize that changes in the SES difference in the overall physical activity level for women must have been larger than that for men in the past decade. However, because of the lack of non-leisure time physical activity measurement in one of datasets used in the present study, this hypothesis cannot be tested.

Among U.S. adults, a larger percent of both women and men with a higher education level wanted to weigh less than those with lower education level (Dwyer and Mayer, 1970; Dornbusch et al., 1984). Serdula and colleagues (1999) reported that a larger percent of both men and women with higher education levels responded that they are trying to lose weight. As indicated earlier, perceiving one's weight status accurately or wanting to change one's weight status may encourage people to change their behaviors to decrease the risk of obesity. For women, ideal body shapes became thinner in 1960s compared to 1950s and have not changed much since then (Spitzer et al., 1999). Since high-SES women are highly concerned about their weight status in general, and with increasing public awareness of obesity problem in the U.S., it is unlikely that fewer women with high-SES have become aware and desired to weigh less over the past decade.

One point which should be noted is that although the directions of the relationship between many of these predictors and SES were same for men and women, the size of associations between SES and these predictors differs between men and women. For example, odds of perceiving own weight as heavy among women with some college education or higher was 2.16 relative to that among women with some high school education or less (OR=1.00). On the other hand, odds of perceiving own weight as heavy

among men with some college education or higher was 1.70 relative to that among men with some high school education or less (OR=1.00) (Kant and Graubard, 2004). Thus, even though the directions of the relationship between predictors and SES are same, the size of these relationships may vary, resulting in the statistically significant difference in the prevalence of obesity by SES between men and women.

When subjects were examined by race/ethnicity and gender combined, the prevalence of obesity among minority racial/ethnic groups has been higher than Caucasians regardless of their gender since 1960-62. Increase in the prevalence of obesity in Black, white, and Mexican-American women over the past decades was 11.7%, 7.3%, and 4%, respectively. In men, increase in the prevalence of obesity in Blacks, Whites, and Mexican-Americans was 7.5%, 7%, and 5%, respectively. Thus, the difference in the prevalence of obesity between Caucasians and Blacks increased (4.4%) over the past decade for women, while it decreased (3.3%) between Caucasians and Mexican-Americans. For men, there were almost no changes in the difference in the prevalence of obesity between Caucasians and Blacks (0.5%), while the difference decreased (2%) between Caucasians and Mexican-Americans (Centers for Disease Control and Prevention, 2002). These results were, however, not tested for their statistical difference.

The prevalence of smoking in Black women and white women aged 25-64 years was similar (33.1% and 30.0%, respectively) and higher than Mexican-American women (15.7%) according to the NHANES 1988-94 (Winkleby et al., 1998). On the other hand, in the NHANES 1999-2001, a higher percentage of white women (25.9%) reported cigarette use during the preceding month than Black (22.2%) or Hispanic women (17.3%)

aged 18 years and older. In this study, there was little racial difference in the percent of those who smoked in men (Centers for Disease Control and Prevention, 2004). Because of the differences in age subcategories and the question format used in these two studies, whether the relationship between SES and smoking differs by gender is inconclusive.

Nine percent of Black obese women and 7% of Hispanic obese women were inaccurate assessors of their weight status, while only 3% of white obese women were inaccurate assessors of their weight status. Similarly in men, racial/ethnic minorities assessed their weight status inaccurately compared to Caucasians (inaccurate assessors: 18 % of Black obese men, 19 % of Hispanic obese men, and 10% of white obese men) (Kuchler and Variyam, 2003). Higher tolerances to the heavier weight and less practices of dieting among racial/ethnic minorities compared to Caucasians have been documented in other studies (Winkleby et al., 1996; Chang et al., 2003; Lowry et al., 2000).

When subjects were examined by gender, SES, and race/ethnicity combined in the U.S., the prevalence of obesity has been inversely associated with education levels among women aged 20-60 years old in the past three decades regardless of their race/ethnicity except in 1999-2000 when the prevalence of obesity among Black women with medium education (54.4%) was highest, followed by Black women with high education (51.5%) and Black women with low education (44.3%). On the other hand, increase in the prevalence of obesity among Black women with high education was much larger (22.7%) than that of Black women with low-education (1.7%) in the past decade. Increase in the prevalence of obesity among white women with high education and among white women with low education in the past decade, on the other hand, was similar (10.2% and 9.7%, respectively). Among men, the relationship between the

prevalence of obesity and SES has been inconsistent and depended on subjects' race/ethnicity in the past three decades. On the contrary to Black women, increase in the prevalence of obesity among Black men with low education was much larger (12.7%) than that of Black men with high education (3.2%) in the past decade. The prevalence of obesity among white men with low education decreased (-2.9%), while it increased among white men with high education (6.9%) (Zhang and Wang, 2004). Winkleby (1997) reported that both men and women with lower education levels are more likely to smoke than those with higher education levels regardless of their race/ethnicity. Crespo and colleagues (2000) reported that both men and women with lower education levels are less likely to participate on leisure-time activity than those with higher education levels regardless of their race/ethnicity. Whether these differences by gender, SES, and race/ethnicity combined correspond to the changes in the disparity in the prevalence of obesity among these subpopulation groups over the past decade has not been examined.

The number of studies which examined the predictors of obesity by combining more than one sociodemographic variables in the U.S. is very limited. Furthermore, they tend to examine the predictors without controlling for other potential confounding predictors. As indicated earlier, obesity results from complex interactions of many predictors. Therefore, we still need studies, which examine predictor differences by combination of more than one soicodemographic variables, while controlling for other predictors.

Wamala and colleagues (1997) concluded that reproductive variables (higher parity and age of first menarche), unhealthy diet, unfavorable psychological factors (poor quality of life, low self-esteem, and job strain) explained 53% of low-SES-obesity

relationship among middle-aged Swedish women, while controlling for other potential confounding predictors. Ball and colleagues (2003) reported that dietary factors, dieting, smoking, leisure-time physical activities, and alcohol consumptions differentiated the risk of obesity according to the subject's gender and SES combined in Australia. As for subjects in the U.S., Lin and colleagues (2004) reported that the frequency of eating out and the total consumption of carbonated soft drinks and juice drinks explained the difference in the risk of obesity between low-SES women and high-SES women. Two of these studies (Wamala et al., 1997; Lin et al., 2004) did not examine men and two of these studies (Wamala et al., 1997; Ball et al., 2003) were not conducted in the U.S. Findings from overseas (Wamala et al, 1997; Ball et al., 2003) may not be applicable to U.S. due to differences in the national policies and overall attributes toward subpopulation groups such as low-SES individuals. Thus, comprehensive studies are in need to identify the predictors that explain the SES differences in the obesity prevalence for men and women in the U.S.

In Summary: The prevalence of obesity in the U.S. has increased in the last three decades, and it continues to increase. The prevalence of obesity among sociodemographic subgroups is assumed to vary due to differences in the predictors of obesity. Many studies, therefore, have identified the differences in the predictors of obesity by sociodemographic characteristics such as gender, SES, and race/ethnicity singly. However, fewer studies identified the differences in the predictors of obesity among subgroups categorized by more than one sociodemographic variable. Thus, why there is a different relationship between SES and prevalence of obesity for men and women remains unanswered. Furthermore, many studies in the past failed to control for

potentially confounding predictors when they identified the predictors that differentiate the risk of obesity among subpopulation groups.

While the prevalence of obesity increased in all subpopulation groups over the past decade, its rate differs among subpopulation groups. However, little is known about its explanations. Identifying predictors that discriminate the prevalence of obesity among subpopulation groups and their changes over the past decade is the first step for nutrition educators and policy makers to understand cultural and specific reasons to explain disparity in obesity prevalence, which is critical to develop effective obesity prevention or control programs in the U.S.

Among a large number of predictors of obesity identified in the literature, the present study will examine subpopulation group differences in the NHANES 1988-94 and 1999-2002 for the following variables: smoking, alcohol consumption, physical activity (leisure-time and non-leisure time activity [NHANES 1999-2002 only]), hours of watching TV and computer use (NHANES 1999-2002 only), dietary behaviors (energy intake, fat intake, breakfast consumption, number of eating occasions, and eating restaurant food), breastfeeding experiences, parity, age at first menarche, perceived one's weight status, desired weight status, attempt to lose weight in the past year, and attempt not to gain weight in the past year (NHANES 1999-2002 only). These variables were selected because they met more than one of the following criteria: 1) they are associated with obesity; 2) they vary among sociodemographic subpopulation groups of the interest in the present study, 3) they are modifiable, 4) they are measurable; 5) they have changed or may have changed in the same direction with the prevalence of obesity in the past

three decades; and 6) they are available in the NHANES 1988-94 and/or NHANES 1999-2002.

METHODS

OVERALL PROCEDURES

Objectives of the present study were completed by the secondary data analysis of the original dataset, the National Health and Examination Survey (NHANES), conducted in 1988-1994 and in 1999-2002. First, descriptive statistics were computed to describe the subjects used in the present study. Statistically significant differences in subjects' characteristics among the subpopulation groups were also examined. Then, age-standardized prevalence of obesity in the subpopulation groups were obtained and compared between 1988-94 and 1999-2002 (Objective 1). Then, predictors of obesity in the subpopulation groups were identified (Objective 2). For this task, the principal component analysis was conducted first to construct variables that are distinct and not highly correlated to one another (multicollinearity). Finally, the predictors identified in the objective 2 were compared between 1988-94 and 1999-2002 to identify the variables that are associated with the changes in the prevalence of obesity in the subpopulation groups over the past decade in the U.S (Objective 3) (Figure 1).

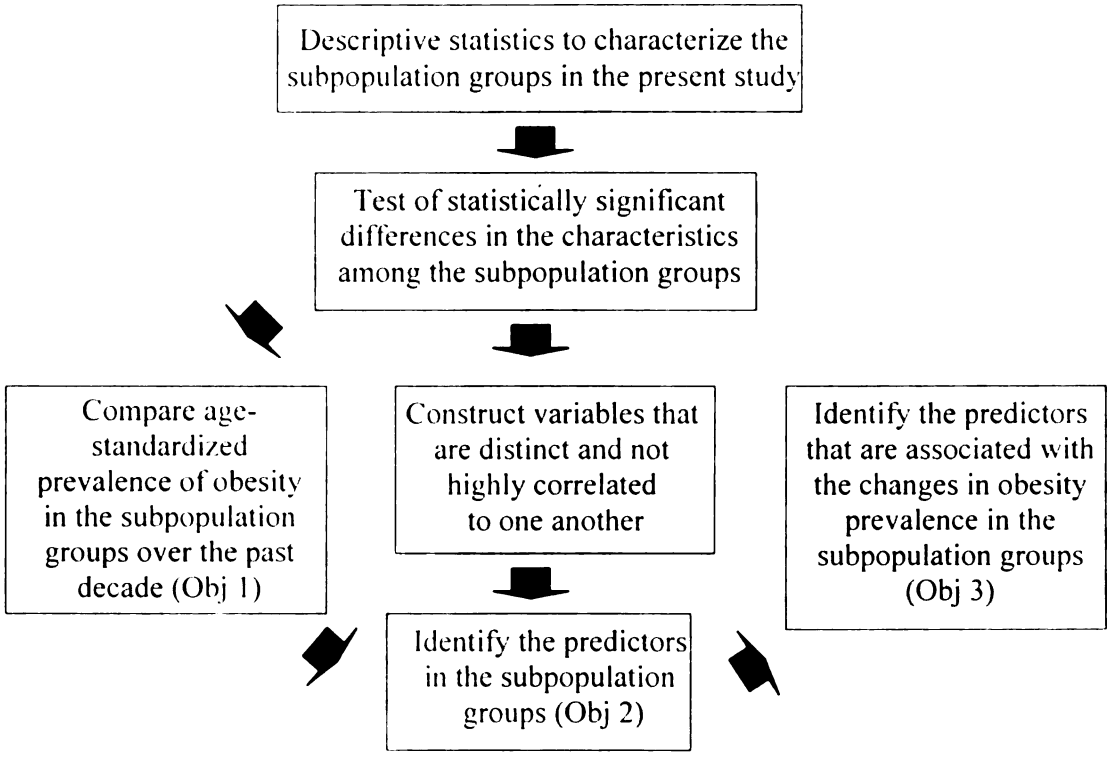


Figure 1. Overall procedures of the present study

DATASETS

The National Health and Examination Survey (NHANES) has been conducted since 1970 as a part of the National Nutrition Surveillance System instituted by the National Center for Health Statistics (NCHS), a branch in Centers for Disease Control and Prevention (CDC). Since the 1960's, the National Nutrition Surveillance System was combined with the National Health Examination Survey (NHES), an ongoing national survey conducted by National Center for Health Statistics (NCHS), a branch of the U.S. Public Health Service in the U.S. Department of Health and Human Services (DHHS), with the new emphasis on nutrition and its relation to health status to establish NHANES. The first NHANES was conducted in 1971-75 (NHANES I), followed in 1976-80

(NHANES II), 1982-84 (Hispanic Health and Nutrition Examination Survey: HHANES), and 1988-94 (NHANES III). The most recent NHANES has been conducted since 1999. Unlike previous surveys where CDC released the data as a four-years-combined data, data from the most recent NHANES will be released every two years (e.g. NHANES 1999-2000, 2001-2002, 2003-3004, etc). Currently, the NHANES 1999-2000, 2001-2002, and limited data from the NHANES 2003-2004 have been released to the public. The NCHS recommends combining NHANES 1999-2000 and 2001-2002 to generalize the data to the U.S population (NCHS, 2005). Thus, in the present study, this four-year combined dataset of NHANES 1999-2000 and 2001-2002 (National Center for Health Statistics, 2005) and the NHANES 1988-1994 were used.

The general structure of the NHANES 1988-94 and NHANES 1999-2002 sample design was similar to that of previous NHANES. NHANES samples were civilian, non-institutionalized U.S. population collected by the complex, multi-stage, stratified, clustering sampling method. Participants for the NHANES 1988-94 were aged 2 months and older. Mexican-Americans, blacks, older subjects, and young children were over-sampled. 33,994 were interviewed in their homes to answer to several questionnaires for the information such as sociodemographics, diet, and lifestyles. Then, 31,311 of the selected persons participated on medical examinations in the Mobile Examination Center (MEC) or in their homes if examinations in the MEC were not possible.

The NHANES 1999-2002 sampled subjects of all ages. The sample size for the home interview and physical examination at MEC was 9,965 and 9,282 in the NHANES 1999-2002 and 11;039 and 10,477 in the NHANES 2001-2002, respectively (NCHS, 2005). In addition to the subpopulation groups over-sampled in the NHANES 1988-94,

NHANES 1999-2002 over-sampled pregnant women and low-income subjects (Briefel and Johnson, 2004).

SUBJECTS

NHANES 1988-94 and NHANES 1999-2002 included 18,825 and 10,291 adults aged 20 years and older, respectively. For the present study with the NHANES 1988-94, excluded were: pregnant (n=288 [1.5% of subjects aged ≥20 years old]) and/or lactating women (n=95 [1% of subjects aged ≥20 years old]); those who did not have complete data on income, gender, weight status, and race/ethnicity (n=3,449 [18% of subjects aged ≥20 years old]); those who were not White, Black or Mexican American (race/ethnic groups such as Asians, Native Alaskans (n=589 [3% of subjects aged ≥20 years old]); underweight subjects (n=330 [2% of subjects aged ≥20 years old]), subjects who had 0 value on their weight variable (n=329 [2% of subjects aged ≥20 years old]); and those who had missing values on other variables used in the present study (n=3,482; n=0 for gender, n=0 for race/ethnicity, n=70 for education, n=0 for age, n=0 for income, n=17 for marital status, n=346 for smoking, n=2,783 for alcohol, n=455 for eating out, n=450 for energy intake, n=455 for the number of eating occasions, n=0 for leisure time activity, n=490 for breastfeeding experience, n=169 for the number of live births, n=304 for age at first menstruation, n=7 for perceived weight status, n=6 for desired weight status, n=7 for accuracy of self-reported weight status, n=4 for attempt to lose weight, n=455 for breakfast consumption, and n=450 for fat intake), leaving the final sample of 10,269 (Figure 2a).

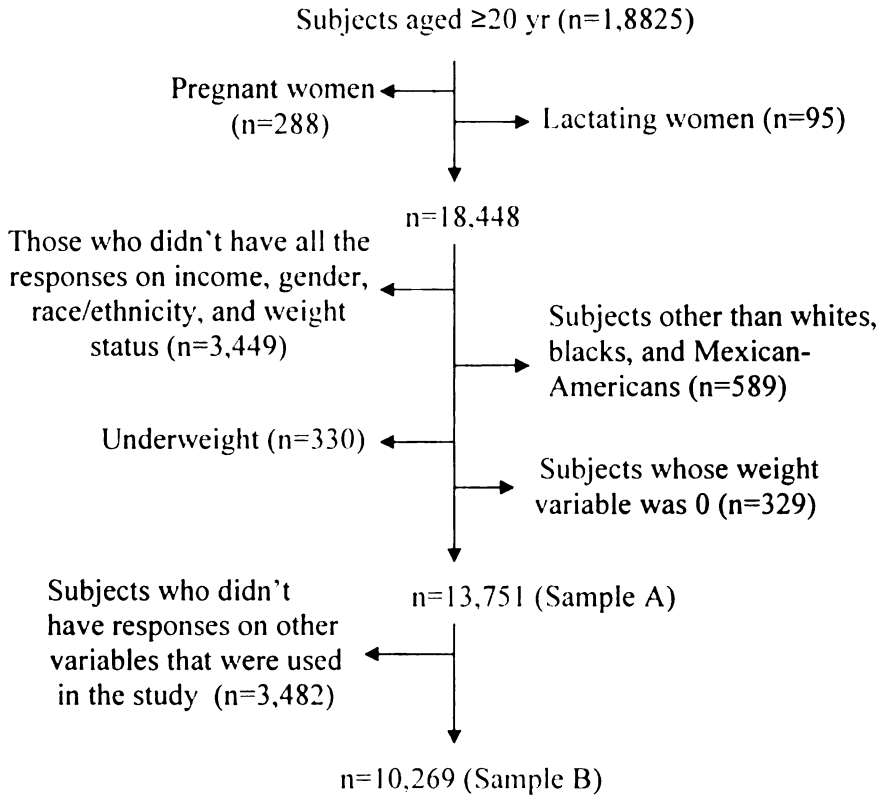


Figure 2a. Changes in the sample size (NHANES 1988-94)

From the NHANES 1999-2002, excluded were: pregnant (n=704 [7% of subjects aged ≥20 years old]) and/or lactating women (n=107 [1% of subjects aged ≥20 years old]); those who did not have complete data on income, gender, weight status, and race/ethnicity (n=2,074 [20% of subjects aged ≥20 years old]); those who were not White, Black or Mexican American (race/ethnic groups such as Asians, Native Alaskans [n=379; 4% of subjects aged ≥20 years old] and non-Mexican-American Hispanics [n=187; 2% of subjects aged ≥20 years old]); underweight subjects (n=107 [1 % of subjects aged ≥20 years old]), subjects who had Primary Sampling Unit and Stratum variable combinations from which the variance contribution for the sampling design could not be estimated (n=12 [0.1% of subjects aged ≥20 years old]); and those who had missing values for other

variables used in the present study (n=2,869; n=0 for gender, n=0 for race/ethnicity, n=10 for education, n=0 for age, n=0 for income, n=340 for marital status, n=581 for smoking, n=9 for hrs of TV watching and use of a computer, n=1,286 for alcohol intakes, n=7 for non-leisure activity, n=272 for eating restaurant food, n=70 for energy intake, n=75 for the number of eating occasions, n=515 for leisure-time activity, n=334 for breastfeeding experiences, n=217 for the number of live births, n=335 for age at first menarche, n=0 for weight status, n=18 for perceived weight status, n=287 for accuracy of self-reported weight status, n=10 for desired weight status, n=704 for attempt to lose weight, n=7 for attempt not to gain weight, n=75 for breakfast consumption, n=71 for fat intake), leaving the final sample of 4,016 (Figure 2b).

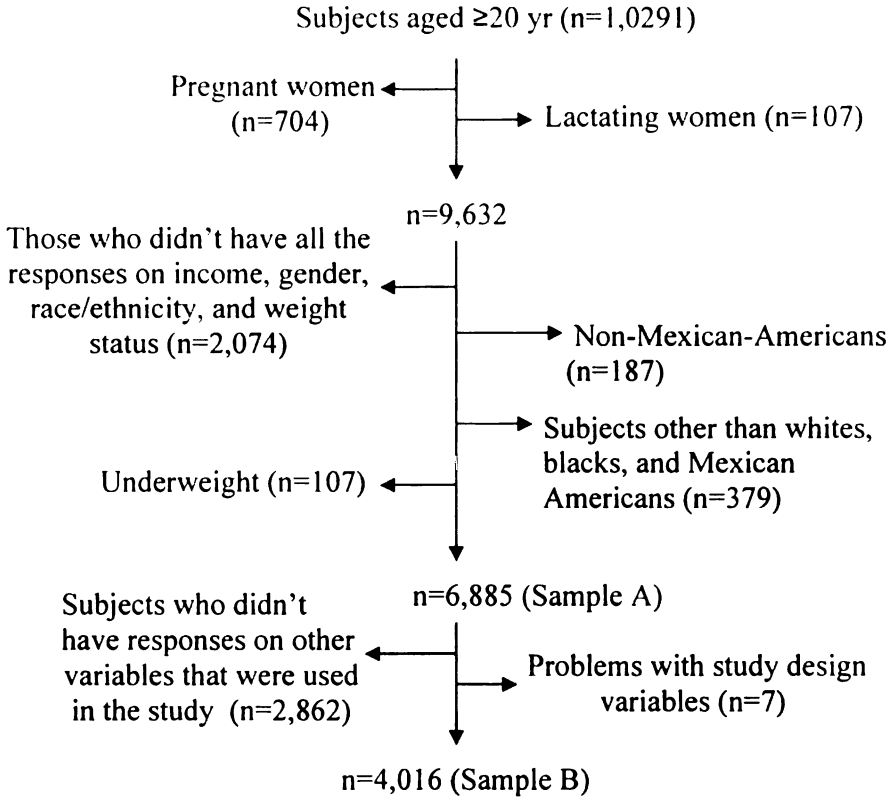


Figure 2b. Changes in the sample size (NHANES 1999-2002)

Non-Mexican American Hispanics were excluded because of their small sample size to generalize to the U.S. population (CDC, 1999-2000, 2001-2002). Underweight subjects (BMI<18.5) were excluded since their characteristics were different from that of normal weight subjects (18.5≤BMI<25). For example, compared to normal weight subjects, underweight subjects had a higher percent of women (74.6 vs. 54.4%), subjects with less than high school education (26.9 vs. 16.6%), younger adults (aged 20-29 years old: 34.4 vs. 23.3%), low-and middle-income subjects (72 vs. 53.3%), subjects who were widowed, divorced, or separated (30.1 vs. 17.1%), subjects who did not participate in any leisure time activity (38.0 vs. 27.6%), subjects who wanted to weigh more (59.5 vs. 14.0%), subjects who ate ≥ 7 times/day (27.6 vs. 17.3%), and subjects who had restaurant food less than weekly (36.0 vs. 21.8%). Underweight subjects also had a lower percent of women who breastfed their child (32.5 vs. 48.5%), who had their first menarche at ≤ 11 years old (4.8 vs. 14.1%), and energy intake under-reporters (4.8 vs. 13.3%) than normal weight subjects (Appendix 1).

Interestingly, different results appeared when subjects were categorized by gender (Appendix 2). For example, underweight men had a higher percent of black subjects than normal weight men (27.4 vs. 13.0%), while it was not the case in women (3.8 vs. 7.4%, respectively). In women, underweight women had a higher percent of white subjects than normal weight women (93.3 vs. 87.7%), while it was opposite in men (69.2 vs. 78.5%, respectively). While underweight men had a lower percent of smokers than normal weight men (32.3 vs. 39.8%), it was opposite in women (38.5 vs. 25.7%, respectively). Underweight men had a lower percent of those who watched TV or used computers for ≤ 1 hour than normal weight men (20.1 vs. 30.4%), while it was opposite

in women (48.9 vs. 40.1%, respectively). Underweight men had a higher percent of those who assessed their weight status correctly than normal weight men (80.2 vs. 73.9%), while it was opposite in women (54.3 vs. 61.6%), respectively. Underweight women had a higher percent of energy intake adequate reporters than normal weight women (87.1 vs. 79.9%), while it was opposite in men (74.6 vs. 77.4%, respectively).

CONSTRUCTION OF VARIABLES

Variables of interest: The BMI was calculated based on measured weight and height in the NHANES 1988-94 and 1999-2002. Subjects' weight status was determined based on the BMI as: normal weight ($18.5 \leq BMI < 25$), overweight ($25 \leq BMI < 30$), and obese ($BMI \geq 30$). In case for the BMI to be used as a continuous outcome variable rather than categorical outcome variable, the BMI was log-transformed because it did not have a normal distribution. The distribution improved after log-transformation (became more symmetric).

Variables examined in relation to subjects' weight status were sociodemographic variables (gender, age, education, income, race/ethnicity, marital status), lifestyle variables (smoking, hours of TV watching or computer use [only for the NHANES 1999-2002], alcohol consumption, non-leisure time activity [only for the NHANES 1999-2002], leisure-time activity), dietary behaviors (breakfast consumption, fat intake, total energy intake, number of eating occasions, use of restaurant food), weight related psychosocial variables and behaviors (perceived weight status, desired weight status, attempt to lose weight, attempt not to lose weight [only for the NHANES 1999-2002]), and reproductive variables (number of live births, breastfeeding experiences, age at first menarche).

Based on the weighted frequency distribution of these variables, these variables were either log-transformed (energy intake and alcohol intakes) or re-defined as ordinal categories: hours of TV watching or computer use (1=≤ 1 hr/day, 2=2-3 hrs/day, 3=≥4 hrs [only in the NHANES 1999-2002]), non-leisure time activity (1=sitting mainly, 2=walking a lot, 3=carrying light or heavy loads [only in the NHANES 1999-2002]), leisure time activity (1=no activity in the past month, 2= first quintile after excluding subjects with no activity, 3= second quintile, 4=third quintile, 5=fourth quintile, and 6= fifth quintile), fat intake (1=≤ 30% of total energy from fat, 2=> 30 % of total energy from fat), number of eating occasions (1=≤ 3 times/day, 2=4 times/day, 3=5 times/day, 4=6 times/day, 5=7+ times/day), use of restaurant food (1=< 1 time/wk, 2=1 time/week, 3=2-3 times/week, 4=4+ times/week in the NHANES 1999-2002; 1=non-consumers and 2=consumers in the NHANES 1988-94), breakfast consumption (1=no, 2=yes), perceived weight status (1=underweight, 2=about right, 3=overweight), desired weight status (1=want to weigh more, 2=want to stay the same, 3=want to weigh less), attempt to lose weight (1=no, 2=yes), attempt not to gain weight (1=no, 2=yes [only in the NHANES 1999-2002]), smoking (1=non-smoker, 2=smoker), number of live births (1=0 or never been pregnant, 2=1, 3=2, 4=3, 5=4, 6=5+), and age at first menarche (1=≤ 11 yrs, 2=12-15 yrs, 3=16+ yrs).

Subjects were asked frequency of alcohol consumptions per week (ranging 0 to 14 times [mean: 1±0.1 times] in the NHANES 1999-2002; 0 to 7 times [mean: 1±0.1 times] in the NHANES 1988-94[1]) and the average number of drinks per day when they drank (ranging 0 to 36 drinks [mean: 2±0.1 drinks] in the NHANES 1999-2002; 0 to 90 drinks

[1] Unlike the NHANES 1999-2002, the NHANES 1988-94 did not include the response of "0 drink/week". Thus, those who did not drink at least 12 drinks in the past year (MAPE2) were considered as "0 drink/week".

[mean: 2±0.1 drinks] in the NHANES 1988-94). The present study constructed an alcohol intake variable as a sum product of these two variables (ranging 0 to 166 drinks/week [mean: 4±0.1 drinks] in the NHANES 1999-2002; 0 to 360 drinks/week [mean: 4±0.2 drinks] in the NHANES 1988-94). Since weighted frequency distribution of an alcohol intake variable was not normal, log-transformation was applied. However, due to the large number of subjects who never drank over past 12 months (18.8% of the subjects in the NHANES 1999-2002; 37.2% in the NHANES 1988-94), log-transformation did not improve the distribution. When this variable was re-defined as ordinal categories, the number of subjects in each subcategory was not comparable between men and women; a larger number of subjects belonged to the higher subcategories in men than in women because men tend to drink larger amount than women, while a larger number of subjects belonged to the lower subcategories in women than in men because women tend to drink smaller amount than men. To make alcohol intake comparisons among the subpopulation groups, including gender subpopulation groups, the number of subjects needs to be evenly distributed across subcategories. Furthermore, we found that re-defining an alcohol intake variable into an ordinal category interfered with constructing the variables that are distinct and are not highly correlated to one another (see the later section on "creating the variables that are distinct and are not highly correlated to one another"). Thus, we decided to use an alcohol intake variable as a log-transformed continuous variable.

In the NHANES 1999-2002, subjects were asked the type (e.g. swimming, running) and frequency of moderate/vigorous leisure-time activity they had participated over the past 30 days (ranging 0 to 420 times in the NHANES 1999-2002). Intensity of

these activities was calculated, using a metabolic equivalent (MET) score (ranging 0 to 124). One MET or metabolic equipment is equivalent to the oxygen consumption required at rest or approximately 1 kcal/kg per hour. Based on these information, the present study constructed a leisure time activity variable as a sum product of intensity and frequency of these activities (ranging from 0 to 2,532) and re-defined as ordinal categories as described earlier (1=no activity in the past month, 2= first quintile after excluding those who had never engaged in any leisure-time activity [MET $\leq$ 29.5], 3= second quintile after excluding those who had never engaged in any leisure-time activity [29.5< MET $\leq$ 64] , 4=third quintile after excluding those who had never engaged in any leisure-time activity [64 < MET $\leq$116.5], 5=fourth quintile after excluding those who had never engaged in any leisure-time activity [116.5 < MET $\leq$ 223.5], and 6= fifth quintile after excluding those who had never engaged in any leisure-time activity [223.5 < MET]). These activity cut points were applied to the NHANES 1988-94 to subcategorize subjects so that the two datasets became comparable. The total leisure-time activity level ranged from 0 to 1,625 in the NHANES 1988-94.

The rest of variables were used as categorical variables: gender (1=male, 2=female), age (1=20-29 yrs, 2=30-39 yrs, 3=40-49 yrs, 4=50-59 yrs, 5=60+ yrs), education (1=< high school, 2=high school graduate, 3=> high school), income (1=Poverty Income Ratio [PIR]$\leq$ 1.85, 2=1.86$\leq$ PIR$\leq$ 3.5, 3=PIR> 3.5), race/ethnicity (1=white, 2=black, 3=Mexican-American), marital status (1=married, 2=divorced, separated, or widowed, 3=never married or living with a partner), breastfeeding

experiences (1=no, 2=yes, 3=never been pregnant)[2], accuracy of self-reported weight status (1=over-assessor, 2=adequate assessor, 3=under-assessor), and energy intake reporting status (1=under-reporter, 2=adequate reporter, 3=over-reporter).

Energy intake reporting status: Self-reported dietary intake data tend to be biased by those who intentionally or unintentionally report their intakes inaccurately. Thus, a new variable was constructed to recognize the potential source of bias in our results. Individuals whose reported energy intake was below 90% of the Basic Metabolic Rate (BMR) were labeled as under-reporters (Goldberg et al., 1991; Briefel et al., 1997), while individuals whose reported energy intake was over 240% of the BMR were labeled as over-reporters (Black et al., 1996; Briefel et al., 1997; Johansson et al., 1998). Subjects whose reported energy intake was between these two values were labeled as adequate reporters. BMR was calculated based on subjects' weight, age, and gender by Schofield (1985):

For adults 20-30 yr
Male BMR= 0.063 wt (kg) + 2.896
Female BMR= 0.062 wt + 2.036

For adults 30-60 yr
Male BMR=0.048 wt + 3.653
Female BMR= 0.034 wt + 3.538

Over 60 yr
Male BMR=0.049 wt + 2.459
Female BMR=0.038 wt + 2.755

[2] This variable was initially re-defined as two ordinal categories (never been pregnant and breastfeeding experience) with dichotomous responses (1=no, 2=yes). However, these ordinal categories did not construct variables that are distinct and not highly correlated to other variables (see the section, "Constructing variables that are distinct and not highly correlated to other variables". Thus, the present study used this variable as a categorical variable.

This variable was used to develop two datasets (one which included every subject and one which included energy intake adequate reporters only), and results were compared.

Differences in the variables between the two datasets used in the present study:

Although the questionnaire format was very similar between the NHANES 1988-94 and NHANES 1999-2002, some variables were not comparable between the two datasets. For example, questions on the number of hours watching TV or using a computer for recreational purposes, non-leisure activity, and attempt not to gain weight were included in the NHANES 1999-2002, but not in the NHANES 1988-94 (Table 1). These variables were, therefore, excluded when comparing predictors among the subpopulation groups between the NHANES 1988-94 and 1999-2002 (Objective 3).

The NHANES 1999-2002 asked about the frequency of eating restaurant food, based on which an ordinal category was constructed as described earlier (1=< 1 time/wk, 2=1 time/wk, 3=2-3 times/wk, and 4= $\geq$ 4 times/wk). This question, however, was not used in the NHANES 1988-94, although participants were asked a source of food they reported in the 24 hr recall. Thus, the present study constructed a binary variable (1=non-consumer, 2=consumer), if participants reported at least one food item from a restaurant. There was no reasonable rationale based on which the ordinal category variable on eating restaurant food in the NHANES 1999-2002 can be re-defined as a binary variable. Thus, no further changes were made on the eating restaurant food variable when comparing the two datasets, although the format differed between the two datasets.

In the NHANES 1999-2002, respondents were asked to provide frequency of leisure time activities they participated in the past month from the list of 61 activities. In the NHANES 1988-94, respondents were asked about only 8 activities, although

Table 1. Comparisons of the variable format used in the present study between NHANES 1988-94 and NHANES 1999-2002

Variables	NHANES 1988-94	NHANES 1999-2002
Age		Identical
Gender		Identical
Income		Identical
Race/ethnicity		Identical
Education		Identical
Marital status		Identical
Smoking status		Identical
Breakfast consumption		Identical
Number of eating occasions		Identical
Leisure-time activity[1]	Categorized into 5 groups, using the same cutpoint as NHANES 1999-2002[1]	1=No activities, 2=1st quintile, 3=2nd quintile, 4=3rd quintile, 5=4th quintile, 6=5th quintile
Non-leisure time activity	Not available	1=Sitting, 2=Walking a lot, 3=Carrying light or heavy loads)
Hrs of TV watching or use of a computer	Not available	1= ≤1hr/d, 2=2-3 hrs/d, 3=≥4 hrs/d
Eating restaurant food[2]	Based on a 24 hr recall (1=Non-consumer, 2=Consumer)	Based on the question that reflects usual behaviors (1=< 1 time/wk, 2=1 time/wk, 3=2-3 times/wk, 4=≥4 times/wk)
Fat intake		Identical
Alcohol intake		Identical
Energy intake		Identical
Perceived weight status		Identical
Desired weight status		Identical
Attempt to lose weight		Identical
Attempt not to gain weight	Not available	1=No, 2=Yes
Breastfeeding experience		Identical
Number of live births		Identical
Age at the first menarche		Identical

[1] Respondents in 1999-2002 answered frequency of leisure-time activity they participated in the past 30 days, given a list of 61activities, while those in 1988-94 were questioned about only 8 activities, although they were further asked to provide frequency of other activities, if there was any.

[2] The information on the type of restaurant was not provided in the NHANES 1999-2002, while restaurant food in the NHANES 1988-94 includes both fast food and non-fast food restaurant food.

respondents in the NHANES 1988-94 were further asked to provide frequency of other leisure time activities, if there were any.

Constructing variables that are distinct and not highly correlated to other variables:

To construct variables that are distinct and not highly correlated to one another, principal component analysis was conducted among modifiable variables that were suggested to associate with the risk of obesity in the literature (i.e. life styles, dietary behaviors, psychosocial variables, and reproductive variables).

The number of variables of interest in the present study was large. With so many different variables, it is difficult to understand how these variables are associated with one another. In addition, there is often substantial redundancy among the information these variables carry. Principal component analysis is a method to re-express multivariate data. It allows researchers to re-organize the data so that the first few dimensions explain as much information the original variables carry as possible as measured in the variance. If there is substantial redundancy in the original variables, it may be possible to account for most of the information in the original variables with a relatively small number of components.

Factor analysis is another method commonly used for the data reduction. However, there is a distinction between factor analysis and principal component analysis. Factor analysis is concerned with identifying common characteristics among the original variables. Thus, it is assumed that the variation of the original variables is attributable to the underlying common factors and to a specific factor. Principal component analysis, on the other hand, is concerned with re-expressing the original data. Thus, there are no

underlying common factors, and each principal component is an exact linear combination of the original variables (Lattin et al., 2003).

Principal component analysis was conducted based on the assumption that there are common components among the subpopulation groups. However, the score, which was calculated based on the common principal components, was expected to differ among the subpopulation groups. Since reproductive variables apply to only women, principal component analysis was conducted separately for men and women in the NHANES 1999-2002. To account for the complex survey design, pooled correlation matrix between modifiable variables was calculated first. Components, of which eigenvalues (variance of the components) were 1 and above, were extracted and the component loading, which was the correlation between components and original variables (transformed into the ordinal category in the present study). Only variables with component loading ≥ 0.4 were used to construct components. To increase interpretability of the loadings, the varimax rotation method was used. These procedures were repeated by including or excluding original variables until common components were extracted between men and women.

In men, four components were extracted (Table 2a). The first component was constructed with three variables on perceived weight status (factor loading=0.85), desired weight status (factor loading=0.84), and fat intake (factor loading=0.40). The second component was constructed with three variables on attempt to lose weight (factor loading=0.77) and attempt not to gain weight (factor loading=0.78), and fat intake (factor loading=-0.41). The third component was constructed with three variables on smoking status (factor loading=-0.58), breakfast consumption (factor loading=0.77), and number

Table 2a. Final structure of components extracted from the principal component analysis (Men in the NHANES 1999-2002)[1]

Variables	C1	C2	C3	C4
Smokers (1=no, 2=yes)	-0.26	-0.03	-0.58	-0.02
Perceived weight status (1=underweight, 2=about right, 3=overweight)	0.85	0.28	0.07	-0.01
Desired weight change (1=weigh more, 2=stay same, 3=weigh less)	0.84	0.32	0.08	-0.01
Tried to lose weight in the past year (1=no, 2=yes)	0.30	0.77	0.05	0.05
Tried not to gain weight in the past year (1=no, 2=yes)	0.24	0.78	0.10	0.06
Breakfast consumer (1=no, 2=yes)	0.09	-0.05	0.77	-0.09
Frequency of eating restaurant food (1=<1 time/wk, 2=1 time/wk, 3=2-3 times/wk, 4=≥ 4 times/wk)	-0.12	0.18	0.00	0.86
Fat intake (1=≤30% of energy from fat, 2=>30% of energy from fat)	0.40	-0.41	0.03	0.53
Number of eating occasions (1=≤3 times/d, 2=4 times/d, 3=5 times/d, 4=6 times/d, 5=≥ 7times/d)	-0.23	0.19	0.66	0.10
Variance explained by each factor	1.89	1.62	1.38	1.06

[1]Highlighted were ordinal categories with the factor loadings ≥0.40

C1-4: Component 1 to 4.

of eating occasions (factor loading=0.66). The fourth component was constructed with two variables on frequency of eating restaurant foods (factor loading=0.86) and fat intake (factor loading=0.53). Thus, fat intake loaded on more than one component.

In women, four components were extracted (Table 2b). The first component was constructed with two variables on perceived weight status (factor loading=0.91) and desired weight status (factor loading=0.88). The second component was constructed with three variables on attempt to lose weight (factor loading=0.75), attempt not to gain weight (factor loading=0.81), and fat intake (factor loading=-0.45). The third component was constructed with three variables on smoking status (factor loading=-0.58), breakfast consumption (factor loading=0.77), and number of eating occasions (factor loading=0.60). The fourth component was constructed with two variables on frequency of eating restaurant food (factor loading=0.81) and fat intake (factor loading=0.56). Again, fat intake loaded on more than one component. However, factor loading of fat intake was highest when fat intake was a construct of the fourth component for both men and women. Thus, four common components were constructed between men and women: first component with two variables on perceived weight status and desired weight status; second component with two variables on attempt to lose weight and attempt not to gain weight; third component with three variables on smoking status, breakfast consumption, and number of eating occasions; fourth component with two variables on frequency of eating restaurant food and fat intake.

Once the final components were determined, a component score for these components was calculated for each subject by summing subjects' responses to the ordinal categories that constructed components. The structure of these components was

Table 2b. Final structure of components extracted from the principal component analysis (Women in the NHANES 1999-2002)[1]

Variables	C1	C2	C3	C4
Smokers (1=no, 2=yes)	-0.13	-0.04	-0.58	0.17
Perceived weight status (1=underweight, 2=about right, 3=overweight)	0.91	0.17	0.00	0.01
Desired weight change (1=weigh more, 2=stay same, 3=weigh less)	0.88	0.25	0.02	0.02
Tried to lose weight in the past year (1=no, 2=yes)	0.34	0.75	0.01	0.08
Tried not to gain weight in the past year (1=no, 2=yes)	0.19	0.81	0.09	0.06
Breakfast consumer (1=no, 2=yes)	-0.03	-0.02	0.77	-0.05
Frequency of eating restaurant food (1=<1 time/wk, 2=1 time/wk, 3=2-3 times/wk, 4=≥ 4 times/wk)	-0.06	0.20	-0.06	0.81
Fat intake (1=≤30% of energy from fat, 2=>30% of energy from fat)	0.29	-0.45	0.02	0.56
Number of eating occasions (1=≤3 times/d, 2=4 times/d, 3=5 times/d, 4=6 times/d, 5=≥ 7times/d)	-0.10	0.09	0.60	0.30
Variance explained by each factor	1.87	1.56	1.30	1.11

[1]Highlighted were ordinal categories with the factor loadings ≥0.40

C1-4: Component 1 to 4.

then examined through three types of correlations. The first correlation was between components. Since each component should not be highly correlated to one another, low correlation was expected. Correlations between components were from small to moderate (r=0.03-0.41 in men; r=0.02-0.40 in women, respectively) (Table 3a for men and Table 3b for women, respectively). The second correlation was between a component and ordinal categories that constructed a component. The correlation between a component and ordinal categories that constructed a component was higher than that between a component and ordinal categories that did not construct a component (Table 3a for men and Table 3b for women, respectively). The third correlation was between ordinal categories that constructed a component. This measures internal consistency of a component and should be moderate to high. Internal consistency for the first and second components was high (r=0.83 and 0.59 in men; r=0.81 and 0.56 in women, respectively), while it was low for the third and fourth components (r=[0.22+0.14+0.22]/3=0.19 and 0.06 in men; r=[0.19+0.10+0.19]/3=0.16 and 0.09 in women, respectively) (Table 3a for men and Table 3b for women, respectively). Based on these correlations, it was concluded that the first and second components had adequate structures, while third and fourth components did not. Therefore, 17 original variables in the NHANES 1999-2002 were reduced to 15 variables that are distinct and with less correlations among them, which included two components (component 1 on desired weight status [consisting of two variables on perceived weight status and desired weight status] and component 2 on an attempt to lose weight [consisting of two variables on attempt to lose weight and attempt not to gain weight).

Table 3a. Correlations between components and ordinal categories (Men in the NHANES 1999-2002)

	C1	C2	C3	C4	perceived wt status	desired wt	try to lose wt	not to gain wt	smoking	breakfas	# of eating occasion	restaurant food	fat	TV	alcohol	non-leisure activity
C1	1.00	0.41	0.11	0.05	0.95	0.96	0.39	0.35	-0.20	0.10	0.04	0.03	0.06	0.02	-0.06	-0.09
C2		1.00	0.13	0.03	0.37	0.42	0.88	0.90	-0.17	0.11	0.07	0.03	0.00	0.01	-0.04	-0.10
C3			1.00	0.03	0.10	0.12	0.09	0.14	-0.45	0.49	0.91	0.05	-0.03	-0.12	-0.10	-0.07
C4				1.00	0.05	0.04	0.03	0.02	-0.04	-0.01	0.03	0.92	0.45	-0.04	0.01	-0.02
perceived wt status					1.00	0.83	0.36	0.31	-0.19	0.10	0.02	0.03	0.05	0.03	-0.06	-0.07
desired wt						1.00	0.39	0.35	-0.19	0.09	0.05	0.02	0.05	0.02	-0.05	-0.10
try to lose wt							1.00	0.59	-0.14	0.09	0.04	0.03	0.00	-0.01	-0.05	-0.07
not to gain wt								1.00	-0.17	0.10	0.09	0.02	0.00	0.02	-0.03	-0.10
smoking									1.00	-0.22	-0.14	-0.03	-0.04	0.13	0.26	0.14
breakfas										1.00	0.22	-0.03	0.03	-0.05	-0.13	-0.06
# of eating occasion											1.00	0.06	-0.06	-0.08	0.00	-0.03
restaurant food												1.00	0.06	-0.06	0.07	0.01
fat													1.00	0.03	-0.12	-0.07
TV														1.00	0.03	-0.04
alcohol															1.00	0.12
non-leisure activity																1.00
leisure activity																
energy																
BMI																

Table 3a (cont'd)

	leisure activity	energy	BMI
C1	0.00	-0.07	0.68
C2	0.23	-0.13	0.34
C3	0.17	0.23	0.07
C4	0.06	0.17	0.03
perceived wt status	0.00	-0.07	0.66
desired wt	0.00	-0.06	0.64
try to lose wt	0.19	-0.11	0.34
not to gain wt	0.23	-0.12	0.27
smoking	-0.16	0.06	-0.17
breakfas	0.13	0.08	0.06
# of eating occasion	0.11	0.28	0.01
restaurant food	0.09	0.14	0.00
fat	-0.04	0.11	0.07
TV	-0.14	-0.02	0.08
alcohol	0.03	0.13	-0.08
non-leisure activity	0.05	0.14	-0.09
leisure activity	1.00	0.02	-0.06
energy		1.00	-0.01
BMI			1.00

Footnote

Highlighted were statistically significant.

C1= responses to the ordinal categories about perceived weight status + desired weight status

C2= responses to the ordinal categories about attempt to lose weight + attempt not to gain weight

C3= responses to the ordinal categories about smoking + breakfast consumption + number of eating occasions

C4= responses to the ordinal categories about frequency of eating restaurant food + fat intake

Table 3b. Correlations between components and ordinal categories (Women in the NHANES 1999-2002)

	C1	C2	C3	C4	perceived wt status	desired wt	try to lose wt	not to gain wt	smoking	breakfas	# of eating occasion	restaurant food	fat	TV	alcohol
C1	1.00	0.40	0.03	0.07	0.95	0.95	0.40	0.30	-0.10	-0.01	0.01	0.07	0.02	0.07	-0.03
C2		1.00	0.08	0.03	0.36	0.39	0.88	0.88	-0.13	0.04	0.04	0.06	-0.07	0.02	0.04
C3			1.00	0.02	0.02	0.04	0.05	0.09	-0.40	0.46	0.92	0.01	0.02	-0.09	-0.02
C4				1.00	0.06	0.08	0.04	0.01	0.00	-0.04	0.03	0.92	0.48	-0.04	0.03
perceived wt status					1.00	0.81	0.38	0.26	-0.08	-0.01	0.00	0.06	0.04	0.08	-0.04
desired wt						1.00	0.38	0.31	-0.11	-0.01	0.02	0.09	0.00	0.05	-0.02
try to lose wt							1.00	0.56	-0.08	0.02	0.03	0.06	-0.04	0.03	0.04
not to gain wt								1.00	-0.15	0.06	0.04	0.05	-0.08	0.00	0.03
smoking									1.00	-0.19	-0.10	-0.01	0.02	0.10	0.18
breakfas										1.00	0.19	-0.04	-0.01	-0.10	-0.02
# of eating occasion											1.00	0.02	0.03	-0.05	0.04
restaurant food												1.00	0.09	-0.05	0.06
fat													1.00	0.00	-0.06
TV														1.00	0.02
alcohol															1.00
non-leisure activity															
leisure activity															
energy															
not breastfed															
never been pregnant															
# of live births															
age at first mens															
BMI															

Table 3b (cont'd)

	non-leisure activity	leisure activity	energy	not breastfed	never been pregnant	# of live births	age at first menarche	BMI
C1	-0.02	-0.03	0.03	0.00	0.01	0.01	-0.11	0.56
C2	0.04	0.22	-0.01	-0.05	0.06	-0.09	-0.06	0.26
C3	0.03	0.09	0.22	-0.05	-0.02	0.01	0.01	-0.05
C4	-0.10	0.03	0.15	0.00	0.10	-0.15	-0.07	0.05
perceived wt status	-0.04	-0.07	0.04	0.01	-0.01	0.03	-0.12	0.57
desired wt	0.00	0.01	0.02	0.00	0.03	-0.01	-0.09	0.49
try to lose wt	0.00	0.14	0.00	-0.05	0.05	-0.07	-0.04	0.28
not to gain wt	0.07	0.25	-0.02	-0.04	0.05	-0.08	-0.06	0.19
smoking	-0.02	-0.10	0.04	0.11	0.01	-0.03	0.02	-0.11
breakfas	0.06	0.06	0.06	0.00	-0.05	0.07	0.02	-0.07
# of eating occasion	0.01	0.05	0.25	-0.02	0.00	-0.02	0.02	-0.07
restaurant food	-0.06	0.06	0.14	-0.02	0.12	-0.18	-0.06	0.02
fat	-0.11	-0.07	0.08	0.05	-0.01	0.02	-0.04	0.08
TV	-0.12	-0.18	-0.03	0.10	0.01	0.05	-0.06	0.19
alcohol	0.03	0.14	0.09	-0.03	0.17	-0.22	0.02	-0.15
non-leisure activity	1.00	0.17	0.07	-0.05	-0.02	0.03	0.01	-0.12
leisure activity		1.00	0.03	-0.13	0.11	-0.16	0.00	-0.22
energy			1.00	-0.06	0.09	-0.10	-0.10	0.00
not breastfed				1.00	-0.32	0.15	-0.01	0.03
never been pregnant					1.00	-0.65	-0.03	-0.02
# of live births						1.00	0.01	0.13
age at first mens							1.00	-0.20
BMI								1.00

Footnote

Highlighted were statistically significant.

C1= responses to the ordinal categories about perceived weight status + desired weight status

C2= responses to the ordinal categories about attempt to lose weight + attempt not to gain weight

C3= responses to the ordinal categories about smoking + breakfast consumption + number of eating occasions

C4= responses to the ordinal categories about frequency of eating restaurant food + fat intake

The same procedures were used in the NHANES 1988-94 without three variables (number of hours watching TV or using a computer for recreational purposes, non-leisure activity, and attempt not to gain weight) that were not available in the NHANES 1988-94. One component on an attempt to lose weight (consisting of three variables on perceived weight status, desired weight status, and attempt to lose weight) had an adequate structure (Table 4a-b and Table 5a-b). Thus, the number of original variables in the NHANES 1988-94 was reduced from 14 to 13.

To compare the NHANES 1988-94 with NHANES 1999-2002, these datasets should have the same sets of variables. Principal component analysis was conducted in the NHANE 1999-2002, using only variables that were available in the NHANES 1988-94. The same component as the one extracted from the NHANES 1988-94 (an attempt to lose weight component consisting of three variables on perceived weight status, desired weight status, and attempt to lose weight) was obtained in NHANES 1999-2002 (Table 6a-b and Table7a-b).

STATISTICAL ANALYSES

Statistical software: Since NHANES collected the sample subjects by a stratified, multistage area probability sampling method, traditional statistical analyses based on the assumption of simple random sampling were not applicable. Thus, SAS Callable SUDAAN (Shah, 2001) software (version 9.1) was used for the data preparation and statistical analyses. Sample weight was applied to all the analyses to obtain national estimates of prevalence, while adjusting for the biases from unequal probability of selection, non-coverage, and non-responses. Study design variables were also applied to all the analyses to estimate the accurate variance. In SAS Callable SUDAAN, Taylor

Table 4a. Final structure of components extracted from the principal component analysis (Men in the NHANES 1988-94)[1]

Variables	C1	C2	C3	C4
Smokers (1=no, 2=yes)	-0.19	0.75	0.07	0.27
Perceived weight status (1=underweight, 2=about right, 3=overweight)	0.89	0.03	0.04	0.01
Desired weight change (1=weigh more, 2=stay same, 3=weigh less)	0.90	-0.02	0.05	0.02
Tried to lose weight in the past year (1=no, 2=yes)	0.68	-0.12	0.01	0.01
Breakfast consumer (1=no, 2=yes)	-0.08	-0.72	0.12	0.37
Frequency of eating restaurant food (1=Non-consumer, 2=Consumer)	0.08	-0.19	0.70	-0.02
Fat intake (1=≤30% of energy from fat, 2=>30% of energy from fat)	-0.01	0.16	0.77	-0.00
Number of eating occasions (1=≤3 times/d, 2=4 times/d, 3=5 times/d, 4=6 times/d, 5=≥ 7times/d)	0.06	0.00	-0.04	0.92
Variance explained by each factor	2.13	1.16	1.10	1.06

[1]Highlighted were ordinal categories with the factor loadings ≥0.40

C1-4: Component 1 to 4.

Table 4b. Final structure of components extracted from the principal component analysis (Women in the NHANES 1988-94)[1]

Variables	C1	C2	C3	C4
Smokers (1=no, 2=yes)	-0.02	0.02	0.03	0.89
Perceived weight status (1=underweight, 2=about right, 3=overweight)	0.88	0.02	0.01	0.03
Desired weight change (1=weigh more, 2=stay same, 3=weigh less)	0.90	0.00	0.00	0.02
Tried to lose weight in the past year (1=no, 2=yes)	0.70	-0.01	0.02	-0.06
Breakfast consumer (1=no, 2=yes)	-0.04	0.70	0.00	-0.41
Frequency of eating restaurant food (1=Non-consumer, 2=Consumer)	0.04	-0.01	0.76	-0.16
Fat intake (1=≤30% of energy from fat, 2=>30% of energy from fat)	-0.01	0.01	0.71	0.19
Number of eating occasions (1=≤3 times/d, 2=4 times/d, 3=5 times/d, 4=6 times/d, 5=≥ 7times/d)	0.04	0.81	-0.00	0.26
Variance explained by each factor	2.06	1.15	1.09	1.09

[1]Highlighted were ordinal categories with the factor loadings ≥0.40
C1-4: Component 1 to 4.

Table 5a. Correlations between components and ordinal categories (Men in the NHANES 1988-94)

	C1	C2	perceived wt status	desired wt	try to lose wt	smoking	breakfas	# of eating occasion	restaurant food	fat	alcohol	leisure activity	energy	BMI
C1	1.00	0.06	0.89	0.91	0.69	-0.17	-0.02	0.03	0.09	0.00	-0.12	0.00	-0.10	0.64
C2		1.00	0.04	0.07	0.03	-0.04	0.09	-0.04	0.71	0.75	-0.08	0.01	0.18	0.06
perceived wt status			1.00	0.76	0.43	-0.11	-0.04	0.01	0.07	0.00	-0.09	-0.02	-0.07	0.61
desired wt				1.00	0.43	-0.17	-0.02	0.04	0.09	0.01	-0.09	-0.03	-0.10	0.61
try to lose wt					1.00	-0.16	0.03	0.04	0.07	-0.02	-0.12	0.07	-0.07	0.36
smoking						1.00	-0.12	0.00	-0.06	0.00	0.20	-0.12	0.04	-0.19
breakfas							1.00	0.14	0.10	0.03	-0.09	0.00	0.04	-0.04
# of eating occasion								1.00	-0.02	-0.04	-0.01	-0.02	0.26	-0.05
restaurant food									1.00	0.07	-0.02	0.05	0.08	0.07
fat										1.00	-0.08	-0.02	0.17	0.02
alcohol											1.00	-0.02	0.10	-0.10
leisure activity												1.00	-0.03	-0.05
energy													1.00	-0.05
BMI														1.00

Highlighted were statistically significant.

C1= responses to the ordinal categories about perceived weight status + desired weight status + attempt to lose weight

C2= responses to the ordinal categories about eating restauracnt food + fat intake

Table 5b. Correlations between components and ordinal categories (Women in the NHANES 1988-94)

	C1	C2	perceived wt status	desired wt	try to lose wt	smoking	breakfas	# of eating occasion	restaurant food	fat	alcohol	leisure activity	energy
C1	1.00	0.01	0.85	0.86	0.72	-0.02	0.00	0.00	0.07	-0.04	-0.03	-0.02	-0.10
C2		1.00	0.02	0.01	0.01	0.00	0.00	-0.01	0.70	0.77	-0.08	-0.04	0.30
perceived wt status			1.00	0.69	0.34	-0.01	0.01	0.01	0.05	-0.02	-0.04	-0.11	-0.10
desired wt				1.00	0.40	0.00	-0.03	-0.03	0.04	-0.03	0.01	0.01	-0.08
try to lose wt					1.00	-0.04	0.03	0.02	0.07	-0.05	-0.04	0.06	-0.05
smoking						1.00	-0.13	-0.05	-0.03	0.03	0.10	-0.05	0.03
breakfas							1.00	0.20	0.00	0.00	0.00	0.04	0.11
# of eating occasion								1.00	-0.01	-0.01	0.04	0.06	0.25
restaurant food									1.00	0.08	-0.02	0.05	0.17
fat										1.00	-0.10	-0.10	0.26
alcohol											1.00	0.01	0.09
leisure activity												1.00	-0.02
energy													1.00
not breastfed													
never been pregnant													
# of live births													
age at first mens													
BMI													

Table 5b (cont'd)

	not breastfed	never been pregnant	# of live births	age at first menarche	BMI
C1	0.06	-0.07	0.05	-0.07	0.51
C2	-0.01	0.03	-0.05	-0.02	-0.01
perceived wt status	0.07	-0.10	0.09	-0.07	0.57
desired wt	0.00	-0.02	0.04	-0.06	0.42
try to lose wt	0.07	-0.05	-0.01	-0.04	0.24
smoking	0.10	-0.04	0.00	-0.03	-0.03
breakfas	0.02	-0.09	0.10	0.06	0.01
# of eating occasion	0.04	-0.03	0.03	0.03	-0.08
restaurant food	-0.04	0.06	-0.06	-0.04	-0.02
fat	0.02	-0.02	-0.01	0.02	0.01
alcohol	0.06	0.08	-0.06	0.05	-0.03
leisure activity	-0.12	0.08	-0.06	0.00	-0.18
energy	-0.04	0.09	-0.06	0.03	-0.06
not breastfed	1.00	-0.43	0.28	-0.03	0.11
never been pregnant		1.00	-0.72	0.04	-0.14
# of live births			1.00	0.02	0.18
age at first mens				1.00	-0.09
BMI					1.00

Footnote

Highlighted were statistically significant.

C1= responses to the ordinal categories about perceived weight status + desired weight status + attempt to lose weight

C2= responses to the ordinal categories about eating restaurant food + fat intake

Table 6a. Final structure of components extracted from the principal component analysis (Men in the NHANES 1999-2002 to compare with NHANES 1988-94)[1]

Variables	C1	C2	C3
Smokers (1=no, 2=yes)	-0.24	-0.56	-0.08
Perceived weight status (1=underweight, 2=about right, 3=overweight)	0.91	0.04	0.05
Desired weight change (1=weigh more, 2=stay same, 3=weigh less)	0.92	0.06	0.04
Tried to lose weight in the past year (1=no, 2=yes)	0.62	0.09	-0.01
Breakfast consumer (1=no, 2=yes)	0.06	0.75	-0.04
Frequency of eating restaurant food (1=< 1 time/wk, 2=1 time/wk, 3=2-3 times/wk, 4=≥ 4 times/wk)	0.00	0.05	0.73
Fat intake (1=≤30% of energy from fat, 2=>30% of energy from fat)	0.04	-0.03	0.72
Number of eating occasions (1=≤3 times/d, 2=4 times/d, 3=5 times/d, 4=6 times/d, 5=≥ 7times/d)	-0.07	0.69	0.00
Variance explained by each factor	2.13	1.37	1.07

[1]Highlighted were ordinal categories with the factor loaindings ≥0.40

C1-3: Component 1 to 3.

Table 6b. Final structure of components extracted from the principal component analysis (Women in the NHANES 1999-2002 to compare with NHANES 1988-94)[1]

Variables	C1	C2	C3
Smokers (1=no, 2=yes)	-0.12	-0.56	0.16
Perceived weight status (1=underweight, 2=about right, 3=overweight)	0.90	-0.02	0.05
Desired weight change (1=weigh more, 2=stay same, 3=weigh less)	0.91	0.01	0.05
Tried to lose weight in the past year (1=no, 2=yes)	0.65	0.07	-0.01
Breakfast consumer (1=no, 2=yes)	-0.05	0.76	-0.06
Frequency of eating restaurant food (1=< 1 time/wk, 2=1 time/wk, 3=2-3 times/wk, 4=≥ 4 times/wk)	0.08	0.02	0.73
Fat intake (1=≤30% of energy from fat, 2=>30% of energy from fat)	-0.02	-0.05	0.70
Number of eating occasions (1=≤3 times/d, 2=4 times/d, 3=5 times/d, 4=6 times/d, 5=≥ 7times/d)	-0.02	0.64	0.23
Variance explained by each factor	2.09	1.3	1.11

[1]Highlighted were ordinal categories with the factor loaindings ≥0.40

C1-3: Component 1 to 3.

Table 7a. Correlations between components and ordinal categories (Men in NHANES 1999-2002 to compare with NHANES 1988-94)

	C1	C2	C3	perceived wt status	desired wt	try to lose wt	smoking	breakfas	# of eating occasion	restaurant food	fat	TV	alcohol	non-leisure activity	leisure activity	energy	BMI
C1	1.00	0.12	0.05	0.91	0.93	0.63	-0.21	0.11	0.05	0.03	0.05	0.02	-0.06	-0.10	0.06	-0.09	0.68
C2		1.00	0.03	0.10	0.12	0.09	-0.45	0.49	0.92	0.05	-0.03	-0.12	-0.10	-0.07	0.16	0.23	0.07
C3			1.00	0.05	0.04	0.03	-0.04	-0.01	0.03	0.92	0.45	-0.04	0.01	-0.02	0.06	0.17	0.03
perceived wt status				1.00	0.83	0.36	-0.19	0.10	0.02	0.03	0.05	0.03	-0.06	-0.07	0.00	-0.07	0.66
desired wt					1.00	0.39	-0.19	0.09	0.05	0.02	0.05	0.02	-0.05	-0.10	0.00	-0.06	0.64
try to lose wt						1.00	-0.14	0.09	0.04	0.03	0.00	-0.01	-0.05	-0.07	0.19	-0.11	0.34
smoking							1.00	-0.22	-0.14	-0.03	-0.04	0.13	0.26	0.14	-0.16	0.06	-0.17
breakfas								1.00	0.22	-0.03	0.03	-0.05	-0.13	-0.06	0.13	0.08	0.06
# of eating occasion									1.00	0.06	-0.06	-0.08	0.00	-0.03	0.11	0.28	0.01
restaurant food										1.00	0.06	-0.06	0.07	0.00	0.09	0.14	0.00
fat											1.00	0.03	-0.12	-0.07	-0.04	0.11	0.07
TV												1.00	0.03	-0.04	-0.14	-0.02	0.08
alcohol													1.00	0.12	0.03	0.13	-0.08
non-leisure activity														1.00	0.05	0.14	-0.09
leisure activity															1.00	0.02	-0.06
energy																1.00	-0.01
BMI																	1.00

Highlighted were statistically significant.

C1= responses to the ordinal categories about perceived weight status + desired weight status + attempt to lose weight

C2= responses to the ordinal categories about smoking + breakfast consumption + number of eating occasions

C3= responses to the ordinal categories about frequency of eating restaurant food + fat intake

Table 7b. Correlations between components and ordinal categories (Women in NHANES 1999-2002 to compare with 1988-94)

	C1	C2	C3	perceived wt status	desired wt	try to lose wt	smoking	breakfas	# of eating occasion	restaurant food	fat	TV	alcohol
C1	1.00	0.05	0.07	0.88	0.88	0.71	-0.11	0.00	0.02	0.08	0.00	0.07	-0.01
C2		1.00	0.02	0.02	0.04	0.05	-0.40	0.46	0.92	0.01	0.02	-0.09	-0.01
C3			1.00	0.06	0.08	0.04	0.00	-0.04	0.03	0.92	0.47	-0.04	0.03
perceived wt status				1.00	0.81	0.38	-0.08	-0.01	0.00	0.06	0.04	0.08	-0.04
desired wt					1.00	0.38	-0.11	-0.01	0.02	0.09	0.00	0.05	-0.02
try to lose wt						1.00	-0.08	0.02	0.03	0.06	-0.04	0.03	0.04
smoking							1.00	-0.19	-0.10	-0.01	0.02	0.10	0.18
breakfas								1.00	0.19	-0.04	-0.01	-0.10	-0.02
# of eating occasion									1.00	0.02	0.03	-0.05	0.04
restaurant food										1.00	0.09	-0.05	0.06
fat											1.00	0.00	-0.06
TV												1.00	0.02
alcohol													1.00
non-leisure activity													
leisure activity													
energy													
not breastfed													

Table 7b (cont'd)

	non-leisure activity	leisure activity	energy	not breastfed	never been pregnant	# of live births	age at first menarche	BMI
C1	-0.02	0.03	0.02	-0.02	0.03	-0.02	-0.10	0.54
C2	0.03	0.09	0.22	-0.05	-0.02	0.01	0.01	-0.05
C3	-0.10	0.03	0.15	0.00	0.10	-0.15	-0.07	0.05
perceived wt status	-0.04	-0.07	0.04	0.01	-0.01	0.03	-0.12	0.57
desired wt	0.00	0.01	0.02	0.00	0.03	-0.01	-0.09	0.49
try to lose wt	0.00	0.14	0.00	-0.05	0.05	-0.07	-0.04	0.28
smoking	-0.02	-0.10	0.04	0.11	0.01	-0.03	0.02	-0.11
breakfas	0.06	0.06	0.06	0.00	-0.05	0.07	0.02	-0.07
# of eating occasion	0.01	0.05	0.25	-0.02	0.00	-0.02	0.02	-0.07
restaurant food	-0.06	0.06	0.14	-0.02	0.12	-0.18	-0.06	0.02
fat	-0.11	-0.07	0.08	0.05	-0.01	0.02	-0.04	0.08
TV	-0.12	-0.18	-0.03	0.10	0.01	0.05	-0.06	0.19
alcohol	0.03	0.14	0.09	-0.03	0.17	-0.22	0.02	-0.15
non-leisure activity	1.00	0.17	0.07	-0.05	-0.02	0.03	0.01	-0.12
leisure activity		1.00	0.03	-0.13	0.11	-0.16	0.00	-0.22
energy			1.00	-0.06	0.09	-0.10	-0.10	0.00
not breastfed				1.00	-0.32	0.15	-0.01	0.03

Table 7b (cont'd)

	non-leisure activity	leisure activity	energy	not breastfed	never been pregnant	# of live births	age at first menarche	BMI
never been pregnant					1.00	**-0.65**	-0.03	-0.02
# of live births						1.00	0.01	**0.13**
age at first mens							1.00	**-0.20**
BMI								1.00

Highlighted were statistically significant.

C1= responses to the ordinal categories about perceived weight status + desired weight status + attempt to lose weight

C2= responses to the ordinal categories about smoking + breakfast consumption + number of eating occasions

C3= responses to the ordinal categories about frequency of eating restaurant food + fat intake

series linearization method was used for robust variance estimation of descriptive statistics and regression parameters.

Descriptive statistics: Descriptive statistics were conducted to characterize the subjects in the study. Statistically significant differences in sociodemographics, lifestyles, and reproductive, dietary, and psychosocial variables among the subpopulation groups were tested by t-test or ANOVA for continuous variables and by chi-square test for ordinal categories, respectively. Tested subpopulation groups were by: 1) gender; 2) income; 3) race/ethnicity, 4) gender and income combined; and 5) gender, income, and race/ethnicity combined (only in the NHANES 1988-94). The present study used income levels rather than education or occupation levels as a SES measurement because the federal government has used the income level to determine the eligibility of nutrition programs such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

Risk of obesity by income: To test the statistically significant difference in the risk of obesity by income levels, multiple regression and logistic regression were conducted, controlling for age. Log-transformed BMI and binary variable of obesity (1=non-obese and 2=obese) were used as an outcome variable for multiple regression and logistic regression, respectively. Separate regressions were conducted for men and women as well as subpopulation groups by gender and race/ethnicity (white women and white men only in the NHANES 1999-2002 due to small sample sizes for other subpopulation groups).

OBJECTIVE 1: To compare the prevalence of obesity among the U.S. subpopulation groups by gender, SES, race/ethnicity, and their combinations over the past decade

Aging of the U.S. population has been suggested to be a contributor to the recent increase in obesity (Keith et al., 2006). When one is interested in comparing the total number of occurrences of the characteristics (obesity in the present study) among groups, the difference in the number of occurrences among groups should reflect the difference in the characteristics among groups rather than difference in the age structure among groups. Thus, the direct method (Klein and Schoenborn, 2001) was used to adjust for age structural differences between NHANES 1988-94 and NHANES 1999-2002 in the present study. The year 2000 projected U.S. population was used as the standard population for age adjusting. The following were the six steps taken to obtain the age-standardized prevalence of obesity by income levels: 1) selecting one of the year 2000 standard population age groupings suggested by Klein and Schoenborn (2001); 2) according to the age grouping selected in the step 1, obtaining the rate of obesity for low-, middle-, and high income subjects, respectively; 3) according to the age grouping selected in the step 1, obtaining the number of the year 2000 standard population for low-, middle, and high-income subjects, respectively; 4) multiply the number obtained in the step 2 by the number obtained in the step 3 for low-, middle-, and high-income subjects, respectively; 5) sum the number obtained in the step 4 for low-, middle-, and high-income subjects, respectively; 6) divide the number obtained in the step 5 by the number of the year 2000 standard population for low-, middle-, and high-income subjects, respectively. The same procedures were used for other subpopulation groups by gender, by race/ethnicity, by gender and income, and by gender, income, and race/ethnicity (only in the NHANES 1988-94).

OBJECTIVE 2: To identify the predictors that account for the prevalence of obesity among the subpopulation groups

Multiple regression and logistic regression were conducted separately within the subpopulation groups to identify the predictors of obesity, while controlling for other confounding variables. In multiple regression, log-transformed BMI was regressed on sociodemographic variables, and lifestyle, reproductive (only in women), dietary, and psychosocial variables (15 in the NHANES 1999-2002 and 13 in the NHANES 1988-94, respectively) in men, women, six subpopulation groups by income and gender (low-income men and women, middle-income men and women, and high-income men and women), and 18 subpopulation groups by income, gender, and race/ethnicity (white-low-income men and women, white-middle-income men and women, white-high-income men and women, black-low-income men and women, black-middle-income men and women, black-high-income men and women, Mexican-American-low-income men and women, Mexican-American-middle-income men and women, and Mexican-American-high-income men and women). A binary variable (1=non-obese and 2=obese) was replaced as an outcome variable in logistic regression. Predictors of obesity were compared across the subpopulation groups to identify the differences.

OBJECTIVE 3: To identify the predictors that are associated with the changes in the prevalence of obesity among the subpopulation groups

Differences in the predictors of obesity among the subpopulation groups between the NHANES 1988-94 and NHANES 1999-2002 were cross-examined against changes in the age-standardized prevalence of obesity and the changes in the prevalence or mean values of these predictors between the two datasets.

Three types of predictors were obtained in the results: 1) those that predicted obesity risk or BMI in 1999-2002 but not in 1988-94; 2) those that predicted obesity risk

or BMI in both 1999-2002 and 1988-94; and 3) those that predicted obesity risk or BMI in 1988-94 but not in 1999-2002. If the direction of predictability of the first type of predictors was positive, these predictors must have contributed to the increase in obesity prevalence over the past decade. These predictors may not have appeared in 1988-94 but appeared in 1999-2002 because the percent or mean of these predictors that increase the risk of obesity increased among obese subjects over the past decade. If their percent or mean among obese subjects did not increase over the past decade but they became a positive predictor in 1999-2002 but not in 1988-94, it may be because the percent or mean of other predictors had changed.

Generalization of the results to the U.S. subpopulation groups: The present study lost substantial number of subjects when identifying the predictors of obesity among the subpopulation groups to control for various variables simultaneously. Thus, it was questionable how representative the results would be to the U.S. subpopulation groups after losing many subjects. We compared the characteristics of the study sample who had all the responses of interest (Sample B in Figure 2a and b) with the study sample before excluding those who did not have all the responses of interest (Sample A in Figure 2a and b).

RESULTS

SUBJECTS' CHARACTERISICS AMONG THE SUBPOPULATION GROUPS OVER THE PAST DECADE

1. Population

In 1999-2002: The majority of subjects examined in the present study were whites (82.6%), middle- or high-income (72.4%), non-smokers (70.6%), breakfast consumers (80.1%), energy intake adequate reporters (75.6%), those who earned high school or higher education (81.6%), and those who accurately assessed their weight status (74.3%) (Table 8). The majority of subjects also watched TV or used computers for ≥ 2 hours/day (70.7%) and consumed restaurant food ≥ 1 time/week (80.5%). Over half of the subjects were married (62.9%), overweight (63.6% [34.6% were overweight but not obese and 29.0% were obese]), perceived themselves as overweight (57.6%), and wanted to weigh less (64.2%), did not attempt to lose weight (64.2%) or did attempt not to gain weight (64.7%) in the past year, and consumed more than 30% of their energy intake from fat (64.9%). About half (49.8%) of subjects spent their days sitting. Thirty-one percent of subjects did not participate in any leisure time activities in the past 30 days.

In women, close to half of subjects (47.5%) breastfed their children. About half (51.5%) of subjects had 2-3 live births. The majority of women (76.2%) had their first menarche at 12-15 years old.

Differences from 1988-94: Noticeable changes in subjects' characteristics from 1988-94 (Table 9) were: decrease in the percent of subjects with high school education (-8.3%) and increase in the percent of subjects with more than high school education (11.0%); decrease in the percent of middle-income subjects (-9.6%) and increase in the percent of

Table 8. Subjects' characteristics by gender in 1999-2002[1]

Variables	n	Percent[2] Total	Men	Women	P[3]
Demographic					
Gender					
Men	2,283	53.8	53.8	N/A	N/A
Women	1,733	46.2	N/A	46.2	
Race/ethnicity					
Non-Hispanic White	2,266	82.9	81.7	84.4	****
Non-Hispanic Black	727	9.5	9.4	9.8	
Mexican-Americans	1,023	7.5	9.0	5.9	
Education					
< High school	1,267	18.4	20.1	16.4	*
High school graduate	948	26.7	26.3	27.2	
> High school	1,801	54.9	53.6	56.4	
Age					
20-29 yrs	602	16.5	18.4	14.2	**
30-39 yrs	657	20.6	20.7	20.4	
40-49 yrs	818	24.7	24.2	25.3	
50-59 yrs	562	17.0	15.8	18.5	
60+ yrs	1,377	21.2	20.9	21.6	
Poverty Income Ratio (PIR)					
≤ 1.85	1,495	27.7	25.7	29.9	*
1.86-3.5	1,047	24.4	24.2	24.6	
> 3.5	1,474	48.0	50.1	45.4	
Marital status					
Married	2,451	62.9	65.0	60.5	****
Widowed, divorced, or separated	778	16.4	10.7	22.9	
Never married or living with partner	787	20.7	24.3	16.6	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	2,944	70.6	67.4	74.3	**
Smoker	1,072	29.4	32.6	25.7	
Daily hrs of TV, video or computer use					
≤ 1 hr	1,119	29.2	26.4	32.6	***
2-3 hrs	1,845	46.8	48.8	44.5	
≥ 4 hrs	1,052	23.9	24.8	22.9	
Alcohol consumption (# drinks/wk)	4,016	4±0.2	6±0.3	2±0.2	****

Table 8 (cont'd)

Variables	n	Percent[2] Total	Men	Women	P[3]
Lifestyle factors(cont'd)					
Daily physical activity					
Mainly sit	932	23.8	22.2	25.6	****
Walk a lot	2,132	49.8	45.7	54.6	
Carry light or heavy loads	952	26.5	32.2	19.8	
Leisure time activity/month					
No activities	1,560	31.2	28.8	34.0	**
1st quintile	511	14.5	16.0	12.8	
2nd quintile	480	13.4	12.3	14.7	
3rd quintile	512	13.6	13.1	14.2	
4th quintile	479	13.6	14.1	13.0	
5th quintile	474	13.6	15.7	11.2	
Reproductive history					
Breast fed your child[4]					
Yes	866	N/A	N/A	47.5	N/A
No	628	N/A	N/A	36.6	
Never been pregnant	239	N/A	N/A	15.9	
Number of live birth[4]					
0 and never been pregnant	239	N/A	N/A	15.9	N/A
1	255	N/A	N/A	16.5	
2	455	N/A	N/A	30.6	
3	377	N/A	N/A	20.9	
4	181	N/A	N/A	8.2	
≥ 5	226	N/A	N/A	7.9	
Age at the first menarche[4]					
≤ 11 yrs old	312	N/A	N/A	17.6	N/A
12-15 yrs old	1,310	N/A	N/A	76.2	
≥ 16 yrs old	111	N/A	N/A	6.2	
Weight status and related perceptions and behaviors					
BMI	4,016	27.9±0.1	27.6±0.1	28.2±0.2	**
Weight status					
Normal weight	1,327	36.4	33.2	40.0	****
Overweight	1,496	34.6	41.4	26.7	
Obese	1,193	29.0	25.4	33.3	

Table 8 (cont'd)

Variables	n	Percent[2] Total	Men	Women	P[3]
Weight status and related perceptions and behaviors					
Perceived own weight status					
Underweight	194	4.4	6.7	1.7	****
About right	1,646	38.0	45.5	29.3	
Overweight	2,176	57.6	47.8	69.9	
Weight status assessment					
Under-assessor	917	17.9	27.0	7.2	****
Accurate assessor	2,867	74.3	71.0	78.2	
Over-assessor	232	7.8	2.0	14.6	
Desired weight changes					
Weigh more	245	6.1	9.8	1.6	****
Stay about the same	1,378	29.8	36.9	21.6	
Weigh less	2,393	64.2	53.3	76.8	
Attempt to lose weight in the past year					
Yes	1,312	35.3	26.0	46.1	****
No	2,704	64.7	74.0	53.9	
Attempt not to gain weight in the past year					
Yes	1,449	39.7	33.4	47.0	****
No	2,567	60.3	66.6	53.0	
Component 1[5]	4,016	5.1±0.0	4.9±0.0	5.4±0.0	****
Component 1[6]	4,016	6.5±0.0	6.1±0.0	6.9±0.0	****
Component 2[7]	4,016	2.8±0.0	2.6±0.0	2.9±0.0	****
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	1,060	19.6	17.9	21.6	****
1 time/wk	909	21.8	19.5	24.5	
2-3 times/wk	1,090	28.5	27.1	30.0	
≥ 4 times/wk	957	30.2	35.5	23.9	
Breakfast consumption					
Yes	3,206	80.1	78.6	81.8	*
No	810	19.9	21.4	18.2	

Table 8 (cont'd)

Variables	n	Percent[2] Total	Men	Women	P[3]
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	4,016	2,288±20	2,645±29	1,872±24	****
Fat intake					
≤ 30% of energy from fat	1,542	35.1	36.2	33.8	NS
> 30% of energy from fat	2,474	64.9	63.8	66.2	
Number of eating occasions					
≤ 3 times/day	910	19.8	20.8	18.6	NS
4 times/day	1,079	24.9	25.3	24.4	
5 times/day	915	23.1	21.8	24.7	
6 times/day	576	16.0	16.5	15.3	
≥ 7 times/day	536	16.2	15.6	17.0	
Energy intake reporting status					
Under-reporters	851	19.3	17.5	21.4	**
Adequate-reporter	2,980	75.6	76.0	75.2	
Over-reporter	185	5.1	6.6	3.4	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; non-whites, blacks, or Mexican Americans; underweight subjects, and those who did not have all the responses to the variables used in the regression.

[2] Percent might not add up to 100% due to rounding.

[3] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by weight status were tested by t-test.

[4] Based on females only.

[5] Sum of responses to perceived weight status and desired weight status

[6] Sum of responses to perceived weight status, desired weight status, and attempt to lose weight to make this variable comparable to the one in the NHANES 1988-94

[7] Sum of responses to attempt to lose weight and attempt not to gain weight

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

Table 9. Subjects' characteristics by gender in 1988-94[1]

Variables	n	Percent[2] Total	Men	Women	P[3]
Demographic					
Gender					
Men	5,679	54.6	54.6	N/A	N/A
Women	4,590	45.4	N/A	45.4	
Race/ethnicity					
Non-Hispanic White	4,738	84.9	84.7	85.1	****
Non-Hispanic Black	2,852	10.4	9.9	11.0	
Mexican-Americans	2,679	4.7	5.4	3.9	
Education					
< High school	3,709	21.1	22.7	19.3	****
High school graduate	3,326	35.0	31.9	38.9	
> High school	3,234	43.9	45.5	41.9	
Age					
20-29 yrs	1,997	20.4	21.6	19.0	*
30-39 yrs	2,239	25.3	25.4	25.2	
40-49 yrs	1,783	20.5	20.6	20.3	
50-59 yrs	1,219	12.8	12.5	13.1	
60+ yrs	3,031	21.1	20.0	22.5	
Poverty Income Ratio (PIR)					
≤ 1.85	4,411	26.3	24.4	28.7	***
1.86-3.5	3,210	34.0	34.3	33.7	
> 3.5	2,648	39.7	41.3	37.7	
Marital status					
Married	6,676	69.1	73.3	64.1	****
Widowed, divorced, or separated	2,038	17.0	10.5	24.7	
Never married or living with partner	1,555	14.0	16.3	11.2	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	7,047	67.6	65.7	69.8	**
Smoker	3,222	32.4	34.3	30.2	
Alcohol consumption (# drinks/wk)	1,0269	4±0.2	6±0.3	2±0.1	****

Table 9 (cont'd)

Variables	n	Percent[2] Total	Men	Women	P^3
Lifestyle factors (cont'd)					
Leisure time activity/month					
No activities	1,885	12.2	9.7	15.1	****
1st quintile	2,118	18.5	16.7	20.7	
2nd quintile	1,451	16.2	15.7	16.9	
3rd quintile	1,465	15.9	16.7	14.9	
4th quintile	1,935	21.6	22.7	20.3	
5th quitile	1,415	15.6	18.5	12.1	
Reproductive history					
Breast fed your child[4]					
Yes	2,068	N/A	N/A	43.9	N/A
No	1,853	N/A	N/A	37.9	
Never been pregnant	669	N/A	N/A	18.2	
Number of live birth[4]					
0 and never been pregnant	669	N/A	N/A	18.2	N/A
1	807	N/A	N/A	17.5	
2	1,227	N/A	N/A	30.9	
3	797	N/A	N/A	16.8	
4	479	N/A	N/A	8.3	
≥ 5	611	N/A	N/A	8.3	
Age at the first menarche[4]					
≤ 11 yrs old	950	N/A	N/A	19.8	N/A
12-15 yrs old	3,356	N/A	N/A	75.0	
≥ 16 yrs old	284	N/A	N/A	5.2	
Weight status and related perceptions and behaviors					
BMI	1,0269	26.8±0.1	26.8±0.1	26.7±0.2	NS
Weight status					
Normal weight	3,915	43.1	38.4	48.8	****
Overweight	3,733	34.6	41.8	26.0	
Obese	2,621	22.3	19.8	25.2	
Perceived own weight status					
Underweight	518	4.2	5.9	2.1	****
About right	4,352	39.9	47.5	30.8	
Overweight	5,399	55.9	46.6	67.1	

Table 9 (cont'd)

Variables	n	Total	Percent[2] Men	Women	P^3	
Weight status and related perceptions and behaviors (cont'd)						
Weight status assessment						
Under-assessor	2,244	16.6	25.4	5.9	****	
Accurate assessor	7,209	71.9	69.9	74.3		
Over-assessor	816	11.6	4.7	19.8		
Desired weight changes						
Weigh more	706	6.5	9.9	2.4	****	
Stay about the same	3,531	29.3	36.3	20.8		
Weigh less	6,032	64.2	53.7	76.7		
Attempt to lose weight in the past year						
Yes	3,990	43.0	31.7	56.6	****	
No	6,279	57.0	68.3	43.4		
Component 1[5]	1,0269	6.5±0.0	6.2±0.0	7.0±0.0	****	
Dietary behaviors						
Restaurant food consumption						
Non-consumer	8,526	77.5	75.6	79.8	**	
Consumer	1,743	22.5	24.4	20.2		
Breakfast consumption						
Yes	7,986	79.9	78.1	82.0	**	
No	2,283	20.1	21.9	18.0		
Energy intake (kcal/d)	10,269	2,285±25	2,698±30	1,789±20	****	
Fat intake						
≤ 30% of energy from fat	3,612	33.8	32.2	35.8	*	
> 30% of energy from fat	6,657	66.2	67.8	64.2		
Number of eating occasions						
≤ 3 times/day	2,780	19.5	20.7	18.1	*	
4 times/day	2,777	24.3	23.9	24.9		
5 times/day	2,197	24.5	23.3	26.1		
6 times/day	1,262	14.3	13.8	14.8		
≥ 7 times/day	1,253	17.4	18.4	16.2		

Table 9 (cont'd)

Variables	n	Percent[2] Total	Men	Women	P[3]
Dietary behaviors (cont'd)					
Energy intake reporting status					
Under-reporters	2,327	19.3	14.6	24.9	****
Adequate-reporter	7,407	74.8	77.6	71.4	
Over-reporter	535	6.0	7.8	3.8	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; underweight subjects, and those who did not have all the responses to the variables used in the regression.

[2] Percent might not add up to 100% due to rounding.

[3] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by weight status were tested by t-test.

[4] Based on females only.

[5] Sum of responses to perceived weight status, desired weight status, and attempt to lose weigh

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

high-income subjects (8.3%); decrease in the percent of married subjects (-6.2%); increase in the percent of subjects who did not participate in any leisure-time activity in the past month (19%); decrease in the percent of subjects of normal weight (-6.7%) and increase in the percent of obese subjects (6.7%); and decrease in the percent of subjects who attempted to lose weight in the past year (-7.7%).

2. Gender subpopulation groups

In 1999-2002: Subjects' characteristics differed significantly by gender except fat intake and the number of eating occasions (Table 8). Women, compared to men, had a higher percent of: subjects with high school and higher education (83.6 vs. 79.9%), low-income subjects (29.9 vs. 25.7%), those who were widowed, divorced, or separated (22.9 vs. 10.7%), non-smokers (74.3 vs. 67.4%), those who spent their days walking a lot (54.6 vs. 45.7%), those who did not participate in any leisure-time activities in the past 30 days (34.0 vs. 28.8%), normal weight subjects (40.0 vs. 33.2%) as well as obese subjects (33.3 vs. 25.4%), those who perceived themselves as overweight (69.9 vs. 47.8%), those who accurately assessed their weight status (78.2 vs. 71.0%) as well as those who over-assessed their weight status (14.6 vs. 2.0%), those who wanted to weigh less (76.8 vs. 53.3%), those who attempted to lose weight in the past year (46.1 vs. 26.0%) as well as those who attempted not to gain weight in the past year (47.0 vs. 33.4%), breakfast consumers (81.8 vs. 78.6%), and energy intake under-reporters (21.4 vs. 17.5%). Mean BMI was also higher in women than men (28.2 vs. 27.6 at $p<0.01$).

Men, compared to women, had a higher percent of high-income subjects (50.1 vs. 45.4%), those who spent their days carrying heavy or light loads (32.2 vs. 19.8%), overweight subjects (excluding obese subjects: 41.4 vs. 26.7%), those who perceived

their weight status as underweight (6.7 vs. 1.7%) as well as those who perceived their weight status as about right (45.5 vs. 29.3%), those who under-assessed their weight status (27.0 vs. 7.2%), those who wanted to weigh more (9.8 vs. 1.6%) as well as and those who wanted their weight to stay the same (36.9 vs. 21.6%), and those who ate restaurant food ≥ 4 times/week (35.5 vs. 23.9%). Men, compared to women, also consumed higher amount of alcohol (6 vs. 2 drinks/week at $p<0.0001$) and energy (2,645 vs. 1,872 kcal/day at $p<0.0001$).

Differences from 1988-94: In 1988-94, subjects' characteristics differed significantly by gender except mean BMI (Table 9). Noticeable changes in 1999-2002 from 1988-94 in men were: decrease in the percent of men with high school degree (-5.6%) and increase in the percent of men with more than high school education (8.1%); decrease in the percent of middle-income men (-10.1%) and increase in the percent of high-income men (8.8%); decrease in the percent of married men (-8.3%); increase in the percent of men who did not participate in any leisure-time activity in the past month (19.1%); decrease in the percent of normal weight men (-5.2%) and increase in the percent of obese men (5.6%); decrease in the percent of men who attempted to lose weight in the past year (-5.7%); decrease in energy intake (-53 kcal); and decrease in the percent of men who consumed more than 30% of energy from fat (-4%).

In women, noticeable changes in 1999-2002 from 1988-94 were: decrease in the percent of women with high school degree (-11.7%) and increase in the percent of women with more than high school education (14.5%); decrease in the percent of middle-income women (-9.1%) and increase in the percent of high-income women (7.7%); increase in the percent of women who did not participate in any leisure-time activity in

the past month (18.9%); decrease in the percent of normal weight women (-8.8%) and increase in the percent of obese women (8.1%); decrease in the percent of women who attempted to lose weight in the past year (-10.5%); and increase in energy intake (83 kcal).

3. Income subpopulation groups

In 1999-2002: Subjects' characteristics differed significantly by the income levels except alcohol intakes, non-leisure time activity, BMI, energy intake, breastfeeding practices, and age at first menarche (Table 10). Middle- and high-income groups had a higher percent of men than women (53.4 vs. 46.6 in the middle-income group and 56.3 vs. 43.8% in the high-income group, respectively), while the ratio between men and women in the low-income group was similar. As the income level increased from low, middle, to high, the percent of whites increased (68.5, 81.6, and 91.9% respectively). As the income level increased, the percent of subjects with less than high school education decreased (38.4, 18.5, and 6.9%, respectively).

The percent of subjects aged 20-29 years old was higher in the low-income group than middle- and high-income groups (26.9 vs. 15.2 and 11.2%, respectively), while the percent of subjects aged 40-59 years old was higher in the high-income group than low- and middle-income groups (54.3 vs. 28.0 and 32.6%, respectively). The percent of married subjects increased as the income level increased (44.9, 60.5, and 74.6%, respectively), while the percent of those who had never married or those who were living with their partners decreased (31.6, 20.9, and 14.4%, respectively). The percent of smokers decreased as the income level increased (43.0, 32.8, and 19.8%, respectively).

As the income level increased, the percent of those who watched TV or used computers for long hours (≥ 4 hours/day) and the percent of subjects who did not

Table 10. Subjects' characteristics by income and gender in 1999-2002[1]

Variables	n	Total (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	1,733	50.0	46.6	43.8	**
Male	2,283	50.0	53.4	56.3	
Race/ethnicity					
Non-Hispanic White	2,266	68.5	81.6	91.9	****
Non-Hispanic Black	727	16.4	10.4	5.2	
Mexican-Americans	1,023	15.2	8.0	2.9	
Education					
< High school	1,267	38.4	18.5	6.9	****
High school graduate	948	31.2	32.5	21.2	
> High school	1,801	30.5	49.0	72.0	
Age					
20-29 yrs	602	26.9	15.2	11.2	****
30-39 yrs	657	22.9	24.6	17.1	
40-49 yrs	818	18.3	21.0	30.3	
50-59 yrs	562	9.7	11.6	24.0	
60+ yrs	1,377	22.3	27.7	17.3	
Marital status					
Married	2,451	44.9	60.5	74.6	****
Widowed, divorced, or separated	778	23.5	18.7	11.1	
Never married or living with partner	787	31.6	20.9	14.4	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	2,944	57.0	67.3	80.2	****
Smoker	1,072	43.0	32.8	19.8	
Daily hrs of TV, video or computer use					
≤ 1 hr	1,119	24.5	26.5	33.4	****
2-3 hrs	1,845	42.2	46.6	49.6	
≥ 4 hrs	1,052	33.3	26.9	17.0	
Alcohol consumption (# of drinks/wk)	4,016	5±0.4	4±0.4	4±0.2	NS.

Table 10 (cont'd)

Variables		Total (%) Low	Middle	High	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	932	23.6	20.7	25.4	NS
Walk a lot	2,132	49.9	50.3	49.4	
Carry light or heavy loads	952	26.6	29.0	25.1	
Leisure time activity/month					
No activities	1,560	45.1	34.8	21.4	****
1st quintile	511	13.9	13.0	15.6	
2nd quintile	480	12.1	14.3	13.7	
3rd quintile	512	10.2	14.6	15.1	
4th quintile	479	8.2	11.6	17.7	
5th quintile	474	10.4	11.7	16.5	
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	4,016	28.4±0.3	28.1±0.3	27.6±0.2	NS
Weight status					
Normal weight	1,327	36.4	33.2	37.9	*
Overweight	1,496	31.4	36.3	35.7	
Obese	1,193	32.3	30.5	26.4	

Table 10 (cont'd)

Variables		Total (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	194	7.1	4.7	2.7	**
About right	1,646	41.5	37.3	36.4	
Overweight	2,176	51.4	58.0	60.9	
Weight status assessment					
Under-assessor	917	24.9	19.3	13.1	****
Accurate assessor	2,867	69.0	74.5	77.3	
Over-assessor	232	6.1	6.2	9.6	
Desired weight changes					
Weigh more	245	9.4	7.7	3.3	****
Stay about the same	1,378	34.6	29.8	27.0	
Weigh less	2,393	56.0	62.5	69.7	
Attempt to lose weight					
Yes	1,312	27.4	34.5	40.2	***
No	2,704	72.6	65.5	59.8	
Attempt not to gain weight					
Yes	1,449	28.2	34.8	48.8	****
No	2,567	71.8	65.2	51.2	
Component 1[3]	4,016	4.9±0.1	5.1±0.1	5.3±0.0	****
Component 1[4]	4,016	6.2±0.1	6.4±0.1	6.7±0.0	****
Component 2[5]	4,016	2.6±0.0	2.7±0.0	2.9±0.0	****
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	1,060	31.5	20.9	12.1	****
1 time/wk	909	23.6	21.7	20.9	
2-3 times/wk	1,090	26.1	26.8	30.6	
≥ 4 times/wk	957	18.8	30.6	36.5	
Breakfast consumption					
Yes	3,206	72.6	81.2	83.8	****
No	810	27.4	18.8	16.2	

Table 10 (cont'd)

Variables	Total	Total (%) Low	Middle	High	P^2
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	4,016	2,236±38	2,320±41	2,302±32	NS
Fat intake					
≤ 30% of energy from fat	1,542	39.5	32.6	33.9	*
> 30% of energy from fat	2,474	60.5	67.4	66.1	
Number of eating occasions					
≤ 3 times/day	910	28.7	20.6	14.3	****
4 times/day	1,079	25.2	26.9	23.7	
5 times/day	915	21.2	21.4	25.2	
6 times/day	576	13.1	15.1	18.0	
≥ 7 times/day	536	11.8	16.1	18.9	
Energy intake reporting status					
Under-reporter	851	22.8	19.3	17.2	*
Adequate-reporter	2,980	71.6	74.0	78.7	
Over-reporter	185	5.6	6.7	4.0	

Table 10 (cont'd)

Variables	n	Men (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	2,283	25.7	24.2	50.1	
Race/ethnicity					
Non-Hispanic White	1,259	64.0	80.9	91.1	****
Non-Hispanic Black	414	16.1	9.7	5.7	
Mexican-Americans	610	19.9	9.3	3.2	
Education					
< High school	783	42.0	21.2	8.3	****
High school graduate	522	28.7	32.4	22.2	
> High school	978	29.3	46.4	69.6	
Age					
20-29 yrs	366	30.2	17.8	12.7	****
30-39 yrs	366	22.7	22.7	18.7	
40-49 yrs	446	17.3	22.8	28.5	
50-59 yrs	299	9.5	10.1	21.7	
60+ yrs	806	20.4	26.6	18.4	
Marital status					
Married	1,490	51.1	61.7	73.7	****
Widowed, divorced, or separated	294	12.5	13.4	8.5	
Never married or living with partner	499	36.4	24.9	17.8	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,608	54.0	62.3	76.8	****
Smoker	675	46.0	37.7	23.2	
Daily hrs of TV, video or computer use					
≤ 1 hr	586	21.3	24.5	29.9	****
2-3 hrs	1,092	44.2	47.9	51.6	
≥ 4 hrs	605	34.5	27.6	18.5	
Alcohol consumption (# of drinks/wk)	2,283	7±0.6	7±0.6	6±0.3	*

Table 10 (cont'd)

Variables		Men (%) Low	Middle	High	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	498	19.1	18.3	25.6	*
Walk a lot	1,137	46.6	45.5	45.2	
Carry light or heavy loads	648	34.3	36.2	29.2	
Leisure time activity/month					
No activities	843	44.2	33.6	18.6	****
1st quintile	309	16.0	14.2	16.9	
2nd quintile	264	11.2	11.3	13.3	
3rd quintile	283	7.6	15.7	14.7	
4th quintile	286	9.9	12.4	17.5	
5th quintile	298	12.1	12.8	19.0	
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	2,283	27.3±0.3	27.6±0.3	27.8±0.2	NS
Weight status					
Normal weight	727	37.4	32.9	31.2	NS
Overweight	987	38.9	41.7	42.6	
Obese	569	23.7	25.5	26.2	

Table 10 (cont'd)

Variables		Men (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	150	11.0	7.1	4.3	***
About right	1,121	53.1	46.1	41.4	
Overweight	1,012	36.0	46.7	54.3	
Weight status assessment					
Under-assessor	721	37.9	29.1	20.4	****
Accurate assessor	1,518	60.8	68.8	77.3	
Over-assessor	44	1.2	2.2	2.3	
Desired weight changes					
Weigh more	198	15.5	12.8	5.5	****
Stay about the same	970	44.4	37.0	32.9	
Weigh less	1,115	40.0	50.2	61.6	
Attempt to lose weight					
Yes	556	17.0	22.1	32.5	****
No	1,727	83.0	77.9	67.5	
Attempt not to gain weight					
Yes	685	19.4	27.2	43.6	****
No	1,598	80.6	72.8	56.4	
Component 1[3]	2,283	4.5±0.1	4.8±0.1	5.1±0.1	****
Component 1[4]	2,283	5.7±0.1	6.0±0.1	6.4±0.1	****
Component 2[5]	2,283	2.4±0.0	2.5±0.0	2.8±0.0	****
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	586	29.2	19.6	11.2	****
1 time/wk	471	22.3	19.5	18.1	
2-3 times/wk	602	23.6	25.8	29.5	
≥ 4 times/wk	624	24.8	35.1	41.2	
Breakfast consumption					
Yes	1,787	71.5	79.0	82.1	**
No	496	28.5	21.0	18.0	

Table 10 (cont'd)

Variables		Men (%) Low	Middle	High	P^2
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	2,283	2,583±43	2,715±74	2,643±37	NS
Fat intake					
≤ 30% of energy from fat	909	43.0	36.3	32.7	*
> 30% of energy from fat	1,374	57.0	63.7	67.3	
Number of eating occasions					
≤ 3 times/day	541	30.2	22.0	15.3	****
4 times/day	622	24.9	27.3	24.6	
5 times/day	500	21.9	19.7	22.8	
6 times/day	327	13.7	16.0	18.2	
≥ 7 times/day	293	9.3	15.0	19.1	
Energy intake reporting status					
Under-reporter	448	21.9	17.4	15.2	*
Adequate-reporter	1,703	71.1	73.5	79.6	
Over-reporter	132	7.0	9.1	5.2	

Table 10 (cont'd)

Variables	n	Women (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	1,733	29.9	24.6	45.4	N/A
Male	N/A	N/A	N/A	N/A	
Race/ethnicity					
Non-Hispanic White	1,007	73.0	82.4	93.0	****
Non-Hispanic Black	313	16.7	11.1	4.5	
Mexican-Americans	413	10.4	6.5	2.5	
Education					
< High school	484	34.7	15.3	5.0	****
High school graduate	426	33.7	32.7	19.9	
> High school	823	31.6	52.0	75.1	
Age					
20-29 yrs	236	23.6	12.1	9.3	****
30-39 yrs	291	23.0	26.8	15.1	
40-49 yrs	372	19.3	18.9	32.7	
50-59 yrs	263	9.8	13.3	27.0	
60+ yrs	571	24.3	28.9	16.0	
Marital status					
Married	961	38.7	59.1	75.7	****
Widowed, divorced, or separated	484	34.6	24.6	14.3	
Never married or living with partner	288	26.8	16.3	10.0	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,336	60.1	72.9	84.4	****
Smoker	397	39.9	27.1	15.6	
Daily hrs of TV, video or computer use					
≤ 1 hr	533	27.7	28.7	37.8	****
2-3 hrs	753	40.2	45.1	47.0	
≥ 4 hrs	447	32.1	26.2	15.1	
Alcohol consumption (# of drinks/wk)	1,733	2±0.3	2±0.3	3±0.3	NS

Table 10 (cont'd)

Variables		Women (%) Low	Middle	High	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	434	28.1	23.5	25.2	NS
Walk a lot	995	53.2	55.7	54.9	
Carry light or heavy loads	304	18.8	20.8	19.9	
Leisure time activity/month					
No activities	717	46.1	36.1	25.0	****
1st quintile	202	11.9	11.7	14.0	
2nd quintile	216	13.1	17.8	14.2	
3rd quintile	229	12.9	13.2	15.7	
4th quintile	193	7.5	10.8	17.9	
5th quintile	176	8.7	10.4	13.3	
Reproductive history					
Breast fed your child					
Yes	866	45.6	48.1	48.5	NS
No	628	41.7	36.3	33.3	
Never been pregnant	239	12.8	15.6	18.2	
Number of live birth					
0 and never been pregnant	239	12.8	15.6	18.2	****
1	255	18.4	14.5	16.3	
2	455	21.2	27.2	38.7	
3	377	22.5	24.1	18.2	
4	181	11.9	11.1	4.1	
≥ 5	226	13.2	7.4	4.6	
Age at the first menarche					
≤ 11 yrs old	312	17.8	16.3	18.2	NS
12-15 yrs old	1,310	75.8	76.0	76.6	
≥ 16 yrs old	111	6.4	7.7	5.2	
Weight status and related perceptions and behaviors					
BMI	1,733	29.4±0.4	28.6±0.4	27.3±0.3	**
Weight status					
Normal weight	600	35.4	33.6	46.5	**
Overweight	509	23.8	30.2	26.8	
Obese	624	40.8	36.2	26.7	

Table 10 (cont'd)

Variables		Women (%)			
		Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	44	3.2	1.9	0.6	*
About right	525	29.9	27.2	30.0	
Overweight	1,164	66.8	70.9	69.4	
Weight status assessment					
Under-assessor	196	11.8	8.1	3.7	***
Accurate assessor	1,349	77.2	81.0	77.4	
Over-assessor	188	11.0	10.9	19.0	
Desired weight changes					
Weigh more	47	3.3	1.8	0.4	**
Stay about the same	408	24.7	21.6	19.5	
Weigh less	1,278	72.0	76.6	80.1	
Attempt to lose weight					
Yes	756	37.7	48.6	50.2	**
No	977	62.3	51.4	49.8	
Attempt not to gain weight					
Yes	764	37.1	43.4	55.5	**
No	969	63.0	56.6	44.5	
Component 1[3]	1,733	5.3±0.1	5.4±0.0	5.5±0.0	NS
Component 1[4]	1,733	6.7±0.1	6.9±0.1	7.0±0.1	*
Component 2[5]	1,733	2.8±0.1	2.9±0.0	3.1±0.1	***
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	474	33.8	22.4	13.1	****
1 time/wk	438	24.8	24.3	24.4	
2-3 times/wk	488	28.6	28.0	32.1	
≥ 4 times/wk	333	12.8	25.4	30.5	
Breakfast consumption					
Yes	1,419	73.8	83.7	86.0	***
No	314	26.2	16.3	14.0	

Table 10 (cont'd)

Variables		Women (%) Low	Middle	High	P^2
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	1,733	1,888±52	1,868±43	1,864±31	NS
Fat intake					
≤ 30% of energy from fat	633	36.0	28.4	35.4	NS
> 30% of energy from fat	1,100	64.1	71.6	64.6	
Number of eating occasions					
≤ 3 times/day	369	27.2	18.9	12.9	**
4 times/day	457	25.5	26.4	22.7	
5 times/day	415	20.4	23.3	28.2	
6 times/day	249	12.5	14.2	17.7	
≥ 7 times/day	243	14.3	17.3	18.5	
Energy intake reporting status					
Under-reporter	403	23.7	21.4	19.8	NS
Adequate-reporter	1,277	72.0	74.8	77.6	
Over-reporter	53	4.3	4.0	2.6	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; non-whites, blacks, or -Mexican Americans; underweight subjects; and those who did not have all the responses on the predictors included in the regression.

[2] Based on the chi-square test except alcohol, energy intakes, and BMI; differences in alcohol, energy intakes, and BMI by income levels were tested by ANOVA.

[3] Sum of responses to perceived weight status and desired weight status

[4] Sum of responses to perceived weight status, desired weight status, and attempt to lose weight to make this variable comparable to the one in the NHANES 1988-94

[5] Sum of responses to attempt to lose weight and attempt not to gain weight

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

participate in any leisure time activities in the past 30 days decreased (33.3, 26.9, and 17.0%, respectively for TV watching or computer use; 45.1, 34.8, and 21.4%, respectively for leisure time activity). The percent of obese subjects was lower in the high-income group than low- and middle-income groups (26.4 vs. 32.3 and 30.5%, respectively). The percent of subjects who perceived themselves as overweight, on the other hand, was lower in the low-income group than middle- and high-income groups (51.4 vs. 58.0 and 60.9%, respectively). The percent of subjects who wanted to weigh less or subjects who attempted to lose weight in the past year was also lower in the low-income group, followed by the middle- and high-income groups (56.0, 62.5, and 69.7%, respectively for subjects who wanted to weigh less; 27.4, 34.5, and 40.2%, respectively for subjects who attempted to lose weight in the past year). Furthermore, the percent of subjects who accurately assessed their weight status was also lower in the low-income group than middle- and high-income groups (69.0 vs. 74.5 and 77.3%, respectively).

The percent of those who ate restaurant food often (≥ 4 times/week) increased as the income level increased (18.8, 30.6, and 36.5%, respectively). The percent of breakfast skippers was higher among the low-income group than middle- and high-income groups (27.4 vs. 18.8 and 16.2%, respectively). The percent of those who had a small number of meals/snacks (≤ 3 times/day) decreased as the income level increased (28.7, 20.6, and 14.3%, respectively). Unexpectedly, the percent of those who ate more than 30% of their energy from fat was higher among middle- and high-income groups than the low-income group (67.4 and 66.1 vs. 60.5%, respectively).

Differences from 1988-94: In 1988-94, subjects' characteristics differed significantly by the income level except alcohol intakes and age at first menarche (Table 11). Noticeable

Table 11. Subjects' characteristics by income and gender in 1988-94[1]

Variables	n	Total (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	4,590	49.5	45.0	43.2	***
Male	5,679	50.5	55.0	56.9	
Race/ethnicity					
Non-Hispanic White	4,738	69.2	87.2	93.4	****
Non-Hispanic Black	2,852	20.0	9.3	4.9	
Mexican-Americans	2,679	10.8	3.5	1.7	
Education					
< High school	3,709	42.1	20.8	7.5	****
High school graduate	3,326	35.6	42.2	28.5	
> High school	3,234	22.3	37.0	64.0	
Age					
20-29 yrs	1,997	30.3	20.6	13.7	****
30-39 yrs	2,239	23.7	27.8	24.2	
40-49 yrs	1,783	13.5	19.1	26.2	
50-59 yrs	1,219	9.1	10.3	17.3	
60+ yrs	3,031	23.4	22.2	18.6	
Marital status					
Married	6,676	54.5	70.9	77.3	****
Widowed, divorced, or separated	2,038	27.9	15.2	11.2	
Never married or living with partner	1,555	17.7	13.9	11.5	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	7,047	57.1	66.5	75.5	****
Smoker	3,222	42.9	33.5	24.5	
Alcohol intake (# of drinks/wk)	10,269	4±0.3	4±0.3	4±0.2	NS
Leisure time activity/month					
No activities	1,885	20.2	12.4	6.7	****
1st quintile	2,118	20.9	19.9	15.8	
2nd quintile	1,451	12.7	17.9	17.1	
3rd quintile	1,465	14.0	15.5	17.5	
4th quintile	1,935	19.1	21.1	23.8	
5th quintile	1,415	13.2	13.3	19.2	

Table 11 (cont'd)

Variables		Total (%) Low	Middle	High	P^2
Lifestyle factors (cont'd)					
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	10,269	27.1±0.2	27.0±0.2	26.4±0.2	**
Weight status					
Normal weight	3,915	42.9	42.4	43.9	**
Overweight	3,733	32.0	33.9	36.9	
Obese	2,621	25.1	23.7	19.2	
Perceived own weight status					
Underweight	518	5.7	4.6	2.8	***
About right	4,352	41.8	38.6	39.8	
Overweight	5,399	52.5	56.8	57.4	
Weight status assessment					
Under-assessor	2,244	19.6	16.0	15.0	***
Accurate assessor	7,209	71.0	73.2	71.3	
Over-assessor	816	9.5	10.8	13.6	
Desired weight changes					
Weigh more	706	8.3	7.7	4.3	****
Stay about the same	3,531	33.7	26.6	28.7	
Weigh less	6,032	58.0	65.7	67.0	

Table 11 (cont'd)

Variables		Total (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight					
Yes	3,990	37.4	43.3	46.6	****
No	6,279	62.6	56.7	53.4	
Component 1[3]	10,269	6.3±0.0	6.5±0.0	6.6±0.0	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	8,526	86.0	79.7	70.0	****
Consumer	1,743	14.0	20.3	30.0	
Breakfast consumption					
Yes	7,986	74.9	80.7	82.5	****
No	2,283	25.1	19.3	17.5	
Energy intake (kcal/d)	10,269	2,204±39	2,327±26	2,302±39	**
Fat intake					
≤ 30% of energy from fat	3,612	34.7	31.3	35.4	*
> 30% of energy from fat	6,657	65.4	68.7	64.6	
Number of eating occasions					
≤ 3 times/day	2,780	27.9	16.9	16.2	****
4 times/day	2,777	27.7	24.1	22.3	
5 times/day	2,197	20.6	24.1	27.5	
6 times/day	1,261	12.0	16.5	13.8	
≥ 7 times/day	1,253	11.8	18.3	20.2	
Energy intake reporting status					
Under-reporter	2,327	24.4	17.5	17.5	****
Adequate-reporter	7,407	68.6	76.6	77.3	
Over-reporter	535	7.0	5.9	5.3	

Table 11 (cont'd)

Variables	n	Men (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	5,679	24.4	34.3	41.3	
Race/ethnicity					
Non-Hispanic White	2,539	67.4	87.0	93.1	****
Non-Hispanic Black	1,516	19.1	9.0	5.1	
Mexican-Americans	1,624	13.5	3.9	1.9	
Education					
< High school	2,283	45.3	23.8	8.3	****
High school graduate	1,626	31.7	38.0	26.9	
> High school	1,770	23.0	38.2	64.8	
Age					
20-29 yrs	1,131	32.0	23.4	14.0	****
30-39 yrs	1,136	22.8	27.9	24.7	
40-49 yrs	945	14.6	18.7	25.7	
50-59 yrs	649	8.7	9.2	17.6	
60+ yrs	1,818	21.9	20.8	18.0	
Marital status					
Married	4,064	64.4	74.0	77.8	****
Widowed, divorced, or separated	707	14.6	9.2	9.2	
Never married or living with partner	908	21.0	16.9	13.0	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	3,776	55.8	63.7	73.2	****
Smoker	1,903	44.2	36.3	26.8	
Alcohol intake (# of drinks/wk)	5,679	7±0.5	6±0.5	6±0.3	NS
Leisure time activity/month					
No activities	866	17.3	9.2	5.6	****
1st quintile	1,061	19.4	19.3	12.9	
2nd quintile	803	12.1	17.1	16.6	
3rd quintile	851	14.6	16.4	18.2	
4th quintile	1,140	20.5	22.0	24.7	
5th quintile	958	16.1	15.9	22.0	

Table 11 (cont'd)

Variables		Men (%) Low	Middle	High	P^2
Lifestyle factors (cont'd)					
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	5,679	26.5±0.2	27.1±0.2	26.7±0.2	NS
Weight status					
Normal weight	2,113	43.2	36.8	36.9	*
Overweight	2,368	36.7	41.4	45.0	
Obese	1,198	20.1	21.8	18.0	
Perceived own weight status					
Underweight	371	8.7	6.5	3.9	****
About right	2,970	53.6	44.7	46.2	
Overweight	2,338	37.7	48.8	50.0	
Weight status assessment					
Under-assessor	1,752	30.2	24.6	23.3	***
Accurate assessor	3,746	67.1	71.5	70.2	
Over-assessor	181	2.7	3.9	6.5	
Desired weight changes					
Weigh more	535	13.1	12.0	6.4	****
Stay about the same	2,502	44.8	32.2	34.8	
Weigh less	2,642	42.2	55.8	58.8	

Table 11 (cont'd)

Variables		Men (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight					
Yes	1,567	21.7	33.6	36.1	****
No	4,112	78.3	66.4	63.9	
Component 1[3]	5,679	5.8±0.1	6.2±0.1	6.4±0.1	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	4,619	84.8	78.1	68.2	****
Consumer	1,060	15.2	21.9	31.9	
Breakfast consumption					
Yes	4,350	75.2	78.0	80.0	NS
No	1,329	24.8	22.0	20.0	
Energy intake (kcal/d)	5,679	2,642±54	2,745±36	2,692±47	NS
Fat intake					
≤ 30% of energy from fat	1,971	34.1	29.9	33.0	NS
> 30% of energy from fat	3,708	65.9	70.2	67.0	
Number of eating occasions					
≤ 3 times/day	1,619	28.0	18.8	18.0	****
4 times/day	1,536	29.0	22.2	22.3	
5 times/day	1,170	18.3	23.1	26.4	
6 times/day	650	12.2	16.4	12.5	
≥ 7 times/day	704	12.5	19.5	20.9	
Energy intake reporting status					
Under-reporter	1,075	20.0	13.9	12.1	****
Adequate-reporter	4,231	69.8	78.0	81.9	
Over-reporter	373	10.3	8.1	6.0	

Table 11 (cont'd)

Variables	n	Women (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	4,590	28.7	33.7	37.7	N/A
Male	N/A	N/A	N/A	N/A	
Race/ethnicity					
Non-Hispanic White	2,199	71.0	87.4	93.8	****
Non-Hispanic Black	1,336	21.0	9.5	4.7	
Mexican-Americans	1,055	8.1	3.1	1.5	
Education					
< High school	1,426	38.9	17.1	6.3	****
High school graduate	1,700	39.6	47.3	30.7	
> High school	1,464	21.6	35.6	63.0	
Age					
20-29 yrs	866	28.6	17.1	13.2	****
30-39 yrs	1,103	24.6	27.6	23.5	
40-49 yrs	838	12.3	19.6	26.9	
50-59 yrs	570	9.5	11.8	16.9	
60+ yrs	1,213	24.9	23.9	19.5	
Marital status					
Married	2,612	44.3	67.0	76.7	****
Widowed, divorced, or separated	1,331	41.4	22.6	13.9	
Never married or living with partner	647	14.3	10.4	9.5	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	3,271	58.3	70.0	78.5	****
Smoker	1,319	41.7	30.0	21.5	
Alcohol intake (# of drinks/wk)	4,590	2±0.2	2±0.2	3±0.2	*
Leisure time activity/month					
No activities	1,019	23.1	16.2	8.0	****
1st quintile	1,057	22.3	20.5	19.5	
2nd quintile	648	13.4	18.9	17.7	
3rd quintile	614	13.3	14.5	16.6	
4th quintile	795	17.8	19.9	22.6	
5th quintile	457	10.1	10.1	15.5	

Table 11 (cont'd)

Variables		Women (%) Low	Middle	High	P^2
Lifestyle factors (cont'd)					
Reproductive history					
Breast fed your child					
Yes	2,068	46.3	44.2	41.8	****
No	1,853	42.7	40.3	32.0	
Never been pregnant	669	11.0	15.5	26.1	
Number of live birth					
0 and never been pregnant	669	11.0	15.5	26.1	****
1	807	18.4	17.9	16.5	
2	1,227	26.2	30.8	34.7	
3	797	18.6	19.2	13.2	
4	479	12.5	7.9	5.5	
≥ 5	611	13.4	8.7	4.0	
Age at the first menarche					
≤ 11 yrs old	950	18.9	19.0	21.1	NS
12-15 yrs old	3,356	75.0	76.1	74.1	
≥ 16 yrs old	284	6.1	5.0	4.8	
Weight status and related perceptions and behaviors					
BMI	4,590	27.7±0.3	26.8±0.3	26.0±0.3	****
Weight status					
Normal weight	1,802	42.6	49.3	53.0	***
Overweight	1,365	27.2	24.7	26.3	
Obese	1,423	30.2	26.0	20.7	
Perceived own weight status					
Underweight	147	2.7	2.3	1.4	NS
About right	1,382	29.7	31.1	31.4	
Overweight	3,061	67.6	66.6	67.2	
Weight status assessment					
Under-assessor	492	8.7	5.5	4.2	****
Accurate assessor	3,463	75.0	75.2	72.8	
Over-assessor	635	16.3	19.2	23.0	
Desired weight changes					
Weigh more	171	3.5	2.5	1.6	*
Stay about the same	1,029	22.4	19.6	20.8	
Weigh less	3,390	74.1	77.9	77.7	

Table 11 (cont'd)

Variables		Women (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight					
Yes	2,423	53.3	55.2	60.4	NS
No	2,167	46.7	44.8	39.6	
Component 1[3]	4,590	6.9±0.1	7.0±0.0	7.0±0.1	NS
Dietary behaviors					
Restaurant food consumption					
Non-consumer	3,907	87.3	81.6	72.5	****
Consumer	683	12.7	18.4	27.5	
Breakfast consumption					
Yes	3,636	74.7	84.0	85.8	****
No	954	25.3	16.0	14.2	
Energy intake (kcal/d)	4,590	1,758±29	1,816±26	1,789±3[illegible]	NS
Fat intake					
≤ 30% of energy from fat	1,641	35.2	33.1	38.6	NS
> 30% of energy from fat	2,949	64.8	66.9	61.4	
Number of eating occasions					
≤ 3 times/day	1,161	27.8	14.5	13.9	****
4 times/day	1,241	26.3	26.4	22.4	
5 times/day	1,027	22.9	25.5	29.0	
6 times/day	612	11.8	16.7	15.5	
≥ 7 times/day	549	11.1	17.0	19.3	
Energy intake reporting status					
Under-reporter	1,252	28.9	21.8	24.5	*
Adequate-reporter	3,176	67.5	74.9	71.2	
Over-reporter	162	3.7	3.3	4.3	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; underweight subjects; and those who did not have all the responses on the predictors included in the regression.

[2] Based on the chi-square test except alcohol, energy intakes, and BMI; differences in alcohol, energy intakes, and BMI by income levels were tested by ANOVA.

[3] Sum of responses to perceived weight status, desired weight status, and attempt to lose weight

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

changes in 1999-2002 from 1988-94 in low-income subjects were: increase in the percent of Mexican-Americans (4.4%); decrease in the percent of subjects with high school degree (-4.4%) and increase in the percent of subjects with more than high school education (8.2%); increase in the percent of subjects aged 40-49 years old (4.8%); decrease in the percent of married subjects (-9.6%); increase in alcohol consumption (1 drink/week); increase in the percent of subjects who did not participate in any leisure-time activity in the past month (24.9%); increase in the percent of subjects who under-assessed their weight status (5.3%); decrease in the percent of subjects who attempted to lose weight in the past year (-10%); and decrease in the percent of subjects who consumed more than 30% of energy from fat (-4.9%). In low-income women, the percent of women who had 2 live births decreased (-5.0%).

Noticeable changes in 1999-2002 from 1988-94 in middle-income subjects were: increase in the percent of Mexican-Americans (4.5%) and decrease in the percent of whites (-5.6%); decrease in the percent of subjects with high school degree (-9.7%) and increase in the percent of subjects with more than high school education (12.0%); increase in the percent of subjects aged 60+ years old (5.5%) and decrease in the percent of subjects aged 20-29 years old (-5.4%); decrease in the percent of married subjects (-10.4%); increase in the percent of subjects who did not participate in any leisure-time activity in the past month (22.4%); and decrease in the percent of subjects who over-assessed their weight status (-4.6%); and decrease in the percent of subjects who attempted to lose weight in the past year (-8.8%).

Noticeable changes in 1999-2002 from 1988-94 in high-income subjects were: decrease in the percent of subjects with high school degree (-7.3%) and increase in the

percent of subjects with more than high school education (8.0%); decrease in the percent of subjects aged 30-39 years old (-7.1%) and increase in the percent of subjects aged 40-59 years old (10.8%); increase in the percent of non-smokers (4.7%); increase in the percent of subjects who did not participate in any leisure time activity in the past month (14.7%); increase in the percent of subjects who assessed their weight status accurately (6.0%) and decrease in the percent of subjects who over-assessed their weight status (-4.0%); decrease in the percent of subjects who attempted to lose weight in the past year (-6.4%); and increase in the percent of subjects who ate meals 6 times/day (4.2%). In high-income women, the percent of subjects who breastfed their children increased (6.7%), while the percent of subjects who had never been pregnant decreased (-7.9%). In addition, the percent of women who had no live births or who had never been pregnant decreased (-7.9%), while the percent of women with 3 live births increased (5.0%).

4. Racial/ethnic subpopulation groups

In 1999-2002: Subjects' characteristics differed significantly by race/ethnicity except smoking status, alcohol intakes, and energy intakes (Table 12). The percent of low-income subjects was highest among Mexican-Americans (55.6%), followed by blacks (47.4%) and whites (22.8%). Difference in education levels by race/ethnicity followed the same pattern. Mexican-Americans had a higher percent of young adults (aged 20-29 years old) than whites and blacks (33.2 vs. 14.8 and 18.2%, respectively).

Blacks had a lower percent of married subjects than whites and Mexican-Americans (34.8 vs. 66.1 and 63.7%, respectively). Mexican-Americans had a higher percent of subjects who watched TV or used computers for a short time (≤1 hour/day) than whites and blacks (35.9 vs. 29.5 and 21.8%, respectively), while blacks had a higher

Table 12. Subjects' characteristics by race/ethnicity and gender in 1999-2002[1]

Variables	n	Total (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	1,733	47.0	47.2	35.9	****
Male	2,283	53.0	52.9	64.1	
Poverty Income Ratio (PIR)					
≤ 1.85	1,495	22.8	47.4	55.6	****
1.86-3.5	1,047	24.0	26.5	26.0	
> 3.5	1,474	53.2	26.1	18.4	
Education					
< High school	1,267	13.4	32.8	54.8	****
High school graduate	948	27.9	23.7	18.2	
> High school	1,801	58.7	43.5	27.0	
Age					
20-29 yrs	602	14.8	18.2	33.2	****
30-39 yrs	657	19.6	23.8	26.7	
40-49 yrs	818	24.6	28.4	21.8	
50-59 yrs	562	18.1	14.0	9.5	
60+ yrs	1,377	23.0	15.6	8.9	
Marital status					
Married	2,451	66.1	34.8	63.7	****
Widowed, divorced, or separated	778	15.8	26.1	10.0	
Never married or living with partner	787	18.1	39.2	26.4	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	2,944	71.0	65.3	72.8	NS
Smoker	1,072	29.0	34.7	27.2	
Daily hrs of TV, video or computer use					
≤ 1 hr	1,119	29.5	21.8	35.9	****
2-3 hrs	1,845	47.7	40.7	45.3	
≥ 4 hrs	1,052	22.9	37.5	18.7	
Alcohol consumption (# drinks/wk)	4,016	4±0.2	5±1.0	5±0.4	NS

Table 12 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	932	23.9	29.3	15.4	****
Walk a lot	2,132	49.1	52.3	54.0	
Carry light or heavy loads	952	27.0	18.5	30.6	
Leisure time activity/month					
No activities	1,560	28.0	47.0	46.5	****
1st quintile	511	14.9	12.5	13.1	
2nd quintile	480	14.0	9.2	11.8	
3rd quintile	512	14.3	10.1	10.7	
4th quintile	479	14.4	10.5	8.9	
5th quintile	474	14.4	10.6	9.0	
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	4,016	27.7±0.2	29.3±0.3	27.9±0.2	***
Weight status					
Normal weight	1,327	37.4	31.7	31.1	***
Overweight	1,496	34.3	32.1	41.2	
Obese	1,193	28.3	36.2	27.7	

Table 12 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	194	3.9	7.8	5.5	****
About right	1,646	36.9	42.9	44.2	
Overweight	2,176	59.2	49.3	50.3	
Weight status assessment					
Under-assessor	1,535	15.7	28.7	27.7	****
Accurate assessor	4,692	75.5	68.9	68.3	
Over-assessor	371	8.8	2.5	4.0	
Desired weight changes					
Weigh more	245	5.3	11.0	7.6	****
Stay about the same	1,378	28.1	39.3	36.7	
Weigh less	2,393	66.6	49.7	55.8	
Attempt to lose weight in the past year					
Yes	1,312	36.3	29.0	32.3	*
No	2,704	63.7	71.0	67.7	
Attempt not to gain weight in the past year					
Yes	1,449	41.6	30.0	31.5	***
No	2,567	58.5	70.0	68.6	
Component 1[4]	4,016	5.2±0.0	4.8±0.1	4.9±0.1	****
Component 1[5]	4,016	6.5±0.0	6.1±0.1	6.3±0.1	****
Component 2[6]	4,016	2.8±0.0	2.6±0.0	2.6±0.0	***
Restaurant food consumption					
< 1 time/wk	1,870	18.0	29.8	24.6	****
1 time/wk	1,525	21.5	21.4	26.0	
2-3 times/wk	1,786	28.6	28.6	26.9	
≥ 4 times/wk	1,432	32.0	20.2	22.5	
Breakfast consumption					
Yes	1,372	81.8	70.2	73.5	****
No	5,238	18.2	29.8	26.5	
Energy intake (kcal/d)	4,016	2,290±25	2,260±51	2,305±38	NS

Table 12 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Dietary behaviors					
Fat intake					
≤ 30% of energy from fat	2,576	33.7	38.0	47.0	****
> 30% of energy from fat	4,038	66.3	62.0	53.0	
Number of eating occasions					
≤ 3 times/day	1,656	17.7	30.8	26.8	****
4 times/day	1,761	24.0	30.5	28.4	
5 times/day	1,469	23.6	20.3	22.1	
6 times/day	907	16.9	10.5	12.5	
≥ 7 times/day	817	17.7	8.0	10.2	
Energy intake reporting status					
Under-reporter	1,596	18.3	28.2	18.7	****
Adequate-reporter	4,727	76.9	65.4	74.7	
Over-reporter	292	7.8	6.4	6.7	

Table 12 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	2,283	81.7	9.4	9.0	
Poverty Income Ratio (PIR)					
≤ 1.85	838	20.2	44.1	57.0	****
1.86-3.5	582	24.0	25.1	25.2	
> 3.5	863	55.9	30.7	17.9	
Education					
< High school	783	14.2	35.4	57.5	****
High school graduate	522	27.4	23.6	19.5	
> High school	978	58.4	41.0	23.0	
Age					
20-29 yrs	366	16.2	21.1	36.4	****
30-39 yrs	366	19.8	22.5	27.1	
40-49 yrs	446	24.2	28.1	20.0	
50-59 yrs	299	16.8	13.1	9.3	
60+ yrs	806	23.0	15.1	7.3	
Marital status					
Married	1,490	68.1	39.2	64.3	****
Widowed, divorced, or separated	294	10.5	17.0	5.9	
Never married or living with partner	499	21.4	43.8	29.9	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,608	68.3	59.3	67.9	NS
Smoker	675	31.7	40.7	32.2	
Daily hrs of TV, video or computer use					
≤ 1 hr	586	26.4	17.8	35.2	****
2-3 hrs	1,092	49.2	45.0	46.8	
≥ 4 hrs	605	24.4	35.2	18.0	
Alcohol consumption (# drinks/wk)	2,283	6±0.3	7±1.7	7±0.6	NS

Table 12 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	498	23.0	26.0	10.5	****
Walk a lot	1,137	44.6	49.5	51.7	
Carry light or heavy loads	648	32.5	24.5	37.9	
Leisure time activity/month					
No activities	843	25.3	42.5	46.4	****
1st quintile	309	16.6	12.6	14.0	
2nd quintile	264	12.6	9.1	12.6	
3rd quintile	283	13.8	11.8	8.7	
4th quintile	286	14.7	13.3	8.9	
5th quintile	298	17.0	10.7	9.5	
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	2,283	27.7±0.2	27.4±0.4	27.5±0.3	NS
Weight status					
Normal weight	727	32.6	38.7	32.8	NS
Overweight	987	41.7	37.1	43.9	
Obese	569	25.7	24.3	23.3	

Table 12 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	150	6.2	10.8	7.2	***
About right	1,121	43.6	55.3	53.1	
Overweight	1,012	50.2	34.0	39.7	
Weight status assessment					
Under-assessor	721	24.8	37.9	35.8	****
Accurate assessor	1,518	73.1	61.4	62.3	
Over-assessor	44	2.1	0.7	1.9	
Desired weight changes					
Weigh more	198	9.2	15.4	9.6	****
Stay about the same	970	34.3	50.9	45.3	
Weigh less	1,115	56.5	33.7	45.1	
Attempt to lose weight in the past year					
Yes	556	27.3	17.9	22.7	**
No	1,727	72.7	82.1	77.3	
Attempt not to gain weight in the past year					
Yes	685	35.8	24.1	21.9	***
No	1,598	64.2	75.9	78.1	
Component 1[4]	2,283	5.0±0.0	4.4±0.1	4.7±0.1	****
Component 1[5]	2,283	6.2±0.0	5.6±0.1	5.9±0.1	****
Component 2[5]	2,283	2.6±0.0	2.4±0.0	2.5±0.0	***
Restaurant food consumption					
< 1 time/wk	586	16.0	27.5	24.8	***
1 time/wk	471	19.2	19.7	21.9	
2-3 times/wk	602	26.9	28.9	27.3	
≥ 4 times/wk	624	37.9	23.9	25.9	
Breakfast consumption					
Yes	1,787	80.7	67.1	71.2	****
No	496	19.3	32.9	28.9	
Energy intake (kcal/d)	2,283	2,666±36	2,514±58	2,596±47	NS

Table 12 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Dietary behaviors					
Fat intake					
≤ 30% of energy from fat	909	34.0	40.3	52.1	****
> 30% of energy from fat	1,374	66.0	59.7	48.0	
Number of eating occasions					
≤ 3 times/day	541	18.9	30.5	27.7	****
4 times/day	622	24.2	32.7	28.0	
5 times/day	500	22.1	19.1	22.6	
6 times/day	327	17.5	12.0	11.9	
≥ 7 times/day	293	17.4	5.8	10.0	
Energy intake reporting status					
Under-reporter	448	16.6	26.7	15.6	***
Adequate-reporter	1,703	77.0	66.9	75.7	
Over-reporter	132	6.4	6.4	8.7	

Table 12 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	1,733	84.4	9.8	5.9	N/A
Male	N/A	N/A	N/A	N/A	
Poverty Income Ratio (PIR)					
≤ 1.85	657	25.9	51.1	53.2	****
1.86-3.5	465	24.1	28.0	27.4	
> 3.5	611	50.1	20.9	19.4	
Education					
< High school	484	12.6	30	49.9	****
High school graduate	426	28.4	23.8	15.9	
> High school	823	59.1	46.3	34.2	
Age					
20-29 yrs	236	13.3	14.9	27.4	***
30-39 yrs	291	19.4	25.3	26.1	
40-49 yrs	372	24.9	28.7	25.0	
50-59 yrs	263	19.5	14.9	9.8	
60+ yrs	571	22.9	16.3	11.6	
Marital status					
Married	961	64.0	29.7	62.6	****
Widowed, divorced, or separated	484	21.8	36.3	17.4	
Never married or living with partner	288	14.3	34.0	20.1	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,336	74.1	72.0	81.7	**
Smoker	397	25.9	28.0	18.4	
Daily hrs of TV, video or computer use					
≤ 1 hr	533	33.0	26.3	37.2	****
2-3 hrs	753	45.9	33.7	42.7	
≥ 4 hrs	447	21.1	40.0	20.1	
Alcohol consumption (# drinks/wk)	1,733	2±0.2	2±0.5	2±0.2	**

Table 12 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	434	24.9	33.0	24.1	**
Walk a lot	995	54.2	55.4	58.2	
Carry light or heavy loads	304	20.9	11.7	17.8	
Leisure time activity/month					
No activities	717	31	52.1	46.8	***
1st quintile	202	12.9	12.4	11.5	
2nd quintile	216	15.7	9.3	10.4	
3rd quintile	229	14.9	8.2	14.2	
4th quintile	193	14.0	7.4	9.0	
5th quintile	176	11.5	10.6	8.2	
Reproductive history					
Breast fed your child[3]					
Yes	866	47.0	41.7	64.4	****
No	628	36.2	48.9	21.5	
Never been pregnant	239	16.8	9.4	14.1	
Number of live birth[3]					
0 and never been pregnant	239	16.8	9.4	14.1	**
1	255	15.9	22.1	15.3	
2	455	31.6	28.1	21.2	
3	377	20.8	20.0	24.8	
4	181	7.6	10.7	11.4	
≥ 5	226	7.3	9.8	13.2	
Age at the first menarche[3]					
≤ 11 yrs old	312	16.8	22.5	20.9	NS
12-15 yrs old	1,310	77.2	68.5	75.1	
≥ 16 yrs old	111	6.0	9.1	4.0	
Weight status and related perceptions and behaviors					
BMI	1,733	27.8±0.2	31.6±0.3	28.7±0.4	****
Weight status					
Normal weight	600	42.7	23.8	28.0	****
Overweight	509	26.1	26.6	36.4	
Obese	624	31.2	49.7	35.6	

Table 12 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	44	1.3	4.4	2.6	NS
About right	525	29.4	29.0	28.3	
Overweight	1,164	69.3	66.6	69.1	
Weight status assessment					
Under-assessor	196	5.5	18.3	13.1	****
Accurate assessor	1,349	78.3	77.2	79.1	
Over-assessor	188	16.3	4.5	7.8	
Desired weight changes					
Weigh more	47	1.0	6.1	3.9	**
Stay about the same	408	21.0	26.3	21.2	
Weigh less	1,278	78.0	67.6	74.9	
Attempt to lose weight in the past year					
Yes	756	46.4	41.4	49.4	NS
No	977	53.6	58.6	50.6	
Attempt not to gain weight in the past year					
Yes	764	48.1	36.6	48.5	*
No	969	51.9	63.4	51.5	
Component 1[4]	1,733	5.5±0.0	5.2±0.1	5.4±0.1	**
Component 1[5]	1,733	6.9±0.0	6.7±0.1	6.9±0.1	*
Component 2[6]	1,733	2.9±0.0	2.8±0.1	3.0±0.1	NS
Restaurant food consumption					
< 1 time/wk	474	20.1	32.5	24.2	***
1 time/wk	438	24.0	23.3	33.4	
2-3 times/wk	488	30.5	28.3	26.2	
≥ 4 times/wk	333	25.4	16.0	16.2	
Breakfast consumption					
Yes	1,419	83.0	73.7	77.6	**
No	314	17.0	26.3	22.4	
Energy intake (kcal/d)	1,733	1,867±24	1,975±66	1,785±36	NS

Table 12 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Dietary behaviors					
Fat intake					
≤ 30% of energy from fat	633	33.4	35.4	38.0	NS
> 30% of energy from fat	1,100	66.6	64.6	62.0	
Number of eating occasions					
≤ 3 times/day	369	16.8	31.2	25.2	****
4 times/day	457	23.7	28.0	29.3	
5 times/day	415	25.2	21.7	21.3	
6 times/day	249	16.2	8.8	13.6	
≥ 7 times/day	243	18.2	10.4	10.7	
Energy intake reporting status					
Under-reporter	403	20.2	29.9	24.2	*
Adequate-reporter	1,277	76.7	63.7	72.8	
Over-reporter	53	3.1	6.4	3.0	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; non-whites, blacks, or -Mexican Americans; underweight subjects; and those who did not have all the responses on the predictors in the regression. Percent might not be add up to 100% due to rounding.

[2] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by income levels were tested by ANOVA.

[3] Based on females only.

[4] Sum of responses to perceived weight status and desired weight status

[5] Sum of responses to perceived weight status, desired weight status, and attempt to lose weight to make this variable comparable to the one in the NHANES 1988-94

[6] Sum of responses to attempt to lose weight and attempt not to gain weight

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

percent of subjects who watched TV or used computers for a long hours (≥4 hours/day) than whites and Mexican-Americans (37.5 vs. 22.9 and 18.7%, respectively). Mexican-Americans also had a lower percent of those who spent their days sitting than whites and blacks (15.4 vs. 23.9 and 29.3%, respectively), while blacks had a lower percent of subjects who spent their days carrying heavy or light loads than whites and Mexican-Americans (18.5 vs. 27.0 and 30.6%, respectively). As for leisure-time activity, Mexican-Americans and blacks had a higher percent of those who did not participate in any leisure-time activity in the past 30 days than whites (47.0 and 46.5 vs. 28.0%, respectively). Mean BMI was the highest among blacks, followed by Mexican-Americans and whites (29.3, 27.9, and 27.7, respectively). The percent of obese subjects was higher among blacks than whites and Mexican-Americans (36.2 vs. 28.3 and 27.7%, respectively), while the percent of overweight subjects was higher among Mexican-Americans than whites and blacks (41.2 vs. 34.3 and 32.1%, respectively). However, the percent of subjects who perceived themselves as overweight was higher among whites than Mexican-Americans and blacks (59.2 vs. 50.3 and 49.3%, respectively). The percent of subjects who wanted to weigh less and subjects who attempted to lose weight in the past year were also higher among whites than Mexican-Americans and blacks (66.6 vs. 55.8 and 49.7%, respectively for those who wanted to weigh less; 36.3 vs. 32.3 and 29.0%, respectively for those who attempted to lose weight).

The percent of those who ate restaurant food often (≥ 4 times/week) was higher among whites than Mexican-Americans and blacks (32.0 vs. 22.5 and 20.2%, respectively). The percent of breakfast skippers was higher among racial/ethnic minorities than whites (29.8 and 26.5 vs. 18.2% for blacks, Mexican-Americans, and

whites, respectively). The percent of subjects who had more than 30% of their energy from fat was lower among Mexican-Americans than whites and blacks (53.0 vs. 66.3 and 62.0%, respectively). The percent of subjects who ate meals/snacks often (≥ 5 times/day) was highest among whites, followed by Mexican-Americans and blacks (58.2, 44.8, and 38.8%, respectively). The percent of those who accurately reported their energy intakes was lower among blacks than whites and Mexican-Americans (65.4 vs. 76.9 and 74.7%, respectively).

In women, Mexican-Americans had a highest prevalence of women who breastfed their children, followed by whites and blacks (64.4, 47.0, and 41.7%, respectively).

Differences from 1988-94: Subjects' characteristics differed significantly by race/ethnicity except alcohol intakes (Table 13). Noticeable changes in subjects' characteristics in 1999-2002 from 1988-94 in whites were: decrease in the percent of middle-income subjects (-10.9%) and increase in the percent of high-income subjects (9.6%); increase in the percent of subjects with more than high school degree (12.2%); decrease in the percent of subjects aged 20-39 years old (-9.4%) and increase in the percent of subjects aged 40-59 years old (9.1%); decrease in the percent of married subjects (-5.6%); increase in the percent of subjects who did not participate in any leisure-time activity (17.3%); decrease in the percent of subjects of normal weight (-6.9%) and increase in the percent of obese subjects (7.0%); and decrease in the percent of subjects who attempted to lose weight in the past year (-7.7%).

Noticeable change in 1999-2002 from 1988-94 in blacks were: decrease in the percent of subjects with high school degree (-14.7%) and increase in the percent of subjects with more than high school degree (10.8%); decrease in the percent of subjects

Table 13. Subjects' characteristics by race/ethnicity and gender in 1988-94[1]

Variables	n	Total (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	4,590	45.6	48.1	37.6	****
Male	5,679	54.5	51.9	62.4	
Poverty Income Ratio (PIR)					
≤ 1.85	4,411	21.5	50.9	60.2	****
1.86-3.5	3,210	34.9	30.4	25.5	
> 3.5	2,648	43.6	18.7	14.4	
Education					
< High school	3,709	18.3	28.9	54.2	****
High school graduate	3,326	35.2	38.4	25.7	
> High school	3,234	46.5	32.7	20.1	
Age					
20-29 yrs	1,997	19.2	24.0	34.3	****
30-39 yrs	2,239	24.6	29.5	28.2	
40-49 yrs	1,783	20.5	21.0	19.2	
50-59 yrs	1,219	13.1	11.5	9.1	
60+ yrs	3,031	22.6	14.0	9.2	
Marital status					
Married	6,676	71.7	47.0	71.1	****
Widowed, divorced, or separated	2,038	16.2	25.7	11.2	
Never married or living with partner	1,555	12.1	27.3	17.7	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	7,047	68.4	59.3	70.6	****
Smoker	3,222	31.6	40.7	29.4	
Alcohol consumption (# drinks/wk)	10,269	4±0.2	5±0.2	5±0.3	NS
Leisure time activity/month					
No activities	1,885	10.7	18.9	23.0	****
1st quintile	2,118	18.0	20.4	23.5	
2nd quintile	1,451	16.8	13.4	12.6	
3rd quintile	1,465	16.2	14.7	12.7	
4th quintile	1,935	22.7	16.1	15.4	
5th quintile	1,415	15.6	16.5	12.9	

Table 13 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	10,269	26.6±0.1	27.9±0.2	27.4±0.2	****
Weight status					
Normal weight	3,915	44.3	37.2	34.5	****
Overweight	3,733	34.4	33.8	40.2	
Obese	2,621	21.3	29.0	25.3	
Perceived own weight status					
Underweight	518	3.8	7.8	4.0	****
About right	4,352	39.4	42.2	43.9	
Overweight	5,399	56.8	50.0	52.1	
Weight status assessment					
Under-assessor	2,244	15.2	24.8	23.6	****
Accurate assessor	7,209	72.2	70.2	69.9	
Over-assessor	816	12.6	5.1	6.5	
Desired weight changes					
Weigh more	706	5.9	12.0	5.3	****
Stay about the same	3,531	28.2	34.7	36.7	
Weigh less	6,032	65.9	53.3	58.0	

Table 13 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight in the past year					
Yes	3,990	44.0	38.0	36.4	****
No	6,279	56.0	62.0	63.7	
Component 1[4]	10,269	6.6±0.0	6.2±0.0	6.4±0.0	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	8,526	75.8	88.9	84.0	****
Consumer	1,743	24.2	11.1	16.0	
Breakfast consumption					
Yes	7,986	81.6	68.9	72.7	****
No	2,283	18.4	31.1	27.3	
Energy intake (kcal/d)	10,269	2,288±27	2,233±28	2,347±30	*
Fat intake					
≤ 30% of energy from fat	3,612	33.7	31.8	40.6	***
> 30% of energy from fat	6,657	66.3	68.2	59.5	
Number of eating occasions					
≤ 3 times/day	2,780	17.0	35.0	31.6	****
4 times/day	2,777	23.9	26.6	27.9	
5 times/day	2,197	25.3	19.5	21.1	
6 times/day	1,262	15.0	10.3	10.1	
≥ 7 times/day	1,253	18.9	8.6	9.3	
Energy intake reporting status					
Under-reporter	2,327	18.4	26.9	17.8	****
Adequate-reporter	7,407	75.7	67.1	75.3	
Over-reporter	535	5.9	6.0	6.9	

Table 13 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	5,679	84.7	9.9	5.4	
Poverty Income Ratio (PIR)					
≤ 1.85	2,391	19.4	47.2	60.8	****
1.86-3.5	1,784	35.2	31.5	24.9	
> 3.5	1,504	45.4	21.3	14.3	
Education					
< High school	2,283	19.4	31.7	56.9	****
High school graduate	1,626	31.9	36.6	23.2	
> High school	1,770	48.7	31.7	19.9	
Age					
20-29 yrs	1,131	20.1	25.6	37.5	****
30-39 yrs	1,136	24.8	28.8	27.9	
40-49 yrs	945	20.9	19.9	17.5	
50-59 yrs	649	12.9	11.5	8.5	
60+ yrs	1,818	21.3	14.3	8.6	
Marital status					
Married	4,064	75.4	54.4	74.4	****
Widowed, divorced, or separated	707	9.9	17.7	5.9	
Never married or living with partner	908	14.7	27.9	19.7	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	3,776	66.8	55.6	67.0	****
Smoker	1,903	33.2	44.4	33.0	
Alcohol consumption (# drinks/wk)	5,679	6±0.3	7±0.4	7±0.4	NS
Leisure time activity/month					
No activities	866	8.6	13.4	20.4	****
1st quintile	1,061	16.3	16.9	21.9	
2nd quintile	803	16.1	13.5	12.9	
3rd quintile	851	17.2	15.1	13.0	
4th quintile	1,140	23.7	18.2	16.4	
5th quintile	958	18.2	22.9	15.4	

Table 13 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	5,679	26.8±0.1	26.8±0.2	26.9±0.2	NS
Weight status					
Normal weight	2,113	38.3	41.5	34.6	**
Overweight	2,368	42.0	37.1	46.1	
Obese	1,198	19.7	21.5	19.4	
Perceived own weight status					
Underweight	371	5.5	10.1	4.7	****
About right	2,970	46.2	55.3	53.9	
Overweight	2,338	48.3	34.6	41.4	
Weight status assessment					
Under-assessor	1,752	24.0	34.9	31.2	****
Accurate assessor	3,746	70.9	63.4	66.0	
Over-assessor	181	5.1	1.8	2.8	
Desired weight changes					
Weigh more	535	9.4	16.4	6.8	****
Stay about the same	2,502	34.6	45.8	46.4	
Weigh less	2,642	56.0	37.8	46.8	

Table 13 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight in the past year					
Yes	1,567	33.0	24.4	25.6	****
No	4,112	67.0	75.6	74.4	
Component 1[4]	5,679	6.2±0.0	5.7±0.0	6.0±0.0	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	4,619	73.9	86.3	82.8	****
Consumer	1,060	26.1	13.7	17.2	
Breakfast consumption					
Yes	4,350	79.9	66.5	71.8	****
No	1,329	20.1	33.6	28.2	
Energy intake (kcal/d)	5,679	2,710±34	2,611±38	2,666±42	NS
Fat intake					
≤ 30% of energy from fat	1,971	31.6	31.3	43.4	***
> 30% of energy from fat	3,708	68.4	68.7	56.6	
Number of eating occasions					
≤ 3 times/day	1,619	18.2	36.5	31.6	****
4 times/day	1,536	23.3	26.5	28.7	
5 times/day	1,170	24.0	18.6	20.7	
6 times/day	650	14.6	9.5	8.8	
≥ 7 times/day	704	20.0	8.9	10.3	
Energy intake reporting status					
Under-reporter	1,075	13.9	21.7	13.5	****
Adequate-reporter	4,231	78.4	70.9	78.2	
Over-reporter	373	7.8	7.4	8.3	

Table 13 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	4,590	85.1	11.0	3.9	N/A
Male	N/A	N/A	N/A	N/A	
Poverty Income Ratio (PIR)					
≤ 1.85	2,020	23.9	54.9	59.2	****
1.86-3.5	1,426	34.6	29.2	26.3	
> 3.5	1,144	41.5	16.0	14.5	
Education					
< High school	1,426	17.0	26.0	49.8	****
High school graduate	1,700	39.1	40.3	29.9	
> High school	1,464	43.9	33.8	20.4	
Age					
20-29 yrs	866	18.1	22.3	28.9	****
30-39 yrs	1,103	24.4	30.2	28.7	
40-49 yrs	838	20.0	22.3	22.1	
50-59 yrs	570	13.4	11.5	10.2	
60+ yrs	1,213	24.2	13.7	10.1	
Marital status					
Married	2,612	67.3	39.1	65.6	****
Widowed, divorced, or separated	1,331	23.7	34.3	20.0	
Never married or living with partner	647	9.0	26.6	14.4	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	3,271	70.4	63.3	76.7	****
Smoker	1,319	29.6	36.7	23.4	
Alcohol consumption (# drinks/wk)	4,590	2±0.2	2±0.2	2±0.2	NS
Leisure time activity/month					
No activities	1,019	13.3	24.8	27.4	****
1st quintile	1,057	20.0	24.1	26.1	
2nd quintile	648	17.6	13.2	12.0	
3rd quintile	614	15.1	14.3	12.3	
4th quintile	795	21.4	14.0	13.6	
5th quintile	457	12.6	9.7	8.6	

Table 13 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Reproductive history					
Breast fed your child[3]					
Yes	2,068	44.7	34.5	52.8	****
No	1,853	36.0	54.2	32.8	
Never been pregnant	669	19.3	11.3	14.4	
Number of live birth[3]					
0 and never been pregnant	669	19.3	11.3	14.4	****
1	807	16.8	24.0	14.5	
2	1,227	31.9	26.8	21.6	
3	797	16.8	16.0	18.7	
4	479	8.0	8.4	14.5	
≥ 5	611	7.3	13.5	16.4	
Age at the first menarche[3]					
≤ 11 yrs old	950	19.1	22.5	25.3	****
12-15 yrs old	3,356	76.0	69.0	71.0	
≥ 16 yrs old	284	4.9	8.5	3.7	
Weight status and related perceptions and behaviors					
BMI	4,590	26.4±0.2	29.1±0.3	28.3±0.3	****
Weight status					
Normal weight	1,802	51.5	32.6	34.3	****
Overweight	1,365	25.3	30.3	30.5	
Obese	1,423	23.2	37.1	35.2	
Perceived own weight status					
Underweight	147	1.7	5.3	2.9	****
About right	1,382	31.3	28.0	27.3	
Overweight	3,061	67.0	66.7	69.9	
Weight status assessment					
Under-assessor	492	4.7	13.9	11.0	****
Accurate assessor	3,463	73.8	77.4	76.3	
Over-assessor	635	21.6	8.6	12.7	
Desired weight changes					
Weigh more	171	1.8	7.2	2.8	****
Stay about the same	1,029	20.6	22.8	20.6	
Weigh less	3,390	77.6	70.0	76.6	

Table 13 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight in the past year					
Yes	2,423	57.2	52.7	54.1	NS
No	2,167	42.8	47.3	45.9	
Component 1[4]	4,590	7.0±0.0	6.8±0.1	7.0±0.0	**
Dietary behaviors					
Restaurant food consumption					
Non-consumer	3,907	78.0	91.8	86.0	****
Consumer	683	22.0	8.3	14.0	
Breakfast consumption					
Yes	3,636	83.7	71.6	74.4	****
No	954	16.3	28.4	25.6	
Energy intake (kcal/d)	4,590	1,783±23	1,825±29	1,818±29	NS
Fat intake					
≤ 30% of energy from fat	1,641	36.2	32.3	35.8	NS
> 30% of energy from fat	2,949	63.8	67.7	64.3	
Number of eating occasions					
≤ 3 times/day	1,161	15.5	33.4	31.6	****
4 times/day	1,241	24.5	26.8	26.7	
5 times/day	1,027	27.0	20.6	21.8	
6 times/day	612	15.4	11.1	12.3	
≥ 7 times/day	549	17.6	8.2	7.6	
Energy intake reporting status					
Under-reporter	1,252	23.9	32.6	24.9	***
Adequate-reporter	3,176	72.5	63.1	70.6	
Over-reporter	162	3.7	4.4	4.6	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; underweight subjects; and those who did not have all the responses on the predictors used in regression.

[2] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by income levels were tested by ANOVA. [3]Based on females only.

[4] Sum of responses to perceived weight status, desired weight status, and attempt to lose weight

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

aged 20-39 years old (-11.5%) and increase in the percent of subjects aged 40-49 years old (7.4%); decrease in the percent of married subjects (-12.2%); increase in the percent of non-smokers (6.0%); increase in the percent of subjects who did not participate in any leisure-time activity (28.1%); decrease in the percent of normal weight subjects (-5.5%) and increase in the percent of obese subjects (7.2%); decrease in the percent of subjects who attempted to lose weight in the past year (-9.0%); and decrease in the percent of subjects who ate more than 30% of energy from fat (-6.2%). In black women, the percent of women who breastfed their children increased (7.2%).

Noticeable change in 1999-2002 from 1988-94 in Mexican-Americans were: decrease in the percent of subjects with high school degree (-7.5%) and increase in the percent of subjects with more than high school degree (6.9%); decrease in the percent of married subjects (-7.4%); increase in the percent of subjects who did not participate in any leisure-time activity (23.5%); and decrease in the percent of subjects who ate more than 30% of energy from fat (-6.5%). In Mexican-American women, the percent of women who breastfed their children increased (11.6%) and the percent of women who had 3 live births also increased (6.1%).

5. Subpopulation groups by income and gender

Gender differences in associations between income and various variables (in 1999-2002):

Most of the significant income differences in subjects' characteristics in the population remained when the subjects were further categorized by gender (Table 10). However, there were some exceptions. For example, alcohol intake did not differ significantly by the income level in the population. When subjects were further categorized by gender, however, it was significantly different in men (7, 7, and 6

drinks/week for the low-, middle-, and high-income group, respectively at $p<0.05$). Non-leisure time activity did not differ significantly by the income level in the population, while it differed significantly in men ($p<0.05$). The percent of subjects who spent their days carrying heavy or light loads was higher among low- and middle-income men than high-income men (34.3 and 36.2 vs. 29.2%, respectively). Mean BMI did not differ significantly by the income level in the population. When subjects were categorized by gender, however, it differed significantly by the income level in women ($p<0.01$). Mean BMI was highest among low-income women, followed by middle- and high-income women (29.4, 28.6, and 27.3, respectively). Weight status categorized into normal, overweight, and obese, using BMI cut-point differed significantly by the income level in the population ($p<0.05$). However, it did not differ significantly in men. Mean score on the desired weight status (component 1) differed significantly by the income level in the total population ($p<0.0001$), while it did not differ significantly in women.

In addition to significant income differences between men and women, some of the percent values differed noticeably between men and women. For example, the percent of smokers decreased as the income level increased for men and women. However, 23.2% of high-income men smoked, while only 15.6% of high-income women smoked (Table 10). The percent of subjects who did not participate in any leisure time activities in the past 30 days decreased as the income level increased for men and women. However, this percent for high-income men vs. high-income women was very different (18.6 vs. 25.0%). The percent of subjects who wanted to weigh less increased as the income level increased for men and women. However, while 40.0% of low-income men wanted to weigh less, 72.0% of low-income women wanted to weigh less. Thus, these

absolute value differences may have contributed to the difference in the weight-income relationship between men and women.

Gender differences in associations between income and various variables (in 1988-94):

Most of the differences in subjects' characteristics by the income level observed in the total population remained when the subjects were further categorized by gender (Table 11). However, there were some exceptions. For example, alcohol intake did not differ significantly by the income level in the total population. However, it differed significantly by the income level in women (2, 2, 3 drinks/week at $p<0.05$ for the low-, middle- and high-income group, respectively). Mean BMI differed significantly by the income level in the total population. When subjects were further categorized by gender, however, it did not differ significantly by the income level in men. Perception about subjects' own weight status differed significantly by the income level in the total population. When subjects were further categorized by gender, however, it did not differ significantly by the income level in women. Attempt to lose weight in the past year differed significantly by the income level in the total population. When subjects were further categorized by gender, however, it did not differ significantly in women. Mean score on the desired weight status (component 1) differed significantly in the total population. When subjects were further categorized by gender, however, it did not differ significantly in women. Breakfast consumption differed significantly by the income level in the total population. When subjects were further categorized by gender, however, it did not differ significantly in men. Mean energy intake differed significantly by the income level in the total population. When subjects were further categorized by gender, however, it did not differ significantly in men and women. Fat intake differed

significantly by the income level in the total population. When subjects were further categorized by gender, however, it did not differ significantly in men and women.

In addition to significant income differences between men and women, some of the percent values differed noticeably between men and women. For example, the percent of subjects with less than high school education decreased as the income level increased for men and women. However, while 45.3% of low-income men had less than high school education, 38.9% of low-income women had less than high school education. The percent of subjects who did not participate in any leisure time activity decreased as the income level increased for men and women. However, while 17.3% of low-income men did not participate in any leisure time activity, 23.1% of low-income women did not participate in any leisure time activity. The percent of subjects who wanted to weigh less increased as the income level increased for men and women. However, while 42.2% of low-income men wanted to weigh less, 74.1% of low-income women wanted to weigh less. Again, these absolute value differences may have contributed to the difference in the weight-income relationship between men and women.

Differences in subjects' characteristics among subpopulation groups by income and gender from 1988-94:

In 1988-94, subjects' characteristics in men were significantly different by the income level except alcohol intake, BMI, breakfast consumption, energy intake, and fat intake. Subjects' characteristics in women differed by the income level except age at first menarche, perception about own weight status, attempt to lose weight, component score on desired weight status, energy intake, and fat intake.

In 1999-2002, subjects' characteristics in men differed by the income level except alcohol intakes, weight status, and energy intake. Subjects' characteristics in women

differed by the income level except alcohol intake, non-leisure-time physical activity, breastfeeding experience, age at first menarche, component score on desired weight status, energy intake, fat intake, and energy intake reporting status.

Noticeable changes in 1999-2002 from 1988-94 in low-income men were: increase in the percent of Mexican-Americans (6.4%); increase in the percent of subjects with high school education (6.3%); decrease in the percent of married subjects (-13.3%); increase in the percent of subjects who did not participate in any leisure-time activity in the past month (26.9%); decrease in the percent of subjects of normal weight (-5.8%); increase in the percent of subjects who under-assessed their weight status (7.7%); and decrease in the percent of subjects who consumed more than 30% of energy from fat (-8.9%).

Noticeable changes in 1999-2002 from 1988-94 in middle-income men were: decrease in the percent of whites (-6.1%) and increase in the percent of Mexican-Americans (5.4%); decrease in the percent of subjects with high school degree (-5.6%) and increase in the percent of subjects with more than high school education (8.2%); decrease in the percent of subjects aged 30-39 years old (-5.2%) and increase in the percent of subjects aged 60+ years old (8.0%); decrease in the percent of married subjects (-12.3%); increase in alcohol intake (1 drink/week); increase in the percent of subjects who did not participate in any leisure-time activity in the past month (24.4%); decrease in the percent of subjects who wanted to weigh less (-5.6%); decrease in the percent of subjects who attempted to lose weight in the past year (-11.5%); decrease in the percent of subjects who consumed more than 30% of energy from fat (-6.5%); and increase in the percent of subjects who ate meals/snacks 4 times/day (5.1%).

Noticeable changes in 1999-2002 from 1988-94 in high-income men were: decrease in the percent of subjects aged 30-39 years old (-6.0%); increase in the percent of subjects who did not participate in any leisure-time activity in the past month (13.0%); decrease in the percent of normal weight subjects (-5.7%) and increase in the percent of obese subjects (8.2%); increase in the percent of subjects who assessed their weight status accurately (7.1%); and increase in the percent of subjects who ate meals/snacks 6 times/day (5.7%).

Noticeable changes in 1999-2002 from 1988-94 in low-income women were: decrease in the percent of subjects with high school degree (-5.9%) and increase in the percent of subjects with more than high school education (10.0%); decrease in the percent of subjects aged 20-29 years old (-5.0%) and increase in the percent of subjects aged 40-49 years old (7.0%); decrease in the percent of married subjects (-5.6%); increase in the percent of subjects who did not participate in any leisure-time activity in the past month (23.0%); decrease in the percent of women who had 2 live births (-5.0%); decrease in the percent of normal weight subjects (-7.2%) and increase in the percent of obese subjects (10.6%); decrease in the percent of subjects who attempted to lose weight in the past year (-15.6%); increase in energy intake (130 kcal); and decrease in the percent of subjects who under-reported energy intakes (-5.2%).

Noticeable changes in 1999-2002 from 1988-94 in middle-income women were: decrease in the percent of subjects with high school degree (-14.6%) and increase in the percent of subjects with more than high school education (17.0%); decrease in the percent of subjects aged 20-29 years old (-5.0%) and increase in the percent of subjects aged 60+ years old (5.0%); decrease in the percent of married subjects (-7.9%); increase in the

percent of subjects who did not participate in any leisure-time activity in the past month (19.9%); decrease in the percent of subjects of normal weight (-15.7%); decrease in the percent of subjects who attempted to lose weight in the past year (-6.6%); increase in energy intake (52 kcal); and increase in the percent of subjects who consumed more than 30% of energy from fat (4.7%).

Noticeable changes in 1999-2002 from 1988-94 in high-income women were: decrease in the percent of subjects with high school degree (-10.8%) and increase in the percent of subjects with more than high school education (12.0%); decrease in the percent of subjects aged 30-39 years old (-8.4%) and increase in the percent of subjects aged 40-59 years old (15.9%); increase in the percent of non-smokers (5.5%); increase in the percent of subjects who did not participate in any leisure-time activity in the past month (17.0%); decrease in the percent of normal weight subjects (-6.5%) and increase in the percent of obese subjects (6.0%); the percent of subjects who assessed their weight status accurately (4.6%); decrease in the percent of subjects who attempted to lose weight in the past year (-10.2%); and increase in energy intake (75 kcal).

6. Subpopulation groups by gender, income, and race/ethnicity (Only in 1988-94)

Men: Eleven of 19 subjects' characteristics showed significant or non-significant difference by the income level that were common regardless of subjects' races/ethnicities (Table 14). As the income level increased from low, middle, to high, the percent of subjects with less than high school education decreased (39.3, 23.2, and 8.0% in white men; 47.2, 21.5, and 12.3% in black men; and 72.8, 42.4, and 14.9% in Mexican-American men, respectively). High-income groups had a lower percent of subjects aged 20-29 years old than low- and middle-income groups (13.9 vs. 30.8 and 22.3% in white

Table 14. Subjects' characteristics among 18 subgroups by gender, income, and race/ethnicity in 1988-94[1]

		White men (%)			
Variables	n	Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	2,539	19.4	35.2	45.4	
Education					
< High school	710	39.3	23.2	8.0	****
High school graduate	765	33.6	38.0	26.4	
> High school	1,064	27.1	38.9	65.6	
Age					
20-29 yrs	325	30.8	22.3	13.9	****
30-39 yrs	393	21.2	27.7	24.1	
40-49 yrs	374	13.7	18.9	25.6	
50-59 yrs	348	8.7	9.0	17.8	
60+ yrs	1,099	25.7	22.1	18.7	
Marital status					
Married	1,967	66.7	75.6	78.9	***
Widowed, divorced, or separated	310	15.1	8.7	8.7	
Never married or living with partner	262	18.2	15.7	12.5	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,830	57.2	63.3	73.6	***
Smoker	709	42.8	36.7	26.4	
Alcohol consumption (# of drinks/wk)	2,539	6±0.7	6±0.5	6±0.3	NS
Leisure time activity/month					
No activities	281	15.1	9.0	5.5	****
1st quintile	427	19.9	19.1	12.6	
2nd quintile	386	11.9	17.5	16.8	
3rd quintile	429	14.9	16.9	18.4	
4th quintile	600	22.2	22.7	25.0	
5th quintile	416	15.9	14.8	21.7	
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	

Table 14 (cont'd)

Variables	n	White men (%) Low	Middle	High	P^2
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	2,539	26.6±0.3	27.1±0.3	26.6±0.2	NS
Weight status					
Normal weight	957	43.2	36.9	37.3	NS
Overweight	1,083	35.6	41.7	45.1	
Obese	499	21.2	21.4	17.6	
Perceived own weight status					
Underweight	144	8.3	6.3	3.7	***
About right	1,246	51.5	43.4	46.1	
Overweight	1,149	40.2	50.3	50.2	
Weight status assessment					
Under-assessor	688	28.0	23.3	22.8	*
Accurate assessor	1,735	68.9	72.6	70.5	
Over-assessor	116	3.1	4.2	6.8	
Desired weight changes					
Weigh more	194	12.8	11.7	6.1	****
Stay about the same	1,023	41.6	30.8	34.5	
Weigh less	1,322	45.7	57.5	59.3	
Attempt to lose weight					
Yes	764	22.3	34.6	36.3	****
No	1,775	77.8	65.4	63.7	
Component 1[3]	2,539	5.9±0.1	6.2±0.1	6.4±0.1	****

Table 14 (cont'd)

Variables	n	White men (%) Low	Middle	High	P^2
Dietary behaviors					
Restaurant food consumption					
Non-consumer	1,936	83.3	77.1	67.4	****
Consumer	603	16.7	22.9	32.6	
Breakfast consumption					
Yes	2,158	78.6	79.5	80.8	NS
No	381	21.4	20.5	19.2	
Energy intake (kcal/d)	2,539	2,682±74	2,750±42	2,691±51	NS
Fat intake					
≤ 30% of energy from fat	813	32.2	29.4	33.0	NS
> 30% of energy from fat	1,726	67.8	70.6	67.0	
Number of eating occasions					
≤ 3 times/day	505	23.5	16.7	17.0	***
4 times/day	654	28.9	21.8	22.0	
5 times/day	587	18.2	23.4	26.9	
6 times/day	357	14.5	17.4	12.5	
≥ 7 times/day	436	15.0	20.6	21.6	
Energy intake reporting status					
Under-reporter	424	19.8	13.3	11.8	***
Adequate-reporter	1,959	69.0	78.6	82.2	
Over-reporter	156	11.2	8.1	6.0	

Table 14 (cont'd)

Variables	n	Black men (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	1,516	47.2	31.5	21.3	
Education					
< High school	570	47.2	21.5	12.3	****
High school graduate	526	35.4	41.3	32.4	
> High school	420	17.4	37.2	55.3	
Age					
20-29 yrs	337	29.1	29.5	12.1	***
30-39 yrs	386	26.2	29.1	34.3	
40-49 yrs	279	17.2	17.6	29.3	
50-59 yrs	167	10.0	10.8	15.5	
60+ yrs	347	17.5	13.1	8.8	
Marital status					
Married	855	47.6	58.7	63.1	***
Widowed, divorced, or separated	277	20.1	14.1	17.9	
Never married or living with partner	384	32.3	27.2	19.0	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	857	46.2	63.1	65.4	****
Smoker	659	53.8	36.9	34.6	
Alcohol consumption (# of drinks/wk)	1,516	8±0.6	6±0.6	6±0.5	**
Leisure time activity/month					
No activities	226	18.8	10.0	6.5	***
1st quintile	269	15.4	18.8	17.6	
2nd quintile	206	13.1	14.6	12.9	
3rd quintile	226	15.1	13.9	16.9	
4th quintile	269	17.7	18.3	19.0	
5th quintile	320	20.0	24.4	27.1	
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	

Table 14 (cont'd)

Variables	n	Black men (%) Low	Middle	High	P^2
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	1,516	26.3±0.2	27.1±0.3	27.3±0.3	*
Weight status					
Normal weight	621	47.8	38.2	32.3	***
Overweight	551	33.8	36.8	44.8	
Obese	344	18.4	25.0	23.0	
Perceived own weight status					
Underweight	150	12.6	9.0	6.5	**
About right	845	57.5	55.7	49.7	
Overweight	521	29.9	35.4	43.8	
Weight status assessment					
Under-assessor	532	35.3	35.6	33.0	NS
Accurate assessor	960	63.3	63.0	64.2	
Over-assessor	24	1.5	1.4	2.8	
Desired weight changes					
Weigh more	231	18.2	17.1	11.4	***
Stay about the same	716	50.7	42.4	39.7	
Weigh less	569	31.1	40.5	48.9	
Attempt to lose weight					
Yes	373	20.3	25.7	31.8	**
No	1,143	79.7	74.3	68.2	
Component 1[3]	1,516	5.5±0.1	5.8±0.1	6.1±0.1	***

Table 14 (cont'd)

Variables	n	Black men (%) Low	Middle	High	P^2
Dietary behaviors					
Restaurant food consumption					
Non-consumer	1,324	89.1	86.3	80.3	*
Consumer	192	10.9	13.7	19.7	
Breakfast consumption					
Yes	1,028	65.7	66.5	68.1	NS
No	488	34.3	33.5	31.9	
Energy intake (kcal/d)	1,516	2,543±68	2,694±63	2,639±9[illegible]	NS
Fat intake					
≤ 30% of energy from fat	477	31.2	29.9	33.8	NS
> 30% of energy from fat	1,039	68.8	70.1	66.2	
Number of eating occasions					
≤ 3 times/day	568	38.9	33.5	35.5	NS
4 times/day	394	27.9	24.9	25.7	
5 times/day	276	17.2	21.2	18.0	
6 times/day	151	8.1	9.5	12.6	
≥ 7 times/day	127	7.8	11.1	8.3	
Energy intake reporting status					
Under-reporter	372	23.8	20.6	18.5	NS
Adequate-reporter	1,035	68.0	71.4	76.5	
Over-reporter	109	8.1	8.0	5.0	

Table 14 (cont'd)

Variables	n	Mexican-American men (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	1,624	60.8	24.9	14.3	
Education					
< High school	1,003	72.8	42.4	14.9	****
High school graduate	335	17.0	31.5	35.2	
> High school	286	10.2	26.2	50.0	
Age					
20-29 yrs	469	42.5	33.8	23.1	**
30-39 yrs	357	26.3	31.0	29.4	
40-49 yrs	292	15.6	18.5	23.8	
50-59 yrs	134	7.0	8.5	14.7	
60+ yrs	372	8.6	8.3	9.0	
Marital status					
Married	1,242	76.7	72.8	67.2	*
Widowed, divorced, or separated	120	4.4	7.6	9.3	
Never married or living with partner	262	18.9	19.6	23.5	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,089	62.8	73.3	73.9	**
Smoker	535	37.2	26.7	26.1	
Alcohol consumption (# of drinks/wk)	1,624	7±0.6	6±0.5	6±0.6	NS
Leisure time activity/month					
No activities	359	26.1	12.6	9.6	***
1st quintile	365	22.4	23.8	16.1	
2nd quintile	211	11.3	16.0	14.3	
3rd quintile	196	12.6	12.6	15.3	
4th quintile	271	15.6	14.7	23.1	
5th quintile	222	12.0	20.2	21.5	
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	

Table 14 (cont'd)

Variables	n	Mexican-American men (%) Low	Middle	High	P^2
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	1,624	26.6±0.2	27.3±0.3	27.5±0.4	*
Weight status					
Normal weight	535	36.6	32.0	30.3	NS
Overweight	734	46.3	46.5	44.4	
Obese	355	17.2	21.5	25.3	
Perceived own weight status					
Underweight	77	5.2	3.6	4.4	***
About right	879	58.9	50.0	39.5	
Overweight	668	36.0	46.4	56.1	
Weight status assessment					
Under-assessor	532	34.3	28.4	22.7	*
Accurate assessor	1,051	63.5	68.4	72.6	
Over-assessor	41	2.2	3.2	4.7	
Desired weight changes					
Weigh more	110	7.3	6.7	5.0	***
Stay about the same	763	52.3	39.9	32.8	
Weigh less	751	40.5	53.3	62.2	
Attempt to lose weight					
Yes	430	21.0	30.4	37.3	**
No	1,194	79.0	69.6	62.7	
Component 1[3]	1,624	5.9±0.1	6.2±0.1	6.5±0.1	****

Table 14 (cont'd)

Variables	n	Mexican-American men (%) Low	Middle	High	P^2
Dietary behaviors					
Restaurant food consumption					
Non-consumer	1,359	86.0	81.3	71.5	**
Consumer	265	14.0	18.7	28.5	
Breakfast consumption					
Yes	1,164	71.3	70.4	76.0	NS
No	460	28.7	29.6	24.0	
Energy intake (kcal/d)	1,624	2,582±49	2,752±76	,873±11	*
Fat intake					
≤ 30% of energy from fat	681	47.8	40.1	31.0	**
> 30% of energy from fat	943	52.3	59.9	69.0	
Number of eating occasions					
≤ 3 times/day	546	35.1	31.0	17.4	***
4 times/day	488	30.8	24.9	26.1	
5 times/day	307	20.3	21.0	22.0	
6 times/day	142	6.8	10.6	14.0	
≥ 7 times/day	141	7.0	12.6	20.5	
Energy intake reporting status					
Under-reporter	279	15.3	10.9	10.5	NS
Adequate-reporter	1,237	76.3	80.6	82.0	
Over-reporter	108	8.4	8.5	7.5	

Table 14 (cont'd)

Variables	n	White women (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	2,199	23.9	34.6	41.5	N/A
Male	N/A	N/A	N/A	N/A	
Education					
< High school	478	36.1	16.7	6.3	****
High school graduate	865	40.7	47.8	30.9	
> High school	856	23.2	35.6	62.8	
Age					
20-29 yrs	298	28.6	16.6	13.3	****
30-39 yrs	431	23.0	26.8	23.1	
40-49 yrs	333	9.9	19.1	26.5	
50-59 yrs	318	9.4	11.7	17.1	
60+ yrs	819	29.1	25.8	20.1	
Marital status					
Married	1,408	47.0	69.1	77.5	****
Widowed, divorced, or separated	637	43.6	22.3	13.4	
Never married or living with partner	154	9.4	8.6	9.1	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,620	56.9	69.8	78.6	****
Smoker	579	43.1	30.2	21.4	
Alcohol consumption (# of drinks/wk)	2,199	2±0.2	2±0.2	3±0.2	*
Leisure time activity/month					
No activities	374	20.1	15.4	7.6	****
1st quintile	429	20.7	20.3	19.3	
2nd quintile	353	14.1	19.7	17.8	
3rd quintile	318	14.4	14.0	16.5	
4th quintile	471	19.8	20.5	23.2	
5th quintile	254	11.1	10.0	15.6	
Reproductive history					
Breast fed your child					
Yes	1,036	48.1	45.2	42.4	****
No	794	39.7	39.2	31.2	
Never been pregnant	369	12.2	15.6	26.4	

Table 14 (cont'd)

Variables	n	White women (%) Low	Middle	High	P^2
Number of live birth					
0 and never been pregnant	369	12.2	15.6	26.4	****
1	367	18.3	16.6	16.1	
2	676	27.4	31.6	34.6	
3	386	18.8	19.5	13.4	
4	205	12.3	8.1	5.5	
≥ 5	196	11.0	8.6	4.0	
Age at the first menarche					
≤ 11 yrs old	394	17.5	18.1	20.9	NS
12-15 yrs old	1,677	77.1	77.2	74.4	
≥ 16 yrs old	128	5.5	4.7	4.7	
Weight status and related perceptions and behaviors					
BMI	2,199	27.1±0.4	26.5±0.3	25.8±0.3	*
Weight status					
Normal weight	1,053	47.2	51.4	54.1	NS
Overweight	618	25.3	24.5	25.9	
Obese	528	27.5	24.1	20.0	
Perceived own weight status					
Underweight	45	1.5	2.1	1.4	NS
About right	707	29.6	31.6	32.1	
Overweight	1,447	69.0	66.3	66.5	
Weight status assessment					
Under-assessor	160	5.3	5.0	4.1	NS
Accurate assessor	1,622	74.7	74.5	72.6	
Over-assessor	417	20.0	20.6	23.3	
Desired weight changes					
Weigh more	47	1.9	2.1	1.5	NS
Stay about the same	497	21.3	19.5	21.1	
Weigh less	1,655	76.8	78.4	77.5	
Attempt to lose weight					
Yes	1,174	55.1	54.9	60.3	NS
No	1,025	44.9	45.1	39.7	
Component 1[3]	2,199	7.0±0.1	7.0±0.1	7±0.1	NS

Table 14 (cont'd)

Variables	n	White women (%) Low	Middle	High	P^2
Dietary behaviors					
Restaurant food consumption					
Non-consumer	1,758	84.6	80.7	71.9	****
Consumer	441	15.4	19.3	28.1	
Breakfast consumption					
Yes	1,895	76.9	85.2	86.3	**
No	304	23.1	14.8	13.7	
Energy intake (kcal/d)	2,199	1,723±36	1,815±30	1,790±37	NS
Fat intake					
≤ 30% of energy from fat	820	35.2	33.5	39.1	NS
> 30% of energy from fat	1,379	64.8	66.5	60.9	
Number of eating occasions					
≤ 3 times/day	369	23.5	12.6	13.3	***
4 times/day	582	25.3	26.6	22.5	
5 times/day	548	24.5	26.0	29.2	
6 times/day	344	13.1	16.9	15.6	
≥ 7 times/day	356	13.6	18.0	19.5	
Energy intake reporting status					
Under-reporter	551	27.9	20.7	24.2	NS
Adequate-reporter	1,581	68.8	76.3	71.4	
Over-reporter	67	3.3	3.0	434	

Table 14 (cont'd)

Variables	n	Black women (%)[2] Low	Middle	High	P^2
Demographic					
Gender					
Female	1,336	54.9	29.2	16.0	N/A
Male	N/A	N/A	N/A	N/A	
Education					
< High school	399	37.3	16.1	5.1	****
High school graduate	528	42.4	44.3	25.7	
> High school	409	20.3	40.0	69.2	
Age					
20-29 yrs	288	27.4	19.3	10.1	****
30-39 yrs	392	28.3	33.0	31.7	
40-49 yrs	292	17.5	24.2	35.2	
50-59 yrs	153	10.5	12.7	13.1	
60+ yrs	211	16.3	10.8	10.0	
Marital status					
Married	531	29.3	45.8	60.5	****
Widowed, divorced, or separated	457	40.3	29.0	23.5	
Never married or living with partner	348	30.4	25.2	15.9	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	845	57.5	68.3	74.1	**
Smoker	491	42.5	31.7	25.9	
Alcohol consumption (# of drinks/wk)	1,336	2±0.3	2±0.3	1±0.3	**
Leisure time activity/month					
No activities	335	28.7	22.0	16.1	*
1st quintile	346	26.2	21.7	21.4	
2nd quintile	168	12.7	11.9	17.5	
3rd quintile	177	11.2	17.8	18.6	
4th quintile	187	13.3	16.0	12.4	
5th quintile	123	7.9	10.6	14.0	
Reproductive history					
Breast fed your child					
Yes	476	37.2	32.3	29.7	*
No	704	55.8	52.8	51.1	
Never been pregnant	156	7.1	14.9	19.2	

Table 14 (cont'd)

Variables	n	Black women (%)[2] Low	Middle	High	P^2
Number of live birth					
0 and never been pregnant	156	7.1	14.9	19.2	****
1	294	21.4	28.8	23.9	
2	341	24.0	25.9	38.2	
3	222	17.9	16.3	8.9	
4	125	11.1	5.1	5.1	
≥ 5	198	18.5	9.0	4.8	
Age at the first menarche					
≤ 11 yrs old	297	22.1	24.1	21.2	NS
12-15 yrs old	924	68.9	67.5	71.8	
≥ 16 yrs old	115	9.0	8.4	7.0	
Weight status and related perceptions and behaviors					
BMI	1,336	29.3±0.3	29.3±0.4	28.2±0.5	NS
Weight status					
Normal weight	399	31.7	33.5	34.1	NS
Overweight	406	31.3	26.2	34.4	
Obese	531	37.0	40.3	31.5	
Perceived own weight status					
Underweight	73	6.5	4.7	2.4	*
About right	379	30.4	27.9	20.1	
Overweight	884	63.1	67.4	77.5	
Weight status assessment					
Under-assessor	203	17.3	11.2	7.4	*
Accurate assessor	1,044	76.2	80.8	75.8	
Over-assessor	89	6.5	8.0	16.9	
Desired weight changes					
Weigh more	97	8.7	6.4	3.5	**
Stay about the same	304	25.7	21.3	15.7	
Weigh less	935	65.5	72.4	80.8	
Attempt to lose weight					
Yes	696	48.3	55.9	62.2	**
No	640	51.7	44.1	37.8	
Component 1[3]	1,336	6.6±0.1	6.9±0.1	7.2±0.1	***

Table 14 (cont'd)

Variables	n	Black women (%)[2] Low	Middle	High	P^2
Dietary behaviors					
Restaurant food consumption					
Non-consumer	1,236	95.2	89.1	84.8	**
Consumer	100	4.8	10.9	15.2	
Breakfast consumption					
Yes	953	67.8	75.3	77.9	*
No	383	32.2	24.7	22.1	
Energy intake (kcal/d)	1,336	1,849±48	1,833±49	1,731±55	NS
Fat intake					
≤ 30% of energy from fat	444	33.6	30.7	30.9	NS
> 30% of energy from fat	892	66.4	69.3	69.1	
Number of eating occasions					
≤ 3 times/day	466	39.0	28.6	22.6	***
4 times/day	358	29.8	25.2	19.5	
5 times/day	256	18.5	20.5	27.9	
6 times/day	144	7.8	15.4	14.4	
≥ 7 times/day	112	5.0	10.2	15.6	
Energy intake reporting status					
Under-reporter	439	33.9	30.9	30.9	**
Adequate-reporter	844	61.1	63.8	68.4	
Over-reporter	53	4.9	5.3	0.7	

Table 14 (cont'd)

Variables	n	Mexican-American women (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	1,055	59.2	26.3	14.5	N/A
Male	N/A	N/A	N/A	N/A	
Education					
< High school	549	66.9	32.5	10.9	****
High school graduate	307	22.5	43.4	35.4	
> High school	199	10.5	24.1	53.7	
Age					
20-29 yrs	280	32.2	25.5	21.3	NS
30-39 yrs	280	29.1	32.3	20.8	
40-49 yrs	213	20.5	21.3	30.2	
50-59 yrs	99	8.1	10.5	18.5	
60+ yrs	183	10.2	10.4	9.2	
Marital status					
Married	673	59.9	73.8	74.2	**
Widowed, divorced, or separated	237	25.1	11.6	14.0	
Never married or living with partner	145	15.0	14.5	11.8	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	806	73.0	81.4	83.1	*
Smoker	249	27.1	18.6	16.9	
Alcohol consumption (# of drinks/wk)	1,055	2±0.3	2±0.4	2±0.4	NS
Leisure time activity/month					
No activities	310	30.5	21.5	9.0	**
1st quintile	282	26.9	24.1	26.6	
2nd quintile	127	9.4	15.6	16.5	
3rd quintile	119	10.0	15.6	15.8	
4th quintile	137	11.7	14.0	20.6	
5th quintile	80	7.6	9.3	11.5	
Reproductive history					
Breast fed your child					
Yes	556	55.1	51.0	46.5	**
No	355	34.6	32.9	25.4	
Never been pregnant	144	10.3	16.1	28.1	

Table 14 (cont'd)

Variables	n	Mexican-American women (%) Low	Middle	High	P^2
Number of live birth					
0 and never been pregnant	144	10.3	16.1	28.1	****
1	146	11.6	19.3	17.5	
2	210	21.1	20.3	26.2	
3	189	18.3	21.0	15.7	
4	149	17.6	11.6	7.1	
≥ 5	217	21.1	11.7	5.4	
Age at the first menarche					
≤ 11 yrs old	259	22.9	26.4	33.4	NS
12-15 yrs old	755	73.1	70.6	63.1	
≥ 16 yrs old	41	4.0	3.1	3.6	
Weight status and related perceptions and behaviors					
BMI	1,055	28.6±0.4	28.2±0.5	27.1±0.6	NS
Weight status					
Normal weight	350	30.4	37.6	44.5	NS
Overweight	341	33.4	27.7	24.1	
Obese	364	36.3	34.7	31.4	
Perceived own weight status					
Underweight	29	4.1	1.1	1.1	*
About right	296	29.1	24.4	24.8	
Overweight	730	66.7	74.6	74.2	
Weight status assessment					
Under-assessor	129	16.0	4.4	2.9	***
Accurate assessor	797	74.5	80.2	76.6	
Over-assessor	129	9.5	15.4	20.5	
Desired weight changes					
Weigh more	27	3.9	1.5	0.8	*
Stay about the same	228	23.0	17.5	16.2	
Weigh less	800	73.1	80.9	83.0	
Attempt to lose weight					
Yes	553	50.5	60.3	57.6	NS
No	502	49.5	39.7	42.4	
Component 1[3]	1,055	6.8±0.1	7.1±0.1	7.1±0.1	**

Table 14 (cont'd)

Variables	n	Mexican-American women (%) Low	Middle	High	P^2
Dietary behaviors					
Restaurant food consumption					
Non-consumer	913	90.8	84.0	69.7	**
Consumer	142	9.2	16.0	30.3	
Breakfast consumption					
Yes	788	72.9	75.9	77.5	NS
No	267	27.1	24.1	22.5	
Energy intake (kcal/d)	1,055	1,825±34	1,772±50	1,872±81	NS
Fat intake					
≤ 30% of energy from fat	377	39.5	29.7	31.6	*
> 30% of energy from fat	678	60.6	70.3	68.4	
Number of eating occasions					
≤ 3 times/day	326	36.2	25.8	23.4	*
4 times/day	301	27.0	26.0	26.7	
5 times/day	223	20.1	26.4	20.3	
6 times/day	124	11.2	13.0	15.2	
≥ 7 times/day	81	5.5	8.7	14.4	
Energy intake reporting status					
Under-reporter	262	24.2	26.7	24.6	NS
Adequate-reporter	751	71.8	68.1	70.1	
Over-reporter	42	4.1	5.2	5.3	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; underweight subjects; and those who did not have all the responses on the predictors included in the regression.

[2] Based on the chi-square test except alcohol, energy intakes, and BMI; differences in alcohol, energy intakes, and BMI by income levels were tested by ANOVA.

[3] Sum of responses to perceived weight status, desired weight status, and attempt to lose weigh

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

men; 12.1 vs. 29.1 and 29.5% in black men; and 23.1 vs. 42.5 and 33.8% in Mexican-American men, respectively), while they had a higher percent of subjects aged 40-59 years old (43.4 vs. 22.4 and 27.9% in white men; 44.8 vs. 27.2 and 28.4% in black men; and 38.5 vs. 22.6 and 27.0% in Mexican-American men). The percent of smokers was higher in low-income groups than middle- and high-income groups (42.8 vs. 36.7 and 26.4% in white men; 53.8 vs. 36.9 and 34.6% in black men; and 37.2 vs. 26.7 and 26.1% in Mexican-American men, respectively). The percent of subjects who did not participate in any leisure time activity in the past 30 days was higher in low-income groups than middle- and high-income groups (5.5 vs. 15.1 and 9.0% in white men; 6.5 vs. 18.8 and 10.0% in black men; and 9.6 vs. 26.1 and 12.6% in Mexican-American men). The percent of subjects who perceived themselves as overweight, who wanted to weigh less, and who attempted to lose weight in the past year was lower in low-income groups than middle- and high-income groups (40.2 vs. 50.3 and 50.2% in white men, 29.2 vs. 35.4 and 43.8% in black men, and 36.0 vs. 46.4 and 56.1% in Mexican-American men for the percent of subjects who perceived themselves as overweight; 45.7 vs. 57.5 and 59.3% in white men, 31.1 vs. 40.5 and 48.9% in black men, and 40.5 vs. 53.3 and 62.2% in Mexican-American men for the percent of subjects who wanted to weigh less; and 22.3 vs. 34.6 and 36.3% in white men, 20.3 vs. 25.7 and 31.8% in black men, and 21.0 vs. 30.4 and 37.3% in Mexican-American men for the percent of subjects who attempted to lose weight in the past year). The percent of subjects who had restaurant food the day before the interview was higher in high-income groups than low- and middle-income groups (32.6 vs. 16.7 and 22.9% in white men, 19.7 vs. 10.9 and 13.7% in black men, and 28.5 vs. 14.0 and 18.7% in Mexican-American men, respectively). The percent of

breakfast skippers did not differ by the income level regardless of subjects' races/ethnicities.

Although trends of income differences in these subjects' characteristics did not differ regardless of subjects' races/ethnicities, the absolute value depended on subjects' races/ethnicities. For example, the percent of subjects who had less than high school education decreased as the income level increased regardless of subjects' races/ethnicities. However, the percent of low-income subjects who had less than high school education was 39.3, 47.2, and 72.8% for whites, blacks, and Mexican-Americans, respectively. The percent of subjects who did not participate in any leisure time activity in the past 30 days decreased as the income level increased regardless of subjects' races/ethnicities. However, the percent of low-income subjects who did not participate in any leisure time activity in the past 30 days was 15.1, 18.8, and 26.1% for whites, blacks, and Mexican-Americans, respectively. These differences in percent may have contributed to differences in weight-income relationship across races/ethnicities.

The rest of income differences in subjects' characteristics depended on subjects' races/ethnicities. For example, alcohol consumption did not differ significantly by the income level in whites (6 drinks/week for all income levels) and Mexican-Americans (7, 6, and 6 drinks/week for the low-, middle-, and high-income group, respectively), while it differed statistically significantly in blacks (8, 6, and 6 drinks/week for the low-, middle, and high-income group at $p<0.01$, respectively). While mean BMI did not differ significantly by the income level in whites (26.6, 27.1, and 26.6 for the low-, middle- and high-income group, respectively), it differed significantly by the income level in blacks (26.3, 27.1, and 27.3 at $p<0.05$ for the low-, middle- and high-income group, respectively)

and Mexican-Americans (26.6, 27.3, and 27.5 at $p<0.05$ for the low-, middle-, and high-income group, respectively). When the weight status was categorized into normal, overweight, and obese, using BMI cut-point, the overall difference was significantly different among whites ($p<0.05$) and Mexican-Americans ($p<0.001$), while it was not significantly different in blacks. Accuracy of self-reported weight status differed significantly by the income level in whites ($p<0.05$) and Mexican-Americans ($p<0.05$), while it did not differ significantly in blacks. Energy and fat intake did not differ significantly by the income level in whites and blacks, while it differed significantly in Mexican-Americans (mean energy intake and the percent of subjects who had more than 30% of their energy intake from fat increased as the income level increased [2,582, 2,752, and 2,873 kcal/day at $p<0.05$ for the low-, middle- and high-income groups, respectively for energy intake; 52.3, 59.9, and 69.0% for the low-, middle-, and high-income groups, respectively for fat intake]). The number of eating occasions did not differ significantly by the income level in blacks, while it differed significantly in whites ($p<0.001$) and Mexican-Americans ($p<0.001$). Energy intake reporting status did not differ significantly by the income level in blacks and Mexican-Americans, while it differed significantly in whites ($p<0.01$). In white men, the percent of energy intake adequate reporters was lower in the low-income group than middle- and high-income groups (69.0 vs. 78.6 and 82.2%, respectively).

Women: Eleven of 22 subjects' characteristics showed significant differences by the income level regardless of subjects' races/ethnicities (Table 14). As the income level increased from low, middle, to high, the percent of subjects with less than high school education decreased (36.1, 16.7, and 6.3% in white women; 37.3, 16.1, and 5.1% in black

women; and 66.9, 32.5, and 10.9% in Mexican-American women, respectively). The percent of married subjects was lower among low-income groups than middle- and high-income groups (47.0 vs. 69.1 and 77.5% in white women; 29.3 vs. 45.8 and 60.5% in black women; and 59.9 vs. 73.8 and 74.2% in Mexican-American women, respectively). As the income level increased, the percent of subjects who did not participate in any leisure-time activity in the past 30 days decreased (20.1, 15.4, and 7.6% in white women; 28.7, 22.0, and 16.1% in black women; and 30.5, 21.5, and 9.0% in Mexican-American women, respectively). The percent of those who had a large number of children ($\geq$ 4) was higher among low-income groups than middle- and high-income groups (23.3 vs. 16.7 and 9.5% in white women; 29.6 vs. 14.1 and 9.9% in black women; and 38.7 vs. 23.3 and 12.5% in Mexican-American women, respectively). Age at first menarche, the weight status that was determined based on the BMI cut-point, and energy intake did not differ significantly by the income regardless of subjects' races/ethnicities.

As observed in men, although trends of income differences or indifferences in these subjects' characteristics were same regardless of subjects' race/ethnicities, the absolute values depended on by race/ethnicity. For example, the percent of women who had less than high school education decreased as the income level increased regardless of subjects' races/ethnicities. However, the percent of low-income women who had less than high school education was 36.1, 37.3 and 66.9% for whites, blacks, and Mexican-Americans, respectively. The percent of women who did not participate in any leisure-time activity in the past 30 days decreased as the income level increased regardless of subjects' races/ethnicities. However, the percent of low-income subjects who did not participate in any leisure time activities in the past 30 days was 20.1, 28.7, and 30.5% for

whites, blacks, and Mexican-Americans, respectively. These differences in percent, again, may have contributed to differences in weight-income relationship across races/ethnicities.

The rest of income differences in subjects' characteristics depended on race/ethnicity. Age distribution differed significantly by the income level in whites ($p<0.0001$) and blacks ($p<0.0001$), while it did not differ significantly in blacks. While alcohol consumption differed significantly by the income level in whites (2, 2, 3 drinks/week for the low-, middle-, and high-income group at $p<0.05$, respectively) and blacks (2, 2, 1 drinks/week at $p<0.01$ for the low-, middle-, and high-income group, respectively), it did not differ significantly in blacks (2 drinks/week for all income groups). While mean BMI did not differ significantly by the income level in blacks (29.3, 29.3, and 28.2 for the low-, middle-, and high-income group, respectively) and Mexican-Americans (28.6, 28.2, and 27.1 for the low-, middle-, and high-income group, respectively), it differed significantly in whites (27.1, 26.5, and 25.8 for the low-, middle-, and high-income group at $p<0.05$, respectively). Perception about subjects' own weight status did not differ significantly by the income level in whites, while it differed significantly in blacks ($p<0.05$) and Mexican-Americans ($p<0.05$). Accuracy of self-reported weight status differed significantly by the income level in blacks ($p<0.05$) and Mexican-Americans ($p<0.001$), while it did not differ significantly in whites. Desired weight changes differed significantly in blacks ($p<0.01$) and Mexican-Americans ($p<0.05$), while it did not differ significantly in whites. In blacks and Mexican-Americans, the percent of subjects who wanted to weigh less was lower in low-income groups than middle- and high-income groups (65.5 vs. 72.4 and 80.8% in blacks; and

73.1 vs. 80.9 and 83.0% in Mexican-Americans, respectively). The percent of subjects who attempted to lose weight in the past year did not differ significantly by the income level in whites and Mexican-Americans, while it differed significantly in blacks ($p<0.01$). In blacks, the percent of subjects who attempted to lose weight increased as the income level increased (48.3, 55.9, and 62.2% for the low-, middle-, and high-income group, respectively).

Breakfast consumption did not differ significantly by the income level in Mexican-Americans, while it did in whites ($p<0.01$) and blacks ($p<0.05$). In whites and blacks, the percent of breakfast consumers in low-income groups was lower than middle- and high-income groups (76.9 vs. 85.2 and 86.3% in whites; and 67.8 vs. 75.3 and 77.9% in blacks, respectively). While fat intake did not differ significantly by the income level in whites and blacks, it differed significantly in Mexican-Americans ($p<0.05$). The percent of subjects who had more than 30 % of their energy intakes from fat was lower in the low-income group than middle- and high-income groups in Mexican-Americans (60.6 vs. 70.3 and 68.4%, respectively). Energy intake reporting status did not differ significantly by the income level in whites and Mexican-Americans, while it differed significantly in blacks ($p<0.01$).

WEIGHT STATUS BY THE INCOME LEVEL WHEN AGE WAS CONTROLLED

BMI as an outcome variable: In 1999-2002, low- and middle-income predicted higher mean BMI relative to high-income in women ($\beta=0.09$ at $p<0.001$ and $\beta=0.06$ at $p<0.01$, respectively; Table 15). In men, there was no statistically significant difference in mean BMI by the income level (Table 15).

Table 15. Income-BMI relationship among subgroups (NHANES 1999-2002) [1]

	W (n=3,343)	M (n=3,542)	WW (n=1,766)	BW (n=732)	MW (n=845)	WM (n=1,931)	BM (n=705)	MM (n=906)
Intercept	3.23****	3.27****	3.22****	N/A	N/A	3.26****	N/A	N/A
Income								
PIR <1.85	0.08****	-0.01	0.07***	N/A	N/A	0.01	N/A	N/A
1.85 ≤ PIR ≤ 3.5	0.06***	0.00	0.05**	N/A	N/A	0.00	N/A	N/A
PIR >3.5	0.00	0.00	0.00	N/A	N/A	0.00	N/A	N/A
Age								
20-29 yrs	0.00	0.00	0.00	N/A	N/A	0.00	N/A	N/A
30-39 yrs	0.04**	0.04**	0.04*	N/A	N/A	0.04*	N/A	N/A
40-49 yrs	0.08***	0.07****	0.07**	N/A	N/A	0.07***	N/A	N/A
50-59 yrs	0.10****	0.08****	0.10***	N/A	N/A	0.09***	N/A	N/A
60+ yrs	0.06***	0.06****	0.07***	N/A	N/A	0.06***	N/A	N/A
R^2	0.03	0.02	0.03	N/A	N/A	0.03	N/A	N/A

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; other Hispanics; subjects other than white, black, or Mexican-American; underweight subjects.

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men

MM: Mexican-American men

When subjects were categorized by gender and race/ethnicity combined, analyses were conducted only in white women and men. This is because other subpopulation groups had problems with their design variables (nesting and stratum variables), making their sample sizes too small (sample size=1) to compute variance contribution to the study design. In white women, low- and middle-income predicted higher mean BMI relative to high-income (β=0.08 at $p<0.01$ and β=0.04 at $p<0.05$, respectively; Table 15), while there was no statistically significant difference in mean BMI by the income level in white men (Table 15).

In 1988-94, low- and middle-income predicted higher mean BMI relative to high-income in women (β=0.08 at $p<0.0001$ and β=0.04 at $p<0.01$, respectively; Table 16). In men, only middle-income predicted higher mean BMI relative to high-income (β=0.02 at $p<0.05$; Table 16).

When subjects were categorized by gender and race/ethnicity together, low- and middle-income predicted higher mean BMI relative to high-income in white women (β=0.06 at $p<0.001$ and β=0.03 at $p<0.05$, respectively; Table 16). In black women, low- and middle-income also predicted higher mean BMI relative to high-income (β=0.05 at $p<0.01$ and β=0.04 at $p<0.05$, respectively; Table 16). In Mexican-American women, only low-income predicted higher mean BMI (β=0.07 at $p<0.01$; Table 16) relative to high-income.

In white men, middle-income predicted higher mean BMI relative to high-income (β=0.02 at $p<0.01$; Table 16). In black men, low-income predicted lower mean BMI relative to high-income (β=-0.04 at $p<0.01$; Table 16). There was no statistically

Table 16. Income-BMI relationship among subgroups (NHANES 1988-94)[1]

	W (n=7,044)	M (n=6,707)	WW (n=3,142)	BW (n=2,132)	MW (n=1,770)	WM (n=2,903)	BM (n=1,874)	MM (n=1,930)
Intercept	3.14****	3.21****	3.13****	3.21****	3.20****	3.20****	3.28****	3.25****
Income								
PIR <1.85	0.08****	0.01	0.06****	0.07****	0.06**	0.01	-0.05***	-0.02
1.85 ≤ PIR ≤ 3.5	0.04***	0.03**	0.03**	0.06***	0.05*	0.03**	-0.01	-0.01
PIR >3.5	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
Age								
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
30-39 yrs	0.07****	0.05****	0.07**	0.07***	0.08****	0.05***	0	0.05****
40-49 yrs	0.11****	0.08****	0.11****	0.13****	0.13****	0.09****	0.02	0.10****
50-59 yrs	0.16****	0.10****	0.17****	0.16****	0.11****	0.10****	0.04*	0.11****
60+ yrs	0.10****	0.07****	0.11****	0.10****	0.09****	0.08****	0.03**	0.06****
R^2	0.07	0.04	0.07	0.06	0.06	0.05	0.02	0.07

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than white, black, or Mexican American; and underweight subjects.
* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001
W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men
MM: Mexican-American men

significant difference in mean BMI by the income level in Mexican-American men (Table 16).

Risk of obesity as an outcome variable: In 1999-2002, being in low- and middle-income groups increased the risk of obesity compared to being in the high-income group in women (OR=2.21 [CI=1.54, 3.17] and OR=1.71 [CI=1.20, 2.44], respectively; Table 17). In men, there was no difference in the risk of obesity by the income level (Table 17). When subjects were categorized by gender and race/ethnicity, being in low-and middle-income groups increased the risk of obesity compared to being in the high-income group in white women (OR=2.09 [CI=1.34, 3.27] and OR=1.55 [CI=1.01, 2.36], respectively), while there was no difference in the risk of obesity by the income level in white men (Table 17).

In 1988-94, being in low- and middle-income groups increased the risk of obesity compared to being in the high-income group in women (OR=1.96 [CI=1.51, 2.54] and OR=1.44 [CI=1.11, 1.87], respectively; Table 18). In men, only being in the middle-income group increased the risk of obesity compared to being in the high-income group (OR=1.43 [CI=1.11, 1.84]). When subjects were categorized by gender and race/ethnicity together, being in low- and middle-income groups increased the risk of obesity compared to being in the high income group in white women (OR=1.77 [CI=1.27, 2.47] and OR=1.35 [CI=1.01, 1.81], respectively). In black women, being in low- and middle-income groups also increased the risk of obesity compared to being in the high-income group (OR=1.53 [CI=1.02, 2.30] and OR=1.64 [CI=1.06, 2.54], respectively). In Mexican-American women, there was no difference in the risk of obesity by the income level. In white men, being in low- and middle-income groups increased the risk of

Table 17. Risk of obesity among subgroups[1] (NHANES 1999-2002 before the regression)

	W (n=3,343)		M (n=3,542)		WW (n=1,766)		BW (n=732)		MW (n=845)		WM (n=1,931)		BM (n=705)		MM (n=906)	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Intercept	0.23	(0.17, 0.31)	0.23	(0.17, 0.33)	0.18	(0.13, 0.27)	N/A	N/A	N/A	N/A	0.22	(0.14, 0.34)	N/A	N/A	N/A	N/A
Income																
PIR <1.85	1.97	(1.56, 2.49)	1.03	(0.83, 1.28)	1.95	(1.44, 2.62)	N/A	N/A	N/A	N/A	1.21	(0.93, 1.59)	N/A	N/A	N/A	N/A
1.85 ≤ PIR ≤ 3.5	1.70	(1.30, 2.22)	1.17	(0.98, 1.39)	1.67	(1.21, 2.32)	N/A	N/A	N/A	N/A	1.21	(0.99, 1.49)	N/A	N/A	N/A	N/A
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A
Age																
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A
30-39 yrs	1.46	(1.09, 1.94)	1.36	(0.90, 2.06)	1.62	(1.10, 2.37)	N/A	N/A	N/A	N/A	1.31	(0.75, 2.29)	N/A	N/A	N/A	N/A
40-49 yrs	2.05	(1.34, 3.13)	1.80	(1.22, 2.64)	2.26	(1.32, 3.88)	N/A	N/A	N/A	N/A	1.90	(1.19, 3.03)	N/A	N/A	N/A	N/A
50-59 yrs	2.23	(1.62, 3.06)	1.99	(1.35, 2.93)	2.65	(1.81, 3.88)	N/A	N/A	N/A	N/A	2.09	(1.26, 3.45)	N/A	N/A	N/A	N/A
60+ yrs	1.56	(1.21, 2.01)	1.81	(1.22, 2.68)	1.79	(1.29, 2.48)	N/A	N/A	N/A	N/A	1.85	(1.11, 3.09)	N/A	N/A	N/A	N/A
R^2	0.03		0.01		0.03		N/A		N/A		0.01		N/A		N/A	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; other Hispanics; subjects other than white, black, or Mexican-American; underweight subjects.
W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men
MM: Mexican-American men
Highlighted were statistically significant.

Table 18. Risk of obesity among subgroups (NHANES 1988-94 before the regression)[1]

	W (n=7,044)		M (n=6,707)		WW (n=3,142)		BW (n=2,132)		MW (n=1,770)		WM (n=2,903)	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Intercept	0.12	(0.09, 0.17)	0.12	(0.09, 0.16)	0.11	(0.07, 0.18)	0.19	(0.14, 0.27)	0.24	(0.16, 0.35)	0.11	(0.07, 0.16)
Income												
PIR <1.85	2.09	(1.67, 2.61)	1.38	(1.05, 1.81)	1.88	(1.44, 2.45)	1.73	(1.28, 2.34)	1.37	(0.90, 2.07)	1.56	(1.10, 2.21)
1.85 ≤ PIR ≤ 3.5	1.58	(1.24, 2.01)	1.51	(1.21, 1.88)	1.46	(1.11, 1.92)	1.88	(1.31, 2.69)	1.39	(0.93, 2.09)	1.56	(1.22, 2.01)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age												
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.98	(1.37, 2.85)	1.42	(1.02, 2.00)	2.11	(1.26, 3.54)	1.68	(1.23, 2.29)	1.64	(1.20, 2.24)	1.53	(0.99, 2.36)
40-49 yrs	2.17	(1.48, 3.18)	2.06	(1.50, 2.83)	2.08	(1.24, 3.47)	2.71	(1.87, 3.94)	2.5	(1.88, 3.32)	2.24	(1.50, 3.32)
50-59 yrs	3.31	(2.33, 4.70)	2.98	(2.06, 4.31)	3.45	(2.17, 5.49)	3.68	(2.35, 5.76)	2.24	(1.54, 3.25)	3.41	(2.16, 5.40)
60+ yrs	1.82	(1.34, 2.46)	1.93	(1.51, 2.48)	1.95	(1.30, 2.91)	2.19	(1.51, 3.16)	1.61	(1.03, 2.52)	2.10	(1.53, 2.88)
R^2		0.03		0.02		0.03		0.04		0.03		0.02

Table 18 (cont'd)

	BM (n=1,874)		MM (n=1,930)	
	OR	CI	OR	CI
Intercept	0.27	(0.18, 0.42)	0.22	(0.13, 0.37)
Income				
PIR <1.85	0.72	(0.49, 1.05)	0.68	(0.45, 1.02)
1.85 ≤ PIR ≤ 3.5	1.07	(0.71, 1.60)	0.81	(0.50, 1.31)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age				
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.06	(0.75, 1.52)	1.26	(0.90, 1.76)
40-49 yrs	1.20	(0.81, 1.80)	2.8	(1.72, 4.57)
50-59 yrs	1.19	(0.79, 1.80)	3.39	(2.01, 5.71)
60+ yrs	1.38	(1.07, 1.79)	1.78	(1.20, 2.66)
R^2	0.01		0.04	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than white, black, or Mexican American; and underweight subjects.
W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men, MM: Mexican-American men
Highlighted were statistically significant.

obesity compared to being in the high-income group (OR=1.50 [CI=1.03, 2.20] and OR=1.46 [CI=1.10, 1.93], respectively). In black men and Mexican-American men, there were no differences in the risk of obesity by the income level.

CHANGES IN AGE STANDARDOZED PREVALENCE OF OBESITY AMONG THE SUBPOPUALTION GROUPS OVER THE PAST DECADE

The age standardized prevalence of obesity in the U.S. increased from 23.6 to 31.1% (7.5%) over the past decade (Table 19). When subjects were categorized by sociodemographic characteristics, the prevalence of obesity increased almost all sociodemographic subpopulation groups. For example, in men, the prevalence increased from 21.1 to 27.7% (6.6%), while it increased from 26.0 to 34.5% (8.5%) in women. While the prevalence increased from 28.8 to 35.8% (7.0%) in the low-income group, it increased from 25.6 to 33.8% (8.2%) in the middle-income group and from 18.6 to 27.0% in the high-income group (8.4%). When subjects were categorized by race/ethnicity, the prevalence increased from 22.2 to 29.6% (7.4%) in whites, while it increased from 31.7 to 39.8% (8.1%) in blacks and from 29.4 to 33.4% in Mexican-Americans (4.0%).

When subjects were categorized by income and gender combined, the highest increase was among the middle-income women from 27.1 to 37.9% (10.8%), followed by the high-income men (from 17.8 to 26.7%; 8.9% increase), low-income women (from 33.7 to 42.4%; 8.7% increase), high-income women (from 19.6 to 27.3%; 7.7% increase), middle-income men (from 24.0 to 29.8%; 5.8% increase), and low-income men (from 22.9 to 28.0%; 5.1% increase). When subjects were categorized by gender, income, and race/ethnicity combined, increase in the prevalence was highest among the high-income Mexican-American women (from 25.1 to 39.3%; 14.2% increase), followed by the high-

Table 19. Changes in the age-standardized prevalence of obesity over the past decade, using the 2000 Standard Population

Subpopulation group	Without adjustment		With adjustment	
	1988-94	1999-2002	1988-94	1999-2002
By gender				
Total	23.0	31.2	23.6	31.1
Men	20.5	27.7	21.1	27.7
Women	25.5	34.8	26.0	34.5
By income				
Low-income	26.3	33.8	28.8	35.8
Mid-income	24.8	33.9	25.6	33.8
High-income	19.0	28.1	18.6	27.0
By race/ethnicity				
White	21.8	30.1	22.2	29.6
Black	30.2	39.3	31.7	39.8
Mexican-American	26.4	31.5	29.4	33.4
By income and gender				
Low income men	20.8	26.1	22.9	28.0
Mid-income men	22.9	29.9	24.0	29.8
High-income men	18.2	27.6	17.8	26.7
Low income women	30.8	40.2	33.7	42.4
Mid-income women	26.7	38.0	27.1	37.9
High-income women	19.8	28.7	19.6	27.3
By income, race/ethnicity, and gender				
White, low-income men	22.1	28.7	24.3	30.4
White, mid-income men	22.8	29.9	23.9	29.7
White, high-income men	17.6	26.8	17.0	25.7
Black, low-income men	18.3	21.0	19.0	21.7
Black, mid-income men	24.7	30.5	24.7	31.8
Black, high-income men	23.8	32.7	25.8	33.0
Mex-Am, low-income men	18.2	21.2	23.6	23.4
Mex-Am, mid-income men	21.8	28.9	23.9	30.1
Mex-Am, high-income men	27.6	38.5	27.5	39.7
White, low-income women	28.1	37.6	30.7	41.0
White, mid-income women	24.6	35.7	25.0	35.1
White, high-income women	19.1	27.1	18.8	25.7
Black, low-income women	38.0	49.9	41.5	50.3
Black, mid-income women	41.2	52.6	42.4	53.3
Black, high-income women	29.4	46.1	31.0	43.3
Mex-Am, low-income women	34.0	39.2	37.0	40.9
Mex-Am, mid-income women	35.6	36.6	35.9	35.2
Mex-Am, high-income women	29.2	38.5	25.1	39.3

income black women (from 31.0 to 43.3; 12.3% increase), high-income Mexican-American men (from 27.5 to 39.7%; 12.2% increase), middle-income black women (from 42.4 to 53.3%; 10.9% increase), low-income white women (from 30.7 to 41.0%; 10.3% increase), middle-income white women (from 25.0 to 35.1%; 10.1% increase), low-income black women (from 41.5 to 50.3%; 8.8% increase), high-income white men (from 17.0 to 25.7%; 8.7% increase), high-income black men (from 25.8 to 33.0%; 7.2% increase), middle-income black men (from 24.7 to 31.8%; 7.1% increase), high-income white women (from 18.8 to 25.7%; 6.9% increase), middle-income Mexican-American men (from 23.9 to 30.1%; 6.2% increase), low-income white men (from 24.3 to 30.4%; 6.1% increase), middle-income white men (from 23.9 to 29.7%; 5.8% increase), low-income Mexican-American women (from 37.0 to 40.9%; 3.9% increase), low-income black men (from 19.0 to 21.7%; 2.7% increase), middle-income Mexican-American women (from 35.9 to 35.2%; 0.7% increase), and low-income Mexican-American men (from 23.6 to 23.4%; 0.2% increase).

The difference between the prevalence of obesity without age-standardization and the one with age-standardization was very small, suggesting that the changes in the prevalence of obesity in the total population as well as subpopulation groups is not due to aging populations in the U.S. over the past decade.

PREDICTORS OF OBESITY AMOMG THE SUBPOPUALTION GROUPS

Log-transformed mean BMI as an outcome variable: The following 1 though 4 will describe the predictors of BMI that were identified among various subpopulation groups in 1999-2002. From 5, the predictors in 1999-2002 that were identified were based on the regressions adjusted for the NHANES 1988-94 since NHANES 1988-94 did not have

all the variables included in the NHANES 1999-2002. Thus, adjusted NHANES 1999-2002 tested for a fewer number of variables.

1. Predictors in gender subpopulation groups in 1999-2002

In men, the following variables increased mean BMI: being black (β=0.03 at $p<0.05$) relative to being white, having high school education (β=0.03 at $p<0.001$) relative to having more than high school education, being in the low-income group (β=0.03 at $p<0.001$) relative to being in the high-income group, being 50-59 years old (β=0.03 at $p<0.05$) or 60+ years old (β=0.03 at $p<0.05$) relative to being 20-29 years old, spending the day by sitting (β=0.02 at $p<0.05$) relative to spending the day by carrying light or heavy loads, not participating in any leisure-time activity (β=0.03 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on desired weight status (β=0.09 at $p<0.001$), higher score on the component on attempted to lose weight (β=0.03 at $p<0.001$), higher energy intake (β=0.03 at $p<0.001$), eating meals/snacks $\leq$ 3 times/day (β=0.03 at $p<0.05$) or 6 times/day (β=0.02 at $p<0.05$) relative to eating meals/snacks $\geq$ 7 times/day. R^2 was 0.51 (Table 20).

In women, the following variables increased mean BMI: being black (β=0.09 at $p<0.0001$) relative to being white, being in the low-income group (β=0.06 at $p<0.01$) or in the middle-income group (β=0.03 at $p<0.05$) relative to being in the high-income group, being 30-39 years old (β=0.05 at $p<0.05$), 40-49 years old (β=0.06 at $p<0.001$), 50-59 years old (β=0.04 at $p<0.05$), or 60+ years old (β=0.05 at $p<0.05$) relative to being 20-29 years old, being a non-smoker (β=0.05 at $p<0.01$) relative to being a smoker, watching TV or using a computer for 2-3 hours/day (β=0.04 at $p<0.01$) or $\geq$ 4 hours/day

Table 20. Predictors of BMI by gender in 1999-2002[1]

	Men		Women	
Variables	β	SE	β	SE
Intercept	2.42****	0.09	2.26****	0.12
Race/ethnicity				
Non-Hispanic White	0.00	0.00	0.00	0.00
Non-Hispanic Black	0.03*	0.01	0.09	0.01
Mexican-Americans	0.01	0.01	-0.01	0.01
Education				
< High school	0.02	0.01	0.03	0.02
High school graduate	0.03***	0.01	-0.00	0.02
> High school	0.00	0.00	0.00	0.00
Income				
PIR <1.85	0.03***	0.01	0.06**	0.02
1.85 ≤ PIR ≤ 3.5	0.02	0.01	0.03*	0.01
PIR >3.5	0.00	0.00	0.00	0.00
Age				
20-29 yrs	0.00	0.00	0.00	0.00
30-39 yrs	0.02	0.01	0.05*	0.02
40-49 yrs	0.02	0.01	0.06**	0.02
50-59 yrs	0.03*	0.01	0.04*	0.02
60+ yrs	0.03*	0.01	0.05*	0.02
Marital status				
Married	0.01	0.01	0.00	0.02
Widowed, divorced, or separated	-0.01	0.01	0.00	0.02
Never married or living with partner	0.00	0.00	0.00	0.00
Smoking status in the past 5 days				
Non-smoker	0.02	0.01	0.05**	0.01
Smoker	0.00	0.00	0.00	0.00
Daily hrs of TV, video or computer use				
≤ 1 hr	0.00	0.00	0.00	0.00
2-3 hrs	0.00	0.01	0.04**	0.01
≥ 4 hrs	0.01	0.01	0.05**	0.02
Alcohol consumption (# of drinks/wk)[2]	-0.00	0.00	-0.02****	0.00

Table 20 (cont'd)

Variables	Men β	Men SE	Women β	Women SE
Daily physical activity				
Mainly sit	0.02*	0.01	0.04**	0.01
Walk a lot	0.01	0.01	0.02	0.01
Carry light or heavy loads	0.00	0.00	0.00	0.00
Leisure time activity/month				
No activities	0.03*	0.01	0.09****	0.02
1st quintile	0.02	0.01	0.04	0.02
2nd quintile	-0.00	0.01	0.02	0.02
3rd quintile	0.01	0.01	0.02	0.02
4th quintile	0.01	0.01	-0.00	0.02
5th quintile	0.00	0.00	0.00	0.00
Breast fed your child				
Yes	N/A	N/A	0.02	0.02
No	N/A	N/A	0.02	0.02
Never been pregnant	N/A	N/A	0.00	0.00
Number of live birth				
0 and never been pregnant	N/A	N/A	0.00	0.00
1	N/A	N/A	-0.04**	0.02
2	N/A	N/A	-0.05**	0.01
3	N/A	N/A	-0.04*	0.02
4	N/A	N/A	0.00	0.00
≥ 5	N/A	N/A	0.00	0.02
Age at the first menarche				
≤ 11 yrs old	N/A	N/A	0.12****	0.02
12-15 yrs old	N/A	N/A	0.05**	0.02
≥ 16 yrs old	N/A	N/A	0	0.00
Component 1[3]	0.09***	0.00	0.12****	0.01
Component 2[4]	0.03***	0.01	0.04****	0.01
Restaurant food consumption				
< 1 time/wk	0.00	0.00	0.00	0.00
1 time/wk	0.00	0.01	0.02	0.02
2-3 times/wk	0.01	0.01	0.01	0.01
≥ 4 times/wk	0.01	0.01	0.03	0.02

Table 20 (cont'd)

	Men		Women	
Variables	β	SE	β	SE
Breakfast consumption				
Yes	0.00	0.00	0.00	0.00
No	0.01	0.01	0.03*	0.01
Energy intake (kcal/d)[2]	0.03***	0.01	0.00	0.01
Fat intake				
≤ 30% of energy from fat	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.01	0.01	0.02*	0.01
Number of eating occasions				
≤ 3 times/day	0.03*	0.01	0.02	0.02
4 times/day	0.01	0.01	0.02	0.01
5 times/day	0.02	0.01	-0.00	0.01
6 times/day	0.02*	0.01	0.00	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00
R^2	0.51		0.49	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and on desired weight status

[4] Sum of responses to the questions on attempt to lose weight and on attempt not to gain weight

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

(β=0.05 at $p<0.01$) relative to watching TV or using a computer for ≤ 1 hour/day, spending the day by sitting (β=0.04 at $p<0.01$) relative to spending the day by carrying light or heavy loads, not participating in any leisure-time activity (β=0.09 at $p<0.0001$) relative to participating in leisure-time activity at the highest level, having first menarche at ≤ 11 years old (β=0.12 at $p<0.0001$) or at 12-15 years old (β=0.05 at $p<0.01$) relative to having first menarche at ≥ 16 years old, higher score on the component on desired weight status (β=0.12 at $p<0.0001$), higher score on the component on attempt to lose weight (β=0.04 at $p<0.0001$), not consuming breakfast (β=0.03 at $p<0.05$) relative to consuming breakfast, and consuming more than 30 % of energy from fat (β=0.02 at $p<0.05$) relative to consuming ≤ 30% of energy from fat. In addition, the following decreased mean BMI: higher alcohol consumption (β=-0.02 at $p<0.0001$), and having one live birth (β=-0.04 at $p<0.01$), two live births (β=-0.05 at $p<0.01$), or three live births (β=-0.04 at $p<0.05$) relative to having no live birth or never being pregnant. R^2 was 0.49 (Table 20).

2. Predictors in income subpopulation groups in 1999-2002

In the low-income group, the following increased mean BMI: being black (β=0.04 at $p<0.05$) relative to being white, being 30-39 years old (β=0.05 at $p<0.05$) or 40-49 years old (β=0.06 at $p<0.01$) relative to being 20-29 years old, being a non-smoker (β=0.06 at $p<0.001$) relative to being a smoker, watching TV or using a computer for ≥ 4 hours/day (β=0.04 at $p<0.05$) relative to watching TV or using a computer for ≤ 1 hour/day, not participating in any leisure-time activity (β=0.09 at $p<0.0001$) or participating in leisure-time activity at the third quintile level (β=0.05 at $p<0.05$) relative

to participating in leisure-time activity at the highest level, higher score on the component on desired weight status (β=0.10 at $p<0.0001$), higher score on the component on attempt to lose weight (β=0.03 at $p<0.001$), and consuming restaurant food 1 time/week (β=0.05 at $p<0.05$) relative to consuming restaurant food less than 1 time/week. In addition being a woman decreased mean BMI (β=-0.04 at $p<0.001$) relative to being a man. R^2 was 0.49 (Table 21).

In the middle-income group, the following increased mean BMI: being black (β=0.08 at $p<0.0001$) relative to being white, watching TV or using a computer for 2-3 hours/day (β=0.04 at $p<0.05$) or $\geq$ 4 hours/day (β=0.04 at $p<0.05$) relative to watching TV or using a computer for $\leq$ 1 hour/day, spending the day by sitting (β=0.03 at $p<0.05$) relative to spending the day by carrying light or heavy loads, higher score on the component on desired weight status (β=0.10 at $p<0.0001$), higher score on the component on attempt to lose weight (β=0.03 at $p<0.001$), and consuming more than 30 % of energy from fat (β=0.02 at $p<0.05$) relative to consuming $\leq$ 30% of energy from fat. In addition, being a woman decreased mean BMI (β=-0.05 at $p<0.001$) relative to being a man. R^2 was 0.47 (Table 21).

In the high-income group, the following increased mean BMI: being black (β=0.06 at $p<0.0001$) relative to being white, having only less than high school education (β=0.05 at $p<0.01$) or high school education (β=0.03 at $p<0.05$) relative to having more than high school education, being 40-49 years old (β=0.04 at $p<0.05$) or 60+ years old (β=0.04 at $p<0.01$) relative to being 20-29 years old, being a non-smoker (β=0.02 at $p<0.05$) relative to being a smoker, watching TV or using a computer for 2-3 hours/day (β=0.02 at $p<0.05$) or $\geq$ 4 hours/day (β=0.05 at $p<0.01$) relative to watching TV or using

Table 21. Predictors of BMI by income in 1999-2002[1]

	Low		Middle		High	
Variables	β	SE	β	SE	β	SE
Intercept	2.41****	0.12	2.41****	0.16	2.38****	0.11
Gender						
Male	0.00	0.00	0.00	0.00	0.00	0.00
Female	-0.04***	0.01	-0.05***	0.01	-0.07****	0.01
Education						
< High school	0.01	0.01	0.02	0.01	0.05**	0.00
High school graduate	0.02	0.01	-0.01	0.01	0.03*	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Race/ethnicity						
White	0.00	0.00	0.00	0.00	0.00	0.00
Black	0.04*	0.02	0.08****	0.02	0.06*	0.02
Mexican-American	-0.01	0.01	0.02	0.01	0.03	0.01
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.05*	0.02	-0.01	0.03	0.01	0.00
40-49 yrs	0.06**	0.02	-0.01	0.03	0.04*	0.00
50-59 yrs	0.04	0.03	0.03	0.03	0.03	0.01
60+ yrs	0.01	0.02	0.04	0.03	0.04**	0.01
Marital status						
Married	0.01	0.02	-0.00	0.02	-0.00	0.01
Widowed, divorced, or separated	0.01	0.02	-0.03	0.02	0.00	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.06***	0.01	0.03	0.02	0.02*	0.00
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Daily hrs of TV, video or computer use						
≤ 1 hr	0.00	0.00	0.00	0.00	0.00	0.00
2-3 hrs	0.01	0.01	0.04**	0.02	0.02*	0.00
≥ 4 hrs	0.04*	0.02	0.04**	0.02	0.05**	0.00
Alcohol consumption (# of drinks/wk)[2]	-0.01	0.01	-0.00	0.01	-0.01***	0.00
Daily physical activity						
Mainly sit	0.02	0.02	0.03*	0.02	0.04*	0.00
Walk a lot	0.01	0.02	0.01	0.01	0.02	0.00
Carry light or heavy loads	0.00	0.00	0.00	0.00	0.00	0.00

Table 21 (cont'd)

	Low		Middle		High	
Variables	β	SE	β	SE	β	SE
Leisure time activity/month						
No activities	0.08****	0.02	0.04	0.02	0.06**	0.02
1st quintile	0.04	0.02	-0.01	0.02	0.04**	0.01
2nd quintile	0.01	0.02	0.00	0.02	0.02	0.01
3rd quintile	0.05*	0.02	-0.01	0.02	0.00	0.01
4th quintile	0.04	0.03	-0.01	0.02	0.00	0.00
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.10****	0.01	0.10****	0.01	0.10****	0.00
Component 2[4]	0.03***	0.00	0.03***	0.01	0.03***	0.01
Restaurant food consumption						
< 1 time/wk	0.00	0.00	0.00	0.00	0.00	0.00
1 time/wk	0.05*	0.02	0.00	0.02	-0.01	0.01
2-3 times/wk	0.02	0.01	-0.01	0.02	0.00	0.01
≥ 4 times/wk	0.01	0.02	0.01	0.02	0.02	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.01	0.01	0.01	0.02	0.03*	0.00
Energy intake (kcal/d)[2]	0.02	0.01	0.03	0.02	0.03*	0.00
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	-0.00	0.01	0.02*	0.01	0.02*	0.00
Number of eating occasions						
≤ 3 times/day	0.03	0.03	0.04	0.02	0.01	0.01
4 times/day	0.02	0.02	0.03	0.02	0.01	0.01
5 times/day	0.01	0.02	0.02	0.02	0.01	0.01
6 times/day	0.02	0.03	0.02	0.02	0.01	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.49		0.47		0.45	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and on desired weight status

[4] Sum of responses to the questions on attempt to lose weight and on attempt not to gain weight

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

a computer for ≤ 1 hour/day, spending the day by sitting (β=0.04 at $p<0.05$) relative to spending the day by carrying light or heavy loads, not participating in any leisure-time activity (β=0.06 at $p<0.01$) or participating in leisure-time activity at the first quintile level (β=0.04 at $p<0.01$) relative to participating in leisure-time activity at the highest level, higher score on the component on desired weight status (β=0.10 at $p<0.0001$), higher score on the component on attempt to lose weight (β=0.03 at $p<0.001$), not consuming breakfast (β=0.03 at $p<0.05$) relative to consuming breakfast, higher energy intake (β=0.03 at $p<0.05$), and consuming more than 30 % of energy from fat (β=0.02 at $p<0.05$) relative to consuming ≤ 30% of energy from fat. In addition, being a woman decreased mean BMI (β=-0.07 at $p<0.0001$) relative to being a man. R^2 was 0.45 (Table 21).

3. Predictors in racial/ethnic subpopulation groups in 1999-2002

In whites, the following increased mean BMI: having less than high school education (β=0.03 at $p<0.05$) relative to having more than high school education, being 40-49 years old (β=0.03 at $p<0.05$), 50-59 years old (β=0.03 at $p<0.05$), or 60+ years old (β=0.04 at $p<0.05$) relative to being 20-29 years old, being a non-smoker (β=0.03 at $p<0.001$) relative to being a smoker, watching TV or using a computer for 2-3 hours/day (β=0.02 at $p<0.01$) or ≥ 4 hours/day (β=0.03 at $p<0.05$) relative to watching TV or using a computer for ≤ 1 hour/day, spending the day by sitting (β=0.03 at $p<0.01$) or by walking a lot (β=0.02 at $p<0.05$) relative to spending the day by carrying light or heavy loads, not participating in any leisure-time activity (β=0.07 at $p<0.0001$) or participating in leisure time activity at the first quintile level (β=0.03 at $p<0.01$) relative to

participating in leisure-time activity at the highest level, higher score on the component on the desired weight status (β=0.10 at $p<0.0001$), higher score on the component on attempt to lose weight (β=0.03 at $p<0.0001$), not consuming breakfast (β=0.03 at $p<0.01$) relative to consuming breakfast, consuming restaurant food $\geq$ 4 times/week (β=0.02 at $p<0.05$) relative to consuming restaurant food less than 1 time/week, higher energy intake (β=0.03 at $p<0.01$), and eating meals or snacks $\leq$ 3 times/day (β=0.03 at $p<0.05$) or 4 times/day (β=0.02 at $p<0.05$) relative to consuming meals/snacks $\geq$ 7 times/day. In addition, being a woman decreased mean BMI (β=-0.07 at $p<0.0001$) relative to being a man. R^2 was 0.45 (Table 22). The present study could not identify the predictors of blacks and Mexican-Americans due to the problems with study design variables described earlier.

4. Predictors in subpopulation groups by income and gender in 1999-2002

In low-income men, the following increased mean BMI: having high school education (β=0.05 at $p<0.01$) relative to having more than high school education, being 40-49 years old (β=0.06 at $p<0.01$) or 50-59 years old (β=0.06 at $p<0.05$) relative to being 20-29 years old, being a non-smoker (β=0.04 at $p<0.05$) relative to being a smoker, participating in leisure-time activity at the third quintile level (β=0.07 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on desired weight status (β=0.09 at $p<0.0001$), higher score on the component on attempt to lose weight (β=0.03 at $p<0.01$), consuming restaurant food 2-3 times/week (β=0.04 at $p<0.05$) relative to consuming restaurant food less than 1 time/week, and higher energy intake (β=0.03 at $p<0.01$). R^2 was 0.57 (Table 23).

Table 22. Predictors of BMI in whites in 1999-2002[1]

Variables	Whites β	Whites SE
Intercept	2.30****	0.08
Gender		
Male	0.00	0.00
Female	-0.07****	0.01
Education		
< High school	0.03*	0.01
High school graduate	0.01	0.01
> High school	0.00	0.00
Income		
PIR <1.85	0.06***	0.01
1.85 ≤ PIR ≤ 3.5	0.03**	0.01
PIR >3.5	0.00	0.00
Age		
20-29 yrs	0.00	0.00
30-39 yrs	0.02	0.01
40-49 yrs	0.03*	0.01
50-59 yrs	0.03*	0.01
60+ yrs	0.04*	0.01
Marital status		
Married	0.00	0.01
Widowed, divorced, or separated	-0.00	0.01
Never married or living with partner	0.00	0.00
Smoking status in the past 5 days		
Non-smoker	0.03***	0.01
Smoker	0.00	0.00
Daily hrs of TV, video or computer use		
≤ 1 hr	0.00	0.00
2-3 hrs	0.02**	0.01
≥ 4 hrs	0.03*	0.01
Alcohol consumption (# of drinks/wk)[2]	-0.01*	0.00
Daily physical activity		
Mainly sit	0.03**	0.01
Walk a lot	0.02*	0.01
Carry light or heavy loads	0.00	0.00

Table 22 (cont'd)

Variables	Whites β	Whites SE
Leisure time activity/month		
No activities	0.07****	0.01
1st quintile	0.03**	0.01
2nd quintile	0.02	0.01
3rd quintile	0.01	0.01
4th quintile	0.01	0.01
5th quintile	0.00	0.00
Component 1[3]	0.10****	0.01
Component 2[4]	0.03****	0.00
Restaurant food consumption		
< 1 time/wk	0.00	0.00
1 time/wk	0.01	0.01
2-3 times/wk	0.01	0.01
≥ 4 times/wk	0.02*	0.01
Breakfast consumption		
Yes	0.00	0.00
No	0.03**	0.01
Energy intake (kcal/d)[2]	0.03**	0.01
Fat intake		
≤ 30% of energy from fat	0.00	0.00
> 30% of energy from fat	0.01	0.01
Number of eating occasions		
≤ 3 times/day	0.03*	0.01
4 times/day	0.02*	0.01
5 times/day	0.01	0.01
6 times/day	0.02	0.01
≥ 7 times/day	0.00	0.00
R^2	0.45	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and on desired weight status

[4] Sum of responses to the questions on attempt to lose weight and on attempt not to gain weight

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table 23. Predictors of BMI by income and gender in 1999-2002[1]

	LIM		MIM		HIM	
Variables	β	SE	β	SE	β	SE
Intercept	2.36****	0.12	2.65****	0.19	2.51****	0.14
Race/ethnicity						
Non-Hispanic White	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hispanic Black	-0.01	0.02	0.04*	0.02	0.05**	0.02
Mexican-Americans	-0.01	0.01	0.02	0.02	0.04*	0.02
Education						
< High school	0.02	0.01	-0.01	0.01	0.06*	0.02
High school graduate	0.05**	0.01	0.00	0.01	0.03**	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.04	0.02	-0.01	0.02	0.01	0.02
40-49 yrs	0.06**	0.02	-0.02	0.02	0.01	0.01
50-59 yrs	0.06*	0.02	0.02	0.03	0.02	0.02
60+ yrs	0.04	0.02	0.02	0.03	0.02	0.02
Marital status						
Married	0.01	0.02	0.03	0.02	0.01	0.01
Widowed, divorced, or separated	-0.01	0.02	-0.03	0.03	-0.01	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.04*	0.01	0.00	0.02	0.01	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Daily hrs of TV, video or computer use						
≤ 1 hr	0.00	0.00	0.00	0.00	0.00	0.00
2-3 hrs	-0.01	0.01	-0.00	0.02	0.00	0.01
≥ 4 hrs	0.01	0.02	0.01	0.02	0.01	0.02
Alcohol consumption (# of drinks/wk)[2]	0.00	0.01	0.01	0.01	-0.01*	0.00
Daily physical activity						
Mainly sit	0.01	0.02	0.05*	0.02	0.02	0.02
Walk a lot	0.01	0.01	-0.00	0.01	0.01	0.01
Carry light or heavy loads	0.00	0.00	0.00	0.00	0.00	0.00

Table 23 (cont'd)

Variables	LIM β	LIM SE	MIM β	MIM SE	HIM β	HIM SE
Leisure time activity/month						
No activities	0.03	0.02	0.02	0.02	0.02	0.02
1st quintile	0.00	0.02	-0.00	0.02	0.02	0.02
2nd quintile	-0.01	0.02	-0.03	0.03	0.01	0.01
3rd quintile	0.07*	0.02	-0.01	0.03	-0.01	0.01
4th quintile	0.04	0.02	-0.01	0.03	0.02	0.02
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menstruation						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	0.09****	0.01	0.09****	0.01	0.09****	0.01
Component 2[4]	0.03**	0.01	0.04**	0.01*	0.02	0.01
Restaurant food consumption						
< 1 time/wk	0.00	0.00	0.00	0.00	0.00	0.00
1 time/wk	0.03	0.02	-0.03	0.03	-0.01	0.01
2-3 times/wk	0.04*	0.02	-0.02	0.02	-0.01	0.01
≥ 4 times/wk	0.02	0.02	-0.01	0.03	0.00	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.01	0.01	-0.01	0.02	0.02	0.02
Energy intake (kcal/d)[2]	0.04*	0.02	0.01	0.02	0.03	0.02

Table 23 (cont'd)

Variables	LIM β	LIM SE	MIM β	MIM SE	HIM β	HIM SE
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.00	0.02	0.01	0.01	0.00	0.01
Number of eating occasions						
≤ 3 times/day	0.02	0.03	0.05	0.02	0.01	0.01
4 times/day	-0.00	0.03	0.02	0.02	-0.00	0.02
5 times/day	-0.01	0.03	0.04	0.03	0.02	0.01
6 times/day	0.01	0.03	0.03	0.03	0.02	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.57		0.54		0.49	

Table 23 (cont'd)

	LIW		MIW		HIW	
Variables	β	SE	β	SE	β	SE
Intercept	2.29****	0.15	2.35****	0.22	2.21****	0.17
Race/ethnicity						
Non-Hispanic White	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hispanic Black	0.08***	0.02	0.12***	0.03	0.08*	0.03
Mexican-Americans	-0.05*	0.02	0.01	0.02	-0.01	0.02
Education						
< High school	0.00	0.02	0.04	0.02	0.05	0.03
High school graduate	-0.01	0.03	-0.02	0.02	0.01	0.02
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.07*	0.03	0.02	0.05	0.05	0.03
40-49 yrs	0.05	0.03	-0.00	0.05	0.08*	0.03
50-59 yrs	-0.00	0.04	0.04	0.05	0.05	0.03
60+ yrs	-0.02	0.03	0.07	0.05	0.07*	0.03
Marital status						
Married	-0.01	0.03	0.02	0.04	0.01	0.02
Widowed, divorced, or separated	-0.01	0.03	0.02	0.03	0.03	0.03
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.07***	0.02	0.03	0.02	0.04	0.02
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Daily hrs of TV, video or computer use						
≤ 1 hr	0.00	0.00	0.00	0.00	0.00	0.00
2-3 hrs	0.01	0.02	0.07***	0.02	0.04*	0.02
≥ 4 hrs	0.02	0.02	0.05**	0.02	0.09***	0.02
Alcohol consumption (# of drinks/wk)^2	-0.03*	0.01	-0.03**	0.01	-0.02**	0.01
Daily physical activity						
Mainly sit	0.06*	0.03	0.03	0.02	0.04	0.02
Walk a lot	0.04	0.02	0.01	0.02	0.01	0.01
Carry light or heavy loads	0.00	0.00	0.00	0.00	0.00	0.00

Table 23 (cont'd)

Variables	LIW β	LIW SE	MIW β	MIW SE	HIW β	HIW SE
Leisure time activity/month						
No activities	0.13***	0.03	0.03	0.03	0.10**	0.03
1st quintile	0.06	0.05	-0.03	0.04	0.07**	0.02
2nd quintile	0.03	0.04	0.00	0.04	0.03	0.02
3rd quintile	0.07*	0.03	-0.02	0.04	0.02	0.03
4th quintile	0.04	0.04	-0.03	0.03	0.00	0.02
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	0.07	0.05	-0.01	0.05	0.01	0.05
No	0.07	0.05	-0.00	0.04	0.00	0.04
Never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00
Number of live birth						
0 and never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00
1	-0.03	0.02	-0.04	0.03	-0.06	0.03
2	-0.05	0.03	-0.12****	0.02	-0.02	0.03
3	-0.03	0.03	-0.08**	0.02	-0.03	0.04
4	0.00	0.00	0.00	0.00	0.00	0.00
≥ 5	0.02	0.04	-0.04	0.04	0.02	0.05
Age at the first menstruation						
≤ 11 yrs old	0.11**	0.04	0.05	0.03	0.16***	0.04
12-15 yrs old	0.05	0.03	-0.01	0.02	0.10**	0.03
≥ 16 yrs old	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.12****	0.01	0.12****	0.01	0.12****	0.01
Component 2[4]	0.05**	0.01	0.03*	0.01	0.03*	0.01
Restaurant food consumption						
< 1 time/wk	0.00	0.00	0.00	0.00	0.00	0.00
1 time/wk	0.05	0.02	0.04	0.02	-0.00	0.03
2-3 times/wk	-0.01	0.02	0.01	0.02	0.02	0.03
≥ 4 times/wk	-0.03	0.02	0.03	0.03	0.04	0.03
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.03	0.02	0.03	0.03	0.03	0.02
Energy intake (kcal/d)[2]	0.00	0.02	0.02	0.02	0.00	0.02

Table 23 (cont'd)

	LIW		MIW		HIW	
Variables	β	SE	β	SE	β	SE
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.00	0.02	0.04	0.02	0.02	0.01
Number of eating occasions						
≤ 3 times/day	0.05	0.03	0.03	0.03	0.00	0.03
4 times/day	0.03	0.03	0.02	0.03	0.03	0.02
5 times/day	0.02	0.02	-0.00	0.03	-0.01	0.02
6 times/day	0.03	0.05	0.01	0.02	-0.01	0.02
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.53		0.52		0.51	

[1] Dependent variable was log-transformed BMI.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and on desired weight status

[4] Sum of responses to the questions on attempt to lose weight and on attempt not to gain weight

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

In middle-income men, the following increased mean BMI: being black (β=0.04 at $p<0.05$) relative to being white, spending the day by sitting (β=0.05 at $p<0.05$) relative to spending the day by carrying light or heavy loads, higher score on the component on desired weight status (β=0.09 at $p<0.0001$), and higher score on the component on attempt to lose weight (β=0.04 at $p<0.01$). R^2 was 0.54 (Table 23).

In high-income men, the following increased mean BMI: being black (β=0.04 at $p<0.01$) or a Mexican-American (β=0.04 at $p<0.05$) relative to being white, having high school education (β=0.06 at $p<0.05$) or less than high school education (β=0.03 at $p<0.01$) relative to having more than high school education, higher score on the component on desired weight status (β=0.09 at $p<0.0001$), and higher score on the component on attempt to lose weight (β=0.02 at $p<0.05$). In addition, higher alcohol intake decreased mean BMI (β=-0.01 at $p<0.05$). R^2 was 0.53 (Table 23).

In low-income women, the following increased mean BMI: being black (β=0.08 at $p<0.001$) relative to being white, being 30-39 years old (β=0.07 at $p<0.05$) relative to being 20-29 years old, being a non-smoker (β=0.07 at $p<0.001$) relative to being a smoker, spending the day by sitting (β=0.06 at $p<0.05$) relative to spending the day by carrying light or heavy loads, not participating in any leisure-time activity (β=0.13 at $p<0.001$) or participating in leisure-time activity at the third quintile level (β=0.07 at $p<0.05$) relative to participating in leisure-time activity at the highest level, having first menarche at $\leq$ 11 years old (β=0.11 at $p<0.01$) relative to having first menarche at $\geq$ 16 years old, higher score on the component on desired weight status (β=0.12 at $p<0.0001$), and higher score on the component on attempt to lose weight (β=0.05 at $p<0.01$). In

addition, being Mexican-American decreased mean BMI (β=-0.05 at $p<0.05$) relative to being white. R^2 was 0.53 (Table 23).

In middle-income women, the following increased mean BMI: being black (β=0.12 at $p<0.001$) relative to being white, watching TV or using a computer for 2-3 hours/day (β=0.07 at $p<0.001$) or $\geq$ 4 hours/day (β=0.05 at $p<0.01$) relative to watching TV or using a computer for $\leq$ 1 hour/day, higher score on the component on desired weight status (β=0.12 at $p<0.0001$), and higher score on the component on attempt to lose weight (β=0.03 at $p<0.05$). In addition, the following decreased mean BMI: higher alcohol consumption (β=-0.03 at $p<0.01$), and having two live births (β=-0.12 at $p<0.0001$) or three live births (β=-0.08 at $p<0.01$) relative to having no live births or never being pregnant. R^2 was 0.52 (Table 23).

In high-income women, the following increased mean BMI: being black (β=0.08 at $p<0.05$) relative to being white, being 40-49 years old (β=0.08 at $p<0.05$) or 60+ years old (β=0.07 at $p<0.05$) relative to being 20-29 years old, watching TV or using a computer for 2-3 hours/day (β=0.04 at $p<0.05$) or $\geq$ 4 hours/day (β=0.09 at $p<0.05$) relative to watching TV or using a computer for $\leq$ 1 hour/day, not participating in any leisure-time activity (β=0.10 at $p<0.01$) or participating in leisure-time activity at the first quintile level (β=0.07 at $p<0.01$) relative to participating in leisure-time activity at the highest level, having first menarche at $\leq$ 11 years old (β=0.16 at $p<0.001$) or at 12-15 years old (β=0.10 at $p<0.01$) relative to having first menarche at $\geq$ 16 years old, higher score on the component on desired weight status (β=0.12 at $p<0.0001$), and higher score

on the component on attempt to lose weight (β=0.03 at $p<0.05$). In addition, higher alcohol intake decreased mean BMI (β=-0.02 at $p<0.01$). R^2 was 0.51 (Table 23).

5. Differences in predictors in gender subpopulation groups between 1999-2002 and 1988-94

In 1999-2002: the following variables increased mean BMI in men: being black (β=0.03 at $p<0.05$) relative to being white, having high school education (β=0.03 at $p<0.001$) relative to having more than high school education, being in the low-income group (β=0.03 at $p<0.01$) relative to being in the high-income group, being 50-59 years old (β=0.04 at $p<0.05$) or 60+ years old (β=0.03 at $p<0.05$) relative to being 20-29 years old, not participating in any leisure-time activity (β=0.04 at $p<0.01$) or participating in leisure-time activity at the first quintile level (β=0.03 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.08 at $p<0.0001$), higher energy intake (β=0.03 at $p<0.001$), eating meals/snacks $\leq$ 3 times/day (β=0.03 at $p<0.05$) or 6 times/day (β=0.02 at $p<0.05$) relative to eating meals/snacks $\geq$ 7 times/day. R^2 was 0.50 (Table 24).

In women, the following variables increased mean BMI: being black (β=0.09 at $p<0.0001$) relative to being white, being in the low-income group (β=0.06 at $p<0.01$) or in the middle-income group (β=0.03 at $p<0.05$) relative to being in the high-income group, being 30-39 years old (β=0.06 at $p<0.01$), 40-49 years old (β=0.07 at $p<0.001$), 50-59 years old (β=0.05 at $p<0.01$), or 60+ years old (β=0.07 at $p<0.001$) relative to being 20-29 years old, being a non-smoker (β=0.05 at $p<0.01$) relative to being a smoker, not participating in any leisure-time activity (β=0.11 at $p<0.0001$) or participating in leisure-time activity at the first quintile level (β=0.05 at $p<0.05$) relative to participating

Table 24. Predictors of BMI by gender[1]
(NHANES 1999-2002 to compare with NHANES 1988-94)

	Men		Women	
Variables	β	SE	β	SE
Intercept	2.42****	0.08	2.32****	0.12
Race/ethnicity				
Non-Hispanic White	0.00	0.00	0.00	0.00
Non-Hispanic Black	0.03*	0.01	0.09****	0.01
Mexican-Americans	0.01	0.01	-0.01	0.01
Education				
< High school	0.01	0.01	0.03	0.02
High school graduate	0.03***	0.01	0.00	0.01
> High school	0.00	0.00	0.00	0.00
Income				
PIR <1.85	0.03**	0.01	0.06***	0.02
1.85 ≤ PIR ≤ 3.5	0.02	0.01	0.03*	0.01
PIR >3.5	0.00	0.00	0.00	0.00
Age				
20-29 yrs	0.00	0.00	0.00	0.00
30-39 yrs	0.02	0.01	0.06**	0.02
40-49 yrs	0.02	0.01	0.07***	0.02
50-59 yrs	0.04*	0.01	0.05**	0.02
60+ yrs	0.03*	0.01	0.07***	0.02
Marital status				
Married	0.01	0.01	-0.00	0.02
Widowed, divorced, or separated	-0.02	0.02	0.01	0.02
Never married or living with partner	0.00	0.00	0.00	0.00
Smoking status in the past 5 days				
Non-smoker	0.02	0.01	0.05**	0.01
Smoker	0.00	0.00	0.00	0.00
Alcohol consumption (# of drinks/wk)[2]	-0.00	0.00	-0.02****	0.00
Leisure time activity/month				
No activities	0.04**	0.01	0.11****	0.02
1st quintile	0.03*	0.01	0.05*	0.02
2nd quintile	0.01	0.01	0.04	0.02
3rd quintile	0.01	0.01	0.03	0.02
4th quintile	0.02	0.01	-0.00	0.02
5th quintile	0.00	0.00	0.00	0.00

Table 24 (cont'd)

Variables	Men β	Men SE	Women β	Women SE
Breast fed your child				
Yes	N/A	N/A	0.01	0.02
No	N/A	N/A	0.01	0.02
Never been pregnant	N/A	N/A	0.00	0.00
Number of live birth				
0 and never been pregnant	N/A	N/A	0.00	0.00
1	N/A	N/A	-0.04**	0.01
2	N/A	N/A	-0.05**	0.01
3	N/A	N/A	-0.04*	0.02
4	N/A	N/A	0.00	0.00
≥ 5	N/A	N/A	0.01	0.02
Age at the first menarche				
≤ 11 yrs old	N/A	N/A	0.13****	0.02
12-15 yrs old	N/A	N/A	0.06**	0.02
≥ 16 yrs old	N/A	N/A	0.00	0.00
Component 1[3]	0.08****	0.00	0.10****	0.00
Restaurant food consumption				
< 1 time/wk	0.00	0.00	0.00	0.00
1 time/wk	0.00	0.01	0.02	0.02
2-3 times/wk	0.01	0.01	0.01	0.01
≥ 4 times/wk	0.01	0.01	0.04*	0.02
Breakfast consumption				
Yes	0.00	0.00	0.00	0.00
No	0.01	0.01	0.04*	0.01
Energy intake (kcal/d)[2]	0.03***	0.01	0.00	0.01
Fat intake				
≤ 30% of energy from fat	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.01	0.01	0.02*	0.01

Table 24 (cont'd)

	Men		Women	
Variables	β	SE	β	SE
Number of eating occasions				
≤ 3 times/day	0.03*	0.01	0.03	0.02
4 times/day	0.01	0.01	0.02	0.01
5 times/day	0.02	0.01	0.00	0.01
6 times/day	0.02*	0.01	0.01	0.02
≥ 7 times/day	0.00	0.00	0.00	0.00
R^2	0.50		0.47	

[1] Dependent variable was log-transformed BMI.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

in leisure-time activity at the highest level, having first menarche at ≤ 11 years old (β=0.13 at $p<0.0001$) or at 12-15 years old (β=0.06 at $p<0.01$) relative to having first menarche at ≥ 16 years old, higher score on the component on attempt to lose weight (β=0.10 at $p<0.0001$), consuming restaurant food ≥ 4 times/week (β=0.04 at $p<0.05$) relative to consuming restaurant food less than 1 time/week, not consuming breakfast (β=0.04 at $p<0.05$) relative to consuming breakfast, and consuming more than 30 % of energy from fat (β=0.02 at $p<0.05$) relative to consuming ≤ 30% of energy from fat. In addition, the following decreased mean BMI: higher alcohol consumption (β=-0.02 at $p<0.0001$), having one live birth (β=-0.04 at $p<0.01$), two live births (β=-0.05 at $p<0.01$), or three live births (β=-0.04 at $p<0.05$) relative to having no live birth or never being pregnant. R^2 was 0.47 (Table 24).

In 1988-94: the following variables increased mean BMI in men: being black (β=0.02 at $p<0.001$) relative to being white, having less than high school education (β=0.04 at $p<0.0001$) or high school education (β=0.03 at $p<0.0001$) relative to having more than high school education, being in the low-income group (β=0.01 at $p<0.05$) relative to being in the high-income group, being 40-49 years old (β=0.03 at $p<0.001$), 50-59 years old (β=0.04 at $p<0.001$), or 60+ years old (β=0.03 at $p<0.0001$) relative to being 20-29 years old, being a non-smoker (β=0.03 at $p<0.001$) relative to being a smoker, not participating in any leisure-time activity (β=0.03 at $p<0.01$) or participating in leisure-time activity at the first quintile level (β=0.03 at $p<0.01$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.07 at $p<0.0001$), higher energy intake (β=0.02 at $p<0.01$), eating

meals/snacks ≤ 3 times/day (β=0.04 at p<0.01) or 4 times/day (β=0.03 at p<0.01) relative to eating meals or snacks ≥ 7 times/day. In addition, higher alcohol consumption decreased mean BMI (β=-0.01 at p<0.01). R^2 was 0.45 (Table 25).

In women, the following variables increased mean BMI: being black (β=0.08 at p<0.0001) or Mexican-American (β=0.03 at p<0.01) relative to being white, being in the low-income group (β=0.03 at p<0.05) relative to being in the high-income group, having less than high school education (β=0.03 at p<0.05) or high school education (β=0.02 at p<0.05) relative to having more than high school education, being 30-39 years old (β=0.06 at p<0.001), 40-49 years old (β=0.08 at p<0.0001), 50-59 years old (β=0.12 at p<0.0001), or 60+ years old (β=0.12 at p<0.0001) relative to being 20-29 years old, being a non-smoker (β=0.02 at p<0.01) relative to being a smoker, not participating in any leisure-time activity (β=0.09 at p<0.0001) or participating in leisure-time activity at the first quintile level (β=0.05 at p<0.001) relative to participating in leisure-time activity at the highest level, having first menarche at ≤ 11 years old (β=0.07 at p<0.0001) relative to having first menarche at ≥ 16 years old, higher score on the component on attempt to lose weight status (β=0.09 at p<0.0001), higher energy intake (β=0.03 at p<0.01), and eating meals/snacks ≤ 3 times/day (β=0.04 at p<0.01) or 4 times/day (β=0.03 at p<0.05) relative to eating meals/snacks ≥ 7 times/day. In addition, the following decreased mean BMI: higher alcohol consumption (β=-0.02 at p<0.0001) and having two live births (β=-0.03 at p<0.05) relative to having no live birth or never being pregnant. R^2 was 0.42 (Table 25).

6. Differences in predictors in income subpopulation groups between 1999-2002 and 1988-94

Table 25. Predictors of BMI by gender in 1988-94[1]

	Men		Women	
Variables	β	SE	β	SE
Intercept	2.57****	0.06	2.23****	0.09
Race/ethnicity				
Non-Hispanic White	0.00	0.00	0.00	0.00
Non-Hispanic Black	0.02***	0.01	0.08****	0.01
Mexican-Americans	0.00	0.01	0.03**	0.01
Education				
< High school	0.04****	0.01	0.03*	0.01
High school graduate	0.03****	0.01	0.02*	0.01
> High school	0.00	0.00	0.00	0.00
Income				
PIR <1.85	0.01	0.01	0.03*	0.01
1.85 ≤ PIR ≤ 3.5	0.01*	0.01	0.01	0.01
PIR >3.5	0.00	0.00	0.00	0.00
Age				
20-29 yrs	0.00	0.00	0.00	0.00
30-39 yrs	0.01	0.01	0.06***	0.01
40-49 yrs	0.03***	0.01	0.08****	0.02
50-59 yrs	0.04***	0.01	0.12****	0.01
60+ yrs	0.03****	0.01	0.12****	0.01
Marital status				
Married	-0.00	0.01	-0.02	0.01
Widowed, divorced, or separated	-0.01	0.01	-0.02	0.01
Never married or living with partner	0.00	0.00	0.00	0.00
Smoking status in the past 5 days				
Non-smoker	0.03***	0.01	0.02**	0.01
Smoker	0.00	0.00	0.00	0.00
Alcohol consumption (# of drinks/wk)[2]	-0.01**	0.00	-0.02****	0.00
Leisure time activity/month				
No activities	0.03**	0.01	0.09****	0.02
1st quintile	0.03**	0.01	0.05***	0.01
2nd quintile	0.01	0.01	0.03	0.02
3rd quintile	0.01	0.01	0.02	0.01
4th quintile	0.01	0.01	-0.00	0.01
5th quintile	0.00	0.00	0.00	0.00

Table 25 (cont'd)

Variables	Men β	Men SE	Women β	Women SE
Breast fed your child				
Yes	N/A	N/A	0.01	0.02
No	N/A	N/A	0.03	0.02
Never been pregnant	N/A	N/A	0.00	0.00
Number of live birth				
0 and never been pregnant	N/A	N/A	0.00	0.00
1	N/A	N/A	-0.00	0.02
2	N/A	N/A	-0.03*	0.01
3	N/A	N/A	-0.02	0.02
4	N/A	N/A	0.00	0.00
≥ 5	N/A	N/A	0.00	0.02
Age at the first menarche				
≤ 11 yrs old	N/A	N/A	0.07****	0.01
12-15 yrs old	N/A	N/A	0.02	0.01
≥ 16 yrs old	N/A	N/A	0.00	0.00
Component 1[3]	0.07****	0.00	0.09****	0.00
Restaurant food consumption				
Non-consumer	0.00	0.00	0.00	0.00
Consumer	-0.00	0.01	-0.02	0.01
Breakfast consumption				
Yes	0.00	0.00	0.00	0.00
No	0.01	0.01	0.01	0.01
Energy intake (kcal/d)[2]	0.02**	0.01	0.03**	0.01
Fat intake				
≤ 30% of energy from fat	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.00	0.01	0.01	0.01
Number of eating occasions				
≤ 3 times/day	0.04**	0.01	0.04**	0.01
4 times/day	0.03**	0.01	0.03*	0.01
5 times/day	0.01	0.01	0.02	0.01
6 times/day	0.00	0.01	0.01	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00
R^2	0.45		0.42	

[1]Dependent variable was log-transformed BMI. [2]Log-transformed

[3]Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight. * p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

In 1999-2002: the following increased mean BMI in the low-income group: being black (β=0.04 at $p<0.05$) relative to being white, having high school education (β=0.03 at $p<0.05$) relative to having more than high school education, being 30-39 years old (β=0.06 at $p<0.05$), 40-49 years old (β=0.07 at $p<0.001$), or 50-59 years old (β=0.05 at $p<0.05$) relative to being 20-29 years old, being a non-smoker (β=0.05 at $p<0.001$) relative to being a smoker, not participating in any leisure-time activity (β=0.09 at $p<0.0001$) or participating in leisure-time activity at the third quintile level (β=0.05 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.10 at $p<0.0001$), and consuming restaurant food 1 time/week (β=0.05 at $p<0.05$) or 2-3 times/week (β=0.02 at $p<0.05$) relative to consuming restaurant food less than 1 time/week. In addition being a woman decreased mean BMI (β=-0.05 at $p<0.001$) relative to being a man. R^2 was 0.49 (Table 26).

In the middle-income group, the following increased mean BMI: being black (β=0.08 at $p<0.0001$) relative to being white, not participating in any leisure-time activity (β=0.05 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.09 at $p<0.0001$), and consuming more than 30 % of energy from fat (β=0.03 at $p<0.05$) relative to consuming $\leq$ 30% of energy from fat. In addition, being a woman decreased mean BMI (β=-0.05 at $p<0.001$) relative to being a man. R^2 was 0.44 (Table 26).

In the high-income group, the following increased mean BMI: being black (β=0.07 at $p<0.001$) relative to being white, having less than high school education (β=0.05 at $p<0.01$) relative to having more than high school education, being 40-49 years

Table 26. Predictors of BMI by income[1]
(NHANES 1999-2002 to compare with NHANES 1988-94)

	Low		Middle		High	
Variables	β	SE	β	SE	β	SE
Intercept	2.41****	0.11	2.44****	0.18	2.43****	0.11
Gender						
Male	0.00	0.00	0.00	0.00	0.00	0.00
Female	-0.05***	0.01	-0.05***	0.01	-0.08***	0.01
Education						
< High school	0.02	0.01	0.01	0.02	0.05**	0.02
High school graduate	0.03*	0.01	-0.01	0.02	0.03	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Race/ethnicity						
White	0.00	0.00	0.00	0.00	0.00	0.00
Black	0.04*	0.02	0.08****	0.02	0.07***	0.02
Mexican-American	-0.02	0.01	0.01	0.01	0.02	0.01
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.06*	0.02	-0.01	0.03	0.01	0.01
40-49 yrs	0.07***	0.02	-0.01	0.03	0.04**	0.01
50-59 yrs	0.05*	0.03	0.04	0.03	0.04*	0.01
60+ yrs	0.02	0.02	0.05	0.03	0.05***	0.01
Marital status						
Married	0.00	0.02	-0.00	0.02	-0.00	0.01
Widowed, divorced, or separated	0.00	0.02	-0.03	0.02	0.00	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.05**	0.01	0.03	0.02	0.02*	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol consumption (# of drinks/wk)[2]	-0.01	0.01	-0.00	0.01	-0.02***	0.00
Leisure time activity/month						
No activities	0.09****	0.02	0.05*	0.02	0.07***	0.02
1st quintile	0.04	0.02	0.01	0.02	0.05***	0.01
2nd quintile	0.02	0.02	0.01	0.02	0.03	0.02
3rd quintile	0.05*	0.02	0.00	0.02	0.01	0.01
4th quintile	0.04	0.03	0.00	0.02	0.00	0.01
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00

Table 26 (cont'd)

Variables	Low β	Low SE	Middle β	Middle SE	High β	High SE
Component 1[3]	0.10****	0.00	0.09****	0.01	0.09****	0.00
Restaurant food consumption						
< 1 time/wk	0.00	0.00	0.00	0.00	0.00	0.00
1 time/wk	0.05*	0.02	0.01	0.02	-0.00	0.01
2-3 times/wk	0.02*	0.01	-0.00	0.02	0.01	0.01
≥ 4 times/wk	0.01	0.02	0.01	0.02	0.03	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.02	0.01	0.01	0.02	0.04**	0.01
Energy intake (kcal/d)[2]	0.02	0.01	0.03	0.02	0.03*	0.01
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	-0.00	0.01	0.03*	0.01	0.02*	0.01
Number of eating occasions						
≤ 3 times/day	0.03	0.03	0.05	0.02	0.01	0.01
4 times/day	0.01	0.02	0.04	0.02	0.01	0.01
5 times/day	0.01	0.02	0.02	0.02	0.01	0.02
6 times/day	0.01	0.03	0.03	0.02	0.01	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.49		0.44		0.43	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

old (β=0.04 at $p<0.01$), 50-59 years old (β=0.04 at $p<0.05$), or 60+ years old (β=0.05 at $p<0.001$) relative to being 20-29 years old, being a non-smoker (β=0.02 at $p<0.05$) relative to being a smoker, not participating in any leisure-time activity (β=0.07 at $p<0.001$) or participating in leisure-time activity at the first quintile level (β=0.05 at $p<0.001$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.09 at $p<0.0001$), not consuming breakfast (β=0.04 at $p<0.01$) relative to consuming breakfast, higher energy intake (β=0.03 at $p<0.05$), and consuming more than 30 % of energy from fat (β=0.02 at $p<0.05$) relative to consuming $\leq$ 30% of energy from fat. In addition, the following decreased mean BMI: being a woman (β=-0.08 at $p<0.0001$) relative to being a man and higher alcohol intakes (β=-0.02 at $p<0.001$). R^2 was 0.43 (Table 26).

In 1988-94: the following increased mean BMI in the low-income group: being black (β=0.05 at $p<0.0001$) relative to being white, having less than high school education (β=0.05 at $p<0.01$) or high school education (β=0.04 at $p<0.01$) relative to having more than high school education, being 30-39 years old (β=0.05 at $p<0.01$), 40-49 years old (β=0.07 at $p<0.0001$), 50-59 years old (β=0.08 at $p<0.0001$), or 60+ years old (β=0.07 at $p<0.0001$) relative to being 20-29 years old, being a non-smoker (β=0.05 at $p<0.0001$) relative to being a smoker, not participating in any leisure-time activity (β=0.05 at $p<0.01$) or participating in leisure-time activity at the first quintile level (β=0.04 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.09 at $p<0.0001$), higher energy intake (β=0.03 at $p<0.001$), eating meals/snacks $\leq$ 3 times/day (β=0.05 at $p<0.001$) or 4 times/day

(β=0.03 at $p<0.05$) relative to eating meals or snacks $\geq$ 7 times/day. In addition, the following decreased mean BMI: being a woman (β=-0.06 at $p<0.0001$) relative to being a man and higher alcohol consumption decreased mean BMI (β=-0.01 at $p<0.05$). R^2 was 0.44 (Table 27).

In the middle-income group, the following increased mean BMI: being black (β=0.07 at $p<0.0001$) or Mexican-American (β=0.02 at $p<0.05$) relative to being white, having less than high school education (β=0.03 at $p<0.05$) or high school education (β=0.02 at $p<0.05$) relative to having more than high school education, being 40-49 years old (β=0.05 at $p<0.001$), 50-59 years old (β=0.06 at $p<0.0001$), or 60+ years old (β=0.06 at $p<0.0001$) relative to being 20-29 years old, not participating in any leisure-time activity (β=0.08 at $p<0.0001$) or participating in leisure-time activity at the first quintile level (β=0.05 at $p<0.01$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.08 at $p<0.0001$), higher energy intake (β=0.04 at $p<0.001$), eating meals/snacks $\leq$ 3 times/day (β=0.03 at $p<0.05$) or 4 times/day (β=0.03 at $p<0.05$) relative to eating meals/snacks $\geq$ 7 times/day. In addition, the following decreased mean BMI: being a woman (β=-0.08 at $p<0.0001$) relative to being a man and higher alcohol consumption decreased mean BMI (β=-0.01 at $p<0.001$). R^2 was 0.40 (Table 27).

In the high-income group, the following increased mean BMI: being black (β=0.05 at $p<0.0001$) or Mexican-American (β=0.02 at $p<0.05$) relative to being white, having less than high school education (β=0.04 at $p<0.01$) or high school education (β=0.03 at $p<0.001$) relative to having more than high school education, being 30-39

Table 27. Predictors of BMI by income in 1988-94[1]

	Low		Middle		High	
Variables	β	SE	β	SE	β	SE
Intercept	2.39****	0.07	2.40****	0.11	2.54****	0.08
Gender						
Male	0.00	0.00	0.00	0.00	0.00	0.00
Female	-0.06****	0.01	-0.08****	0.01	-0.08****	0.01
Education						
< High school	0.05**	0.01	0.03*	0.01	0.04**	0.01
High school graduate	0.04**	0.01	0.02*	0.01	0.03***	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Race/ethnicity						
White	0.00	0.00	0.00	0.00	0.00	0.00
Black	0.05****	0.01	0.07****	0.01	0.05****	0.01
Mexican-American	0.02	0.01	0.02*	0.01	0.02*	0.01
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.05**	0.01	0.01	0.01	0.04*	0.01
40-49 yrs	0.07****	0.02	0.05***	0.01	0.05***	0.01
50-59 yrs	0.08****	0.02	0.06****	0.01	0.09****	0.02
60+ yrs	0.07****	0.01	0.06****	0.01	0.08****	0.01
Marital status						
Married	-0.01	0.01	-0.01	0.01	-0.01	0.01
Widowed, divorced, or separated	-0.01	0.02	-0.02	0.01	-0.00	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.05****	0.01	0.02	0.01	0.02	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol consumption (# of drinks/wk)[2]	-0.01*	0.00	-0.01***	0.00	-0.01**	0.00
Leisure time activity/month						
No activities	0.05**	0.02	0.08****	0.02	0.05**	0.01
1st quintile	0.04*	0.02	0.05**	0.02	0.05***	0.01
2nd quintile	0.01	0.02	0.01	0.01	0.03**	0.01
3rd quintile	0.02	0.02	0.02	0.02	0.02	0.01
4th quintile	0.02	0.03	-0.00	0.01	-0.00	0.01
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.09****	0.00	0.08****	0.00	0.07****	0.00

Table 27 (cont'd)

	Low		Middle		High	
Variables	β	SE	β	SE	β	SE
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Consumer	-0.01	0.01	-0.01	0.01	-0.01	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.01	0.01	0.00	0.01	0.00	0.01
Energy intake (kcal/d)[2]	0.03***	0.01	0.04**	0.01	0.03*	0.01
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.01	0.01	0.01	0.01	-0.00	0.01
Number of eating occasions						
≤ 3 times/day	0.05***	0.01	0.03*	0.01	0.04**	0.02
4 times/day	0.03*	0.01	0.03*	0.01	0.03**	0.01
5 times/day	0.03	0.01	0.01	0.01	0.01	0.01
6 times/day	0.03	0.02	-0.00	0.01	0.01	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.44		0.40		0.38	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

years old (β=0.04 at $p<0.05$), 40-49 years old (β=0.05 at $p<0.001$), 50-59 years old (β=0.09 at $p<0.0001$), or 60+ years old (β=0.08 at $p<0.0001$) relative to being 20-29 years old, not participating in any leisure-time activity (β=0.05 at $p<0.01$), participating the first quintile level of activity (β=0.05 at $p<0.001$), or participating in leisure-time activity at the second quintile level (β=0.03 at $p<0.01$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.07 at $p<0.0001$), higher energy intake (β=0.03 at $p<0.05$), eating meals/ snacks $\leq$ 3 times/day (β=0.04 at $p<0.01$) or 4 times/day (β=0.03 at $p<0.01$) relative to eating meals/snacks $\geq$ 7 times/day. In addition, the following decreased mean BMI: being a woman (β=-0.08 at $p<0.0001$) relative to being a man and higher alcohol consumption decreased mean BMI (β=-0.01 at $p<0.01$). R^2 was 0.38 (Table 27).

7. Differences in predictors in racial/ethnic subpopulation groups between 1999-2002 and 1988-94

In 1999-2002: the following increased mean BMI in whites: having less than high school education (β=0.03 at $p<0.05$) relative to having more than high school education, being in the low-income group (β=0.06 at $p<0.0001$) or in the middle-income group (β=0.03 at $p<0.05$) relative to being in the high-income group, being 40-49 years old (β=0.04 at $p<0.01$), 50-59 years old (β=0.04 at $p<0.01$), or 60+ years old (β=0.05 at $p<0.01$) relative to being 20-29 years old, being a non-smoker (β=0.04 at $p<0.001$) relative to being a smoker, not participating in any leisure-time activity (β=0.08 at $p<0.0001$) or participating in leisure-time activity at the first quintile level (β=0.04 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.09 at $p<0.0001$), not consuming breakfast (β=0.03 at

$p<0.01$) relative to consuming breakfast, consuming restaurant food $\geq$ 4 times/week ($\beta=0.02$ at $p<0.05$) relative to consuming restaurant food less than 1 time/week, higher energy intake ($\beta=0.03$ at $p<0.01$), consuming more than 30% of energy from fat ($\beta=0.02$ at $p<0.05$) relative to consuming $\leq$ 30% of energy from fat, and eating meals/snacks $\leq$ 3 times/day ($\beta=0.03$ at $p<0.05$) or 4 times/day ($\beta=0.02$ at $p<0.05$) relative to consuming meals/snacks $\geq$ 7 times/day. In addition, the following decreased mean BMI: being a woman ($\beta=-0.07$ at $p<0.0001$) relative to being a man and higher alcohol intake ($\beta=-0.01$ at $p<0.05$). R^2 was 0.44 (Table 28).

In 1988-94: In whites, the following increased mean BMI: being in the low-income group ($\beta=0.02$ at $p<0.01$) relative to being in the high-income, having less than high school education ($\beta=0.04$ at $p<0.0001$) or high school education ($\beta=0.03$ at $p<0.0001$) relative to having more than high school education, being 30-39 years old ($\beta=0.03$ at $p<0.01$), 40-49 years old ($\beta=0.05$ at $p<0.0001$), 50-59 years old ($\beta=0.08$ at $p<0.0001$), or 60+ years old ($\beta=0.07$ at $p<0.0001$) relative to being 20-29 years old, being a non-smoker ($\beta=0.02$ at $p<0.001$) relative to being a smoker, not participating in any leisure-time activity ($\beta=0.06$ at $p<0.0001$) or participating in leisure-time activity at the first quintile level ($\beta=0.04$ at $p<0.0001$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight ($\beta=0.08$ at $p<0.0001$), higher energy intake ($\beta=0.03$ at $p<0.001$), eating meals/snacks $\leq$ 3 times/day ($\beta=0.04$ at $p<0.001$) or 4 times/day ($\beta=0.03$ at $p<0.001$) relative to eating meals/snacks $\geq$ 7 times/day. In addition, the following decreased mean BMI: being a woman ($\beta=-0.09$ at

Table 28. Predictors of BMI in whites[1]
(NHANES 1999-2002 to compare with NHANES 1988-94)

	Whites	
Variables	β	SE
Intercept	2.35****	0.08
Gender		
Male	0.00	0.00
Female	-0.07****	0.01
Education		
< High school	0.03*	0.01
High school graduate	0.01	0.01
> High school	0.00	0.00
Income		
PIR <1.85	0.06****	0.01
1.85 ≤ PIR ≤ 3.5	0.03*	0.01
PIR >3.5	0.00	0.00
Age		
20-29 yrs	0.00	0.00
30-39 yrs	0.03	0.01
40-49 yrs	0.04**	0.01
50-59 yrs	0.04**	0.01
60+ yrs	0.05**	0.01
Marital status		
Married	0.00	0.01
Widowed, divorced, or separated	-0.00	0.02
Never married or living with partner	0.00	0.00
Smoking status in the past 5 days		
Non-smoker	0.04***	0.01
Smoker	0.00	0.00
Alcohol consumption (# of drinks/wk)[2]	-0.01*	0.00
Leisure time activity/month		
No activities	0.08****	0.01
1st quintile	0.04*	0.01
2nd quintile	0.02	0.01
3rd quintile	0.02	0.01
4th quintile	0.01	0.01
5th quintile	0.00	0.00

Table 28 (cont'd)

	Whites	
Variables	β	SE
Component 1[3]	0.09****	0.00
Restaurant food consumption		
< 1 time/wk	0.00	0.00
1 time/wk	0.02	0.01
2-3 times/wk	0.01	0.01
≥ 4 times/wk	0.02*	0.01
Breakfast consumption		
Yes	0.00	0.00
No	0.03**	0.01
Energy intake (kcal/d)[2]	0.03**	0.01
Fat intake		
≤ 30% of energy from fat	0.00	0.00
> 30% of energy from fat	0.02*	0.01
Number of eating occasions		
≤ 3 times/day	0.03*	0.01
4 times/day	0.02*	0.01
5 times/day	0.01	0.01
6 times/day	0.02	0.01
≥ 7 times/day	0.00	0.00
R^2	0.44	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

$p<0.0001$) relative to being a man and higher alcohol consumption decreased mean BMI (β=-0.01 at $p<0.001$). R^2 was 0.39 (Table 29).

In blacks, the following increased mean BMI: being in the low-income group (β=0.03 at $p<0.001$) or middle-income (β=0.03 at $p<0.01$) relative to being in the high-income, having less than high school education (β=0.02 at $p<0.05$) relative to having more than high school education, being 30-39 years old (β=0.03 at $p<0.001$), 40-49 years old (β=0.04 at $p<0.001$), 50-59 years old (β=0.06 at $p<0.0001$), or 60+ years old (β=0.06 at $p<0.0001$) relative to being 20-29 years old, being a non-smoker (β=0.04 at $p<0.0001$) relative to being a smoker, not participating in any leisure-time activity (β=0.04 at $p<0.01$) or participating in leisure-time activity at the first quintile level (β=0.03 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.09 at $p<0.0001$), higher energy intake (β=0.03 at $p<0.001$), eating meals/snacks $\leq$ 3 times/day (β=0.04 at $p<0.001$), 4 times/day (β=0.03 at $p<0.001$), or 5 times/day (β=0.03 at $p<0.05$) relative to eating meals/snacks $\geq$ 7 times/day. In addition, being a woman decreased mean BMI (β=-0.02 at $p<0.05$) relative to being a man. R^2 was 0.45 (Table 29).

In Mexican-Americans, the following increased mean BMI: being in the low-income group (β=0.02 at $p<0.05$) relative to being in the high-income, having less than high school education (β=0.03 at $p<0.01$) relative to having more than high school education, being 30-39 years old (β=0.03 at $p<0.05$), 40-49 years old (β=0.05 at $p<0.0001$), 50-59 years old (β=0.07 at $p<0.0001$), or 60+ years old (β=0.06 at $p<0.0001$) relative to being 20-29 years old, not participating in any leisure-time activity (β=0.04 at

Table 29. Predictors of BMI by race/ethnicity in 1988-94[1]

Variables	Whites β	Whites SE	Black β	Black SE	Mexican-American β	Mexican-American SE
Intercept	2.47****	0.06	2.38****	0.07	2.49****	0.08
Gender						
Male	0.00	0.00	0.00	0.00	0.00	0.00
Female	-0.09****	0.01	-0.02*	0.01	-0.03**	0.01
Education						
< High school	0.04****	0.01	0.02*	0.01	0.03**	0.01
High school graduate	0.03****	0.01	0.01	0.01	0.02	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Income						
PIR <1.85	0.02**	0.01	0.03***	0.01	0.02*	0.01
1.85 ≤ PIR ≤ 3.5	0.01	0.01	0.03**	0.01	0.01	0.01
PIR >3.5	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.03**	0.01	0.03***	0.01	0.03*	0.01
40-49 yrs	0.05****	0.01	0.04***	0.01	0.05****	0.01
50-59 yrs	0.08****	0.01	0.06****	0.01	0.07****	0.01
60+ yrs	0.07****	0.01	0.06****	0.01	0.06****	0.01
Marital status						
Married	-0.02	0.01	-0.01	0.01	0.01	0.01
Widowed, divorced, or separated	-0.01	0.01	-0.01	0.01	0.01	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.02***	0.01	0.04****	0.01	0.01	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol consumption (# of drinks/wk)[2]	-0.01****	0.00	-0.00	0.00	-0.00	0.00
Leisure time activity/month						
No activities	0.06****	0.01	0.04**	0.01	0.04**	0.01
1st quintile	0.04****	0.01	0.03*	0.01	0.02	0.01
2nd quintile	0.02	0.01	0.02	0.01	0.02	0.01
3rd quintile	0.02	0.01	0.01	0.01	-0.00	0.01
4th quintile	-0.00	0.01	0.02	0.01	0.00	0.01
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00

Table 29 (cont'd)

Variables	Whites β	Whites SE	Black β	Black SE	Mexican-American β	Mexican-American SE
Component 1[3]	0.08****	0.00	0.09****	0.00	0.08****	0.00
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Consumer	-0.01	0.01	-0.00	0.01	-0.02*	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.01	0.01	-0.00	0.01	0.01	0.01
Energy intake (kcal/d)[2]	0.03***	0.01	0.03***	0.01	0.03***	0.01
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.01	0.00	0.00	0.01	-0.01	0.01
Number of eating occasions						
≤ 3 times/day	0.04***	0.01	0.04***	0.01	0.03*	0.01
4 times/day	0.03***	0.01	0.03**	0.01	0.02	0.01
5 times/day	0.01	0.01	0.03**	0.01	-0.01	0.01
6 times/day	0.01	0.01	0.01	0.02	-0.01	0.02
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.39		0.45		0.40	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

$p<0.01$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight ($\beta=0.08$ at $p<0.0001$), higher energy intake ($\beta=0.03$ at $p<0.001$), and eating meals/snacks $\leq$ 3 times/day ($\beta=0.03$ at $p<0.05$). In addition, the following decreased mean BMI: being a woman ($\beta=-0.03$ at $p<0.01$) relative to being a man and consuming restaurant food the day before the interview ($\beta=-0.02$ at $p<0.05$) relative to not consuming restaurant food the day before the interview. R^2 was 0.40 (Table 29).

8. Differences in predictors in subpopulation groups by income and gender between 1999-2002 and 1988-94

In 1999-2002: the following increased mean BMI in low-income men: having high school education ($\beta=0.05$ at $p<0.001$) relative to having more than high school education, being 40-49 years old ($\beta=0.06$ at $p<0.01$), 50-59 years old ($\beta=0.07$ at $p<0.01$), or 60+ years old ($\beta=0.05$ at $p<0.05$) relative to being 20-29 years old, being a non-smoker ($\beta=0.03$ at $p<0.05$) relative to being a smoker, participating in leisure-time activity at the third quintile level ($\beta=0.07$ at $p<0.01$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight ($\beta=0.09$ at $p<0.05$), consuming restaurant food 2-3 times/week ($\beta=0.04$ at $p<0.01$) relative to consuming restaurant food less than 1 time/week, and higher energy intake ($\beta=0.04$ at $p<0.0001$). R^2 was 0.57 (Table 30).

In middle-income men, the following increased mean BMI: being black ($\beta=0.04$ at $p<0.05$) relative to being white, higher score on the component on attempt to lose weight ($\beta=0.09$ at $p<0.0001$), and eating meals/snacks $\leq$ 3 times/day ($\beta=0.05$ at $p<0.05$) relative to eating meals/snacks $\geq$ 7 times/day. R^2 was 0.53 (Table 30).

Table 30. Predictors of BMI by income and gender (NHANES 1999-2002 to compare with NHANES 1988-94)[1]

	LIM		MIM		HIM	
Variables	β	SE	β	SE	β	SE
Intercept	2.34****	0.11	2.66****	0.18	2.51****	0.13
Race/ethnicity						
Non-Hispanic White	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hispanic Black	-0.00	0.02	0.04*	0.02	0.05**	0.02
Mexican-Americans	-0.01	0.01	0.01	0.02	0.03	0.02
Education						
< High school	0.02	0.01	-0.02	0.01	0.06*	0.02
High school graduate	0.05***	0.01	-0.00	0.01	0.03**	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.04	0.02	-0.00	0.02	0.01	0.02
40-49 yrs	0.06**	0.02	-0.02	0.02	0.01	0.01
50-59 yrs	0.07**	0.02	0.03	0.03	0.03	0.02
60+ yrs	0.05*	0.02	0.02	0.03	0.02	0.02
Marital status						
Married	0.00	0.02	0.03	0.02	0.01	0.01
Widowed, divorced, or separated	-0.01	0.02	-0.03	0.03	-0.02	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.03*	0.02	0.01	0.02	0.01	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol consumption (# of drinks/wk)[2]	0.00	0.01	0.01	0.01	-0.01*	0.00
Leisure time activity/month						
No activities	0.04	0.02	0.04	0.02	0.03	0.02
1st quintile	0.01	0.02	0.01	0.03	0.03	0.02
2nd quintile	-0.00	0.02	-0.02	0.03	0.01	0.01
3rd quintile	0.07**	0.02	-0.01	0.03	0.00	0.01
4th quintile	0.04	0.02	-0.00	0.03	0.02	0.02
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A

Table 30 (cont'd)

Variables	LIM β	LIM SE	MIM β	MIM SE	HIM β	HIM SE
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	0.09*	0.01	0.09****	0.01	0.08****	0.01
Restaurant food consumption						
< 1 time/wk	0.00	0.00	0.00	0.00	0.00	0.00
1 time/wk	0.03	0.01	-0.03	0.03	-0.01	0.02
2-3 times/wk	0.04**	0.02	-0.03	0.02	0.00	0.01
≥ 4 times/wk	0.02	0.02	-0.02	0.03	0.01	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.02	0.01	-0.01	0.02	0.03	0.02
Energy intake (kcal/d)[2]	0.04****	0.01	0.01	0.02	0.03	0.02
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.00	0.02	0.01	0.02	0.01	0.01
Number of eating occasions						
≤ 3 times/day	0.01	0.03	0.05*	0.02	0.01	0.02
4 times/day	-0.00	0.03	0.03	0.02	-0.00	0.02
5 times/day	-0.01	0.03	0.04	0.03	0.02	0.01
6 times/day	0.01	0.03	0.03	0.03	0.02	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.57		0.53		0.48	

Table 30 (cont'd)

	LIW		MIW		HIW	
Variables	β	SE	β	SE	β	SE
Intercept	2.36****	0.15	2.43****	0.24	2.26****	0.18
Race/ethnicity						
Non-Hispanic White	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hispanic Black	0.09	0.02	0.11***	0.03	0.09*	0.03
Mexican-Americans	-0.05	0.02	0.00	0.02	-0.00	0.02
Education						
< High school	0.01	0.02	0.05	0.03	0.01	0.02
High school graduate	-0.00	0.02	-0.02	0.02	0.02	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.07*	0.03	0.03	0.05	0.05	0.03
40-49 yrs	0.05	0.03	0.01	0.05	0.09*	0.03
50-59 yrs	0.00	0.04	0.06	0.05	0.07*	0.03
60+ yrs	-0.01	0.03	0.09	0.04	0.09**	0.03
Marital status						
Married	-0.01	0.03	0.01	0.04	0.01	0.02
Widowed, divorced, or separated	-0.01	0.03	0.01	0.03	0.05	0.03
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.07***	0.01	0.04	0.02	0.04	0.02
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol consumption (# of drinks/wk)^2	-0.03*	0.01	-0.02*	0.01	-0.02**	0.01
Leisure time activity/month						
No activities	0.14****	0.03	0.04	0.04	0.12**	0.03
1st quintile	0.05	0.05	-0.03	0.04	0.08**	0.02
2nd quintile	0.04	0.04	0.00	0.04	0.04	0.03
3rd quintile	0.07*	0.03	-0.02	0.04	0.03	0.03
4th quintile	0.04	0.04	-0.02	0.03	0.00	0.02
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	0.07	0.05	-0.02	0.04	-0.02	0.04
No	0.07	0.05	-0.01	0.04	-0.02	0.04
Never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00

Table 30 (cont'd)

Variables	LIW β	LIW SE	MIW β	MIW SE	HIW β	HIW SE
Number of live birth						
0 and never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00
1	-0.02	0.02	-0.04	0.02	-0.04	0.03
2	-0.06*	0.03	-0.12***	0.03	-0.00	0.03
3	-0.03	0.03	-0.06**	0.02	-0.02	0.04
4	0.00	0.00	0.00	0.00	0.00	0.00
≥ 5	0.02	0.04	-0.04	0.03	0.04	0.05
Age at the first menarche						
≤ 11 yrs old	0.11**	0.04	0.07*	0.03	0.17***	0.04
12-15 yrs old	0.05	0.03	-0.00	0.03	0.10	0.03
≥ 16 yrs old	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.11****	0.00	0.10****	0.01	0.10****	0.01
Restaurant food consumption						
< 1 time/wk	0.00	0.00	0.00	0.00	0.00	0.00
1 time/wk	0.05	0.03	0.05*	0.02	0.00	0.03
2-3 times/wk	-0.00	0.02	0.02	0.02	0.02	0.03
≥ 4 times/wk	-0.03	0.02	0.04	0.03	0.05	0.03
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.03	0.02	0.04	0.03	0.04*	0.02
Energy intake (kcal/d)[2]	-0.00	0.02	0.01	0.03	0.01	0.02
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.01	0.02	0.04	0.02	0.02	0.01
Number of eating occasions						
≤ 3 times/day	0.05	0.03	0.04	0.04	0.01	0.03
4 times/day	0.02	0.03	0.03	0.03	0.02	0.02
5 times/day	0.02	0.02	0.00	0.02	-0.00	0.02
6 times/day	0.03	0.04	0.02	0.02	-0.00	0.02
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.52		0.48		0.48	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight. * p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

In high-income men, the following increased mean BMI: being black (β=0.05 at $p<0.01$) relative to being white, having less than high school education (β=0.06 at $p<0.01$) or high school education (β=0.03 at $p<0.05$) relative to having more than high school education, and higher score on the component on attempt to lose weight (β=0.08 at $p<0.0001$). In addition, higher alcohol intake decreased mean BMI (β=-0.01 at $p<0.05$). R^2 was 0.48 (Table 30).

In low-income women, the following increased mean BMI: being black (β=0.09 at $p<0.001$) relative to being white, being 30-39 years old (β=0.07 at $p<0.05$) relative to being 20-29 years old, being a non-smoker (β=0.07 at $p<0.001$) relative to being a smoker, not participating in any leisure-time activity (β=0.14 at $p<0.0001$) or participating in leisure-time activity at the third quintile level (β=0.07 at $p<0.05$) relative to participating in leisure-time activity at the highest level, having first menarche at $\leq$ 11 years old (β=0.11 at $p<0.01$) relative to having first menarche at $\geq$ 16 years old, and higher score on the component on attempt to lose weight (β=0.11 at $p<0.0001$). In addition, the following decreased mean BMI: being Mexican-American (β=-0.05 at $p<0.05$) relative to being white, higher alcohol intake (β=-0.03 at $p<0.05$) and having two live births (β=-0.06 at $p<0.05$) relative to having no live birth or never being pregnant. R^2 was 0.52 (Table 30).

In middle-income women, the following increased mean BMI: being black (β=0.11 at $p<0.001$) relative to being white, having first menarche at $\leq$ 11 years old (β=0.07 at $p<0.05$) relative to having first menarche at $\geq$ 16 years old, higher score on the component on attempt to lose weight (β=0.10 at $p<0.0001$), and eating restaurant food 1

time/week (β=0.05 at $p<0.05$) relative to eating restaurant food less than 1 time/week. In addition, the following decreased mean BMI: higher alcohol consumption (β=-0.02 at $p<0.05$) and having two live births (β=-0.12 at $p<0.001$) or three live births (β=-0.06 at $p<0.01$) relative to having no live births or never being pregnant. R^2 was 0.48 (Table 30).

In high-income women, the following increased mean BMI: being black (β=0.09 at $p<0.05$) relative to being white, being 40-49 years old (β=0.09 at $p<0.05$), 50-59 years old (β=0.07 at $p<0.05$), or 60+ years old (β=0.09 at $p<0.01$) relative to being 20-29 years old, not participating any leisure-time activity (β=0.12 at $p<0.01$) or participating in leisure-time activity at the first quintile level (β=0.08 at $p<0.01$) relative to participating in leisure-time activity at the highest level, having first menarche at $\leq$ 11 years old (β=0.17 at $p<0.001$) or at 12-15 years old (β=0.10 at $p<0.01$) relative to having first menarche at $\geq$ 16 years old, higher score on the component on attempt to lose weight (β=0.10 at $p<0.0001$), and not consuming breakfast (β=0.00 at $p<0.05$) relative to consuming breakfast. In addition, higher alcohol intake decreased mean BMI (β=-0.02 at $p<0.01$). R^2 was 0.48 (Table 30).

In 1988-94: the following increased mean BMI in low-income men: having less than high school education (β=0.04 at $p<0.01$) or high school education (β=0.03 at $p<0.05$) relative to having more than high school education, being 40-49 years old (β=0.05 at $p<0.01$) relative to being 20-29 years old, being a non-smoker (β=0.04 at $p<0.0001$) relative to being a smoker, higher score on the component on attempt to lose weight (β=0.08 at $p<0.0001$), and eating meals/snacks $\leq$ 3 times/day (β=0.04 at $p<0.05$) relative to eating meals/snacks $\geq$ 7 times/day. In addition, being widowed, divorced or separated

decreased mean BMI (β=-0.03 at $p<0.05$) relative to never being married or living with a partner). R^2 was 0.52 (Table 31).

In middle-income men, the following increased mean BMI: being black (β=0.03 at $p<0.001$) relative to being white, having less than high school education (β=0.03 at $p<0.05$) or high school education (β=0.03 at $p<0.01$) relative to having more than high school education, being 40-49 years old (β=0.03 at $p<0.05$) relative to being 20-29 years old, being a non-smoker (β=0.03 at $p<0.01$) relative to being a smoker, and higher score on the component on attempt to lose weight (β=0.07 at $p<0.0001$). R^2 was 0.47 (Table 31).

In high-income men, the following increased mean BMI: being black (β=0.03 at $p<0.01$) relative to being white, having less than high school education (β=0.05 at $p<0.01$) or high school education (β=0.03 at $p<0.001$) relative to having more than high school education, being 50-59 years old (β=0.05 at $p<0.05$) or 60+ years old (β=0.05 at $p<0.01$) relative to being 20-29 years old, not participating any leisure-time activity (β=0.05 at $p<0.05$) or participating in leisure-time activity at the first quintile level (β=0.04 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.06 at $p<0.0001$), higher energy intake (β=0.03 at $p<0.05$), and eating meals/snacks $\leq$ 3 times/day (β=0.04 at $p<0.05$) or 4 times/day (β=0.05 at $p<0.01$) relative to eating meals/snacks $\geq$ 7 times/day. In addition higher alcohol consumption decreased mean BMI (β=-0.01 at $p<0.05$). R^2 was 0.42 (Table 31).

Table 31. Predictors of BMI by income and gender in 1988-94[1]

	LIM		MIM		HIM	
Variables	β	SE	β	SE	β	SE
Intercept	2.58****	0.08	2.57****	0.12	2.60****	0.09
Race/ethnicity						
Non-Hispanic White	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hispanic Black	0.02	0.01	0.03***	0.01	0.03	0.01
Mexican-Americans	-0.01	0.01	0.01	0.01	0.02	0.01
Education						
< High school	0.04**	0.02	0.03*	0.01	0.05**	0.01
High school graduate	0.03*	0.01	0.03**	0.01	0.03***	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.02	0.01	0.00	0.01	0.02	0.02
40-49 yrs	0.05**	0.02	0.03*	0.01	0.03	0.02
50-59 yrs	0.03	0.02	0.02	0.02	0.05*	0.02
60+ yrs	0.03	0.02	0.01	0.01	0.05**	0.02
Marital status						
Married	0.00	0.01	0.01	0.01	-0.01	0.01
Widowed, divorced, or separated	-0.03*	0.02	0.00	0.02	0.00	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.04****	0.01	0.03**	0.01	0.02	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol intake (# of drinks/wk)[2]	-0.00	0.00	-0.01	0.00	-0.01*	0.00
Leisure time activity/month						
No activities	0.01	0.02	0.02	0.02	0.05*	0.02
1st quintile	0.00	0.02	0.03	0.02	0.04*	0.02
2nd quintile	0.01	0.02	-0.01	0.01	0.03	0.02
3rd quintile	0.01	0.02	0.02	0.02	0.02	0.01
4th quintile	0.01	0.02	-0.00	0.01	0.00	0.01
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A

Table 31 (cont'd)

Variables	LIM β	LIM SE	MIM β	MIM SE	HIM β	HIM SE
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	0.08****	0.00	0.07****	0.00	0.06****	0.00
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Conusmer	-0.01	0.01	-0.00	0.01	0.00	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.02	0.01	-0.01	0.01	0.00	0.01
Energy intake (kcal/d)[2]	0.01	0.01	0.03	0.01	0.03*	0.01
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.01	0.01	0.02	0.01	-0.01	0.01
Number of eating occasions						
≤ 3 times/day	0.04*	0.02	0.03	0.02	0.04*	0.02
4 times/day	0.03	0.02	0.00	0.01	0.05**	0.01
5 times/day	0.01	0.02	0.01	0.01	0.01	0.01
6 times/day	0.03	0.02	-0.02	0.01	0.01	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.52		0.47		0.42	

Table 31 (cont'd)

Variables	LIW β	LIW SE	MIW β	MIW SE	HIW β	HIW SE
Intercept	2.18****	0.12	2.11****	0.13	2.40****	0.14
Race/ethnicity						
Non-Hispanic White	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hispanic Black	0.08****	0.01	0.10****	0.02	0.05***	0.02
Mexican-Americans	0.03*	0.02	0.03	0.02	0.02	0.02
Education						
< High school	0.04*	0.02	0.02	0.02	0.01	0.02
High school graduate	0.04*	0.02	0.01	0.02	0.02	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.07**	0.02	0.04*	0.02	0.07**	0.02
40-49 yrs	0.08**	0.02	0.08**	0.03	0.09***	0.02
50-59 yrs	0.11****	0.02	0.10****	0.02	0.14****	0.02
60+ yrs	0.10****	0.02	0.13****	0.02	0.13****	0.02
Marital status						
Married	-0.02	0.02	-0.03	0.02	-0.01	0.02
Widowed, divorced, or separated	-0.01	0.02	-0.04	0.02	0.00	0.03
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.05***	0.01	0.00	0.01	0.01	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol intake (# of drinks/wk)^2	-0.02**	0.01	-0.02**	0.01	-0.03***	0.01
Leisure time activity/month						
No activities	0.10***	0.03	0.11***	0.03	0.04	0.02
1st quintile	0.06**	0.02	0.07**	0.02	0.05*	0.02
2nd quintile	0.02	0.02	0.03	0.02	0.04	0.02
3rd quintile	0.02	0.02	0.03	0.03	0.01	0.02
4th quintile	0.02	0.02	-0.00	0.02	-0.01	0.02
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	0.00	0.03	0.04	0.03	0.01	0.03
No	0.03	0.03	0.04	0.03	0.02	0.03
Never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00

Table 31 (cont'd)

	LIW		MIW		HIW	
Variables	β	SE	β	SE	β	SE
Number of live birth						
0 and never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00
1	-0.01	0.02	0.00	0.03	-0.01	0.03
2	-0.02	0.02	-0.03	0.03	-0.05*	0.02
3	-0.01	0.02	-0.04	0.03	-0.03	0.03
4	0.00	0.00	0.00	0.00	0.00	0.00
≥ 5	0.03	0.02	0.04	0.04	0.02	0.04
Age at the first menarche						
≤ 11 yrs old	0.12****	0.02	0.08**	0.03	0.03	0.03
12-15 yrs old	0.04*	0.02	0.03	0.02	-0.02	0.03
≥ 16 yrs old	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.09****	0.00	0.10****	0.00	0.08****	0.00
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Conusmer	-0.01	0.02	-0.02	0.02	-0.02	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.00	0.01	0.01	0.02	0.00	0.02
Energy intake (kcal/d)[2]	0.03*	0.01	0.04**	0.01	0.02	0.02
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.02	0.01	0.01	0.01	0.01	0.01
Number of eating occasions						
≤ 3 times/day	0.05	0.03	0.02	0.02	0.05*	0.02
4 times/day	0.03	0.03	0.05**	0.02	0.01	0.02
5 times/day	0.04	0.03	0.01	0.02	0.01	0.02
6 times/day	0.03	0.02	0.00	0.02	0.00	0.02
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.45		0.43		0.4	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

In low-income women, the following increased mean BMI: being black (β=0.08 at $p<0.0001$) or Mexican-American (β=0.03 at $p<0.05$) relative to being white, having less than high school education (β=0.04 at $p<0.05$) or high school education (β=0.04 at $p<0.05$) relative to having more than high school education, being 30-39 years old (β=0.07 at $p<0.01$), 40-49 years old (β=0.08 at $p<0.01$), 50-59 years old (β=0.11 at $p<0.0001$), or 60+ years old (β=0.10 at $p<0.0001$) relative to being 20-29 years old, being a non-smoker (β=0.05 at $p<0.001$) relative to being a smoker, not participating in any leisure-time activity (β=0.10 at $p<0.001$) or participating in leisure-time activity at the first quintile level (β=0.06 at $p<0.01$) relative to participating in leisure-time activity at the highest level, having first menarche at $\leq$ 11 years old (β=0.12 at $p<0.0001$) or at 12-15 years old (β=0.04 at $p<0.05$) relative to having first menarche at $\geq$ 16 years old, higher score on the component on attempt to lose weight (β=0.09 at $p<0.0001$), and higher energy intake (β=0.03 at $p<0.05$). In addition, higher alcohol consumption (β=-0.02 at $p<0.01$) decreased mean BMI. R^2 was 0.45 (Table 31).

In middle-income women, the following increased mean BMI: being black (β=0.10 at $p<0.0001$) relative to being white, being 30-39 years old (β=0.04 at $p<0.05$), 40-49 years old (β=0.08 at $p<0.01$), 50-59 years old (β=0.10 at $p<0.0001$), or 60+ years old (β=0.13 at $p<0.0001$) relative to being 20-29 years old, not participating any leisure-time activity (β=0.11 at $p<0.001$) or participating in leisure-time activity at the first quintile level (β=0.07 at $p<0.01$) relative to participating in leisure-time activity at the highest level, having first menarche at $\leq$ 11 years old (β=0.08 at $p<0.01$) relative to having first menarche at $\geq$ 16 years old, higher score on the component on attempt to lose

weight (β=0.10 at $p<0.0001$), higher energy intake (β=0.04 at $p<0.01$), and eating meals/snacks 4 times/day (β=0.05 at $p<0.01$) relative to eating meals/snacks ≥ 7 times/day. In addition, higher alcohol consumption (β=-0.02 at $p<0.01$) decreased mean BMI. R^2 was 0.43 (Table 31).

In high-income women, the following increased mean BMI: being black (β=0.05 at $p<0.0001$) relative to being white, being 30-39 years old (β=0.07 at $p<0.01$), 40-49 years old (β=0.09 at $p<0.001$), 50-59 years old (β=0.14 at $p<0.0001$), or 60+ years old (β=0.13 at $p<0.0001$) relative to being 20-29 years old, participating in leisure-time activity at the first quintile level (β=0.05 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.08 at $p<0.0001$), and eating meals/snacks ≤ 3 times/day (β=0.05 at $p<0.05$) relative to eating meals/snacks ≥ 7 times/day. In addition, the following decreased mean BMI: higher alcohol consumption (β=-0.03 at $p<0.001$) and having two live births (β=-0.05 at $p<0.05$) relative to having no live birth or never being pregnant. R^2 was 0.40 (Table 31).

9. Predictors in subpopulation groups by income, gender, and race/ethnicity in 1988-94

In white low-income men, the following increased mean BMI: having less than high school education (β=0.06 at $p<0.01$) or high school education (β=0.04 at $p<0.05$) relative to having more than high school education, being 40-49 years old (β=0.07 at $p<0.01$) relative to being 20-29 years old, being a non-smoker (β=0.06 at $p<0.0001$) relative to being a smoker, and higher score on the component on attempt to lose weight (β=0.09 at $p<0.0001$). R^2 was 0.57 (Table 32).

Table 32. Predictors of BMI among 18 subgroups by income, gender, and race/ethnicity in 1988-94[1]

	White men					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Intercept	2.59****	0.11	2.59****	0.14	2.61****	0.10
Education						
< High school	0.06**	0.02	0.03*	0.01	0.05**	0.02
High school graduate	0.04*	0.02	0.03**	0.01	0.03**	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.04	0.02	0.00	0.02	0.02	0.02
40-49 yrs	0.07**	0.02	0.03*	0.01	0.03	0.02
50-59 yrs	0.03	0.03	0.02	0.02	0.05*	0.02
60+ yrs	0.03	0.02	0.02	0.01	0.05**	0.02
Marital status						
Married	-0.00	0.02	0.01	0.01	-0.01	0.01
Widowed, divorced, or separated	-0.04	0.02	-0.00	0.02	0.00	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.06****	0.01	0.03*	0.01	0.01	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol intake (# of drinks/wk)[2]	0.00	0.00	-0.01	0.00	-0.01	0.00
Leisure time activity/month						
No activities	0.01	0.03	0.02	0.02	0.05*	0.02
1st quintile	0.01	0.02	0.03	0.02	0.04*	0.02
2nd quintile	0.02	0.02	-0.02	0.01	0.03	0.02
3rd quintile	0.03	0.03	0.02	0.02	0.02	0.01
4th quintile	0.02	0.02	-0.01	0.01	0.00	0.01
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A

Table 32 (cont'd)

	White men					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menstruation						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	0.09****	0.00	0.07****	0.00	0.06****	0.00
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Conusmer	-0.01	0.01	-0.00	0.01	0.00	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.02	0.02	-0.01	0.01	0.01	0.01
Energy intake (kcal/d)[2]	0.00	0.01	0.02	0.02	0.03*	0.01
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.01	0.01	0.02	0.01	-0.01	0.01
Number of eating occasions						
≤ 3 times/day	0.04	0.02	0.04*	0.02	0.04*	0.02
4 times/day	0.02	0.02	-0.00	0.01	0.05**	0.02
5 times/day	-0.00	0.02	0.00	0.01	0.01	0.01
6 times/day	0.04	0.02	-0.02	0.01	0.01	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.57		0.48		0.42	

Table 32 (cont'd)

	Black men					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Intercept	2.50****	0.09	2.58****	0.11	2.73****	0.17
Education						
< High school	0.00	0.02	0.03	0.02	0.01	0.03
High school graduate	0.00	0.01	-0.02	0.02	0.03	0.02
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	-0.02	0.01	-0.02	0.02	-0.02	0.03
40-49 yrs	-0.01	0.02	-0.03	0.02	-0.02	0.03
50-59 yrs	0.01	0.02	-0.03	0.02	-0.01	0.04
60+ yrs	0.01	0.02	-0.03	0.02	-0.01	0.03
Marital status						
Married	0.02	0.01	0.02	0.02	0.04	0.02
Widowed, divorced, or separated	-0.02	0.02	0.02	0.03	0.01	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.02	0.01	0.03**	0.01	0.04*	0.02
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol intake (# of drinks/wk)^2	-0.01*	0.01	-0.00	0.01	-0.00	0.01
Leisure time activity/month						
No activities	0.00	0.02	0.01	0.02	0.00	0.03
1st quintile	-0.00	0.02	0.03	0.02	0.04	0.03
2nd quintile	-0.00	0.02	0.04	0.02	0.01	0.03
3rd quintile	-0.00	0.02	0.01	0.02	-0.00	0.02
4th quintile	0.02	0.02	0.03	0.02	-0.02	0.02
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	0.00	0.03	0.04	0.03	0.01	0.03
No	0.03	0.03	0.04	0.03	0.02	0.03
Never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00

Table 32 (cont'd)

	Black men					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Number of live birth						
0 and never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00
1	-0.01	0.02	0.00	0.03	-0.01	0.03
2	-0.02	0.02	-0.03	0.03	-0.05	0.02
3	-0.01	0.02	-0.04	0.03	-0.03	0.03
4	0.00	0.00	0.00	0.00	0.00	0.00
≥ 5	0.03	0.02	0.04	0.04	0.02	0.04
Age at the first menstruation						
≤ 11 yrs old	0.12	0.02	0.08	0.03	0.03	0.03
12-15 yrs old	0.04	0.02	0.03	0.02	-0.02	0.03
≥ 16 yrs old	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.08****	0.00	0.09****	0.01	0.07****	0.00
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Conusmer	-0.00	0.02	0.01	0.02	0.02	0.02
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.02*	0.01	0.00	0.01	-0.00	0.01
Energy intake (kcal/d)[2]	0.03**	0.01	0.02	0.01	0.01	0.02
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	-0.00	0.02	0.01	0.01	0.01	0.02
Number of eating occasions						
≤ 3 times/day	0.04	0.02	0.02	0.02	-0.01	0.02
4 times/day	0.05*	0.02	0.04	0.03	0.01	0.03
5 times/day	0.03	0.02	0.03	0.02	0.03	0.03
6 times/day	0.02	0.03	0.02	0.03	-0.00	0.04
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.49		0.53		0.51	

Table 32 (cont'd)

	Mexican-American men					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Intercept	2.76****	0.10	2.64****	0.10	2.54****	0.20
Education						
< High school	0.02	0.02	0.01	0.02	0.01	0.03
High school graduate	0.01	0.02	-0.00	0.02	0.01	0.02
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.01	0.01	0.03*	0.02	-0.05	0.03
40-49 yrs	0.03*	0.01	0.05*	0.02	-0.02	0.02
50-59 yrs	0.07***	0.02	0.08**	0.03	0.02	0.04
60+ yrs	0.04*	0.01	0.03	0.02	0.01	0.03
Marital status						
Married	0.03*	0.01	0.02	0.02	0.00	0.03
Widowed, divorced, or separated	-0.00	0.02	0.04	0.03	-0.02	0.03
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.00	0.01	-0.00	0.01	0.00	0.02
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol intake (# of drinks/wk)^2	0.00	0.00	-0.01	0.00	-0.01	0.01
Leisure time activity/month						
No activities	0.00	0.01	0.04	0.02	0.06	0.04
1st quintile	0.01	0.01	0.01	0.02	0.02	0.04
2nd quintile	0.02	0.02	0.02	0.02	0.01	0.02
3rd quintile	-0.01	0.02	0.04	0.02	-0.06**	0.02
4th quintile	-0.00	0.01	0.01	0.02	-0.01	0.03
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A

Table 32 (cont'd)

	Mexican-American men					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menstruation						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	0.07****	0.00	0.07****	0.01	0.07****	0.01
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Conusmer	-0.00	0.01	-0.01	0.01	-0.02	0.02
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.01*	0.01	0.01	0.02	-0.03	0.02
Energy intake (kcal/d)[2]	0.00	0.01	0.02	0.01	0.04	0.02
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.01	0.01	-0.01	0.01	-0.00	0.02
Number of eating occasions						
≤ 3 times/day	0.01	0.02	0.02	0.02	0.02	0.02
4 times/day	0.02	0.02	0.01	0.02	0.05	0.03
5 times/day	0.01	0.02	-0.00	0.03	-0.00	0.02
6 times/day	-0.00	0.02	-0.02	0.03	-0.01	0.03
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.47		0.48		0.48	

Table 32 (cont'd)

	White women					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Intercept	2.17****	0.16	2.14****	0.14	2.40****	0.15
Education						
< High school	0.04	0.02	0.02	0.02	0.01	0.03
High school graduate	0.04	0.02	0.01	0.02	0.02	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.06	0.03	0.04	0.02	0.07**	0.02
40-49 yrs	0.06	0.04	0.07*	0.03	0.09***	0.02
50-59 yrs	0.11***	0.03	0.10***	0.03	0.15****	0.03
60+ yrs	0.09***	0.02	0.13****	0.03	0.13****	0.02
Marital status						
Married	-0.02	0.04	-0.01	0.03	-0.02	0.02
Widowed, divorced, or separated	-0.01	0.04	-0.01	0.03	-0.00	0.03
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.06**	0.02	-0.00	0.02	0.01	0.02
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol intake (# of drinks/wk)^2	-0.04**	0.01	-0.03***	0.01	-0.03***	0.01
Leisure time activity/month						
No activities	0.11**	0.03	0.11***	0.03	0.03	0.02
1st quintile	0.07*	0.03	0.06*	0.02	0.04*	0.02
2nd quintile	0.01	0.03	0.03	0.03	0.04	0.02
3rd quintile	0.03	0.03	0.02	0.03	0.01	0.02
4th quintile	0.03	0.03	-0.01	0.02	-0.01	0.02
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	-0.00	0.04	0.03	0.04	0.01	0.03
No	0.03	0.03	0.03	0.04	0.03	0.03
Never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00

Table 32 (cont'd)

	White women					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Number of live birth						
0 and never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.03	0.01	0.03	-0.02	0.03
2	-0.03	0.03	-0.03	0.03	-0.05*	0.02
3	-0.01	0.03	-0.04	0.03	-0.03	0.03
4	0.00	0.00	0.00	0.00	0.00	0.00
≥ 5	0.03	0.03	0.05	0.04	0.01	0.04
Age at the first menstruation						
≤ 11 yrs old	0.15****	0.03	0.09**	0.03	0.02	0.03
12-15 yrs old	0.06**	0.02	0.03	0.02	-0.02	0.03
≥ 16 yrs old	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.10****	0.01	0.10****	0.00	0.08****	0.00
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Conusmer	-0.01	0.03	-0.02	0.02	-0.02	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.01	0.02	0.01	0.02	0.00	0.02
Energy intake (kcal/d)[2]	0.02	0.02	0.03*	0.02	0.02	0.02
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.03	0.02	0.01	0.02	0.01	0.01
Number of eating occasions						
≤ 3 times/day	0.04	0.03	0.01	0.03	0.05*	0.03
4 times/day	0.02	0.03	0.05*	0.02	0.01	0.02
5 times/day	0.03	0.03	0.01	0.02	0.01	0.02
6 times/day	0.02	0.03	-0.00	0.02	0.00	0.02
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.45		0.42		0.40	

Table 32 (cont'd)

	Black women					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Intercept	2.25****	0.14	2.11****	0.20	2.88****	0.23
Education						
< High school	0.03	0.02	0.05*	0.02	-0.01	0.06
High school graduate	0.00	0.02	0.03	0.02	-0.05	0.03
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.10****	0.02	0.09**	0.03	-0.04	0.04
40-49 yrs	0.11****	0.02	0.12***	0.03	0.04	0.07
50-59 yrs	0.16****	0.03	0.08*	0.04	0.07	0.06
60+ yrs	0.16****	0.03	0.10**	0.04	0.04	0.06
Marital status						
Married	-0.04	0.02	-0.06*	0.03	0.10*	0.05
Widowed, divorced, or separated	-0.01	0.02	-0.09***	0.02	0.06	0.05
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.06***	0.01	0.08***	0.02	0.02	0.03
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol intake (# of drinks/wk)^2	0.01	0.01	0.02	0.02	0.01	0.02
Leisure time activity/month						
No activities	0.05	0.03	0.11*	0.04	0.17**	0.05
1st quintile	0.02	0.03	0.08*	0.03	0.11**	0.04
2nd quintile	0.03	0.03	0.01	0.03	0.13**	0.04
3rd quintile	-0.00	0.02	0.05	0.04	0.12**	0.04
4th quintile	-0.00	0.03	0.05	0.03	0.13**	0.04
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	-0.01	0.04	0.05	0.06	-0.05	0.08
No	0.04	0.04	0.09	0.06	-0.01	0.07
Never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00

Table 32 (cont'd)

	Black women					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Number of live birth						
0 and never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00
1	-0.03	0.03	-0.08	0.06	0.01	0.08
2	-0.01	0.03	-0.12	0.06	-0.01	0.07
3	-0.01	0.03	-0.11	0.06	0.01	0.09
4	0.00	0.00	0.00	0.00	0.00	0.00
≥ 5	0.02	0.03	-0.05	0.06	0.09	0.08
Age at the first menstruation						
≤ 11 yrs old	0.06*	0.03	-0.00	0.04	0.01	0.08
12-15 yrs old	0.02	0.03	-0.02	0.03	-0.02	0.07
≥ 16 yrs old	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.10****	0.00	0.10****	0.01	0.07****	0.01
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Conusmer	0.00	0.03	-0.02	0.02	-0.00	0.03
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	-0.02	0.02	-0.02	0.02	0.00	0.03
Energy intake (kcal/d)[2]	0.03	0.02	0.05*	0.02	-0.04	0.03
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.01	0.02	0.01	0.02	-0.01	0.02
Number of eating occasions						
≤ 3 times/day	0.08*	0.03	0.06	0.04	-0.01	0.04
4 times/day	0.04	0.03	0.03	0.05	-0.05	0.04
5 times/day	0.05	0.03	0.01	0.04	0.00	0.04
6 times/day	0.03	0.03	0.01	0.05	0.01	0.05
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.50		0.52		0.44	

Table 32 (cont'd)

	Mexican-American women					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Intercept	2.32****	0.16	2.12****	0.23	2.21****	0.31
Education						
< High school	0.06*	0.02	0.03	0.03	0.04	0.06
High school graduate	0.10***	0.03	-0.03	0.02	-0.05	0.04
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.05*	0.02	0.08*	0.03	0.06	0.05
40-49 yrs	0.08***	0.02	0.13***	0.04	0.04	0.04
50-59 yrs	0.08**	0.03	0.11*	0.04	0.12	0.06
60+ yrs	0.11***	0.02	0.15***	0.03	0.08	0.05
Marital status						
Married	0.05	0.03	-0.07	0.05	-0.02	0.06
Widowed, divorced, or separated	0.04	0.03	-0.04	0.06	0.00	0.06
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.02	0.02	-0.00	0.02	-0.02	0.05
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol intake (# of drinks/wk)^2	-0.01	0.01	-0.01	0.02	0.02	0.02
Leisure time activity/month						
No activities	0.07	0.04	0.11**	0.04	0.08	0.07
1st quintile	0.03	0.04	0.08*	0.03	0.09	0.05
2nd quintile	0.02	0.04	0.03	0.05	0.08	0.06
3rd quintile	0.00	0.04	0.01	0.04	-0.00	0.06
4th quintile	0.01	0.04	0.03	0.04	0.03	0.05
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	-0.06	0.04	-0.01	0.04	-0.02	0.08
No	-0.05	0.04	0.04	0.05	-0.03	0.08
Never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00

Table 32 (cont'd)

	Mexican-American women					
	Low-income		Mid-income		High-income	
Variables	β	SE	β	SE	β	SE
Number of live birth						
0 and never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00
1	-0.02	0.03	0.03	0.04	0.02	0.08
2	0.02	0.02	-0.07*	0.03	0.07	0.07
3	0.01	0.02	0.02	0.05	0.04	0.07
4	0.00	0.00	0.00	0.00	0.00	0.00
≥ 5	0.04	0.02	-0.01	0.04	0.06	0.07
Age at the first menstruation						
≤ 11 yrs old	0.03	0.03	0.02	0.04	0.13	0.09
12-15 yrs old	-0.01	0.03	-0.02	0.03	0.11	0.08
≥ 16 yrs old	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.08****	0.00	0.11****	0.01	0.10****	0.01
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Conusmer	-0.05*	0.02	0.05	0.03	-0.01	0.04
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.01	0.01	0.06*	0.02	0.01	0.04
Energy intake (kcal/d)[2]	0.04	0.02	0.05	0.03	0.03	0.04
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.03	0.02	-0.04	0.02	0.01	0.03
Number of eating occasions						
≤ 3 times/day	0.06	0.03	0.05	0.04	0.07	0.06
4 times/day	0.01	0.02	0.02	0.04	-0.04	0.06
5 times/day	0.01	0.03	-0.03	0.04	-0.03	0.05
6 times/day	0.01	0.03	-0.04	0.05	-0.06	0.06
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.41		0.49		0.45	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

In white middle-income men, the following increased mean BMI: having less than high school education (β=0.03 at $p<0.05$) or high school education (β=0.03 at $p<0.01$) relative to having more than high school education, being 40-49 years old (β=0.03 at $p<0.05$) relative to being 20-29 years old, being a non-smoker (β=0.03 at $p<0.05$) relative to being a smoker, higher score on the component on attempt to lose weight (β=0.07 at $p<0.0001$), and eating meals/snacks $\leq$ 3 times/day (β=0.04 at $p<0.05$) relative to eating meals/snacks $\geq$ 7 times/day. R^2 was 0.48 (Table 32).

In white high-income men, the following increased mean BMI: having less than high school education (β=0.05 at $p<0.01$) or high school education (β=0.03 at $p<0.01$) relative to having more than high school education, being 50-59 years old (β=0.05 at $p<0.05$) or 60+ years old (β=0.05 at $p<0.01$) relative to being 20-29 years old, not participating in any leisure-time activity (β=0.05 at $p<0.05$) or participating in leisure-time activity the first quintile level (β=0.04 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.06 at $p<0.0001$), higher energy intake (β=0.03 at $p<0.05$), and eating meals/snacks $\leq$ 3 times/day (β=0.04 at $p<0.05$) or 4 times/day (β=0.05 at $p<0.01$) relative to eating meals/snacks $\geq$ 7 times/day. R^2 was 0.42 (Table 32).

In black low-income men, the following increased mean BMI: higher score on the component on attempt to lose weight (β=0.08 at $p<0.0001$), not consuming breakfast (β=0.02 at $p<0.05$) relative to consuming breakfast, higher energy intake (β=0.03 at $p<0.01$), and eating meals/snacks 4 times/day (β=0.05 at $p<0.05$) relative to eating

meals/snacks ≥ 7 times/day. In addition, higher alcohol consumption (β=-0.01 at $p<0.05$) decreased mean BMI. R^2 was 0.49 (Table 32).

In black middle-income men, the following increased mean BMI: being a non-smoker (β=0.03 at $p<0.01$) relative to being a smoker and higher score on the component on attempt to lose weight (β=0.09 at $p<0.0001$). R^2 was 0.53 (Table 32).

In black high-income men, the following increased mean BMI: being a non-smoker (β=0.04 at $p<0.05$) relative to being a smoker and higher score on the component on attempt to lose weight (β=0.07 at $p<0.0001$). R^2 was 0.51 (Table 32).

In Mexican-American low-income men, the following increased mean BMI: being 40-49 years old (β=0.03 at $p<0.05$), 50-59 years old (β=0.07 at $p<0.001$), or 60+ years old (β=0.04 at $p<0.05$) relative to being 20-29 years old, being married (β=0.03 at $p<0.05$) relative to never been married or living with a partner, higher score on the component on attempt to lose weight (β=0.07 at $p<0.0001$), and not consuming breakfast (β=0.01 at $p<0.05$) relative to consuming breakfast. R^2 was 0.47 (Table 32).

In Mexican-American middle-income men, the following increased mean BMI: being 30-39 years old (β=0.03 at $p<0.05$), 40-49 years old (β=0.05 at $p<0.05$), or 50-59 years old (β=0.08 at $p<0.01$) relative to being 20-29 years old and higher score on the component on attempt to lose weight (β=0.07 at $p<0.0001$). R^2 was 0.48 (Table 32).

In Mexican-American high-income men, higher score on the component on attempt to lose weight increased mean BMI (β=0.07 at $p<0.0001$), while participating in leisure-time activity at the third quintile level (β=-0.06 at $p<0.01$) relative to participating in leisure-time activity at the highest level decreased mean BMI. R^2 was 0.48 (Table 32).

In white low-income women, the following increased mean BMI: being 50-59 years old (β=0.11 at $p<0.001$) or 60+ years old (β=0.09 at $p<0.001$) relative to being 20-29 years old, being a non-smoker (β=0.06 at $p<0.01$) relative to being a smoker, not participating in any leisure-time activity (β=0.11 at $p<0.01$) or participating in leisure-time activity at the first quintile level (β=0.07 at $p<0.05$) relative to participating in leisure-time activity at the highest level, having first menarche at ≤ 11 years old (β=0.15 at $p<0.0001$) or at 12-15 years old (β=0.06 at $p<0.01$) relative to having first menarche at ≥ 16 years old, and higher score on the component on attempt to lose weight (β=0.10 at $p<0.0001$). In addition, higher alcohol consumption (β=-0.04 at $p<0.01$) decreased mean BMI. R^2 was 0.45 (Table 32).

In white middle-income women, the following increased mean BMI: being 40-49 years old (β=0.07 at $p<0.05$), 50-59 years old (β=0.10 at $p<0.001$), or 60+ years old (β=0.13 at $p<0.001$) relative to being 20-29 years old, not participating in any leisure-time activity (β=0.11 at $p<0.001$) or participating in leisure-time activity at the first quintile level of activity (β=0.06 at $p<0.05$) relative to participating in leisure-time activity at the highest level, having first menarche at ≤ 11 years old (β=0.09 at $p<0.01$) relative to having first menarche at ≥ 16 years old, higher score on the component on attempt to lose weight (β=0.10 at $p<0.0001$), higher energy intake (β=0.03 at $p<0.05$), and eating meals/snacks 4 times/day (β=0.05 at $p<0.05$) relative to eating meals/snacks ≥ 7 times/day. In addition, higher alcohol consumption (β=-0.03 at $p<0.001$) decreased mean BMI. R^2 was 0.42 (Table 32).

In white high-income women, the following increased mean BMI: being 30-39 years old (β=0.07 at $p<0.01$), 40-49 years old (β=0.09 at $p<0.001$), 50-59 years old (β=0.15 at $p<0.0001$), or 60+ years old (β=0.13 at $p<0.0001$) relative to being 20-29 years old, participating in leisure-time activity at the first quintile level (β=0.04 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.08 at $p<0.0001$), and eating meals/snacks $\leq$ 3 times/day (β=0.05 at $p<0.05$) relative to eating meals/snacks $\geq$ 7 times/day. In addition, the following decreased mean BMI: higher alcohol consumption (β=-0.03 at $p<0.001$) and having two live births (β=-0.05 at $p<0.05$) relative to having no live birth or never being pregnant. R^2 was 0.40 (Table 32).

In black low-income women, the following increased mean BMI: being 30-39 years old (β=0.10 at $p<0.0001$), 40-49 years old (β=0.11 at $p<0.0001$), 50-59 years old (β=0.16 at $p<0.0001$), or 60+ years old (β=0.16 at $p<0.0001$) relative to being 20-29 years old, being a non-smoker (β=0.06 at $p<0.001$) relative to being a smoker, having first menarche at $\leq$ 11 years old (β=0.06 at $p<0.05$) relative to having first menarche at $\geq$ 16 years old, higher score on the component on attempt to lose weight (β=0.10 at $p<0.0001$), and eating meals/snacks $\leq$ 3 times/day (β=0.08 at $p<0.05$) relative to eating meals/snacks $\geq$ 7 times/day. R^2 was 0.50 (Table 32).

In black middle-income women, the following increased mean BMI: having less than high school education (β=0.05 at $p<0.05$) relative to having more than high school education, being 30-39 years old (β=0.09 at $p<0.01$), 40-49 years old (β=0.12 at $p<0.001$), 50-59 years old (β=0.08 at $p<0.005$), or 60+ years old (β=0.10 at $p<0.01$) relative to

being 20-29 years old, being a non-smoker (β=0.08 at $p<0.001$) relative to being a smoker, not participating in any leisure-time activity (β=0.11 at $p<0.05$) or participating in leisure-time activity at the first quintile level (β=0.08 at $p<0.05$) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (β=0.10 at $p<0.0001$), and higher energy intake (β=0.05 at $p<0.01$). In addition, being married (β=-0.06 at $p<0.05$) or being widowed, divorced, or separated (β=-0.09 at $p<0.001$) decreased mean BMI relative to never been married or living with a partner. R^2 was 0.52 (Table 32).

In black high-income women, the following increased mean BMI: being married (β=0.10 at $p<0.05$), not participating in any leisure-time activity (β=0.17 at $p<0.01$), participating in leisure-time activity at the first quintile level (β=0.11 at $p<0.01$), participating in leisure-time activity at the second quintile level (β=0.13 at $p<0.001$), participating in leisure-time activity at the third quintile level (β=0.12 at $p<0.01$), and participating in leisure-time activity at the fourth quintile level (β=0.13 at $p<0.01$) relative to participating in leisure-time activity at the highest level of leisure-time activity, and higher score on the component on attempt to lose weight (β=0.07 at $p<0.0001$). R^2 was 0.44 (Table 32).

In Mexican-American low-income women, the following increased mean BMI: having less than high school education (β=0.06 at $p<0.05$) or having high school education (β=0.10 at $p<0.001$) relative to having more than high school education, being 30-39 years old (β=0.05 at $p<0.05$), 40-49 years old (β=0.08 at $p<0.001$), 50-59 years old (β=0.08 at $p<0.01$), or 60+ years old (β=0.11 at $p<0.001$) relative to being 20-29 years

old, and higher score on the component on attempt to lose weight (β=0.08 at $p<0.0001$). In addition, eating restaurant food the day before the interview decreased mean BMI (β=-0.05 at $p<0.05$). R^2 was 0.41 (Table 32).

In Mexican-American middle-income women, the following increased mean BMI: being 30-39 years old (β=0.08 at $p<0.05$), 40-49 years old (β=0.13 at $p<0.001$), 50-59 years old (β=0.11 at $p<0.05$), or 60+ years old (β=0.15 at $p<0.001$) relative to being 20-29 years old, not participating in any leisure time activity (β=0.11 at $p<0.01$) or participating in leisure-time activity at the first quintile level (β=0.08 at $p<0.05$) relative to participating in leisure-time activity at the highest level of leisure-time activity, higher score on the component on attempt to lose weight (β=0.11 at $p<0.0001$), and not consuming breakfast (β=0.06 at $p<0.05$). In addition, having two live births (β=-0.07 at $p<0.05$) relative to having no live birth or never being pregnant decreased mean BMI. R^2 was 0.49 (Table 30). In Mexican-American high-income women, higher score on the component score on desired weight status (β=0.10 at $p<0.0001$) increased mean BMI. R^2 was 0.45 (Table 32).

Risk of obesity as an outcome variable: The following 1 though 4 will describe the predictors of obesity risk that were identified among various subpopulation groups in 1999-2002. From 5, the predictors in 1999-2002 that were identified were based on the logistic regressions adjusted for the NHANES 1988-94 since NHANES 1988-94 did not have all the variables included in the NHANES 1999-2002. Thus, adjusted NHANES 1999-2002 tested for a fewer number of variables.

1. Predictors in gender subpopulation groups in 1999-2002

In men, the following increased the risk of obesity: being black (OR=1.76 [CI=1.14, 2.71]) relative to being white, having high school education (OR=1.48 [CI=1.05, 2.10]) relative to having more than high school education, higher score on the component on desired weight status (OR=4.77 [CI=3.57, 6.38]), higher score on the component on attempt to lose weight (OR=1.29 [CI=1.08, 1.56]), and higher alcohol consumption (OR=0.85 [CI=0.75, 0.97]). R^2 was 0.28 (Table 33).

In women, the following increased the risk of obesity: being black (OR=2.23 [CI=1.40, 3.55]) relative to being white, being in the low-income group (OR=2.11 [CI=1.28, 3.49]) relative to being in the high-income group, being 40-49 years old (OR=2.08 [CI=1.13, 3.85]) relative to being 20-29 years old, being a non-smoker (OR=1.68 [CI=1.08, 2.61]) relative to being a smoker, watching TV or using a computer for 2-3 hours/day (OR=1.85 [CI=1.27, 2.69]) or ≥ 4 hours/day (OR=2.27 [CI=1.38, 3.75]) relative to watching TV or using a computer for ≤ 1 hour/day, spending the day sitting (OR=2.18 [CI=1.44, 3.30]) or walking a lot (OR=1.70 [CI=1.10, 2.63]) relative to spending the day carrying light or heavy loads, not participating in any leisure-time activity (OR=2.78 [CI=1.50, 5.13]), participating in leisure-time activity at the first quintile level (OR=1.70 [CI=1.10, 2.63]), or participating in leisure-time activity at the third quintile level (OR=1.77 [CI=1.05, 2.97]) relative to participating in leisure-time activity at the highest level, having first menarche at ≤ 11 years old (OR=2.91 [CI=1.26, 6.72]) relative to having first menarche at ≥ 16 years old, higher score on the component on desired weight status (OR=6.46 [CI=4.45, 9.36]), higher score on the component on attempt to lose weight (OR=1.34 [CI=1.11, 1.62]), and higher alcohol consumption (OR=0.73 [CI=0.62, 0.86]). R^2 was 0.33 (Table 33).

Table 33. Predictors of obesity risk by gender in 1999-2002[1]

	Men		Women	
Variables	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Race/ethnicity				
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	1.76	(1.14, 2.71)	2.23	(1.40, 3.55)
Mexican-Americans	1.06	(0.69, 1.64)	0.72	(0.49, 1.06)
Education				
< High school	1.40	(0.92, 2.14)	1.40	(0.92, 2.14)
High school graduate	1.48	(1.05, 2.10)	1.11	(0.60, 2.04)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Income				
PIR <1.85	1.46	(0.98, 2.16)	2.11	(1.28, 3.49)
1.85 ≤ PIR ≤ 3.5	1.22	(0.80, 1.86)	1.42	(0.86, 2.33)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age				
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.15	(0.60, 2.23)	1.55	(0.84, 2.89)
40-49 yrs	1.38	(0.77, 2.48)	2.08	(1.13, 3.85)
50-59 yrs	1.46	(0.75, 2.85)	1.14	(0.64, 2.03)
60+ yrs	1.55	(0.76, 3.16)	1.35	(0.71, 2.54)
Marital status				
Married	1.19	(0.69, 2.03)	0.90	(0.57, 1.41)
Widowed, divorced, or separated	0.79	(0.43, 1.43)	0.91	(0.51, 1.65)
Never married or living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days				
Non-smoker	0.80	(0.62, 1.04)	1.68	(1.08, 2.61)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Daily hrs of TV, video or computer use				
≤ 1 hr	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
2-3 hrs	1.11	(0.81, 1.54)	1.85	(1.27, 2.69)
≥ 4 hrs	1.29	(0.81, 2.06)	2.27	(1.38, 3.75)
Alcohol consumption (# of drinks/wk)[2]	0.85	(0.75, 0.97)	0.73	(0.62, 0.86)

Table 33 (cont'd)

Variables	Men OR	Men 95% CI	Women OR	Women 95% CI
Daily physical activity				
Mainly sit	1.31	(0.88, 1.94)	**2.18**	**(1.44, 3.30)**
Walk a lot	1.36	(0.90, 2.05)	**1.70**	**(1.10, 2.63)**
Carry light or heavy loads	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Leisure time activity/month				
No activities	1.41	(0.75, 2.65)	**2.78**	**(1.50, 5.13)**
1st quintile	1.14	(0.64, 2.05)	**2.03**	**(1.09, 3.79)**
2nd quintile	0.83	(0.46, 1.50)	1.52	(0.81, 2.85)
3rd quintile	0.99	(0.49, 2.01)	1.77	(1.05, 2.97)
4th quintile	1.46	(0.84, 2.53)	0.79	(0.36, 1.72)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child				
Yes	N/A	N/A	1.22	(0.58, 2.60)
No	N/A	N/A	1.38	(0.58, 3.29)
Never been pregnant	N/A	N/A	1.00	(1.00, 1.00)
Number of live birth				
0 and never been pregnant	N/A	N/A	1.00	(1.00, 1.00)
1	N/A	N/A	0.54	(0.26, 1.14)
2	N/A	N/A	0.56	(0.29, 1.06)
3	N/A	N/A	0.69	(0.37, 1.28)
4	N/A	N/A	1.00	(1.00, 1.00)
≥ 5	N/A	N/A	1.12	(0.50, 2.51)
Age at the first menarche				
≤ 11 yrs old	N/A	N/A	**2.91**	**(1.26, 6.72)**
12-15 yrs old	N/A	N/A	1.65	(0.90, 3.03)
≥ 16 yrs old	N/A	N/A	1.00	(1.00, 1.00)
Component 1[3]	**4.77**	**(3.57, 6.38)**	**6.46**	**(4.45, 9.36)**
Component 2[4]	**1.29**	**(1.08, 1.56)**	**1.34**	**(1.11, 1.62)**
Restaurant food consumption				
< 1 time/wk	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	0.99	(0.59, 1.64)	1.35	(0.83, 2.19)
2-3 times/wk	1.05	(0.65, 1.69)	1.06	(0.71, 1.56)
≥ 4 times/wk	1.16	(0.83, 1.62)	1.52	(0.89, 2.59)

Table 33 (cont'd)

	Men		Women	
Variables	OR	95% CI	OR	95% CI
Breakfast consumption				
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	0.87	(0.58, 1.30)	1.32	(0.95, 1.85)
Energy intake (kcal/d)[2]	1.59	(0.97, 2.61)	1.06	(0.68, 1.63)
Fat intake				
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	0.95	(0.66, 1.37)	1.23	(0.92, 1.63)
Number of eating occasions				
≤ 3 times/day	1.52	(0.94, 2.45)	1.53	(0.90, 2.61)
4 times/day	0.89	(0.54, 1.47)	1.41	(0.91, 2.17)
5 times/day	1.02	(0.63, 1.63)	1.02	(0.68, 1.53)
6 times/day	1.13	(0.58, 2.19)	1.33	(0.75, 2.36)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.28		0.33

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and on desired weight status.

[4] Sum of responses to the questions on attempt to lose weight and on attempt not to gain weight.

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CHANGES IN PREDICTORS OF OBESITY PREVALENCE AMONG U.S. SUBPOPUALTION GROUPS OVER THE PAST DECADE

VOLUME II

By

Saori Obayashi

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
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DOCTOR OF PHILOSOPHY

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2. Predictors in income subpopulation groups in 1999-2002

In the low-income group, the following increased the risk of obesity: being black (OR=1.96 [CI=1.01, 3.79]) relative to being white, being a non-smoker (OR=1.46 [CI=1.12, 1.91]) relative to being a smoker, not participating in any leisure-time activity (OR=3.06 [CI=1.83, 5.14]) or participating in leisure-time activity at the third quintile level (OR=2.54 [CI=1.42, 4.56]) relative to participating in leisure-time activity at the highest level of leisure-time activity, higher score on the component on desired weight status (OR=4.62 [CI=3.35, 6.39]), and higher score on the component on attempt to lose weight (OR=1.34 [CI=1.09, 1.64]). In addition, being Mexican-American decreased the risk of obesity (OR=0.65 [CI=0.43, 0.99]) relative to being white. R^2 was 0.36 (Table 34).

In the middle-income group, the following increased the risk of obesity: being black (OR=3.42 [CI=1.98, 5.92]) relative to being white, watching TV or using a computer for 2-3 hours/day (OR=2.18 [CI=1.28, 3.69]) or ≥ 4 hours/day (OR=2.27 [CI=1.39, 3.73]) relative to watching TV or using a computer for ≤ 1 hour/day, higher score on the component on desired weight status (OR=5.17 [CI=3.33, 8.01]), and higher score on the component on attempt to lose weight (OR=1.42 [CI=1.11, 1.82]). R^2 was 0.32 (Table 34).

In the high-income group, the following increased the risk of obesity: having less than high school education (OR=2.02 [CI=1.07, 3.81]) relative to having more than high school education, being 40-49 years old (OR=2.70 [CI=1.39, 5.23]) or 60+ years old (OR=2.21 [CI=1.29, 3.81]) relative to being 20-29 years old, watching TV or using a computer for ≥4 hours/day (OR=1.94 [CI=1.11, 3.37]) relative to watching TV or using a

Table 34. Predictors of obesity risk by income in 1999-2002[1]

	Low		Middle		High	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Gender						
Male	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Female	0.86	(0.56, 1.31)	0.83	(0.48, 1.43)	0.63	(0.46, 0.88)
Education						
< High school	1.33	(0.83, 2.13)	1.32	(0.75, 2.33)	2.02	(1.07, 3.81)
High school graduate	1.48	(0.76, 2.90)	1.09	(0.73, 1.62)	1.20	(0.79, 1.81)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Race/ethnicity						
White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Black	1.96	(1.01, 3.79)	3.42	(1.98, 5.92)	1.21	(0.66, 2.22)
Mexican-American	0.65	(0.43, 0.99)	1.15	(0.61, 2.16)	1.28	(0.83, 1.96)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.91	(0.77, 4.73)	0.57	(0.25, 1.29)	1.56	(0.67, 3.62)
40-49 yrs	1.76	(0.92, 3.37)	0.82	(0.28, 2.42)	2.70	(1.39, 5.23)
50-59 yrs	1.26	(0.50, 3.21)	1.43	(0.51, 3.98)	1.73	(0.86, 3.50)
60+ yrs	0.98	(0.46, 2.07)	1.49	(0.60, 3.68)	2.21	(1.29, 3.81)
Marital status						
Married	1.15	(0.65, 2.04)	1.23	(0.60, 2.50)	0.70	(0.38, 1.29)
Widowed, divorced, or separated	1.23	(0.58, 2.61)	0.61	(0.29, 1.29)	0.72	(0.33, 1.58)
Never married or living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.46	(1.12, 1.91)	1.26	(0.61, 2.60)	1.03	(0.66, 1.62)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Daily hrs of TV, video or computer use						
≤ 1 hr	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
2-3 hrs	1.14	(0.72, 1.80)	2.18	(1.28, 3.69)	1.28	(0.90, 1.83)
≥ 4 hrs	1.41	(0.86, 2.32)	2.27	(1.39, 3.73)	1.94	(1.11, 3.37)
Alcohol intake (# of drinks/wk)[2]	0.81	(0.63, 1.03)	0.99	(0.80, 1.24)	0.74	(0.63, 0.86)
Daily physical activity						
Mainly sit	1.15	(0.59, 2.25)	1.52	(0.84, 2.74)	1.93	(1.29, 2.90)
Walk a lot	1.53	(0.93, 2.52)	1.49	(0.90, 2.48)	1.64	(0.97, 2.77)
Carry light or heavy loads	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 34 (cont'd)

Variables	Low OR	Low 95% CI	Middle OR	Middle 95% CI	High OR	High 95% CI
Leisure time activity/month						
No activities	3.06	(1.83, 5.14)	1.78	(0.83, 3.82)	1.66	(0.83, 3.30)
1st quintile	1.47	(0.68, 3.20)	1.06	(0.45, 2.50)	1.53	(0.82, 2.87)
2nd quintile	1.20	(0.63, 2.31)	0.93	(0.45, 1.91)	1.02	(0.54, 1.92)
3rd quintile	2.54	(1.42, 4.56)	0.97	(0.37, 2.55)	0.95	(0.52, 1.75)
4th quintile	1.66	(0.61, 4.53)	0.71	(0.28, 1.78)	0.99	(0.62, 1.59)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	4.62	(3.35, 6.39)	5.17	(3.33, 8.01)	7.04	(4.02, 12.32)
Component 2[4]	1.34	(1.09, 1.64)	1.42	(1.11, 1.82)	1.21	(0.97, 1.51)
Restaurant food consumption						
< 1 time/wk	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	1.75	(0.91, 3.39)	0.90	(0.48, 1.68)	1.05	(0.58, 1.88)
2-3 times/wk	1.30	(0.76, 2.22)	0.79	(0.39, 1.61)	1.07	(0.53, 2.14)
≥ 4 times/wk	1.11	(0.61, 2.02)	1.46	(0.73, 2.90)	1.30	(0.74, 2.31)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	0.92	(0.57, 1.46)	1.07	(0.61, 1.87)	1.25	(0.75, 2.06)
Energy intake (kcal/d)[2]	1.41	(0.99, 2.01)	1.22	(0.55, 2.68)	1.40	(0.82, 2.37)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	0.94	(0.70, 1.28)	1.34	(0.88, 2.06)	1.04	(0.73, 1.49)
Number of eating occasions						
≤ 3 times/day	1.96	(0.81, 4.75)	1.28	(0.56, 2.95)	1.34	(0.79, 2.28)
4 times/day	1.01	(0.47, 2.17)	1.12	(0.45, 2.76)	1.33	(0.79, 2.26)
5 times/day	1.04	(0.51, 2.11)	0.82	(0.41, 1.64)	1.22	(0.76, 1.96)
6 times/day	1.42	(0.45, 4.49)	1.09	(0.49, 2.39)	1.21	(0.67, 2.18)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.36		0.32		0.26	

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and on desired weight status.

[4] Sum of responses to the questions on attempt to lose weight and on attempt not to gain weight.

Highlighted were statistically significant

computer for ≤ 1 hour/day, spending the day sitting (OR=1.93 [CI=1.29, 2.90]) relative to spending the day carrying light or heavy loads, higher score on the component on desired weight status (OR=7.04 [CI=4.02, 12.32]), and higher alcohol consumption (OR=0.74 [CI=0.63, 0.86]). In addition, the following decreased the risk of obesity: being a woman (OR=0.63 [CI=0.46, 0.88]) relative to being a man. R^2 was 0.26 (Table 34).

3. Predictors in racial/ethnic subpopulation groups in 1999-2002

In whites, the following increased the risk of obesity: having less than high school education (OR=1.46 [CI=1.06, 2.02]) (Table 35) relative to having more than high school education, being in the low-income group (OR=1.96 [CI=1.27, 3.02]) relative to being in the high-income group, being 40-49 years old (OR=1.90 [CI=1.09, 3.31]) relative to being 20-29 years old, watching TV or using a computer for 2-3 hour/day (OR=1.52 [CI=1.17, 1.97]) or ≥ 4 hours/day (OR=1.73 [CI=1.15, 2.60]) relative to watching TV or using a computer for ≤ 1 hour/day, spending the day sitting (OR=1.65 [CI=1.27, 2.13]) or walking a lot (OR=1.56 [CI=1.12, 2.18]) relative to spending the day carrying light or heavy loads, not participating in any leisure-time activity (OR=2.07 [CI=1.23, 3.48]) relative to participating in leisure-time activity at the highest level of leisure-time activity, higher score on the component on desired weight status (OR=6.00 [CI=4.09, 8.81]), higher score on the component on attempt to lose weight (OR=1.34 [CI=1.17, 1.53]), eating meals/snacks ≤ 3 times/day (OR=1.56 [CI=1.06, 2.29]) relative to eating meals/snacks ≥ 7 times/day, and higher alcohol consumption (OR=0.80 [CI=0.69, 0.92]). In addition, the following decreased the risk of obesity: being a woman (OR=0.71 [CI=0.54, 0.94]) relative to being a man. R^2 was 0.28 (Table 35). The present study

Table 35. Predictors of obesity risk in whites in 1999-2002[1]

	Whites	
Variables	OR	95% CI
Intercept	0.00	(0.00, 0.00)
Gender		
Male	1.00	(1.00, 1.00)
Female	0.71	(0.54, 0.94)
Education		
< High school	1.46	(1.06, 2.02)
High school graduate	1.19	(0.79, 1.77)
> High school	1.00	(1.00, 1.00)
Income		
PIR <1.85	1.96	(1.27, 3.02)
1.85 ≤ PIR ≤ 3.5	1.36	(0.90, 2.05)
PIR >3.5	1.00	(1.00, 1.00)
Age		
20-29 yrs	1.00	(1.00, 1.00)
30-39 yrs	1.26	(0.66, 2.38)
40-49 yrs	1.90	(1.09, 3.31)
50-59 yrs	1.44	(0.76, 2.71)
60+ yrs	1.73	(0.99, 3.04)
Marital status		
Married	1.07	(0.69, 1.68)
Widowed, divorced, or separated	0.86	(0.49, 1.51)
Never married or living with partner	1.00	(1.00, 1.00)
Smoking status in the past 5 days		
Non-smoker	1.17	(0.85, 1.61)
Smoker	1.00	(1.00, 1.00)
Daily hrs of TV, video or computer use		
≤ 1 hr	1.00	(1.00, 1.00)
2-3 hrs	1.52	(1.17, 1.97)
≥ 4 hrs	1.73	(1.15, 2.60)
Alcohol consumption (# of drinks/wk)[2]	0.80	(0.69, 0.92)

Table 35 (cont'd)

Variables	Whites OR	95% CI
Daily physical activity		
Mainly sit	1.65	(1.27, 2.13)
Walk a lot	1.56	(1.12, 2.18)
Carry light or heavy loads	1.00	(1.00, 1.00)
Leisure time activity/month		
No activities	2.07	(1.23, 3.48)
1st quintile	1.49	(0.85, 2.60)
2nd quintile	1.10	(0.73, 1.67)
3rd quintile	1.29	(0.79, 2.09)
4th quintile	1.04	(0.61, 1.77)
5th quintile	1.00	(1.00, 1.00)
Component 1[3]	6.00	(4.09, 8.81)
Component 2[4]	1.34	(1.17, 1.53)
Restaurant food consumption		
< 1 time/wk	1.00	(1.00, 1.00)
1 time/wk	1.28	(0.82, 2.02)
2-3 times/wk	1.10	(0.73, 1.66)
≥ 4 times/wk	1.42	(0.98, 2.07)
Breakfast consumption		
Yes	1.00	(1.00, 1.00)
No	1.18	(0.83, 1.69)
Energy intake (kcal/d)[2]	1.45	(1.00, 2.13)
Fat intake		
≤ 30% of energy from fat	1.00	(1.00, 1.00)
> 30% of energy from fat	1.07	(0.81, 1.42)

Table 35 (cont'd)

	Whites	
Variables	OR	95% CI
Number of eating occasions		
≤ 3 times/day	1.56	(1.06, 2.29)
4 times/day	1.16	(0.83, 1.62)
5 times/day	1.02	(0.70, 1.48)
6 times/day	1.26	(0.76, 2.09)
≥ 7 times/day	1.00	(1.00, 1.00)
R^2	0.28	

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and on desired weight status

[4] Sum of responses to the questions on attempt to lose weight and attempt not to gain weight

Highlighted were statistically significant

could not identify the predictors of obesity for other race/ethnic subpopulation groups due to the reasons described earlier.

4. Predictors in subpopulation groups by income and gender in 1999-2002

In the low-income men, the following increased the risk of obesity: having high school education (OR=2.87 [CI=1.45, 5.69]) relative to having more than high school education, participating in leisure-time activity at the fourth quintile level of activity (OR=3.51 [CI=1.05, 11.71]) relative to participating in leisure-time activity at the highest level of leisure-time activity, and higher score on the component on desired weight status (OR=4.73 [CI=2.98, 7.50]). R^2 was 0.35 (Table 36).

In the middle-income men, the following increased the risk of obesity: being black (OR=2.94 [CI=1.29, 6.70]) relative to being white, being married (OR=2.71 [CI=1.03, 7.11]) relative to never being married or loving with a partner, not participating in any leisure-time activity (OR=3.85 [CI=1.18, 12.59]) relative to participating in leisure-time activity at the highest level, higher score on the component on desired weight status (OR=5.26 [CI=3.16, 8.74]), and higher score on the component on attempt to lose weight (OR=1.82 [CI=1.11, 2.98]). In addition, being 30-39 years old decreased the risk of obesity (OR=0.29 [CI=0.09, 0.90]) relative to being 20-29 years old. R^2 was 0.34 (Table 36).

In the high-income men, the following increased the risk of obesity: being Mexican-American (OR=2.18 [CI=1.32, 3.61]) relative to being white, being 40-49 years old (OR=2.26 [CI=1.12, 4.57]) relative to being 20-29 years old, higher score on the component on desired weight status (OR=5.91 [CI=3.40, 10.27]), higher energy intake

Table 36. Predictors of obesity risk by income and gender in 1999-2002[1]

	LIM		MIM		HIM	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	1.49	(0.65, 3.42)	2.94	(1.29, 6.70)	1.43	(0.70, 2.92)
Mexican-Americans	0.63	(0.36, 1.10)	1.31	(0.41, 4.15)	2.18	(1.32, 3.61)
Education						
< High school	1.44	(0.66, 3.17)	1.00	(0.46, 2.19)	2.03	(0.78, 5.26)
High school graduate	2.87	(1.45, 5.69)	1.24	(0.75, 2.03)	1.14	(0.64, 2.02)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	2.13	(0.64, 7.15)	0.29	(0.09, 0.90)	1.42	(0.56, 3.57)
40-49 yrs	1.87	(0.72, 4.83)	0.25	(0.05, 1.15)	2.26	(1.12, 4.57)
50-59 yrs	1.77	(0.73, 4.33)	0.91	(0.28, 2.93)	1.94	(0.72, 5.20)
60+ yrs	1.49	(0.53, 4.19)	0.64	(0.14, 3.07)	2.14	(0.88, 5.22)
Marital status						
Married	1.45	(0.64, 3.29)	2.71	(1.03, 7.11)	0.71	(0.32, 1.58)
Widowed, divorced, or separated	1.12	(0.43, 2.86)	0.72	(0.21, 2.45)	0.53	(0.18, 1.52)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	0.95	(0.54, 1.67)	0.79	(0.30, 2.06)	0.76	(0.46, 1.24)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Daily hrs of TV, video or computer use						
≤ 1 hr	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
2-3 hrs	1.31	(0.73, 2.34)	0.78	(0.29, 2.07)	1.08	(0.69, 1.67)
≥ 4 hrs	1.63	(0.72, 3.69)	1.08	(0.45, 2.59)	1.25	(0.61, 2.58)
Alcohol intake (# of drinks/wk)[2]	0.92	(0.71, 1.18)	1.12	(0.90, 1.40)	0.74	(0.62, 0.88)
Daily physical activity						
Mainly sit	1.20	(0.51, 2.86)	1.35	(0.49, 3.70)	1.23	(0.69, 2.20)
Walk a lot	1.80	(0.94, 3.48)	0.98	(0.48, 2.00)	1.41	(0.74, 2.67)
Carry light or heavy loads	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Leisure time activity/month						
No activities	2.29	(0.69, 7.60)	3.85	(1.18, 12.59)	0.90	(0.38, 2.14)
1st quintile	1.06	(0.35, 3.26)	1.15	(0.33, 4.04)	1.06	(0.47, 2.40)
2nd quintile	1.34	(0.34, 5.28)	0.91	(0.28, 2.91)	0.70	(0.30, 1.61)
3rd quintile	3.70	(0.95, 14.47)	2.06	(0.42, 10.10)	0.69	(0.27, 1.81)
4th quintile	3.51	(1.05, 11.71)	1.24	(0.33, 4.62)	1.24	(0.66, 2.34)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 36 (cont'd)

Variables	LIM OR	LIM 95% CI	MIM OR	MIM 95% CI	HIM OR	HIM 95% CI
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	4.73	(2.98, 7.50)	5.26	(3.16, 8.74)	5.91	(3.40, 10.27)
Component 2[4]	1.18	(0.80, 1.74)	1.82	(1.11, 2.98)	1.16	(0.83, 1.60)
Restaurant food consumption						
< 1 time/wk	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	1.76	(0.74, 4.15)	0.43	(0.12, 1.58)	0.84	(0.34, 2.10)
2-3 times/wk	1.85	(0.82, 4.17)	0.57	(0.20, 1.58)	0.83	(0.34, 1.99)
≥ 4 times/wk	1.10	(0.41, 2.99)	1.41	(0.49, 4.07)	0.90	(0.46, 1.75)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	0.88	(0.45, 1.69)	0.50	(0.14, 1.86)	1.11	(0.54, 2.31)
Energy intake (kcal/d)[2]	1.59	(0.66, 3.82)	1.22	(0.47, 3.13)	3.49	(1.22, 9.98)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.14	(0.61, 2.14)	1.00	(0.46, 2.17)	0.82	(0.51, 1.31)
Number of eating occasions						
≤ 3 times/day	1.55	(0.49, 4.84)	1.23	(0.36, 4.18)	1.62	(0.65, 4.04)
4 times/day	0.85	(0.27, 2.60)	0.82	(0.24, 2.80)	1.03	(0.48, 2.19)
5 times/day	0.75	(0.27, 2.09)	0.90	(0.27, 2.99)	1.33	(0.73, 2.42)
6 times/day	1.19	(0.32, 4.36)	1.18	(0.35, 3.95)	1.34	(0.62, 2.87)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.35		0.34		0.27

Table 36 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Intercept	0.00	(0.00, 0.01)	0.00	(0.00, 0.03)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	2.42	(1.00, 5.83)	5.72	(1.73, 18.93)	0.97	(0.33, 2.92)
Mexican-Americans	0.54	(0.28, 1.02)	0.86	(0.49, 1.51)	0.47	(0.18, 1.23)
Education						
< High school	1.15	(0.52, 2.50)	1.58	(0.64, 3.89)	1.42	(0.43, 4.75)
High school graduate	1.02	(0.31, 3.36)	0.99	(0.42, 2.34)	1.12	(0.59, 2.12)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.99	(0.80, 4.96)	1.01	(0.31, 3.35)	2.44	(0.42, 14.30)
40-49 yrs	1.62	(0.70, 3.74)	2.04	(0.54, 7.69)	3.41	(0.79, 14.72)
50-59 yrs	0.69	(0.15, 3.09)	1.85	(0.56, 6.18)	1.32	(0.39, 4.40)
60+ yrs	0.57	(0.18, 1.85)	3.91	(1.07, 14.37)	1.39	(0.39, 4.91)
Marital status						
Married	0.83	(0.42, 1.66)	1.12	(0.29, 4.30)	0.64	(0.24, 1.75)
Widowed, divorced, or separated	1.02	(0.40, 2.64)	0.55	(0.16, 1.84)	0.85	(0.22, 3.31)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.93	(1.20, 3.09)	1.53	(0.71, 3.29)	2.61	(1.14, 5.95)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Daily hrs of TV, video or computer use						
≤ 1 hr	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
2-3 hrs	0.98	(0.52, 1.84)	5.33	(2.92, 9.74)	1.77	(0.90, 3.49)
≥ 4 hrs	1.05	(0.44, 2.52)	4.83	(2.48, 9.42)	4.01	(1.93, 8.33)
Alcohol intake (# of drinks/wk)[2]	0.59	(0.39, 0.91)	0.85	(0.60, 1.20)	0.75	(0.56, 1.01)
Daily physical activity						
Mainly sit	1.24	(0.47, 3.24)	1.67	(0.67, 4.18)	4.39	(1.96, 9.84)
Walk a lot	1.43	(0.57, 3.60)	1.57	(0.64, 3.86)	2.05	(0.92, 4.56)
Carry light or heavy loads	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Leisure time activity/month						
No activities	4.67	(1.21, 17.99)	0.78	(0.30, 1.99)	4.58	(1.45, 14.47)
1st quintile	1.93	(0.38, 9.92)	0.86	(0.25, 2.98)	3.66	(1.31, 10.26)
2nd quintile	1.29	(0.28, 5.93)	0.59	(0.21, 1.65)	2.57	(0.82, 7.99)
3rd quintile	3.02	(0.96, 9.47)	0.40	(0.10, 1.59)	2.13	(0.75, 5.99)
4th quintile	0.99	(0.20, 4.83)	0.25	(0.07, 0.88)	1.01	(0.36, 2.85)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 36 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Breast fed your child						
Yes	2.03	(0.52, 7.85)	1.47	(0.39, 5.51)	0.88	(0.21, 3.72)
No	2.00	(0.44, 9.17)	1.62	(0.44, 5.89)	1.23	(0.29, 5.23)
Never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Number of live birth						
0 and never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1	0.79	(0.24, 2.52)	0.42	(0.12, 1.45)	0.47	(0.11, 1.95)
2	**0.31**	**(0.10, 0.96)**	**0.14**	**(0.04, 0.42)**	1.36	(0.42, 4.39)
3	0.67	(0.26, 1.76)	0.45	(0.15, 1.32)	0.97	(0.27, 3.52)
4	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
≥ 5	1.18	(0.35, 3.90)	**0.30**	**(0.09, 0.96)**	3.21	(0.57, 18.16)
Age at the first menarche						
≤ 11 yrs old	3.33	(0.68, 16.32)	1.09	(0.27, 4.46)	**3.94**	**(1.10, 14.08)**
12-15 yrs old	1.68	(0.43, 6.54)	0.49	(0.12, 2.01)	2.45	(0.77, 7.81)
≥ 16 yrs old	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	**5.14**	**(3.55, 7.44)**	**7.26**	**(3.17, 16.63)**	**47.52**	**(9.97, 226.60)**
Component 2[4]	1.65	(1.05, 2.60)	1.39	(0.97, 2.00)	1.31	(0.89, 1.92)
Restaurant food consumption						
< 1 time/wk	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	1.46	(0.73, 2.91)	1.58	(0.79, 3.15)	1.42	(0.54, 3.77)
2-3 times/wk	0.89	(0.55, 1.44)	1.02	(0.45, 2.30)	1.26	(0.50, 3.16)
≥ 4 times/wk	0.97	(0.45, 2.09)	1.77	(0.69, 4.58)	1.76	(0.59, 5.24)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.07	(0.60, 1.89)	2.04	(0.82, 5.06)	1.18	(0.54, 2.57)
Energy intake (kcal/d)[2]	1.21	(0.65, 2.28)	0.84	(0.31, 2.28)	1.15	(0.58, 2.29)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	0.89	(0.60, 1.31)	**2.77**	**(1.37, 5.59)**	1.32	(0.72, 2.40)

Table 36 (cont'd)

Variables	LiW OR	LiW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Number of eating occasions						
≤ 3 times/day	2.50	(0.99, 6.29)	1.43	(0.47, 4.33)	1.31	(0.41, 4.20)
4 times/day	1.03	(0.47, 2.25)	1.49	(0.53, 4.18)	2.10	(0.68, 6.42)
5 times/day	1.12	(0.60, 2.09)	0.91	(0.42, 1.96)	1.29	(0.62, 2.68)
6 times/day	2.10	(0.57, 7.72)	1.49	(0.43, 5.16)	1.31	(0.58, 2.93)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.38		0.40		0.38

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and on desired weight status

[4] Sum of responses to the questions on attempt to lose weight and on attempt not to gain weight

Highlighted were statistically significant

(OR=3.49 [CI=1.22, 9.98]), and higher alcohol intakes decreased the risk of obesity (OR=0.74 [CI=0.62, 0.88]). R^2 was 0.27 (Table 36).

In the low-income women, the following increased the risk of obesity: being a non-smoker (OR=1.93 [CI=1.20, 3.09]) relative to being a smoker, not participating in leisure-time activity (OR=4.67 [CI=1.21, 17.99]) relative to participating in leisure time activity at the highest level, higher score on the component on desired weight status (OR=5.14 [CI=3.55, 7.44]), higher score on the component on attempt to lose weight (OR=1.65 [CI=1.05, 2.60]), and higher alcohol intakes (OR=0.59 [CI=0.39, 0.91]). In addition, having two live births decreased the risk of obesity (OR=0.31 [CI=0.10, 0.96]) relative to having no live birth or never being pregnant. R^2 was 0.38 (Table 36).

In the middle-income women, the following increased the risk of obesity: being black (OR=5.72 [CI=1.73, 18.93]) relative to being white, being 60+ years old (OR=3.91 [CI=1.07, 14.37]) relative to 20-29 years old, watching TV or using a computer for 2-3 hours/day (OR=5.33 [CI=2.92, 9.74]) or ≥ 4 hours/day (OR=4.83 [CI=2.48, 9.42]) relative to watching TV or using a computer for ≤ 1 hour/day, higher score on the component on desired weight status (OR=7.26 [CI=3.17, 16.63]), and consuming more than 30% of energy from fat (OR=2.77 [CI=1.37, 5.59]) relative to consuming ≤ 30% of energy from fat. In addition, the following decreased the risk of obesity: participating in leisure-time activity at the fourth quintile level (OR=0.25 [CI=0.07, 0.88]) relative to participating in leisure-time activity at the highest level, and having two live births (OR=0.14 [CI=0.04, 0.42]) or ≥ 5 live births (OR=0.30 [CI=0.09, 0.96]) relative to having no live birth or never being pregnant. R^2 was 0.40 (Table 36).

In the high-income women, the following increased the risk of obesity: being a non-smoker (OR=2.61 [CI=1.14, 5.95]) relative to being a smoker, watching TV or using a computer for ≥ 4 hours/day (OR=4.01 [CI=1.93, 8.33]) relative to watching TV or using a computer for ≤ 1 hour/day, spending the day sitting (OR=4.39 [CI=1.96, 9.84]) relative to spending the day carrying light or heavy loads, not participating in any leisure time activity (OR=4.58 [CI=1.45, 14.47]) or participating in leisure-time activity at the first quintile level of activity (OR=3.66 [CI=1.31, 10.26]) relative to participating in leisure-time activity at the highest level, having first menarche at ≤ 11 years old (OR=3.94 [CI=1.10, 14.08]) relative to having first menarche at ≥ 16 years old, and higher score on the component on desired weight status (OR=47.52 [CI=9.97, 226.60]). R^2 was 0.38 (Table 36).

5. Differences in predictors in gender subpopulation groups between 1999-2002 and 1988-94

In 1999-2002: the following increased the risk of obesity in men: being black (OR=1.68 [CI=1.13, 2.50]) relative to being white, having high school education (OR=1.51 [CI=1.11, 2.06]) relative to having more than high school education, being in the low-income group (OR=1.54 [CI=1.01, 2.35]) relative to being in the high-income group, higher score on the component on attempt to lose weight (OR=3.39 [CI=2.84, 4.06]), higher energy intake (OR=1.69 [CI=1.04, 2.77]), and higher alcohol consumption (OR=0.87 [CI=0.77, 0.99]). In addition, being a non-smoker decreased the risk of obesity (OR=0.78 [CI=0.61, 0.99]) relative to being a smoker. R^2 was 0.27 (Table 37).

In women, the following decreased the risk of obesity: being black (OR=2.19 [CI=1.41, 3.40]) relative to being white, being in the low-income group (OR=2.11 [CI=1.29, 3.44]) relative to being in the high-income group, being 30-39 years old

Table 37. Predictors of obesity risk by gender [1]
(NHANES 1999-2002 to compare with NHANES 1988-94)

	Men		Women	
Variables	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Race/ethnicity				
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	**1.68**	**(1.13, 2.50)**	**2.19**	**(1.41, 3.40)**
Mexican-Americans	0.98	(0.66, 1.45)	0.73	(0.49, 1.07)
Education				
< High school	1.37	(0.93, 2.00)	1.49	(0.96, 2.32)
High school graduate	**1.51**	**(1.11, 2.06)**	1.19	(0.68, 2.08)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Income				
PIR <1.85	**1.54**	**(1.01, 2.35)**	**2.11**	**(1.29, 3.44)**
1.85 ≤ PIR ≤ 3.5	1.26	(0.81, 1.95)	1.37	(0.84, 2.24)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age				
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.28	(0.65, 2.52)	**1.89**	**(1.09, 3.29)**
40-49 yrs	1.56	(0.84, 2.92)	**2.57**	**(1.48, 4.46)**
50-59 yrs	1.78	(0.89, 3.54)	1.55	(0.91, 2.62)
60+ yrs	1.88	(0.92, 3.82)	**2.03**	**(1.14, 3.60)**
Marital status				
Married	1.18	(0.72, 1.92)	0.86	(0.57, 1.28)
Widowed, divorced, or separated	0.70	(0.38, 1.30)	0.91	(0.53, 1.55)
Never married or living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days				
Non-smoker	**0.78**	**(0.61, 0.99)**	**1.61**	**(1.07, 2.42)**
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol consumption (# of drinks/wk)[2]	**0.87**	**(0.77, 0.99)**	0.73	(0.63, 0.85)
Leisure time activity/month				
No activities	1.79	(0.94, 3.43)	**3.54**	**(1.92, 6.54)**
1st quintile	**1.44**	**(0.80, 2.59)**	**2.23**	**(1.19, 4.19)**
2nd quintile	0.98	(0.56, 1.71)	1.84	(0.97, 3.50)
3rd quintile	1.18	(0.56, 2.52)	**1.78**	**(1.11, 2.87)**
4th quintile	1.60	(0.91, 2.80)	0.74	(0.35, 1.54)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 37 (cont'd)

Variables	Men OR	Men 95% CI	Women OR	Women 95% CI
Breast fed your child				
Yes	N/A	N/A	1.05	(0.52, 2.10)
No	N/A	N/A	1.25	(0.58, 2.71)
Never been pregnant	N/A	N/A	1.00	(1.00, 1.00)
Number of live birth				
0 and never been pregnant	N/A	N/A	1.00	(1.00, 1.00)
1	N/A	N/A	0.62	(0.32, 1.21)
2	N/A	N/A	0.55	(0.31, 0.97)
3	N/A	N/A	0.72	(0.42, 1.23)
4	N/A	N/A	1.00	(1.00, 1.00)
≥ 5	N/A	N/A	1.19	(0.61, 2.33)
Age at the first menarche				
≤ 11 yrs old	N/A	N/A	3.17	(1.50, 6.72)
12-15 yrs old	N/A	N/A	1.67	(1.01, 2.77)
≥ 16 yrs old	N/A	N/A	1.00	(1.00, 1.00)
Component 1[3]	3.39	(2.84, 4.06)	3.33	(2.81, 3.95)
Restaurant food consumption				
< 1 time/wk	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	0.99	(0.60, 1.63)	1.39	(0.91, 2.13)
2-3 times/wk	1.13	(0.69, 1.84)	1.12	(0.77, 1.62)
≥ 4 times/wk	1.15	(0.83, 1.61)	1.67	(1.04, 2.69)
Breakfast consumption				
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	0.88	(0.58, 1.33)	1.47	(1.02, 2.12)
Energy intake (kcal/d)[2]	1.69	(1.04, 2.77)	1.05	(0.71, 1.56)
Fat intake				
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	0.99	(0.68, 1.44)	1.27	(0.97, 1.68)

Table 37 (cont'd)

	Men		Women	
Variables	OR	95% CI	OR	95% CI
Number of eating occasions				
≤ 3 times/day	1.54	(0.94, 2.45)	1.55	(0.96, 2.50)
4 times/day	0.93	(0.55, 1.56)	1.35	(0.88, 2.07)
5 times/day	0.96	(0.60, 1.54)	1.05	(0.67, 1.64)
6 times/day	1.19	(0.62, 2.29)	1.41	(0.77, 2.60)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.27		0.30	

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

Highlighted were statistically significant

(OR=1.89 [CI=1.09, 3.29]), 40-49 years old (OR=2.57 [CI=1.48, 4.46]), or 60+ years old (OR=2.03 [CI=1.14, 3.60]) relative to being 20-29 years old, being a non-smoker (OR=1.61 [CI=1.07, 2.42]) relative to being a smoker, not participating in any leisure time activity (OR=3.54 [CI=1.92, 6.54]), participating in leisure-time activity at the first quintile level of activity (OR=2.23 [CI=1.19, 4.19]), or participating in leisure-time activity at the third quintile level (OR=1.78 [CI=1.11, 2.87]) relative to participating in leisure-time activity at the highest level of leisure-time activity, having first menarche at ≤ 11 years old (OR=3.17 [CI=1.50, 6.72]) or at 12-15 years old (OR=1.67 [CI=1.01, 2.77]) relative to having first menarche at ≥ 16 years old, higher score on the component on attempt to lose weight (OR=3.33 [CI=2.81, 3.95]), and consuming restaurant food ≥ 4 times/week (OR=1.67 [CI=1.04, 2.69]) relative to consuming restaurant food less than 1 time/week, not consuming breakfast (OR=1.47 [CI=1.02, 2.12]). R^2 was 0.30 (Table 37).

In 1988-94: the following increased the risk of obesity in men: being black (OR=1.50 [CI=1.16, 1.93]) relative to being white, having high school education (OR=1.57 [CI=1.11, 2.21]) or high school education (OR=1.47 [CI=1.11, 1.95]) relative to having more than high school education, being in the low-income group (OR=1.58 [CI=1.03, 2.43]) or in the middle-income group (OR=1.33 [CI=1.01, 1.75]) relative to being in the high-income group, being 40-49 years old (OR=1.58 [CI=1.06, 2.38]) or 50-59 years old (OR=2.18 [CI=1.34, 3.55]), or 60+ years old (OR=1.97 [CI=1.38, 2.81]) relative to being 20-29 years old, being a non-smoker (OR=1.53 [CI=1.15, 2.04]) relative to being a smoker, participating in leisure-time activity at the first quintile level (OR=2.12 [CI=1.34, 3.34]) relative to participating in leisure-time activity at the highest level, and

higher score on the component on attempt to lose weight (OR=2.84 [CI=2.50, 3.22]). R^2 was 0.22 (Table 38).

In women, the following decreased the risk of obesity: being black (OR=1.73 [CI=1.37, 2.19]) or Mexican-American (OR=1.41 [CI=1.06, 1.88]) relative to being white, being 30-39 years old (OR=1.97 [CI=1.26, 3.08]), 40-49 years old (OR=1.89 [CI=1.18, 3.01]), 50-59 years old (OR=2.77 [CI=1.69, 4.53]), or 60+ years old (OR=2.34 [CI=1.52, 3.60]) relative to being 20-29 years old, not participating in any leisure-time activity (OR=2.59 [CI=1.66, 4.03]), participating in leisure-time activity at the first quintile level (OR=1.99 [CI=1.25, 3.18]), or participating in leisure-time activity at the second quintile level (OR=1.65 [CI=1.02, 2.68]) relative to participating in leisure-time activity at the highest level, having first menarche at ≤ 11 years old (OR=2.40 [CI=1.41, 4.08]) relative to having first menarche at ≥ 16 years old, higher score on the component on attempt to lose weight (OR=2.88 [CI=2.58, 3.21]), higher energy intake (OR=1.38 [CI=1.04, 1.83]), and higher alcohol consumption decreased the risk of obesity (OR=0.75 [CI=0.66, 0.85]). R^2 was 0.21 (Table 38).

6. Differences in predictors in income subpopulation groups between 1999-2002 and 1988-94

In 1999-2002: In the low-income group, the following increased the risk of obesity: being black (OR=1.90 [CI=1.02, 3.53]) relative to being white, being 40-49 years old (OR=2.03 [CI=1.13, 3.63]) relative to being 20-29 years old, being a non-smoker (OR=1.35 [CI=1.03, 1.77]) relative to being a smoker, not participating in any leisure-time activity (OR=3.69 [CI=2.14, 6.34]) or participating in leisure-time activity at the third quintile level (OR=2.73 [CI=1.51, 4.92]) relative to participating in leisure-time activity at the highest level, and higher score on the component on attempt to lose weight

Table 38. Predictors of obesity risk by gender in 1988-94[1]

	Men		Women	
Variables	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Race/ethnicity				
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	1.50	(1.16, 1.93)	1.73	(1.37, 2.19)
Mexican-Americans	0.89	(0.64, 1.25)	1.41	(1.06, 1.88)
Education				
< High school	1.57	(1.11, 2.21)	1.36	(0.99, 1.88)
High school graduate	1.47	(1.11, 1.95)	1.27	(0.98, 1.64)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Income				
PIR <1.85	1.58	(1.03, 2.43)	1.31	(0.96, 1.79)
1.85 ≤ PIR ≤ 3.5	1.33	(1.01, 1.75)	1.19	(0.88, 1.61)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age				
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.18	(0.76, 1.83)	1.97	(1.26, 3.08)
40-49 yrs	1.58	(1.06, 2.38)	1.89	(1.18, 3.01)
50-59 yrs	2.18	(1.34, 3.55)	2.77	(1.69, 4.53)
60+ yrs	1.97	(1.38, 2.81)	2.34	(1.52, 3.60)
Marital status				
Married	1.02	(0.72, 1.46)	0.83	(0.52, 1.33)
Widowed, divorced, or separated	0.75	(0.47, 1.20)	1.01	(0.61, 1.67)
Never married or living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days				
Non-smoker	1.53	(1.15, 2.04)	1.15	(0.85, 1.56)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol consumption (# of drinks/wk)[2]	0.92	(0.80, 1.05)	0.75	(0.66, 0.85)
Leisure time activity/month				
No activities	1.66	(0.98, 2.81)	2.59	(1.66, 4.03)
1st quintile	2.12	(1.34, 3.34)	1.99	(1.25, 3.18)
2nd quintile	1.10	(0.68, 1.78)	1.65	(1.02, 2.68)
3rd quintile	1.28	(0.84, 1.96)	1.33	(0.85, 2.07)
4th quintile	0.91	(0.61, 1.36)	1.14	(0.75, 1.73)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 38 (cont'd)

Variables	Men OR	Men 95% CI	Women OR	Women 95% CI
Breast fed your child				
Yes	N/A	N/A	0.79	(0.48, 1.31)
No	N/A	N/A	0.97	(0.60, 1.57)
Never been pregnant	N/A	N/A	1.00	(1.00, 1.00)
Number of live birth				
0 and never been pregnant	N/A	N/A	1.00	(1.00, 1.00)
1	N/A	N/A	1.15	(0.72, 1.84)
2	N/A	N/A	0.83	(0.55, 1.26)
3	N/A	N/A	0.94	(0.56, 1.55)
4	N/A	N/A	1.00	(1.00, 1.00)
≥ 5	N/A	N/A	1.63	(0.98, 2.72)
Age at the first menarche				
≤ 11 yrs old	N/A	N/A	2.40	(1.41, 4.08)
12-15 yrs old	N/A	N/A	1.27	(0.76, 2.13)
≥ 16 yrs old	N/A	N/A	1.00	(1.00, 1.00)
Component 1[3]	2.84	(2.50, 3.22)	2.88	(2.58, 3.21)
Restaurant food consumption				
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.86	(0.62, 1.20)	0.91	(0.68, 1.21)
Breakfast consumption				
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.22	(0.90, 1.65)	1.08	(0.78, 1.48)
Energy intake (kcal/d)[2]	1.24	(0.95, 1.64)	1.38	(1.04, 1.83)
Fat intake				
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.14	(0.88, 1.49)	1.22	(1.00, 1.48)

Table 38 (cont'd)

	Men		Women	
Variables	OR	95% CI	OR	95% CI
Number of eating occasions				
≤ 3 times/day	1.53	(1.00, 2.35)	1.58	(0.98, 2.54)
4 times/day	1.28	(0.91, 1.79)	1.37	(0.96, 1.95)
5 times/day	0.88	(0.57, 1.35)	1.2	(0.77, 1.87)
6 times/day	0.88	(0.56, 1.38)	1.03	(0.71, 1.48)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.22		0.21

[1] Dependent variable was obese vs. non-obese. [2]Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

Highlighted were statistically significant

(OR=3.53 [CI=2.91, 4.29]). In addition, being Mexican-American decreased the risk of obesity (OR=0.65 [CI=0.43, 0.99]) relative to being a white. R^2 was 0.35 (Table 39).

In the middle-income group, the following increased the risk of obesity: being black (OR=3.19 [CI=2.03, 5.00]) relative to being white and higher score on the component score on desired weight status (OR=3.32 [CI=2.56, 4.31]). R^2 was 0.29 (Table 32). In the high-income group, the following increased the risk of obesity: having less than high school education (OR=1.97 [CI=1.14, 3.39]) relative to having more than high school education, being 40-49 years old (OR=3.16 [CI=1.68, 5.96]), 50-59 years old (OR=2.15 [CI=1.10, 4.19]), or 60+ years old (OR=2.89 [CI=1.75, 4.78]) relative to being 20-29 years old, not participating in any leisure time activity (OR=2.29 [CI=1.18, 4.48]) or participating in leisure-time activity at the first quintile level (OR=1.95 [CI=1.07, 3.56]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=3.31 [CI=2.77, 3.95]), and higher alcohol consumption (OR=0.74 [CI=0.63, 0.86]).

In addition, being a woman decreased the risk of obesity (OR=0.60 [CI=0.45, 0.81]) relative to being a man. R^2 was 0.23 (Table 39).

In 1988-94: In the low-income group, the following increased the risk of obesity: being black (OR=1.49 [CI=1.11, 2.00]) relative to being white, having less than high school education (OR=1.67 [CI=1.10, 2.53]) relative to having more than high school education, being 40-49 years old (OR=2.15 [CI=1.37, 3.37]), 50-59 years old (OR=2.24 [CI=1.20, 4.18]), or 60+ years old (OR=1.84 [CI=1.14, 2.96]) relative to being 20-29 years old, being a non-smoker (OR=1.84 [CI=1.39, 2.45]) relative to being a smoker, not participating in any leisure time activity (OR=1.94 [CI=1.03, 3.66]) relative to

Table 39. Predictors of obesity risk by income[1]
(NHANES 1999-2002 to compare with NHANES 1888-94)

	Low		Middle		High	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Gender						
Male	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Female	0.84	(0.56, 1.26)	0.85	(0.47, 1.52)	0.60	(0.45, 0.81)
Education						
< High school	1.43	(0.87, 2.37)	1.22	(0.68, 2.19)	1.97	(1.14, 3.39)
High school graduate	1.70	(0.90, 3.20)	1.05	(0.69, 1.58)	1.25	(0.85, 1.85)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Race/ethnicity						
White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Black	1.90	(1.02, 3.53)	3.19	(2.03, 5.00)	1.36	(0.73, 2.53)
Mexican-American	0.65	(0.43, 0.99)	1.08	(0.56, 2.07)	1.20	(0.78, 1.84)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	2.23	(0.95, 5.26)	0.70	(0.29, 1.68)	1.78	(0.80, 3.96)
40-49 yrs	2.03	(1.13, 3.63)	0.87	(0.30, 2.53)	3.16	(1.68, 5.96)
50-59 yrs	1.60	(0.66, 3.86)	1.92	(0.74, 5.03)	2.15	(1.10, 4.19)
60+ yrs	1.30	(0.63, 2.69)	2.12	(0.86, 5.19)	2.89	(1.75, 4.78)
Marital status						
Married	1.08	(0.60, 1.96)	1.07	(0.55, 2.09)	0.75	(0.42, 1.33)
Widowed, divorced, or separated	1.13	(0.52, 2.45)	0.52	(0.25, 1.09)	0.77	(0.33, 1.82)
Never married or living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.35	(1.03, 1.77)	1.29	(0.67, 2.50)	0.98	(0.62, 1.54)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	0.80	(0.64, 1.01)	0.99	(0.80, 1.24)	0.74	(0.63, 0.86)
Leisure time activity/month						
No activities	3.69	(2.14, 6.34)	2.24	(0.98, 5.13)	2.29	(1.18, 4.48)
1st quintile	1.7	(0.76, 3.77)	1.25	(0.52, 2.98)	1.95	(1.07, 3.56)
2nd quintile	1.49	(0.73, 3.03)	1.00	(0.46, 2.17)	1.30	(0.71, 2.39)
3rd quintile	2.73	(1.51, 4.92)	1.04	(0.37, 2.94)	1.14	(0.65, 2.01)
4th quintile	1.72	(0.64, 4.66)	0.77	(0.31, 1.89)	1.00	(0.66, 1.53)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	3.53	(2.91, 4.29)	3.32	(2.56, 4.31)	3.31	(2.77, 3.95)

Table 39 (cont'd)

Variables	Low OR	Low 95% CI	Middle OR	Middle 95% CI	High OR	High 95% CI
Restaurant food consumption						
< 1 time/wk	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	1.83	(0.97, 3.42)	0.97	(0.52, 1.79)	1.09	(0.59, 2.01)
2-3 times/wk	1.38	(0.83, 2.32)	0.82	(0.39, 1.70)	1.21	(0.62, 2.34)
≥ 4 times/wk	1.19	(0.68, 2.07)	1.55	(0.82, 2.93)	1.38	(0.79, 2.39)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	0.95	(0.60, 1.52)	1.04	(0.55, 1.95)	1.38	(0.82, 2.31)
Energy intake (kcal/d)[2]	1.42	(1.00, 2.02)	1.24	(0.54, 2.84)	1.44	(0.89, 2.33)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	0.98	(0.71, 1.36)	1.36	(0.87, 2.10)	1.15	(0.81, 1.63)
Number of eating occasions						
≤ 3 times/day	1.98	(0.79, 4.95)	1.32	(0.58, 2.98)	1.34	(0.85, 2.10)
4 times/day	0.99	(0.45, 2.16)	1.16	(0.47, 2.83)	1.29	(0.74, 2.28)
5 times/day	1.00	(0.49, 2.02)	0.89	(0.43, 1.82)	1.18	(0.70, 1.97)
6 times/day	1.38	(0.42, 4.53)	1.19	(0.56, 2.54)	1.37	(0.73, 2.56)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.35		0.29		0.23

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

Highlighted were statistically significant

participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=3.10 [CI=2.77, 3.47]), higher energy intake (OR=1.38 [CI=1.03, 1.83]), and eating meals/snacks ≤ 3 times/day (OR=1.79 [CI=1.08, 2.98]) relative to eating meals/snacks ≥ 7 times/day. In addition, being a woman decreased the risk of obesity (OR=0.67 [CI=0.46, 0.97]) relative to being a man. R^2 was 0.26 (Table 40).

In the middle-income group, the following increased the risk of obesity: being black (OR=2.33 [CI=1.71, 3.18]) relative to being white, being 50-59 years old (OR=1.94 [CI=1.20, 3.16]) or 60+ years old (OR=2.18 [CI=1.36, 3.48]) relative to being 20-29 years old, not participating in any leisure time activity (OR=2.31 [CI=1.20, 4.46]) relative to participating in leisure-time activity at the highest level, and higher score on the component on attempt to lose weight (OR=3.07 [CI=2.71, 3.49]). R^2 was 0.22 (Table 40).

In the high-income group, the following increased the risk of obesity: being black (OR=1.52 [CI=1.09, 2.12]) or Mexican-American (OR=1.60 [CI=1.07, 2.40]) relative to being white, being 40-49 years old (OR=1.92 [CI=1.08, 3.43]), 50-59 years old (OR=3.54 [CI=1.80, 6.95]), or 60+ years old (OR=2.95 [CI=1.60, 5.45]) relative to being 20-29 years old, not participating in any leisure time activity (OR=1.89 [CI=1.07, 3.37]), participating in leisure-time activity at the first quintile level (OR=2.59 [CI=1.52, 4.40]), or participating in leisure-time activity at the second quintile level (OR=1.90 [CI=1.20, 2.99]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=2.53 [CI=2.12, 3.01]), eating meals/snacks ≤ 3 times/day (OR=1.80 [CI=1.10, 2.93]) relative to eating meals/snacks ≥ 7 times/day, and higher alcohol consumption (OR=0.74 [CI=0.63, 0.86]). In addition, being a woman

Table 40. Predictors of obesity risk by income in 1988-94[1]

	Low		Middle		High	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Gender						
Male	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Female	0.67	(0.46, 0.97)	0.72	(0.51, 1.01)	0.73	(0.54, 0.98)
Education						
< High school	1.67	(1.10, 2.53)	1.37	(0.90, 2.10)	1.54	(0.92, 2.58)
High school graduate	1.43	(0.95, 2.15)	1.31	(0.90, 1.89)	1.29	(0.88, 1.90)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Race/ethnicity						
White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Black	1.49	(1.11, 2.00)	2.33	(1.71, 3.18)	1.52	(1.09, 2.12)
Mexican-American	0.95	(0.66, 1.36)	1.18	(0.87, 1.59)	1.60	(1.07, 2.40)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.37	(0.89, 2.12)	1.39	(0.88, 2.21)	2.05	(1.00, 4.20)
40-49 yrs	2.15	(1.37, 3.37)	1.67	(0.95, 2.94)	1.92	(1.08, 3.43)
50-59 yrs	2.24	(1.20, 4.18)	1.94	(1.20, 3.16)	3.54	(1.80, 6.95)
60+ yrs	1.84	(1.14, 2.96)	2.18	(1.36, 3.48)	2.95	(1.60, 5.45)
Marital status						
Married	0.97	(0.62, 1.52)	1.10	(0.66, 1.84)	0.69	(0.37, 1.29)
Widowed, divorced, or separated	1.20	(0.73, 1.99)	0.69	(0.41, 1.18)	0.89	(0.39, 2.04)
Never married or living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.84	(1.39, 2.45)	1.11	(0.84, 1.48)	1.23	(0.85, 1.77)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	0.96	(0.84, 1.09)	0.92	(0.79, 1.08)	0.74	(0.63, 0.86)
Leisure time activity/month						
No activities	1.94	(1.03, 3.66)	2.31	(1.20, 4.46)	1.89	(1.07, 3.37)
1st quintile	1.63	(0.88, 3.02)	1.91	(0.96, 3.79)	2.59	(1.52, 4.40)
2nd quintile	0.93	(0.49, 1.77)	1.10	(0.57, 2.13)	1.90	(1.20, 2.99)
3rd quintile	1.19	(0.67, 2.11)	1.26	(0.66, 2.40)	1.51	(0.93, 2.45)
4th quintile	0.95	(0.51, 1.79)	0.85	(0.48, 1.53)	1.25	(0.79, 2.00)
5th quitile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	3.10	(2.77, 3.47)	3.07	(2.71, 3.49)	2.53	(2.12, 3.01)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.87	(0.60, 1.24)	0.81	(0.59, 1.10)	0.93	(0.57, 1.30)

Table 40 (cont'd)

Variables	Low OR	Low 95% CI	Middle OR	Middle 95% CI	High OR	High 95% CI
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.17	(0.84, 1.62)	1.08	(0.76, 1.54)	1.15	(0.78, 1.70)
Energy intake (kcal/d)[2]	1.38	(1.03, 1.83)	1.34	(0.92, 1.95)	1.39	(1.00, 1.94)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.15	(0.88, 1.50)	1.23	(0.91, 1.66)	1.13	(0.84, 1.53)
Number of eating occasions						
≤ 3 times/day	1.79	(1.08, 2.98)	1.45	(0.91, 2.31)	1.80	(1.10, 2.93)
4 times/day	1.59	(0.98, 2.57)	1.32	(0.91, 1.92)	1.39	(0.89, 2.17)
5 times/day	1.49	(0.89, 2.48)	0.99	(0.61, 1.59)	1.02	(0.63, 1.64)
6 times/day	1.59	(0.88, 2.85)	0.76	(0.47, 1.23)	0.90	(0.60, 1.35)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.26		0.22		0.17

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

Highlighted were statistically significant

decreased the risk of obesity (OR=0.73 [CI=0.54, 0.98]) relative to being a man. R^2 was 0.17 (Table 40).

7. Differences in predictors in racial/ethnic subpopulation groups between 1999-2002 and 1988-94

In 1999-2002: In whites, the following increased the risk of obesity: having less than high school education (OR=1.45 [CI=1.05, 2.00]) relative to having more than high school education, being in the low-income group (OR=2.05 [CI=1.34, 3.13]) relative to being in the high-income group, being 40-49 years old (OR=2.23 [CI=1.30, 3.84]), 50-59 years old (OR=1.87 [CI=1.03, 3.39]), or 60+ years old (OR=2.33 [CI=1.36, 4.00]) relative to being 20-29 years old, not participating in any leisure-time activity (OR=2.66 [CI=1.57, 4.49]) or participating in leisure-time activity at the first quintile level (OR=1.84 [CI=1.07, 3.15]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=3.44 [CI=2.91, 4.05]), consuming restaurant food ≥ 4 times/week (OR=1.47 [CI=1.05, 2.06]) relative to consuming restaurant food less than 1 time/week, eating meals/snacks ≤ 3 times/day (OR=1.59 [CI=1.10, 2.30]) relative to eating meals/snacks ≥ 7 times/day, and higher alcohol consumption (OR=0.81 [CI=0.71, 0.92]). In addition, being a woman decreased the risk of obesity (OR=0.69 [CI=0.53, 0.89]) relative to being a man. R^2 was 0.26 (Table 41). The present study could not identify the predictors of obesity for other race/ethnic groups due to the reasons described earlier.

In 1988-94: In whites, the following increased the risk of obesity: having less than high school education (OR=1.52 [CI=1.10, 2.09]) or high school education (OR=1.40 [CI=1.10, 1.78]) relative to having high school education, being in the low-income group (OR=1.50 [CI=1.13, 1.99]) relative to being in the high-income group, being 30-39 years

Table 41. Predictors of obesity risk in whites[1]
(NHANES 1999-2002 to compare with NHANES 1988-94)

	Whites	
Variables	OR	95% CI
Intercept	0.00	(0.00, 0.00)
Gender		
Male	1.00	(1.00, 1.00)
Female	0.69	(0.53, 0.89)
Education		
< High school	1.45	(1.05, 2.00)
High school graduate	1.23	(0.84, 1.79)
> High school	1.00	(1.00, 1.00)
Income		
PIR <1.85	2.05	(1.34, 3.13)
1.85 ≤ PIR ≤ 3.5	1.34	(0.88, 2.02)
PIR >3.5	1.00	(1.00, 1.00)
Age		
20-29 yrs	1.00	(1.00, 1.00)
30-39 yrs	1.45	(0.80, 2.62)
40-49 yrs	2.23	(1.30, 3.84)
50-59 yrs	1.87	(1.03, 3.39)
60+ yrs	2.33	(1.36, 4.00)
Marital status		
Married	1.03	(0.68, 1.57)
Widowed, divorced, or separated	0.84	(0.47, 1.49)
Never married or living with partner	1.00	(1.00, 1.00)
Smoking status in the past 5 days		
Non-smoker	1.14	(0.84, 1.53)
Smoker	1.00	(1.00, 1.00)
Alcohol consumption (# of drinks/wk)[2]	0.81	(0.71, 0.92)
Leisure time activity/month		
No activities	2.66	(1.57, 4.49)
1st quintile	1.84	(1.07, 3.15)
2nd quintile	1.36	(0.91, 2.04)
3rd quintile	1.46	(0.90, 2.35)
4th quintile	1.08	(0.65, 1.78)
5th quintile	1.00	(1.00, 1.00)

Table 41 (cont'd)

Variables	Whites OR	95% CI
Component 1[3]	**3.44**	**(2.91, 4.05)**
Restaurant food consumption		
< 1 time/wk	1.00	(1.00, 1.00)
1 time/wk	1.32	(0.86, 2.01)
2-3 times/wk	1.17	(0.78, 1.74)
≥ 4 times/wk	1.47	(1.05, 2.06)
Breakfast consumption		
Yes	1.00	(1.00, 1.00)
No	1.25	(0.86, 1.83)
Energy intake (kcal/d)[2]	1.48	(1.00, 2.17)
Fat intake		
≤ 30% of energy from fat	1.00	(1.00, 1.00)
> 30% of energy from fat	1.15	(0.88, 1.49)
Number of eating occasions		
≤ 3 times/day	1.59	(1.10, 2.30)
4 times/day	1.17	(0.80, 1.69)
5 times/day	1.01	(0.68, 1.49)
6 times/day	1.35	(0.79, 2.31)
≥ 7 times/day	1.00	(1.00, 1.00)
R^2	0.26	

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

Highlighted were statistically significant

old (OR=1.61 [CI=1.09, 2.37]), 40-49 years old (OR=1.79 [CI=1.21, 2.66]), 50-59 years old (OR=2.61 [CI=1.70, 4.01]), or 60+ years old (OR=2.29 [CI=1.57, 3.33]) relative to being 20-29 years old, being a non-smoker (OR=1.28 [CI=1.04, 1.59]) relative to being a smoker, not participating in any leisure-time activity (OR=2.14 [CI=1.39, 3.31]) or participating in leisure-time activity at the first quintile level (OR=2.18 [CI=1.46, 3.27]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=2.87 [CI=2.56, 3.22]), higher energy intake (OR=1.33 [CI=1.04, 1.70]), eating meals/snacks ≤ 3 times/day (OR=1.64 [CI=1.20, 2.23]) or 4 times/day (OR=1.36 [CI=1.06, 1.75]) relative to eating meals/ snacks ≥ 7 times/day, and higher alcohol intake (OR=0.83 [CI=0.75, 0.92]). In addition, being a woman decreased the risk of obesity (OR=0.65 [CI=0.53, 0.81]) relative to being a man. R^2 was 0.20 (Table 42).

In blacks, the following increased the risk of obesity: being in the low-income group (OR=1.54 [CI=1.11, 2.14]) or high school education (OR=1.80 [CI=1.27, 2.55]) relative to being in the high-income group, being 30-39 years old (OR=1.52 [CI=1.14, 2.03]), 40-49 years old (OR=1.69 [CI=1.15, 2.47]), 50-59 years old (OR=1.88 [CI=1.24, 2.85]), or 60+ years old (OR=2.24 [CI=1.44, 3.47]) relative to being 20-29 years old, being a non-smoker (OR=1.62 [CI=1.29, 2.05]) relative to being a smoker, not participating in any leisure-time activity (OR=1.86 [CI=1.28, 2.71]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=2.77 [CI=2.51, 3.07]), higher energy intake (OR=1.39 [CI=1.08, 1.79]), and higher alcohol intake (OR=0.80 [CI=0.69, 0.92]). R^2 was 0.27 (Table 42).

Table 42. Predictors of risk of obesity by race/ethnicity in 1988-94[1]

Variables	Whites OR	Whites 95% CI	Black OR	Black 95% CI	Mexican-American OR	Mexican-American 95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Gender						
Male	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Female	0.65	(0.53, 0.81)	0.95	(0.74, 1.22)	1.18	(0.87, 1.62)
Education						
< High school	1.52	(1.10, 2.09)	1.34	(0.92, 1.96)	1.18	(0.83, 1.66)
High school graduate	1.40	(1.10, 1.78)	1.02	(0.81, 1.30)	1.01	(0.70, 1.45)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Income						
PIR <1.85	1.50	(1.13, 1.99)	1.54	(1.11, 2.14)	1.04	(0.72, 1.51)
1.85 ≤ PIR ≤ 3.5	1.23	(0.97, 1.56)	1.80	(1.27, 2.55)	0.97	(0.68, 1.39)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.61	(1.09, 2.37)	1.52	(1.14, 2.03)	1.05	(0.73, 1.53)
40-49 yrs	1.79	(1.21, 2.66)	1.69	(1.15, 2.47)	1.70	(1.10, 2.62)
50-59 yrs	2.61	(1.70, 4.01)	1.88	(1.24, 2.85)	2.38	(1.40, 4.04)
60+ yrs	2.29	(1.57, 3.33)	2.24	(1.44, 3.47)	1.87	(1.12, 3.13)
Marital status						
Married	0.85	(0.55, 1.29)	0.97	(0.71, 1.32)	1.15	(0.68, 1.92)
Widowed, divorced, or separated	0.86	(0.52, 1.40)	0.99	(0.69, 1.42)	1.13	(0.68, 1.85)
Never married or living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.28	(1.04, 1.59)	1.62	(1.29, 2.05)	1.29	(0.92, 1.81)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	0.83	(0.75, 0.92)	0.80	(0.69, 0.92)	0.98	(0.84, 1.15)
Leisure time activity/month						
No activities	2.14	(1.39, 3.31)	1.86	(1.28, 2.71)	2.58	(1.30, 5.09)
1st quintile	2.18	(1.46, 3.27)	1.41	(0.96, 2.06)	1.72	(0.96, 3.09)
2nd quintile	1.36	(0.92, 2.01)	1.03	(0.66, 1.59)	2.06	(1.15, 3.68)
3rd quintile	1.34	(0.92, 1.94)	1.23	(0.78, 1.95)	1.21	(0.73, 2.01)
4th quintile	1.00	(0.70, 1.43)	1.22	(0.78, 1.91)	1.16	(0.65, 2.09)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	2.87	(2.56, 3.22)	2.77	(2.51, 3.07)	2.94	(2.60, 3.33)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.86	(0.68, 1.10)	0.94	(0.62, 1.43)	0.69	(0.51, 0.93)

Table 42 (cont'd)

Variables	Whites OR	Whites 95% CI	Black OR	Black 95% CI	Mexican-American OR	Mexican-American 95% CI
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.20	(0.89, 1.61)	0.94	(0.74, 1.20)	1.2	(0.90, 1.58)
Energy intake (kcal/d)[2]	1.33	(1.04, 1.70)	1.39	(1.08, 1.79)	1.55	(1.09, 2.20)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.18	(0.96, 1.45)	1.11	(0.87, 1.43)	0.94	(0.75, 1.18)
Number of eating occasions						
≤ 3 times/day	1.64	(1.20, 2.23)	1.47	(0.94, 2.28)	1.30	(0.80, 2.11)
4 times/day	1.36	(1.06, 1.75)	1.43	(0.94, 2.17)	1.05	(0.67, 1.64)
5 times/day	1.04	(0.76, 1.41)	1.53	(0.97, 2.40)	0.96	(0.59, 1.54)
6 times/day	0.96	(0.72, 1.28)	0.92	(0.54, 1.56)	0.75	(0.42, 1.33)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.20		0.27		0.24	

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

Highlighed were statistically significant

In Mexican-Americans, the following increased the risk of obesity: being 40-49 years old (OR=1.70 [CI=1.10, 2.62]), 50-59 years old (OR=2.38 [CI=1.40, 4.04]), or 60+ years old (OR=1.87 [CI=1.12, 3.12]) relative to being 20-29 years old, not participating in any leisure-time activity (OR=2.58 [CI=1.30, 5.09]) or participating in leisure-time activity at the second quintile level (OR=2.06 [CI=1.15, 3.68]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=2.94 [CI=2.60, 3.33]), and higher energy intake (OR=1.55 [CI=1.09, 2.20]). In addition, consuming restaurant food the day before the interview decreased the risk of obesity (OR=0.69 [CI=0.51, 0.93]). R^2 was 0.24 (Table 42).

8. Differences in predictors in subpopulation groups by income and gender between 1999-2002 and 1988-94

In 1999-2002: In the low-income men, the following increased the risk of obesity: having high school education (OR=2.94 [CI=1.53, 5.64]) relative to having more than high school education, not participating in any leisure time activity (OR=3.11 [CI=1.03, 9.40]), participating in leisure-time activity at the third quintile level (OR=4.30 [CI=1.05, 17.57]), or participating in leisure-time activity at the fourth quintile level (OR=4.66 [CI=1.49, 14.57]) relative to participating in leisure-time activity at the highest level, and higher score on the component on attempt to lose weight (OR=3.71 [CI=2.79, 4.92]). R^2 was 0.35 (Table 43).

In the middle-income men, the following increased the risk of obesity: being black (OR=2.65 [CI=1.32, 5.35]) relative to being white, being married (OR=2.61 [CI=1.04, 6.51]) relative to never being married or loving with a partner, not participating in any leisure-time activity (OR=4.10 [CI=1.18, 14.27]) relative to participating in

Table 43. Predictors of obesity risk by income and gender[1]
(NHANES 1999-2002 to compare with NHANES 1988-94)

	LIM		MIM		HIM	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	1.44	(0.67, 3.09)	**2.65**	**(1.32, 5.35)**	1.52	(0.76, 3.03)
Mexican-Americans	0.63	(0.36, 1.09)	1.14	(0.40, 3.24)	**1.90**	**(1.19, 3.05)**
Education						
< High school	1.43	(0.61, 3.34)	0.85	(0.45, 1.59)	2.10	(0.90, 4.90)
High school graduate	**2.94**	**(1.53, 5.64)**	1.11	(0.70, 1.75)	1.27	(0.77, 2.09)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	2.65	(0.79, 8.87)	0.35	(0.11, 1.10)	1.45	(0.59, 3.53)
40-49 yrs	2.15	(0.80, 5.79)	0.29	(0.06, 1.40)	**2.47**	**(1.21, 5.06)**
50-59 yrs	2.47	(0.96, 6.34)	1.17	(0.33, 4.12)	2.13	(0.79, 5.78)
60+ yrs	2.22	(0.76, 6.52)	0.68	(0.16, 2.84)	**2.51**	**(1.03, 6.13)**
Marital status						
Married	1.30	(0.54, 3.15)	**2.61**	**(1.04, 6.51)**	0.79	(0.37, 1.68)
Widowed, divorced, or separated	1.14	(0.44, 2.96)	0.64	(0.19, 2.22)	0.45	(0.16, 1.30)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	0.83	(0.48, 1.44)	0.88	(0.36, 2.19)	0.74	(0.47, 1.16)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	0.94	(0.75, 1.18)	1.15	(0.90, 1.46)	0.75	(0.64, 0.89)
Leisure time activity/month						
No activities	**3.11**	**(1.03, 9.40)**	**4.10**	**(1.18, 14.27)**	1.21	(0.48, 3.04)
1st quintile	1.61	(0.57, 4.59)	1.13	(0.29, 4.38)	1.46	(0.66, 3.22)
2nd quintile	1.64	(0.41, 6.58)	1.04	(0.31, 3.47)	0.85	(0.36, 2.00)
3rd quintile	**4.30**	**(1.05, 17.57)**	1.83	(0.37, 9.01)	0.89	(0.34, 2.35)
4th quintile	**4.66**	**(1.49, 14.57)**	1.14	(0.28, 4.74)	1.36	(0.72, 2.55)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A

Table 43 (cont'd)

Variables	LIM OR	LIM 95% CI	MIM OR	MIM 95% CI	HIM OR	HIM 95% CI
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	3.71	(2.79, 4.92)	4.19	(2.86, 6.15)	3.36	(2.62, 4.30)
Restaurant food consumption						
< 1 time/wk	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	1.75	(0.77, 4.00)	0.38	(0.11, 1.34)	0.89	(0.35, 2.29)
2-3 times/wk	2.00	(0.90, 4.45)	0.50	(0.20, 1.27)	1.03	(0.44, 2.40)
≥ 4 times/wk	1.20	(0.45, 3.25)	1.18	(0.46, 3.03)	0.96	(0.48, 1.93)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	0.91	(0.49, 1.71)	0.47	(0.13, 1.68)	1.14	(0.55, 2.39)
Energy intake (kcal/d)[2]	1.68	(0.72, 3.96)	1.27	(0.48, 3.33)	1.59	(0.73, 3.48)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.16	(0.62, 2.16)	0.95	(0.41, 2.20)	0.93	(0.56, 1.52)
Number of eating occasions						
≤ 3 times/day	1.46	(0.47, 4.51)	1.24	(0.36, 4.25)	1.61	(0.63, 4.09)
4 times/day	0.81	(0.27, 2.45)	0.89	(0.25, 3.14)	1.06	(0.47, 2.41)
5 times/day	0.68	(0.24, 1.94)	0.95	(0.28, 3.29)	1.17	(0.61, 2.21)
6 times/day	1.05	(0.30, 3.64)	1.19	(0.36, 3.97)	1.48	(0.70, 3.12)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.35		0.33		0.25

Table 43 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Intercept	0.00	(0.00, 0.01)	0.00	(0.00, 0.03)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	2.33	(0.99, 5.47)	**4.88**	**(1.94, 12.29)**	1.31	(0.45, 3.85)
Mexican-Americans	0.57	(0.30, 1.06)	0.80	(0.42, 1.53)	0.61	(0.27, 1.39)
Education						
< High school	1.25	(0.59, 2.66)	1.74	(0.66, 4.59)	1.73	(0.62, 4.80)
High school graduate	1.16	(0.39, 3.50)	1.05	(0.48, 2.26)	1.29	(0.67, 2.48)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	2.23	(0.88, 5.66)	1.27	(0.43, 3.76)	3.15	(0.58, 17.09)
40-49 yrs	1.96	(0.85, 4.53)	2.16	(0.61, 7.59)	**4.71**	**(1.36, 16.26)**
50-59 yrs	0.80	(0.20, 3.24)	2.64	(0.85, 8.17)	2.35	(0.72, 7.66)
60+ yrs	0.71	(0.25, 2.01)	**6.31**	**(1.71, 23.28)**	2.38	(0.78, 7.23)
Marital status						
Married	0.76	(0.37, 1.54)	0.95	(0.26, 3.44)	0.83	(0.37, 1.85)
Widowed, divorced, or separated	0.90	(0.35, 2.30)	0.48	(0.14, 1.59)	1.47	(0.41, 5.24)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.83	(1.17, 2.87)	1.68	(0.82, 3.42)	2.1	(0.78, 5.49)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)^2	0.56	(0.39, 0.80)	0.99	(0.69, 1.44)	0.72	(0.54, 0.97)
Leisure time activity/month						
No activities	**4.56**	**(1.26, 16.43)**	1.08	(0.37, 3.13)	**6.60**	**(2.42, 18.06)**
1st quintile	1.67	(0.35, 8.02)	0.87	(0.21, 3.52)	**4.56**	**(1.57, 13.23)**
2nd quintile	1.42	(0.32, 6.29)	0.58	(0.17, 2.04)	**3.34**	**(1.09, 10.27)**
3rd quintile	2.78	(0.97, 7.95)	0.38	(0.09, 1.52)	2.34	(0.94, 5.82)
4th quintile	0.83	(0.20, 3.53)	0.31	(0.09, 1.07)	1.10	(0.41, 2.92)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	1.98	(0.57, 6.89)	0.98	(0.31, 3.09)	0.54	(0.16, 1.80)
No	2.14	(0.54, 8.52)	1.19	(0.31, 4.55)	0.78	(0.24, 2.58)
Never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 43 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Number of live birth						
0 and never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1	0.86	(0.27, 2.72)	0.53	(0.17, 1.65)	0.54	(0.17, 1.76)
2	0.31	(0.11, 0.86)	0.19	(0.06, 0.59)	1.38	(0.58, 3.28)
3	0.72	(0.32, 1.66)	0.74	(0.26, 2.09)	1.02	(0.35, 2.96)
4	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
≥ 5	1.18	(0.38, 3.70)	0.40	(0.13, 1.27)	3.88	(0.75, 20.13)
Age at the first menarche						
≤ 11 yrs old	3.41	(0.82, 14.18)	1.63	(0.36, 7.41)	4.88	(1.27, 18.68)
12-15 yrs old	1.76	(0.52, 5.93)	0.59	(0.15, 2.35)	2.80	(0.84, 9.28)
≥ 16 yrs old	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	3.99	(3.07, 5.17)	3.59	(2.45, 5.25)	3.48	(2.51, 4.82)
Restaurant food consumption						
< 1 time/wk	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	1.58	(0.76, 3.26)	1.84	(0.96, 3.49)	1.3	(0.51, 3.54)
2-3 times/wk	0.95	(0.61, 1.50)	1.19	(0.52, 2.75)	1.36	(0.53, 3.49)
≥ 4 times/wk	1.01	(0.49, 2.09)	2.32	(0.96, 5.60)	2	(0.69, 5.94)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.07	(0.60, 1.93)	2.11	(0.77, 5.75)	1.46	(0.74, 2.86)
Energy intake (kcal/d)[2]	1.12	(0.62, 2.00)	0.77	(0.30, 2.00)	1.30	(0.71, 2.38)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	0.92	(0.62, 1.36)	2.49	(1.25, 4.98)	1.3	(0.73, 2.17)
Number of eating occasions						
≤ 3 times/day	2.40	(0.93, 6.23)	1.58	(0.49, 5.12)	1.2	(0.40, 3.78)
4 times/day	0.95	(0.42, 2.14)	1.77	(0.55, 5.66)	1.66	(0.66, 4.21)
5 times/day	1.05	(0.60, 1.84)	0.98	(0.41, 2.31)	1.3	(0.62, 2.80)
6 times/day	2.00	(0.53, 7.47)	1.78	(0.53, 5.92)	1.3	(0.50, 3.14)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.39		0.35		0.29

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight

Highlighted were statistically significant

leisure-time activity at the highest level, and higher score on the component on attempt to lose weight (OR=4.19 [CI=2.86, 6.15]). R^2 was 0.33 (Table 43).

In the high-income men, the following increased the risk of obesity: being Mexican-American (OR=1.90 [CI=1.19, 3.05]) relative to being white, being 40-49 years old (OR=2.47 [CI=1.21, 5.06]) or 60+ years old (OR=2.51 [CI=1.03, 6.13]) relative to being 20-29 years old, higher score on the component on attempt to lose weight (OR=3.36 [CI=2.62, 4.30]), and higher alcohol intakes (OR=0.75 [CI=0.64, 0.89]). R^2 was 0.25 (Table 43).

In the low-income women, the following increased the risk of obesity: being a non-smoker (OR=1.83 [CI=1.17, 2.87]) relative to being a smoker, not participating in any leisure-time activity (OR=4.56 [CI=1.26, 16.43]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=3.99 [CI=3.07, 5.17]), and higher alcohol intakes (OR=0.56 [CI=0.39, 0.80]). In addition, having 2 live births relative to having no live birth or never been pregnant decreased the risk of obesity (OR=0.31 [CI=0.11, 0.86]). R^2 was 0.39 (Table 43).

In the middle-income women, the following increased the risk of obesity: being a Black (OR=4.88 [CI=1.94, 12.29]) relative to being a white, being 60+ years old (OR=6.31 [CI=1.71, 23.28]) relative to 20-29 years old, higher score on the component on attempt to lose weight (OR=3.59 [CI=2.45, 5.25]), and consuming more than 30% of energy from fat (OR=2.49 [CI=1.25, 4.985]) relative to consuming ≤ 30% of energy from fat. In addition having 2 live births relative to having no birth or never been pregnant decreased the risk of obesity (OR=0.19 [CI=0.06, 0.59]). R^2 was 0.35 (Table 43).

In the high-income women, the following increased the risk of obesity: being 40-49 years old (OR=4.71 [CI=1.36, 16.26]) relative to being 20-29 years old, not participating in any leisure time activity (OR=6.60 [CI=2.42, 18.06]), participating in leisure-time activity at the first quintile level (OR=4.56 [CI=1.57, 13.23]), or participating in leisure-time activity at the second quintile level (OR=3.34 [CI=1.09, 10.27]) relative to participating in leisure-time activity at the highest level, having first menarche at ≤ 11 years old (OR=4.88 [CI=1.27, 18.68]) relative to having first menarche at ≥ 16 years old, and higher score on the component on attempt to lose weight (OR=3.48 [CI=2.51, 4.82]). R^2 was 0.29 (Table 43).

In 1988-94: In the low-income men, the following increased the risk of obesity: being 40-49 years old (OR=2.31 [CI=1.13, 4.74]) or 60+ years old (OR=2.35 [CI=1.17, 4.75]) relative to being 20-29 years old, being a non-smoker (OR=2.00 [CI=1.27, 3.13]) relative to being a smoker, and higher score on the component on attempt to lose weight (OR=3.23 [CI=2.76, 3.79]). R^2 was 0.27 (Table 44).

In the middle-income men, the following increased the risk of obesity: being black (OR=2.06 [CI=1.37, 3.09]) relative to being white and higher score on the component on attempt to lose weight (OR=3.05 [CI=2.55, 3.04]). R^2 was 0.25 (Table 44).

In the high-income men, the following increased the risk of obesity: being 50-59 years old (OR=2.94 [CI=1.11, 7.83]) or 60+ years old (OR=2.79 [CI=1.21, 6.46]) relative to being 20-29 years old, participating in leisure-time activity at the first quintile level (OR=2.69 [CI=1.14, 6.31]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=2.57 [CI=2.01, 3.28]), and higher alcohol intakes (OR=0.75 [CI=0.60, 0.93]). R^2 was 0.19 (Table 44).

Table 44. Predictors of risk of obesity by income and gender in 1988-94[1]

Variables	LIM OR	LIM 95% CI	MIM OR	MIM 95% CI	HIM OR	HIM 95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	1.06	(0.67, 1.69)	**2.06**	**(1.37, 3.09)**	1.60	(0.94, 2.73)
Mexican-Americans	0.64	(0.39, 1.03)	0.93	(0.60, 1.42)	1.59	(0.85, 3.00)
Education						
< High school	1.81	(0.97, 3.38)	1.51	(0.88, 2.59)	1.95	(0.99, 3.86)
High school graduate	1.66	(0.93, 2.97)	1.39	(0.87, 2.23)	1.37	(0.84, 2.25)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.25	(0.66, 2.37)	1.04	(0.57, 1.92)	1.40	(0.49, 3.95)
40-49 yrs	**2.31**	**(1.13, 4.74)**	1.12	(0.52, 2.41)	1.98	(0.83, 4.71)
50-59 yrs	2.01	(0.76, 5.30)	1.57	(0.67, 3.66)	**2.94**	**(1.11, 7.83)**
60+ yrs	**2.35**	**(1.17, 4.75)**	1.41	(0.79, 2.51)	**2.79**	**(1.21, 6.46)**
Marital status						
Married	1.30	(0.70, 2.39)	1.45	(0.69, 3.02)	0.67	(0.34, 1.33)
Widowed, divorced, or separated	1.16	(0.52, 2.59)	0.59	(0.26, 1.33)	0.65	(0.23, 1.83)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	**2.00**	**(1.27, 3.13)**	1.51	(0.99, 2.29)	1.34	(0.81, 2.22)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	1.12	(0.90, 1.38)	1.03	(0.85, 1.25)	0.75	(0.60, 0.93)
Leisure time activity/month						
No activities	1.42	(0.63, 3.24)	1.39	(0.48, 4.03)	2.09	(0.82, 5.35)
1st quintile	1.55	(0.74, 3.28)	1.84	(0.77, 4.37)	**2.69**	**(1.14, 6.31)**
2nd quintile	1.24	(0.53, 2.93)	0.73	(0.31, 1.69)	1.45	(0.65, 3.21)
3rd quintile	1.24	(0.51, 2.98)	1.19	(0.50, 2.80)	1.44	(0.74, 2.80)
4th quintile	0.83	(0.40, 1.72)	0.59	(0.26, 1.34)	1.27	(0.65, 2.51)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A

Table 44 (cont'd)

Variables	LIM OR	LIM 95% CI	MIM OR	MIM 95% CI	HIM OR	HIM 95% CI
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	3.23	(2.76, 3.79)	3.05	(2.55, 3.64)	2.57	(2.01, 3.28)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.87	(0.53, 1.43)	0.74	(0.46, 1.18)	1.09	(0.68, 1.74)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.57	(0.94, 2.64)	0.99	(0.57, 1.71)	1.25	(0.74, 2.11)
Energy intake (kcal/d)[2]	1.24	(0.79, 1.96)	1.26	(0.75, 2.12)	1.15	(0.69, 1.90)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.14	(0.75, 1.74)	1.45	(0.91, 2.31)	0.98	(0.69, 1.39)
Number of eating occasions						
≤ 3 times/day	1.84	(0.89, 3.80)	1.70	(0.92, 3.16)	1.45	(0.72, 2.92)
4 times/day	1.65	(0.83, 3.28)	0.98	(0.60, 1.62)	1.62	(0.82, 3.22)
5 times/day	1.03	(0.46, 2.26)	0.99	(0.52, 1.88)	0.76	(0.41, 1.42)
6 times/day	1.70	(0.82, 3.54)	0.60	(0.29, 1.24)	0.97	(0.50, 1.87)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.27		0.25		0.19

Table 44 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Intercept	0.00	(0.00, 0.01)	0.00	(0.00, 0.03)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	1.66	(1.13, 2.45)	2.78	(1.79, 4.32)	1.28	(0.78, 2.10)
Mexican-Americans	1.28	(0.80, 2.04)	1.56	(0.98, 2.50)	1.50	(0.87, 2.58)
Education						
< High school	1.46	(0.91, 2.33)	1.45	(0.80, 2.63)	0.96	(0.39, 2.35)
High school graduate	1.35	(0.81, 2.26)	1.25	(0.77, 2.05)	1.20	(0.75, 1.92)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.35	(0.76, 2.39)	2.13	(0.97, 4.64)	3.52	(1.50, 8.24)
40-49 yrs	1.63	(0.91, 2.92)	3.20	(1.30, 7.90)	2.26	(0.90, 5.66)
50-59 yrs	2.26	(1.02, 5.01)	2.58	(1.19, 5.59)	5.12	(2.30, 11.40)
60+ yrs	1.42	(0.78, 2.62)	3.79	(1.75, 8.23)	3.55	(1.56, 8.07)
Marital status						
Married	0.77	(0.39, 1.52)	0.92	(0.42, 1.99)	0.84	(0.31, 2.27)
Widowed, divorced, or separated	1.18	(0.61, 2.30)	0.73	(0.32, 1.65)	1.44	(0.46, 4.51)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.84	(1.22, 2.77)	0.77	(0.51, 1.15)	1.04	(0.58, 1.85)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)^2	0.76	(0.60, 0.95)	0.80	(0.63, 1.03)	0.69	(0.52, 0.93)
Leisure time activity/month						
No activities	2.40	(1.11, 5.16)	3.28	(1.62, 6.63)	2.02	(0.82, 4.96)
1st quintile	1.60	(0.82, 3.12)	2.10	(1.02, 4.32)	2.30	(1.02, 5.18)
2nd quintile	0.85	(0.42, 1.75)	1.62	(0.76, 3.42)	2.42	(1.08, 5.44)
3rd quintile	1.11	(0.54, 2.28)	1.26	(0.61, 2.61)	1.50	(0.67, 3.35)
4th quintile	1.02	(0.51, 2.04)	1.34	(0.62, 2.89)	1.20	(0.51, 2.78)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	0.86	(0.38, 1.93)	0.89	(0.35, 2.23)	0.56	(0.22, 1.45)
No	1.40	(0.65, 3.02)	0.88	(0.34, 2.25)	0.68	(0.26, 1.79)
Never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 44 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Number of live birth						
0 and never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1	0.86	(0.42, 1.74)	1.10	(0.48, 2.55)	1.40	(0.49, 4.01)
2	0.66	(0.33, 1.32)	0.99	(0.43, 2.30)	0.79	(0.36, 1.70)
3	1.02	(0.48, 2.15)	0.64	(0.27, 1.55)	1.26	(0.49, 3.24)
4	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
≥ 5	1.61	(0.77, 3.35)	1.61	(0.63, 4.10)	2.17	(0.74, 6.37)
Age at the first menarche						
≤ 11 yrs old	5.44	(2.69, 10.99)	2.44	(0.81, 7.35)	1.16	(0.49, 2.73)
12-15 yrs old	2.41	(1.30, 4.47)	1.82	(0.61, 5.43)	0.52	(0.25, 1.09)
≥ 16 yrs old	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	3.09	(2.63, 3.61)	3.42	(2.81, 4.16)	2.56	(2.10, 3.11)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.94	(0.51, 1.72)	0.99	(0.65, 1.50)	0.79	(0.49, 1.26)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.02	(0.66, 1.57)	1.08	(0.66, 1.77)	0.95	(0.53, 1.69)
Energy intake (kcal/d)[2]	1.51	(0.96, 2.39)	1.21	(0.81, 1.79)	1.61	(0.94, 2.77)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.21	(0.82, 1.80)	1.11	(0.74, 1.65)	1.41	(0.94, 2.11)
Number of eating occasions						
≤ 3 times/day	1.67	(0.74, 3.77)	1.10	(0.53, 2.30)	2.32	(0.99, 5.40)
4 times/day	1.31	(0.62, 2.78)	1.76	(1.03, 3.00)	1.20	(0.63, 2.29)
5 times/day	1.58	(0.68, 3.65)	0.98	(0.54, 1.78)	1.4	(0.68, 2.88)
6 times/day	1.57	(0.71, 3.44)	0.93	(0.48, 1.80)	0.89	(0.45, 1.75)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.27		0.23		0.19

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

Highlighted were statistically significant

In the low-income women, the following increased the risk of obesity: being black (OR=1.66 [CI=1.13, 2.45]) relative to being white, being 50-59 years old (OR=2.26 [CI=1.02, 5.01]) relative to being 20-29 years old, being a non-smoker (OR=1.84 [CI=1.22, 2.77]) relative to being a smoker, not participating in any leisure-time activity (OR=2.40 [CI=1.11, 5.16]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=5.14 [CI=3.55, 7.44]), having first menarche at ≤ 11 years old (OR=5.44 [CI=2.69, 10.99]) or at 12-15 years old (OR=2.41 [CI=1.30, 4.47]) relative to having first menarche at ≥ 16 years old, higher score on the component score on desired weight status (OR=3.09 [CI=2.63, 3.61]), and higher alcohol intakes (OR=0.76 [CI=0.60, 0.95]). R^2 was 0.27 (Table 44).

In the middle-income women, the following increased the risk of obesity: being black (OR=2.78 [CI=1.79, 4.32]) relative to being white, being 40-49 years old (OR=3.20 [CI=1.30, 7.90]), 50-59 years old (OR=2.58 [CI=1.19, 5.59]), or 60+ years old (OR=3.79 [CI=1.75, 8.23]) relative to 20-29 years old, not participating in any leisure-time activity (OR=3.28 [CI=1.62, 6.63]) or participating in leisure-time activity at the first quintile level (OR=2.10 [CI=1.02, 4.32]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=3.42 [CI=2.81, 4.16]), and eating meals/snacks 4 times/day (OR=1.76 [CI=1.03, 3.00]) relative to eating meals/snacks ≥ 7 times/day. R^2 was 0.23 (Table 44).

In the high-income women, the following increased the risk of obesity: being 30-39 years old (OR=3.52 [CI=1.50, 8.24]), 50-59 years old (OR=5.12 [CI=2.30, 11.40]), or 60+ years old (OR=3.55 [CI=1.56, 8.07]) relative to being 20-29 years old, participating in leisure-time activity at the first quintile level (OR=2.30 [CI=1.02, 5.18]) or at the

second quintile level (OR=2.42 [CI=1.08, 5.44]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=2.56 [CI=2.10, 3.11]), and higher alcohol intake (OR=0.69 [CI=0.52, 0.93]). R^2 was 0.19 (Table 44).

9. Predictors in subpopulation groups by income, gender, and race/ethnicity in 1988-94

In white low-income men, the following increased the risk of obesity: being a non-smoker (OR=2.64 [CI=1.35, 5.17]) relative to being a smoker and higher score on the component score on desired weight status (OR=3.57 [CI=2.79, 4.58]). R^2 was 0.30 (Table 45). In white middle-income men, higher score on the component on attempt to lose weight increased the risk of obesity (OR=3.06 [CI=2.46, 3.80]). R^2 was 0.25 (Table 45). In white high-income men, the following increased the risk of obesity: being 50-59 years old (OR=3.72 [CI=1.16, 11.94]) or 60+ years old (OR=3.32 [CI=1.20, 9.18]) relative to being 20-29 years old, participating in leisure-time activity at the first quintile level (OR=2.80 [CI=1.08, 7.29]) relative to participating in leisure-time activity at the highest level, and higher score on the component score on desired weight status (OR=2.54 [CI=1.95, 3.32]). R^2 was 0.19 (Table 45).

In black low-income men, the following increased the risk of obesity: higher score on the component score on desired weight status (OR=3.16 [CI=2.59, 3.86]), higher energy intake (OR=2.34 [CI=1.38, 3.97]), and eating meals/snacks 4 times/day (OR=3.94 [CI=1.22, 12.76]) relative to eating meals/snacks ≥ 7 times/day. R^2 was 0.27 (Table 45). In black middle-income men, higher score on the component on attempt to lose weight increased the risk of obesity (OR=3.23 [CI=2.49, 4.21). R^2 was 0.31 (Table 45). In black

Table 45. Predictors of risk of obesity among 18 subgroups by income, gender, and race/ethnicity in 1988-94[1]

	White men					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Education						
< High school	1.95	(0.82, 4.65)	1.64	(0.87, 3.10)	2.12	(0.99, 4.53)
High school graduate	1.76	(0.77, 4.00)	1.57	(0.90, 2.73)	1.40	(0.83, 2.37)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.34	(0.48, 3.78)	1.06	(0.51, 2.21)	1.74	(0.48, 6.26)
40-49 yrs	2.88	(0.96, 8.65)	1.23	(0.49, 3.12)	2.45	(0.85, 7.06)
50-59 yrs	2.05	(0.50, 8.33)	1.74	(0.63, 4.77)	3.72	(1.16, 11.94)
60+ yrs	2.37	(0.78, 7.16)	1.51	(0.77, 2.96)	3.32	(1.20, 9.18)
Marital status						
Married	1.40	(0.47, 4.14)	1.47	(0.59, 3.63)	0.61	(0.27, 1.35)
Widowed, divorced, or separated	1.36	(0.38, 4.92)	0.51	(0.19, 1.37)	0.62	(0.18, 2.10)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	2.64	(1.35, 5.17)	1.52	(0.93, 2.48)	1.37	(0.79, 2.40)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	1.24	(0.91, 1.70)	1.04	(0.84, 1.29)	0.74	(0.58, 0.94)
Leisure time activity/month						
No activities	1.88	(0.56, 6.30)	1.24	(0.35, 4.38)	2.12	(0.71, 6.36)
1st quintile	2.10	(0.72, 6.10)	1.78	(0.66, 4.85)	2.80	(1.08, 7.29)
2nd quintile	1.40	(0.41, 4.86)	0.61	(0.23, 1.66)	1.45	(0.60, 3.46)
3rd quintile	1.58	(0.43, 5.79)	1.09	(0.42, 2.87)	1.44	(0.67, 3.11)
4th quintile	0.77	(0.30, 2.01)	0.49	(0.19, 1.27)	1.32	(0.63, 2.78)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A

Table 45 (cont'd)

	White men					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	3.57	(2.79, 4.58)	3.06	(2.46, 3.80)	2.54	(1.95, 3.32)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.89	(0.45, 1.77)	0.72	(0.42, 1.22)	1.08	(0.65, 1.77)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.53	(0.64, 3.66)	0.92	(0.48, 1.74)	1.27	(0.69, 2.33)
Energy intake (kcal/d)[2]	1.05	(0.54, 2.02)	1.23	(0.69, 2.21)	1.08	(0.61, 1.92)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	0.98	(0.52, 1.84)	1.57	(0.89, 2.75)	0.96	(0.65, 1.43)
Number of eating occasions						
≤ 3 times/day	2.06	(0.74, 5.74)	1.92	(0.93, 3.95)	1.55	(0.72, 3.30)
4 times/day	1.26	(0.52, 3.04)	0.93	(0.52, 1.64)	1.64	(0.79, 3.41)
5 times/day	0.81	(0.28, 2.38)	0.92	(0.45, 1.90)	0.74	(0.38, 1.43)
6 times/day	1.80	(0.71, 4.54)	0.59	(0.26, 1.30)	0.97	(0.47, 2.00)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.30		0.25		0.19	

Table 45 (cont'd)

	Black men					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.01)	0.00	(0.00, 0.03)	0.00	(0.00, 0.00)
Education						
< High school	1.74	(0.86, 3.49)	1.52	(0.64, 3.61)	0.93	(0.29, 2.99)
High school graduate	1.81	(0.90, 3.65)	0.66	(0.31, 1.41)	0.93	(0.38, 2.25)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.24	(0.69, 2.25)	0.77	(0.37, 1.64)	0.33	(0.09, 1.19)
40-49 yrs	1.14	(0.45, 2.85)	0.50	(0.19, 1.35)	0.39	(0.07, 2.30)
50-59 yrs	1.15	(0.37, 3.50)	0.42	(0.13, 1.35)	0.37	(0.06, 2.40)
60+ yrs	2.14	(0.99, 4.62)	0.47	(0.15, 1.42)	1.01	(0.15, 6.90)
Marital status						
Married	1.46	(0.80, 2.67)	1.21	(0.51, 2.90)	2.87	(0.87, 9.51)
Widowed, divorced, or separated	0.87	(0.41, 1.83)	0.90	(0.27, 2.96)	2.60	(0.68, 10.00)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.31	(0.80, 2.17)	1.46	(0.77, 2.78)	1.13	(0.49, 2.61)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)^2	0.88	(0.70, 1.12)	0.97	(0.73, 1.29)	0.94	(0.68, 1.29)
Leisure time activity/month						
No activities	0.99	(0.52, 1.91)	1.51	(0.59, 3.86)	1.23	(0.20, 7.53)
1st quintile	0.94	(0.45, 1.98)	1.83	(0.87, 3.82)	2.08	(0.58, 7.47)
2nd quintile	0.79	(0.31, 1.98)	1.08	(0.37, 3.14)	1.67	(0.45, 6.12)
3rd quintile	1.18	(0.46, 2.98)	1.30	(0.58, 2.91)	2.39	(0.64, 8.93)
4th quintile	1.67	(0.79, 3.54)	1.62	(0.61, 4.31)	0.94	(0.27, 3.20)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A

Table 45 (cont'd)

	Black men					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	3.16	(2.59, 3.86)	3.23	(2.49, 4.21)	3.02	(2.24, 4.08)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.76	(0.35, 1.63)	0.89	(0.29, 2.73)	1.87	(0.74, 4.71)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.51	(0.93, 2.46)	1.40	(0.80, 2.43)	1.61	(0.73, 3.52)
Energy intake (kcal/d)[2]	2.34	(1.38, 3.97)	0.89	(0.42, 1.88)	1.00	(0.35, 2.87)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.38	(0.68, 2.79)	1.39	(0.73, 2.66)	0.97	(0.38, 2.49)
Number of eating occasions						
≤ 3 times/day	2.20	(0.85, 5.73)	2.05	(0.57, 7.34)	1.75	(0.26, 11.58)
4 times/day	3.94	(1.22, 12.76)	2.24	(0.77, 6.53)	2.38	(0.37, 15.18)
5 times/day	2.21	(0.67, 7.29)	2.58	(0.91, 7.31)	3.58	(0.54, 23.71)
6 times/day	1.01	(0.20, 5.05)	1.20	(0.37, 3.93)	2.07	(0.28, 15.54)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.27		0.31		0.28	

Table 45 (cont'd)

	Mexican-American men					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Education						
< High school	1.55	(0.87, 2.78)	0.84	(0.38, 1.89)	0.6	(0.12, 2.63)
High school graduate	1.04	(0.42, 2.59)	0.66	(0.29, 1.49)	1.1	(0.27, 4.72)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	0.91	(0.53, 1.55)	1.63	(0.49, 5.40)	0.16	(0.03, 0.83)
40-49 yrs	2.21	(1.28, 3.80)	1.73	(0.46, 6.50)	0.22	(0.04, 1.28)
50-59 yrs	5.40	(2.01, 14.56)	2.86	(0.56, 14.63)	0.82	(0.11, 6.37)
60+ yrs	2.14	(1.04, 4.40)	2.53	(0.60, 10.79)	0.5	(0.07, 3.59)
Marital status						
Married	2.38	(1.05, 5.40)	1.83	(0.63, 5.35)	1.4	(0.37, 5.50)
Widowed, divorced, or separated	1.16	(0.33, 4.09)	3.17	(0.76, 13.16)	0.3	(0.02, 4.34)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	0.99	(0.60, 1.66)	0.93	(0.36, 2.36)	0.7	(0.20, 2.37)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	1.10	(0.82, 1.21)	1.05	(0.77, 1.44)	0.8	(0.52, 1.30)
Leisure time activity/month						
No activities	1.11	(0.29, 4.21)	28.89	(2.52, 330.71)	2.10	(0.40, 10.88)
1st quintile	1.06	(0.30, 3.73)	11.35	(1.22, 105.65)	1.57	(0.34, 7.18)
2nd quintile	2.60	(0.86, 7.82)	13.91	(1.76, 109.86)	2.57	(0.83, 7.93)
3rd quintile	0.78	(0.31, 1.98)	14.13	(1.65, 120.70)	0.09	(0.01, 1.20)
4th quintile	1.06	(0.29, 3.87)	10.43	(1.03, 105.42)	2.33	(0.69, 7.85)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A

Table 45 (cont'd)

	Mexican-American men					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	3.13	(2.54, 3.85)	4.27	(2.87, 6.36)	3.3	(2.13, 4.98)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.77	(0.44, 1.36)	0.99	(0.39, 2.50)	0.6	(0.25, 1.62)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.98	(1.30, 3.01)	0.99	(0.57, 1.71)	0.75	(0.24, 2.33)
Energy intake (kcal/d)[2]	0.97	(0.54, 1.75)	2.02	(0.79, 5.21)	3.4	(0.58, 20.17)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.40	(0.87, 2.27)	0.91	(0.47, 1.77)	1.51	(0.43, 5.36)
Number of eating occasions						
≤ 3 times/day	1.77	(0.74, 4.24)	1.07	(0.29, 3.93)	1.00	(0.17, 5.91)
4 times/day	1.83	(0.85, 3.94)	0.96	(0.32, 2.88)	1.60	(0.40, 6.32)
5 times/day	1.32	(0.50, 3.52)	1.24	(0.38, 4.11)	1.58	(0.43, 5.82)
6 times/day	0.74	(0.25, 2.13)	0.59	(0.15, 2.28)	0.62	(0.10, 3.72)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.25		0.32		0.32	

Table 45 (cont'd)

	White women					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.01)	0.00	(0.00, 0.03)	0.00	(0.00, 0.00)
Education						
< High school	1.50	(0.71, 3.08)	1.37	(0.67, 2.83)	0.94	(0.35, 2.57)
High school graduate	1.43	(0.69, 2.94)	1.28	(0.71, 2.29)	1.30	(0.78, 2.16)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.23	(0.51, 3.01)	2.00	(0.78, 5.14)	4.00	(1.54, 10.41)
40-49 yrs	1.22	(0.44, 3.36)	3.37	(1.14, 10.00)	2.37	(0.84, 6.71)
50-59 yrs	1.88	(0.58, 6.08)	2.83	(1.12, 7.14)	5.61	(2.33, 13.49)
60+ yrs	1.13	(0.48, 2.65)	4.09	(1.63, 10.28)	4.01	(1.63, 9.85)
Marital status						
Married	0.63	(0.15, 2.72)	1.39	(0.45, 4.26)	0.67	(0.22, 2.06)
Widowed, divorced, or separated	1.01	(0.24, 4.33)	1.14	(0.35, 3.68)	1.21	(0.33, 4.42)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.91	(1.01, 3.60)	0.64	(0.40, 1.04)	1.03	(0.55, 1.94)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)^2	0.61	(0.42, 0.88)	0.76	(0.56, 1.02)	0.68	(0.50, 0.93)
Leisure time activity/month						
No activities	2.50	(0.82, 7.61)	3.48	(1.46, 8.27)	1.74	(0.64, 4.77)
1st quintile	1.73	(0.68, 4.41)	2.00	(0.86, 4.64)	2.40	(1.00, 5.77)
2nd quintile	0.77	(0.28, 2.12)	1.65	(0.69, 3.94)	2.48	(1.03, 5.96)
3rd quintile	1.10	(0.45, 2.67)	1.14	(0.48, 2.69)	1.51	(0.64, 3.57)
4th quintile	1.12	(0.45, 2.80)	1.29	(0.52, 3.23)	1.17	(0.47, 2.91)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	0.88	(0.24, 3.28)	0.75	(0.26, 2.19)	0.60	(0.22, 1.68)
No	1.60	(0.46, 5.55)	0.72	(0.24, 2.18)	0.74	(0.26, 2.12)
Never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Number of live birth						
0 and never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1	0.90	(0.30, 2.64)	1.04	(0.40, 2.69)	1.32	(0.42, 4.16)
2	0.53	(0.19, 1.50)	1.07	(0.41, 2.78)	0.69	(0.30, 1.59)
3	0.90	(0.30, 2.71)	0.56	(0.21, 1.55)	1.22	(0.44, 3.39)
4	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
≥ 5	1.45	(0.51, 4.10)	1.67	(0.57, 4.91)	1.74	(0.55, 5.49)

Table 45 (cont'd)

	White women					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Age at the first menarche						
≤ 11 yrs old	11.18	(2.87, 43.60)	3.54	(0.80, 15.78)	1.10	(0.44, 2.72)
12-15 yrs old	4.17	(1.31, 13.29)	2.31	(0.53, 10.13)	0.47	(0.21, 1.05)
≥ 16 yrs old	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	3.56	(2.61, 4.86)	3.73	(2.91, 4.79)	2.55	(2.07, 3.14)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.93	(0.44, 1.99)	0.99	(0.63, 1.58)	0.79	(0.48, 1.28)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.29	(0.64, 2.60)	1.14	(0.63, 2.06)	0.93	(0.47, 1.85)
Energy intake (kcal/d)[2]	1.74	(0.88, 3.43)	1.15	(0.73, 1.80)	1.68	(0.90, 3.12)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.45	(0.80, 2.65)	1.11	(0.68, 1.81)	1.45	(0.92, 2.28)
Number of eating occasions						
≤ 3 times/day	1.60	(0.54, 4.74)	1.03	(0.41, 2.59)	2.41	(0.95, 6.11)
4 times/day	1.51	(0.60, 3.81)	1.94	(1.05, 3.60)	1.29	(0.64, 2.56)
5 times/day	1.65	(0.54, 5.02)	1.00	(0.50, 1.99)	1.47	(0.68, 3.15)
6 times/day	1.68	(0.62, 4.52)	1.00	(0.47, 2.14)	0.90	(0.42, 1.90)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.28		0.23		0.19

Table 45 (cont'd)

	Black women					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Education						
< High school	1.43	0.83, 2.47)	1.82	(0.68, 4.85)	0.36	(0.03, 4.10)
High school graduate	1.01	0.58, 1.75)	1.20	(0.62, 2.31)	0.25	(0.06, 1.00)
> High school	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	2.66	1.41, 5.02)	4.08	1.65, 10.12)	0.44	(0.07, 2.67)
40-49 yrs	3.42	1.83, 6.38)	3.81	(1.50, 9.68)	2.52	(0.40, 15.95)
50-59 yrs	5.66	2.11, 15.18	2.37	(0.68, 8.21)	4.45	(0.54, 36.60)
60+ yrs	4.96	2.02, 12.19	3.17	0.87, 11.55)	1.50	(0.15, 15.10)
Marital status						
Married	0.58	0.29, 1.15)	0.38	(0.17, 0.83)	6.14	(0.97, 38.72)
Widowed, divorced, or separated	0.88	0.44, 1.76)	0.37	(0.18, 0.75)	4.56	(0.42, 49.27)
Never married/living with partner	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	1.87	1.19, 2.95)	3.15	(1.56, 6.36)	0.53	(0.16, 1.72)
Smoker	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	1.06	0.79, 1.42)	1.35	(0.81, 2.26)	0.85	(0.36, 1.98)
Leisure time activity/month						
No activities	2.17	0.88, 5.32)	1.79	(0.59, 5.38)	12.24	(1.08, 138.82)
1st quintile	1.44	0.58, 3.55)	1.23	(0.45, 3.36)	2.07	(0.26, 16.72)
2nd quintile	1.45	0.59, 3.58)	0.24	(0.07, 0.81)	4.80	(0.82, 28.09)
3rd quintile	1.04	0.39, 2.72)	1.06	(0.34, 3.30)	1.50	(0.20, 11.27)
4th quintile	0.87	0.35, 2.19)	0.94	(0.33, 2.70)	2.97	(0.40, 21.93)
5th quintile	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	0.61	0.20, 1.84)	1.07	(0.20, 5.69)	0.50	(0.02, 13.19)
No	1.04	0.36, 2.99)	1.60	(0.29. 8.88)	0.84	(0.04, 17.03)
Never been pregnant	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Number of live birth						
0 and never been pregnant	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1	0.83	0.38, 1.84)	0.68	(0.13, 3.48)	3.13	(0.32, 30.17)
2	0.98	0.42, 2.27)	0.35	(0.08, 1.56)	2.76	(0.35, 21.51)
3	1.39	0.56, 3.44)	0.48	(0.09, 2.49)	1.16	(0.12, 11.49)
4	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
≥ 5	1.90	0.86, 4.21)	1.15	(0.25, 5.38)	223.97	(2.19, 22865.82)

Table 45 (cont'd)

	Black women					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Age at the first menarche						
≤ 11 yrs old	2.72	1.09, 6.77)	0.43	(0.11, 1.68)	2.34	(0.28, 19.53)
12-15 yrs old	1.57	0.66, 3.76)	0.87	(0.22, 3.38)	1.46	(0.22, 9.54)
≥ 16 yrs old	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	2.93	2.47, 3.48)	2.76	(2.08, 3.65)	5.90	(2.75, 12.64)
Restaurant food consumption						
Non-consumer	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.89	0.29, 2.78)	0.96	(0.36, 2.60)	0.42	(0.11, 1.63)
Breakfast consumption						
Yes	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	0.66	0.43, 1.01)	0.58	(0.32, 1.05)	0.22	(0.22, 3.84)
Energy intake (kcal/d)[2]	1.08	0.70, 1.69)	1.76	(0.87, 3.54)	0.56	(0.16, 1.97)
Fat intake						
≤ 30% of energy from fat	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.19	0.77, 1.85)	1.25	(0.74, 2.12)	0.35	(0.14, 0.83)
Number of eating occasions						
≤ 3 times/day	1.20	0.54, 2.68)	1.10	(0.32, 3.79)	1.01	(0.13, 7.89)
4 times/day	0.63	0.27, 1.50)	1.16	(0.31, 4.29)	0.44	(0.07, 2.99)
5 times/day	1.26	0.51, 3.10)	0.83	(0.25, 2.71)	1.08	(0.20, 5.82)
6 times/day	0.77	0.33, 1.83)	0.40	(0.10, 1.63)	0.66	(0.11, 4.13)
≥ 7 times/day	1.00	1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.33		0.32		0.41	

Table 45 (cont'd)

	Mexican-American women					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.01)	0.00	(0.00, 0.03)	0.00	(0.00, 0.00)
Education						
< High school	1.54	(0.72, 3.30)	1.02	(0.40, 2.57)	2.88	(0.28, 30.00)
High school graduate	**2.68**	**(1.30, 5.53)**	0.59	(0.24, 1.48)	1.04	(0.25, 4.30)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.05	(0.53, 2.08)	2.30	(0.74, 7.16)	1.73	(0.26, 11.38)
40-49 yrs	**1.94**	**(1.13, 3.32)**	2.67	(0.62, 11.52)	1.61	(0.23, 11.29)
50-59 yrs	2.26	(0.90, 5.66)	1.82	(0.38, 8.75)	5.11	(0.55, 47.00)
60+ yrs	**2.56**	**(1.05, 6.25)**	1.77	(0.37, 8.37)	0.73	(0.03, 19.70)
Marital status						
Married	1.69	(0.82, 3.48)	0.80	(0.13, 5.04)	0.38	(0.06, 2.37)
Widowed, divorced, or separated	1.64	(0.85, 3.15)	1.86	(0.27, 12.86)	0.28	(0.03, 2.28)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Smoking status in the past 5 days						
Non-smoker	**2.20**	**(1.15, 4.20)**	1.79	(0.77, 4.21)	2.6	(0.55, 12.40)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	1.13	(0.79, 1.60)	0.88	(0.52, 1.49)	1.35	(0.67, 2.71)
Leisure time activity/month						
No activities	1.69	(0.51, 5.60)	4.73	(0.76, 29.67)	1.40	(0.09, 21.91)
1st quintile	0.80	(0.24, 2.71)	3.29	(0.51, 21.14)	2.92	(0.45, 19.07)
2nd quintile	0.71	(0.22, 2.32)	3.65	(0.49, 27.19)	0.52	(0.07, 4.21)
3rd quintile	0.64	(0.19, 2.16)	1.98	(0.29, 13.61)	0.60	(0.08, 4.46)
4th quintile	0.57	(0.18, 1.84)	1.91	(0.31, 11.76)	0.74	(0.11, 4.87)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	0.40	(0.17, 0.93)	0.95	(0.16, 5.64)	0.74	(0.03, 16.72)
No	0.72	(0.28, 1.87)	1.21	(0.16, 9.15)	0.41	(0.01, 11.53)
Never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Number of live birth						
0 and never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1	0.65	(0.28, 1.47)	0.80	(0.21, 3.01)	2.34	(0.13, 41.21)
2	0.92	(0.37, 2.29)	0.22	(0.08, 0.59)	3.65	(0.28, 47.72)
3	1.20	(0.60, 2.40)	0.87	(0.21, 3.63)	0.40	(0.02, 7.30)
4	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
≥ 5	1.41	(0.78, 2.54)	1.06	(0.27, 4.12)	3.43	(0.08, 143.50)

Table 45 (cont'd)

	Mexican-American women					
	Low-income		Mid-income		High-income	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Age at the first menarche						
≤ 11 yrs old	1.67	(0.58, 4.82)	1.20	(0.60, 2.41)	1.71	(0.45, 6.53)
12-15 yrs old	0.82	(0.25, 2.70)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
≥ 16 yrs old	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	2.83	(2.27, 3.53)	3.87	(2.32, 6.47)	5.78	(2.33, 14.34)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.25	(0.12, 0.53)	1.43	(0.56, 3.60)	0.5	(0.11, 2.19)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.06	(0.66, 1.70)	1.72	(0.69, 4.30)	0.84	(0.16, 4.33)
Energy intake (kcal/d)[2]	1.61	(0.87, 2.97)	1.83	(0.72, 4.66)	2	(0.36, 11.13)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	0.58	(0.41, 0.82)	0.91	(0.44, 1.88)	2.3	(0.85, 6.08)
Number of eating occasions						
≤ 3 times/day	1.71	(0.62, 4.72)	2.64	(0.77, 9.11)	2.4	(0.40, 14.18)
4 times/day	1.11	(0.46, 2.66)	1.93	(0.51, 7.32)	0.43	(0.08, 2.32)
5 times/day	1.20	(0.52, 2.76)	1.45	(0.49, 4.26)	1	(0.20, 5.36)
6 times/day	1.07	(0.33, 3.49)	0.99	(0.23, 4.25)	0.50	(0.08, 3.30)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.29		0.29		0.33	

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weigt status, and attempt to lose weight.

Highlighted were statistically significant

high-income men, higher score on the component score on desired weight status increased the risk of obesity (OR=3.02 [CI=2.24, 4.08). R^2 was 0.28 (Table 45).

In Mexican-American low-income men, the following increased the risk of obesity: being 40-49 years old (OR=2.21 [CI=1.28, 3.80]), 50-59 years old (OR=5.40 [CI=2.01, 14.56]), or 60+ years old (OR=2.14 [CI=1.04, 4.40]) relative to being 20-29 years old, being married (OR=2.38 [CI=1.05, 5.40]) relative to never being married, higher score on the component on attempt to lose weight (OR=3.13 [CI=2.54, 3.85]), and not consuming breakfast (OR=1.98 [CI=1.30, 3.01]). R^2 was 0.25 (Table 45). In Mexican-American middle-income men, the following increased the risk of obesity: not participating in any leisure-time activity (OR=28.89 [CI=2.52, 330.71]), participating in leisure-time activity at the first quintile level (OR=11.35 [CI=1.22, 105.65]), at the second quintile level (OR=13.91 [CI=1.76, 109.86]), at the third quintile level (OR=14.13 [CI=1.65, 120.70]), or at the fourth quintile level (OR=10.43 [CI=1.03, 105.42]) relative to participating in leisure-time activity at the highest level, and higher score on the component on attempt to lose weight (OR=4.27 [CI=2.87, 6.36]). R^2 was 0.32 (Table 45). In Mexican-American high-income men, higher score on the component score on desired weight status increased the risk of obesity (OR=3.26 [CI=2.13, 4.98]). R^2 was 0.32 (Table 45).

In white low-income women, the following increased the risk of obesity: being a non-smoker (OR=1.91 [CI=1.01, 3.60]) relative to being a smoker, having first menarche at ≤ 11 years old (OR=11.18 [CI=2.87, 43.60]) or at 12-15 years old (OR=4.17 [CI=1.31, 13.29]) relative to having first menarche at ≥ 16 years old, higher score on the component on attempt to lose weight (OR=3.56 [CI=2.61, 4.86]), and higher alcohol intake

(OR=0.61 [CI=0.42, 0.88]). R^2 was 0.28 (Table 45). In white middle-income women, the following increased the risk of obesity: being 40-49 years old (OR=3.37 [CI=1.14, 10.00]), 50-59 years old (OR=2.83 [CI=1.12, 7.14]), or 60+ years old (OR=4.09 [CI=1.63, 10.28]) relative to being 20-29 years old, not participating in any leisure-time activity (OR=3.48 [CI=1.46, 8.27]) relative to participating in leisure-time activity at the highest level, and higher score on the component on attempt to lose weight (OR=3.73 [CI=2.91, 4.79]). R^2 was 0.23 (Table 45). In white high-income women, the following increased the risk of obesity: being 30-39 years old (OR=4.00 [CI=1.54, 10.41]), 50-59 years old (OR=5.61 [CI=2.33, 13.49]), or 60+ years old (OR=4.01 [CI=1.63, 9.85]) relative to being 20-29 years old, participating in leisure-time activity at the second quintile level (OR=2.48 [CI=1.03, 5.96]) relative to participating in leisure-time activity at the highest level, higher score on the component on attempt to lose weight (OR=2.55 [CI=2.07, 3.14]), and higher alcohol intake (OR=0.68 [CI=0.50, 0.93]). R^2 was 0.19 (Table 45).

In black low-income women, the following increased the risk of obesity: being 30-39 years old (OR=2.66 [CI=1.41, 5.02]), 40-49 years old (OR=3.42 [CI=1.41, 5.02]), 50-59 years old (OR=5.66 [CI=2.11, 15.18]), or 60+ years old (OR=4.96 [CI=2.02, 12.19]) relative to being 20-29 years old, being a non-smoker (OR=1.87 [CI=1.19, 2.95]) relative to being a smoker, having first menarche at $\leq$ 11 years old (OR=2.72 [CI=1.09, 6.77]) relative to having first menarche at $\geq$ 16 years old, and higher score on the component on attempt to lose weight (OR=2.93 [CI=2.47, 3.48]). R^2 was 0.33 (Table 45). In black middle-income women, the following increased the risk of obesity: being 30-39 years old (OR=4.08 [CI=1.65, 10.12]) or 40-49 years old (OR=3.81 [CI=1.50, 9.68]) relative to being 20-29 years old, being a non-smoker (OR=3.15 [CI=1.56, 6.36]) relative

to being a smoker, and higher score on the component on attempt to lose weight (OR=2.76 [CI=2.06, 3.65]). In addition, the following decreased the risk of obesity: being married (OR=0.38 [CI=0.17, 0.83]) or being widowed, divorced, or separated (OR=0.37 [CI=0.18, 0.75]) relative to never being married or living with a partner, and participating in leisure-time activity at the second quintile level (OR=0.24 [CI=0.07, 0.81]) relative to participating in leisure-time activity at the highest level of leisure-time activity. R^2 was 0.32 (Table 45). In black high-income women, the following increased the risk of obesity: not participating in any leisure time activity (OR=12.24 [CI=1.08, 138.82]) relative to participating in leisure-time activity at the highest level, having ≥ 5 live births (OR=223.97 [CI=2.19, 22865.82]) relative to having no live birth or never being pregnant, and higher score on the component on attempt to lose weight (OR=5.90 [CI=2.75, 12.64]). In addition, consuming more than 30% of energy from fat decreased the risk of obesity (OR=0.35 [CI=0.14, 0.83]) relative to consuming ≤ 30% of energy from fat. R^2 was 0.41 (Table 45).

In Mexican-American low-income women, the following increased the risk of obesity: having high school education (OR=2.68 [CI=1.30, 5.53]) relative to having more than high school education, being 40-49 years old (OR=1.94 [CI=1.13, 3.32]) or 60+ years old (OR=2.56 [CI=1.05, 6.25]) relative to being 20-29 years old, being a non-smoker (OR=2.20 [CI=1.15, 4.20]) relative to being a smoker, and higher score on the component on attempt to lose weight (OR=2.83 [CI=2.27, 3.53]). In addition, the following decreased the risk of obesity: consuming restaurant food the day before the interview (OR=0.25 [CI=0.12, 0.53]) and consuming more than 30% of energy from fat (OR=0.58 [CI=0.41, 0.82]) relative to consuming ≤ 30% of energy from fat. R^2 was 0.29

(Table 45). In Mexican-American middle-income women, higher score on the component on attempt to lose weight increased the risk of obesity (OR=3.87 [CI=2.32, 6.47]). In addition, having 2 live births decreased the risk of obesity (OR=0.22 [CI=0.08, 0.59]) relative to having no live birth or never being pregnant. R^2 was 0.29 (Table 43). In Mexican-American high-income women, higher score on the component on attempt to lose weight increased the risk of obesity (OR=5.78 [CI=2.33, 14.34]). R^2 was 0.33 (Table 45).

DIFFERENCES IN STUDY SUBJECTS' CHARACTERISTICS BEFORE AND AFTER EXCLUDING SUBJECTS WITH MISSING RESPONSES ON THE VARIABLES OF INTEREST

Since some subjects did not provide all the information of interest, the study subjects' characteristics may have changed between the sample with the information on at least BMI, gender, age, race/ethnicity, and income (Sample A in Figure 2a and b) and the sample with all the information needed to identify the predictors of obesity risk (Sample B in Figure 2a and b). Therefore, subjects' characteristics between these two study samples needed to be examined to assure that they were not substantially different.

1. Weight status by the income level

BMI as an outcome variable: In 1999-2002, the age-adjusted relationships between log-transformed mean BMI and income levels after excluding subjects who did not have all the responses on the variables of interest (Table 46) was the same as the ones before excluding these subjects (Table 15). In 1999-2002, being in low- and middle-income groups predicted higher log-transformed mean BMI relative to being in the high-income group in women (β=0.08 at $p<0.0001$ and β=0.06 at $p<0.001$, respectively) (Table 46). There was no statistically significant difference in the log-transformed mean BMI by the

Table 46. Income-BMI relationship among subgroups[1]
(NHANES 1999-2002 for the regression)

	W (n=1,733)	M (n=2,283)	WW (n=999)	BW (n=313)	MW (n=413)	WM (n=1,259)	BM (n=414)	MM (n=610)
Intercept	3.21****	3.24****	3.20****	N/A	N/A	3.23****	N/A	N/A
Income								
PIR <1.85	0.09***	-0.00	0.08**	N/A	N/A	0.01	N/A	N/A
1.85 ≤ PIR ≤ 3.5	0.06**	-0.00	0.04*	N/A	N/A	0.00	N/A	N/A
PIR >3.5	0.00	0.00	0.00	N/A	N/A	0.00	N/A	N/A
Age								
20-29 yrs	0.00	0.00	0.00	N/A	N/A	0.00	N/A	N/A
30-39 yrs	0.05*	0.05**	0.06*	N/A	N/A	0.04*	N/A	N/A
40-49 yrs	0.09**	0.08****	0.08**	N/A	N/A	0.09****	N/A	N/A
50-59 yrs	0.08**	0.10****	0.09**	N/A	N/A	0.12****	N/A	N/A
60+ yrs	0.06**	0.09****	0.07**	N/A	N/A	0.09****	N/A	N/A
R^2	0.03	0.04	0.03	N/A	N/A	0.05	N/A	N/A

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; other Hispanics; subjects other than whites, blacks, or Mexican Americans; underweight subjects; and those who did not have all the responses on the predictors included in the regression.

W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men, MM: Mexican-American men

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001

income level in men (Table 46). When subjects were categorized by gender and race/ethnicity together, being in low- and middle-income groups predicted higher log-transformed mean BMI relative to being in the high-income group in white women (β=0.07 at $p<0.001$ and β=0.05 at $p<0.01$, respectively) (Table 46). There was no statistically significant difference in log-transformed mean BMI by the income level in white men (Table 46).

In 1989-94, the age-adjusted relationships between log-transformed mean BMI and income levels after excluding subjects who did not have all the responses on the variables of the interest (Table 47) was also the same as the ones before excluding these subjects except Mexican-American women (Table 16). In women, being in low- and middle-income groups predicted higher log-transformed mean BMI relative to being in the high-income group (β=0.08 at $p<0.0001$ and β=0.04 at $p<0.001$, respectively) (Table 47). In men, being in the middle-income group predicted higher log-transformed mean BMI (β=0.03 at $p<0.01$) relative to being in the high-income group, while no statistically significant difference was observed between the low-income group and the high-income group (Table 47). When subjects were categorized by gender and race/ethnicity together, being in low- and middle-income groups predicted higher log-transformed mean BMI (β=0.06 at $p<0.0001$ and β=0.03 at $p<0.01$, respectively) relative to being in the high-income group in white women. Being in low- and middle-income groups predicted higher log-transformed mean BMI (β=0.07 at $p<0.0001$ and β=0.06 at $p<0.001$, respectively) relative to being in the high-income group in black women. In Mexican-American women, only being in the low-income group predicted higher mean BMI (β=0.07 at $p<0.01$; Table 16) relative to being in the high-income group after the

Table 47. Income-BMI relationship among subgroups[1]
(NHANES 1988-94 for the regression)

	W (n=4,590)	M (n=5,679)	WW (n=2,199)	BW (n=1,336)	MW (n=1,055)	WM (n=2,539)	BM (n=1,516)	MM (n=1,624)
Intercept	3.14****	3.21****	3.14****	3.21****	3.20****	3.20****	3.28****	3.24****
Income								
PIR <1.85	0.08****	0.00	0.06***	0.05**	0.07**	0.01	-0.04**	-0.01
1.85 ≤ PIR ≤ 3.5	0.04**	0.02*	0.03*	0.04*	0.04	0.02*	-0.01	0.00
PIR >3.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Age								
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.07***	0.05****	0.07**	0.07***	0.08**	0.06****	-0.00	0.04***
40-49 yrs	0.12****	0.08****	0.11****	0.14****	0.13****	0.08****	0.02	0.10****
50-59 yrs	0.16****	0.10****	0.17****	0.17****	0.10***	0.10****	0.04*	0.11****
60+ yrs	0.11****	0.07****	0.11****	0.13****	0.09**	0.08****	0.03**	0.05***
R^2	0.06	0.04	0.06	0.06	0.06	0.05	0.02	0.07

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; underweight subjects; and those who did not have all the responses on the predictors included in the regression.

W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men, MM: Mexican-American men

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001

exclusion, while both being in low- and middle-income groups predicted higher mean BMI relative to being in the high-income group before the exclusion (Table 47). Being in the middle-income group predicted higher log-transformed mean BMI (β=0.03 at $p<0.01$) relative to being in the high-income group in white men, while no statistically significant difference was observed between the low-income and the high-income group. Being in the low-income group predicted lower log-transformed mean BMI (β=-0.05 at $p<0.001$) relative to being in middle- and high-income groups in black men. The log-transformed mean BMI did not differ by the income level in Mexican-American men.

The risk of obesity as an outcome variable: In 1999-2002, the age-adjusted relationships between obesity risk and the income level after excluding subjects who did not have all the responses on the variables of the interest (Table 48) were the same as the ones before the exclusion (Table 17). In women, being in low- and middle-income groups increased the risk of obesity relative to being in the high-income group (OR=1.97 [CI=1.56, 2.49] for the low-income group and OR=1.70 [CI=1.30, 2.22] for the middle-income group, respectively) (Table 48). In men, there was no statistically significant difference in the risk of obesity by the income level. When subjects were categorized by gender and race/ethnicity together, the risk of obesity in the low- and middle-income groups was higher than that in the high-income group in white women (OR=1.95 [CI=1.44, 2.62] and OR=1.67 [CI=1.21, 2.32], respectively). No statistically significant difference in the risk of obesity was observed in white men.

In 1989-94, the age-adjusted relationships between obesity risk and the income level after excluding subjects who did not have all the responses on the variables of the interest were the same as the ones before exclusion except the one in men. Women in the

Table 48. Risk of obesity among subgroups[1] (NHANES 1999-2002 for the regression)

	W (n=1,733)		M (n=2,283)		WW (n=999)		BW (n=313)		MW (n=413)		WM (n=1,259)		BM (n=414)		MM (n=610)	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Intercept	0.20	(0.13, 0.29)	0.18	(0.11, 0.27)	0.17	(0.10, 0.28)	N/A	N/A	N/A	N/A	0.16	(0.09, 0.29)	N/A	N/A	N/A	N/A
Income																
PIR <1.85	2.21	(1.54, 3.17)	1.03	(0.80, 1.33)	2.09	(1.34,3.27)	N/A	N/A	N/A	N/A	1.21	(0.86, 1.70)	N/A	N/A	N/A	N/A
1.85 ≤ PIR ≤ 3.5	1.71	(1.20, 2.44)	1.03	(0.75, 1.43)	1.55	(1.01, 2.36)	N/A	N/A	N/A	N/A	1.10	(0.77, 1.57)	N/A	N/A	N/A	N/A
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A
Age																
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A
30-39 yrs	1.6	(0.99, 2.50)	1.59	(0.96, 2.64)	1.73	(0.91, 3.28)	N/A	N/A	N/A	N/A	1.50	(0.71, 3.17)	N/A	N/A	N/A	N/A
40-49 yrs	2.3	(1.40, 3.87)	2.29	(1.36, 3.84)	2.55	(1.35, 4.82)	N/A	N/A	N/A	N/A	2.56	(1.31, 5.00)	N/A	N/A	N/A	N/A
50-59 yrs	2	(1.10, 3.45)	2.60	(1.52, 4.44)	2.32	(1.15, 4.68)	N/A	N/A	N/A	N/A	2.90	(1.43, 5.90)	N/A	N/A	N/A	N/A
60+ yrs	1.7	(1.09, 2.58)	2.22	(1.35, 3.65)	1.93	(1.12, 3.32)	N/A	N/A	N/A	N/A	2.32	(1.16, 4.65)	N/A	N/A	N/A	N/A
R^2	0.03		0.02		0.03		N/A		N/A		0.02		N/A		N/A	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; other Hispanics; subjects other than whites, blacks, or Mexican Americans; underweight subjects; and those who did not have all the responses on the predictors included in the regression.

W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men, MM: Mexican-American men

Highlighted were statistically significant

low- and middle-income groups had a higher risk of obesity than women in the high-income group (OR=2.09 [CI=1.67, 2.61] and OR=1.58 [CI=1.24, 2.01], respectively) (Table 49). While only being in the middle-income group increased the risk of obesity relative to being in the high-income group (OR=1.43 [CI=1.11, 1.84]) after the exclusion, both being in low- and middle-income groups increased the risk of obesity compared to being in the high-income group before the exclusion (OR=1.38 [CI=1.05, 1.81] and OR=1.51 [CI=1.21, 1.88], respectively in Table 18). When subjects were categorized by gender and race/ethnicity together, being in low- and middle-income groups increased the risk of obesity relative to being in the high-income group in white women (OR=1.88 [CI=1.44, 2.45] and OR=1.46 [CI=1.11, 1.92], respectively). Black women in the low- and middle-income groups had a higher risk of obesity than black women in the high-income group (OR=1.73 [CI=1.28, 2.34] and OR=1.88 [CI=1.31, 2.69], respectively). No statistically significant difference was observed in the risk of obesity by the income level in Mexican-American women. White men in the low- and middle-income groups had a higher risk of obesity than white men the high-income group (OR=1.56 [CI=1.10, 2.21] and OR=1.56 [CI=1.22, 2.01], respectively). No statistically significant difference was observed in the risk of obesity by the income level in black and Mexican-American men.

2. Subjects' characteristics

1. Total population

In 1999-2002: Subjects' characteristics were very similar between the two samples before and after excluding respondents who did not have responses on all the variables of the interest (Table 50 and Table 8).

Table 49. Risk of obesity among different subgroups[1] (NHANES 1988-94 for the regression)

	W (n=4,590)		M (n=5,679)		WW (n=2,199)		BW(n=1,336)		MW (n=1,055)	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Intercept	0.13	(0.09, 0.18)	0.11	(0.08, 0.15)	0.12	(0.08, 0.20)	0.19	(0.13, 0.29)	0.28	(0.16, 0.50)
Income										
PIR <1.85	1.96	(1.51, 2.54)	1.35	(1.00, 1.83)	1.77	(1.27, 2.47)	1.53	(1.02, 2.30)	1.40	(0.83, 2.34)
1.85 ≤ PIR ≤ 3.5	1.44	(1.11, 1.87)	1.43	(1.11, 1.84)	1.35	(1.01, 1.81)	1.64	(1.06, 2.54)	1.26	(0.76, 2.08)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age										
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.98	(1.30, 3.01)	1.51	(1.04, 2.17)	2.05	(1.18, 3.54)	1.86	(1.29, 2.68)	1.42	(0.86, 2.35)
40-49 yrs	2.25	(1.45, 3.49)	2.27	(1.64, 3.14)	2.10	(1.18, 3.76)	2.92	(1.92, 4.44)	2.27	(1.40, 3.67)
50-59 yrs	3.19	(2.09, 4.86)	3.24	(2.18, 4.81)	3.22	(1.91, 5.45)	4.02	(2.40, 6.76)	1.79	(1.03, 3.10)
60+ yrs	1.82	(1.27, 2.62)	2.25	(1.70, 2.97)	1.89	(1.21, 2.95)	2.66	(1.55, 4.56)	1.40	(0.75, 2.60)
R^2	0.03		0.02		0.02		0.05		0.02	

Table 49 (cont'd)

	WM (n=2,539)		BM (n=1,516)		MM (n=1,624)	
	OR	CI	OR	CI	OR	CI
Intercept	0.09	(0.06, 0.14)	0.27	(0.18, 0.40)	0.18	(0.09, 0.34)
Income						
PIR <1.85	1.50	(1.03, 2.20)	0.75	(0.50, 1.12)	0.74	(0.46, 1.18)
1.85 ≤ PIR ≤ 3.5	1.46	(1.10, 1.93)	1.13	(0.72, 1.78)	0.93	(0.54, 1.60)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.64	(1.03, 2.61)	1.03	(0.71, 1.50)	1.34	(0.91, 1.96)
40-49 yrs	2.50	(1.66, 3.77)	1.20	(0.80, 1.80)	2.98	(1.77, 4.99)
50-59 yrs	3.78	(2.34, 6.11)	1.07	(0.66, 1.73)	3.76	(2.17, 6.49)
60+ yrs	2.48	(1.74, 3.55)	1.49	(1.14, 1.93)	1.82	(1.13, 2.92)
R^2	0.03		0.01		0.04	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; underweight subjects; and those who did not have all the responses on the predictors included in the regression.
W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men, MM: Mexican-American men
Highlighted were statistically significant

Table 50. Subjects' characteristics by gender[1]
(NHANES 1999-2002 before the regression)

Variables	n	Percent Total	Men	Women	P[3]
Demographic					
Gender					
Men	3,542	50.2	50.2	N/A	N/A
Women	3,343	49.8	N/A	49.8	
Race/ethnicity					
Non-Hispanic White	3,697	80.6	80.8	80.9	****
Non-Hispanic Black	1,437	11.6	10.6	12.5	
Mexican-Americans	1,751	7.6	8.5	6.6	
Education					
< High school	2,287	19.7	20.2	19.1	NS
High school graduate	1,627	26.8	26.1	27.4	
> High school	2,961	53.6	53.7	53.5	
Age					
20-29 yrs	1,066	17.3	19.1	15.4	****
30-39 yrs	1,128	20.7	21.6	19.9	
40-49 yrs	1,315	23.1	23.0	23.3	
50-59 yrs	955	16.8	16.6	17.0	
60+ yrs	2,421	22.1	19.7	24.5	
Poverty Income Ratio (PIR)					
≤ 1.85	2,771	30.5	27.5	33.5	****
1.86-3.5	1,751	24.4	24.8	24.1	
> 3.5	2,363	45.1	47.7	42.5	
Marital status					
Married	3,800	60.5	63.9	57.1	****
Widowed, divorced, or separated	1,424	17.8	11.4	24.2	
Never married or living with partner	1,321	21.7	24.8	18.7	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	4,816	73.6	69.7	77.3	****
Smoker	1,488	26.4	30.3	22.7	

Table 50 (cont'd)

Variables	n	Percent Total	Men	Women	P^3
Lifestyle factors(cont'd)					
Daily hrs of TV, video or computer use					
≤ 1 hr	1,913	28.6	26.4	30.8	**
2-3 hrs	3,131	46.8	48.5	45.0	
≥ 4 hrs	1,832	24.6	25.1	24.2	
Alcohol consumption (# drinks/wk)	5,599	4±0.1	6±0.2	2±0.2	****
Daily physical activity					
Mainly sit	1,695	24.5	22.4	26.5	****
Walk a lot	3,651	50.2	45.5	55.0	
Carry light or heavy loads	1,532	25.4	32.1	18.5	
Leisure time activity/month					
No activities	2,585	32.3	29.3	35.5	**
1st quintile	758	13.4	14.8	12.0	
2nd quintile	748	13.3	13.1	13.6	
3rd quintile	805	13.8	13.3	14.3	
4th quintile	749	13.6	13.8	13.3	
5th quintile	725	13.6	15.8	11.3	
Reproductive history					
Breast fed your child[4]					
Yes	1,498	N/A	N/A	47.6	N/A
No	1,100	N/A	N/A	36.2	
Never been pregnant	411	N/A	N/A	16.2	
Number of live birth[4]					
0 and never been pregnant	527	N/A	N/A	19.8	N/A
1	432	N/A	N/A	15.6	
2	724	N/A	N/A	26.9	
3	633	N/A	N/A	19.8	
4	326	N/A	N/A	8.7	
≥ 5	484	N/A	N/A	9.1	
Age at the first menarche[4]					
≤ 11 yrs old	582	N/A	N/A	19.3	N/A
12-15 yrs old	2,226	N/A	N/A	74.6	
≥ 16 yrs old	200	N/A	N/A	6.1	

Table 50 (cont'd)

Variables	n	Percent Total	Men	Women	P^3
Weight status and related perceptions and behaviors					
BMI	6,885	28.3±0.1	28.0±0.1	28.6±0.2	**
Weight status					
Normal weight	2,114	33.6	30.5	36.8	****
Overweight	2,538	35.1	41.7	28.5	
Obese	2,233	31.2	27.7	34.8	
Perceived own weight status					
Underweight	303	3.8	6.2	1.5	****
About right	2,762	37.3	44.4	30.2	
Overweight	3,802	58.8	49.4	68.3	
Weight status assessment					
Under-assessor	1,535	18.5	28.0	9.1	****
Accurate assessor	4,692	73.9	69.6	78.2	
Over-assessor	371	7.6	2.4	12.8	
Desired weight changes					
Weigh more	391	5.3	9.1	1.5	****
Stay about the same	2,293	28.7	35.5	21.7	
Weigh less	4,191	66.0	55.4	76.8	
Attempt to lose weight in the past year					
Yes	1,979	34.8	26.2	43.6	****
No	4,202	65.2	73.8	56.5	
Attempt not to gain weight in the past year					
Yes	2,671	43.3	37.5	49.2	****
No	4,207	56.7	62.5	50.9	
Component 1[5]	6,865	5.2±0.0	4.9±0.0	5.4±0.0	****
Component 1[6]	6,165	6.5±0.0	6.1±0.0	6.8±0.0	****
Component 2[7]	6,179	2.7±0.0	2.6±0.0	2.9±0.0	****

Table 50 (cont'd)

Variables	n	Percent Total	Men	Women	P^3
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	1,870	21.4	19.1	23.8	****
1 time/wk	1,525	22.4	20.2	24.7	
2-3 times/wk	1,786	28.7	27.8	29.7	
≥ 4 times/wk	1,432	27.4	32.9	21.9	
Breakfast consumption					
Yes	5,238	79.9	77.9	81.9	***
No	1,372	20.1	22.1	18.1	
Energy intake (kcal/d)	6,615	2,235±15	2,634±26	1,832±20	****
Fat intake					
≤ 30% of energy from fat	2,576	36.3	37.2	35.4	NS
> 30% of energy from fat	4,038	63.7	62.8	64.6	
Number of eating occasions					
≤ 3 times/day	1,656	21.8	23.2	20.4	NS
4 times/day	1,761	24.8	24.1	25.5	
5 times/day	1,469	22.6	21.4	23.7	
6 times/day	907	15.5	15.9	15.0	
≥ 7 times/day	817	15.4	15.4	15.4	
Energy intake reporting status					
Under-reporters	1,596	21.2	18.7	23.7	***
Adequate-reporter	4,727	73.9	75.0	72.8	
Over-reporter	292	4.9	6.4	3.5	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women;those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; non-whites, blacks, or -Mexican Americans; and underweight subjects.

[2] Percent might not add up to 100% due to rounding.

[3] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by weight status were tested by t-test. [4] Based on females only.

[5] Sum of responses to perceived weight status and desired weight status

[6] Sum of responses to perceived weight status, desired weight status, and attempt to lose weight to make this variable comparable to the one in the NHANES 1988-94

[7] Sum of responses to attempt to lose weight and attempt not to gain weight

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

In 1988-94: Subjects' characteristics were very similar between the two samples before and after excluding respondents who did not have responses on all the variables of the interest (Table 51 and Table 9). However, the percent of middle-income subjects was smaller before the exclusion (25.8% in Table 51) compared to the percent after the exclusion (34.0% in Table 9).

2. Gender subpopulation groups

In 1999-2002: Subjects' characteristics were very similar between the two samples (Table 50 and Table 8) with one exception: education attainment did not differ statistically significantly by gender before excluding subjects who did not have responses on all the variables of the interest (Table 50), while it differed statistically significantly after the exclusion (Table 8).

In 1988-94: Subjects' characteristics were very similar between the two samples (Table 51 and Table 9).

3. Income subpopulation groups

In 1999-2002: Subjects' characteristics were very similar between the two samples (Table 52 and Table 10). However, there were some exceptions. While non-leisure time activity did not differ statistically significantly by the income level before excluding subjects who did not have responses to all the variables of interest (Table 52), it differed statistically significantly after the exclusion (Table 10). Mean BMI did not differ statistically significantly by the income level before the exclusion (Table 52), while it differed statistically significantly after the exclusion (Table 10). Mean energy intake did not differ statistically significantly before the exclusion (Table 52), while it differed statistically significantly after the exclusion (Table 10).

Table 51. Subjects' characteristics by gender[1]
(NHANES 1988-94 before the regression)

Variables	n	Percent[2] Total	Men	Women	P[3]
Demographic					
Gender					
Men	7,044	49.6	49.6	N/A	N/A
Women	6,707	50.4	N/A	50.4	
Race/ethnicity					
Non-Hispanic White	6,045	83.4	83.7	83.1	****
Non-Hispanic Black	4,006	11.5	10.7	12.4	
Mexican-Americans	3,700	5.1	5.7	4.6	
Education					
< High school	5,378	23.0	23.8	22.3	****
High school graduate	4,320	35.0	31.5	38.5	
> High school	3,983	42.0	44.7	39.3	
Age					
20-29 yrs	2,730	20.7	22.0	19.4	****
30-39 yrs	2,810	24.1	25.0	23.2	
40-49 yrs	2,235	19.6	19.9	19.2	
50-59 yrs	1,570	12.7	12.6	12.8	
60+ yrs	4,406	22.9	20.4	25.4	
Poverty Income Ratio (PIR)					
≤ 1.85	6,441	28.6	25.9	31.4	****
1.86-3.5	4,092	33.5	34.3	32.8	
> 3.5	3,218	37.9	39.9	35.8	
Marital status					
Married	8,564	67.3	72.4	62.3	****
Widowed, divorced, or separated	2,981	17.6	10.5	24.6	
Never married or living with partner	2,189	15.1	17.1	13.1	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	9,630	69.9	66.5	73.2	****
Smoker	3,775	30.1	33.5	26.8	

Table 51 (cont'd)

Variables	n	Percent[2] Total	Men	Women	P[3]
Lifestyle factors (cont'd)					
Alcohol consumption (# drinks/wk)	10,968	4±0.2	6±0.3	2±0.2	****
Leisure time activity/month					
No activities	2,930	13.8	10.3	17.3	****
1st quintile	2,820	18.8	17.2	20.5	
2nd quintile	1,863	15.6	15.3	15.9	
3rd quintile	1,880	15.6	16.6	14.6	
4th quintile	2,477	21.1	22.6	19.6	
5th quintile	1,781	15.1	18.1	12.2	
Reproductive history					
Breast fed your child[4]					
Yes	3,055	N/A	N/A	44.6	N/A
No	2,541	N/A	N/A	37.5	
Never been pregnant	958	N/A	N/A	17.8	
Number of live birth[4]					
0 and never been pregnant	1,273	N/A	N/A	22.5	N/A
1	1,103	N/A	N/A	16.3	
2	1,665	N/A	N/A	28.2	
3	1,121	N/A	N/A	16.0	
4	692	N/A	N/A	8.1	
≥ 5	1,021	N/A	N/A	8.9	
Age at the first menarche[4]					
≤ 11 yrs old	1,324	N/A	N/A	19.2	N/A
12-15 yrs old	4,971	N/A	N/A	75.2	
≥ 16 yrs old	445	N/A	N/A	5.7	
Weight status and related perceptions and behaviors					
BMI	1,3751	26.8±0.1	26.8±0.1	26.8±0.1	NS
Weight status					
Normal weight	5,227	43.2	38.7	47.7	****
Overweight	4,909	33.8	40.9	26.7	
Obese	3,615	23.0	20.5	25.5	

Table 51 (cont'd)

Variables	n	Percent[2] Total	Men	Women	P^3
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	679	4.0	5.9	2.2	****
About right	5,880	40.1	48.0	32.2	
Overweight	7,185	55.9	46.1	65.6	
Weight status assessment					
Under-assessor	2,916	16.2	25.4	7.3	****
Accurate assessor	9,331	72.1	70.2	74.0	
Over-assessor	1,047	11.7	4.5	18.7	
Desired weight changes					
Weigh more	904	6.0	9.7	2.4	****
Stay about the same	4,869	30.2	37.6	22.8	
Weigh less	7,972	63.8	52.7	74.8	
Attempt to lose weight in the past year					
Yes	5,265	42.5	31.1	53.9	****
No	8,482	57.5	69.0	46.2	
Component 1[5]	13,734	6.5±0.0	6.1±0.0	6.9±0.0	****
Dietary behaviors					
Restaurant food consumption					
Consumer	2,080	21.2	23.8	18.6	****
Non-consumer	11,216	78.8	76.2	81.4	
Breakfast consumption					
Yes	10,365	80.2	78.3	82.1	**
No	2,931	19.8	21.8	17.9	
Energy intake (kcal/d)	13,301	2,209±23	2,673±29	1,757±18	****
Fat intake					
≤ 30% of energy from fat	4,820	34.8	32.5	37.1	**
> 30% of energy from fat	8,481	65.2	67.5	62.9	

Table 51 (cont'd)

Variables	n	Percent[2] Total	Men	Women	P[3]
Dietary behaviors (cont'd)					
Number of eating occasions					
≤ 3 times/day	3,916	21.0	21.5	20.4	**
4 times/day	3,663	25.0	24.3	25.7	
5 times/day	2,755	24.0	22.9	25.0	
6 times/day	1,506	13.9	13.6	14.1	
≥ 7 times/day	1,456	16.2	17.7	14.8	
Energy intake reporting status					
Under-reporters	3,302	20.7	15.3	25.9	****
Adequate-reporter	9,355	73.8	77.0	70.6	
Over-reporter	644	5.6	7.7	3.5	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; and underweight subjects.

[2] Percent might not add up to 100% due to rounding.

[3] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by weight status were tested by t-test.

[4] Based on females only.

[5] Sum of responses to the questions on perceived weight status, desired weight status and attempt to lose weight.

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

Table 52. Subjects' characteristics by income and gender[1] (NHANES 1999-2002 before the regression)

Variables	n	Total (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	3,343	54.7	49.0	46.9	****
Male	3,542	45.3	51.0	53.1	
Race/ethnicity					
Non-Hispanic White	3,697	67.6	79.9	90.3	****
Non-Hispanic Black	1,437	18.1	12.4	6.7	
Mexican-Americans	1,751	14.3	7.7	3.0	
Education					
< High school	2,287	38.1	19.6	7.2	****
High school graduate	1,627	30.5	31.9	21.4	
> High school	2,961	31.4	48.5	71.4	
Age					
20-29 yrs	1,066	26.5	15.9	11.8	****
30-39 yrs	1,128	20.8	24.0	18.9	
40-49 yrs	1,315	17.4	19.1	29.2	
50-59 yrs	955	10.0	13.6	23.0	
60+ yrs	2,421	25.3	27.4	17.1	
Marital status					
Married	3,800	43.3	59.2	72.8	****
Widowed, divorced, or separated	1,424	26.6	18.8	11.3	
Never married or living with partner	1,321	30.2	22.0	15.9	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	4,816	63.5	70.5	81.8	****
Smoker	1,488	36.5	29.5	18.2	
Daily hrs of TV, video or computer use					
≤ 1 hr	1,913	25.5	25.8	32.2	****
2-3 hrs	3,131	42.0	47.1	49.8	
≥ 4 hrs	1,832	32.5	27.1	18.0	
Alcohol consumption (# drinks/wk)	5,599	5±0.3	4±0.3	4±0.2	NS

Table 52 (cont'd)

Variables	n	Total (%) Low	Middle	High	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	1,695	26.0	19.9	25.9	***
Walk a lot	3,651	49.4	52.1	49.7	
Carry light or heavy loads	1,532	24.6	28.0	24.5	
Leisure time activity/month					
No activities	2,585	46.4	35.2	22.0	****
1st quintile	758	12.5	12.9	14.2	
2nd quintile	748	12.0	14.2	13.8	
3rd quintile	805	10.5	14.0	15.8	
4th quintile	749	8.1	12.3	17.6	
5th quintile	725	10.5	11.5	16.6	
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	6,885	28.7±0.2	28.6±0.2	27.9±0.2	**
Weight status					
Normal weight	2,114	34.5	30.4	34.8	**
Overweight	2,538	31.8	35.7	37.1	
Obese	2,233	33.8	33.9	28.1	

Table 52 (cont'd)

Variables	n	Total (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	303	6.0	4.2	2.2	****
About right	2,762	41.1	35.4	35.8	
Overweight	3,802	52.9	60.4	62.0	
Weight status assessment					
Under-assessor	1,535	24.7	18.9	14.2	****
Accurate assessor	4,692	69.1	74.7	76.7	
Over-assessor	371	6.2	6.4	9.2	
Desired weight changes					
Weigh more	391	7.8	6.2	3.1	****
Stay about the same	2,293	33.4	28.0	25.8	
Weigh less	4,191	58.8	65.7	71.1	
Attempt to lose weight in the past year					
Yes	1,979	27.4	34.8	39.9	***
No	4,202	72.6	65.2	60.1	
Attempt not to gain weight in the past year					
Yes	2,671	33.0	39.6	52.3	****
No	4,207	67.0	60.4	47.7	
Component 1[4]	6,865	5.0±0.0	5.2±0.0	5.3±0.0	****
Component 1[5]	6,165	6.2±0.0	6.5±0.1	6.6±0.0	****
Component 2[6]	6,179	2.6±0.0	2.7±0.0	2.9±0.0	****
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	1,870	33.3	22.4	12.9	****
1 time/wk	1,525	23.8	21.2	22.2	
2-3 times/wk	1,786	25.7	29.0	30.6	
≥ 4 times/wk	1,432	17.2	27.5	34.3	
Breakfast consumption					
Yes	5,238	73.0	81.5	83.6	***
No	1,372	27.0	18.5	16.4	

Table 52 (cont'd)

Variables	n	Total (%) Low	Middle	High	P^2
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	6,615	2,136±24	2,273±31	2,280±27	**
Fat intake					
≤ 30% of energy from fat	2,576	40.2	33.5	35.2	*
> 30% of energy from fat	4,038	59.8	66.5	64.8	
Number of eating occasions					
≤ 3 times/day	1,656	29.9	21.8	16.4	****
4 times/day	1,761	26.1	25.6	23.4	
5 times/day	1,469	20.5	21.6	24.6	
6 times/day	907	13.6	15.6	16.7	
≥ 7 times/day	817	10.0	15.5	19.0	
Energy intake reporting status					
Under-reporter	1,596	25.4	21.7	18.1	***
Adequate-reporter	4,727	69.6	71.8	77.9	
Over-reporter	292	4.9	6.5	4.0	

Table 52 (cont'd)

Variables	n	Men (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	3,542	27.5	24.8	47.7	
Race/ethnicity					
Non-Hispanic White	1,931	65.7	79.9	90.0	****
Non-Hispanic Black	705	16.6	11.3	6.9	
Mexican-Americans	906	17.7	8.8	3.1	
Education					
< High school	1,213	39.3	21.6	8.5	****
High school graduate	813	28.5	31.5	22.0	
> High school	1,510	32.2	46.9	69.5	
Age					
20-29 yrs	582	29.7	17.6	13.9	****
30-39 yrs	585	22.2	24.3	19.8	
40-49 yrs	665	18.1	19.9	27.4	
50-59 yrs	488	10.1	13.4	21.9	
60+ yrs	1,222	19.9	24.8	17.1	
Marital status					
Married	2,160	51.2	61.5	72.3	****
Widowed, divorced, or separated	467	14.4	13.0	8.8	
Never married or living with partner	744	34.5	25.5	18.9	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	2,320	57.6	65.2	78.9	****
Smoker	889	42.5	34.8	21.1	
Daily hrs of TV, video or computer use					
≤ 1 hr	918	23.5	23.6	29.6	****
2-3 hrs	1,666	43.8	48.7	51.0	
≥ 4 hrs	955	32.7	27.8	19.3	
Alcohol consumption (# drinks/wk)	3,154	7±0.5	6±0.5	6±0.2	NS

Table 52 (cont'd)

Variables	n	Men (%) Low	Middle	High	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	787	21.4	18.2	25.2	**
Walk a lot	1,746	44.7	46.3	45.5	
Carry light or heavy loads	1,006	33.9	35.6	29.3	
Leisure time activity/month					
No activities	1,223	43.8	33.9	19.1	****
1st quintile	424	13.8	14.1	15.7	
2nd quintile	383	11.9	13.0	13.7	
3rd quintile	414	9.4	13.9	15.2	
4th quintile	140	8.8	11.8	17.5	
5th quintile	433	12.4	13.4	18.9	
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	3,542	27.8±0.2	28.1±0.2	28.1±0.2	NS
Weight status					
Normal weight	1,069	35.9	29.5	28.0	*
Overweight	1,506	38.0	40.6	44.5	
Obese	967	26.1	29.9	27.6	

Table 52 (cont'd)

Variables	n	Men (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	222	9.9	6.8	3.7	****
About right	1,705	50.4	43.4	41.5	
Overweight	1,606	39.7	49.8	54.8	
Weight status assessment					
Under-assessor	1,083	35.8	29.1	22.9	****
Accurate assessor	2,234	62.0	68.3	74.7	
Over-assessor	73	2.2	2.6	2.5	
Desired weight changes					
Weigh more	302	13.9	11.0	5.5	***
Stay about the same	1,457	41.4	35.3	31.8	
Weigh less	1,778	44.8	53.8	62.7	
Attempt to lose weight in the past year					
Yes	775	20.2	23.3	31.3	****
No	2,420	79.8	76.7	68.7	
Attempt not to gain weight in the past year					
Yes	1,190	25.9	31.4	47.4	****
No	2,348	74.1	68.6	52.6	
Component 1[4]	3,531	4.6±0.1	4.9±0.1	5.1±0.0	****
Component 1[5]	3,187	5.8±0.1	6.0±0.1	6.3±0.1	****
Component 2[6]	3,194	2.4±0.0	2.5±0.0	2.7±0.0	****
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	898	30.0	20.7	11.9	****
1 time/wk	721	22.0	19.3	19.7	
2-3 times/wk	903	24.9	28.1	29.3	
≥ 4 times/wk	875	23.1	31.9	39.1	
Breakfast consumption					
Yes	2,629	71.4	78.4	81.4	**
No	767	28.6	21.6	18.7	

Table 52 (cont'd)

Variables	n	Men (%) Low	Middle	High	P^2
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	3,398	2,549±47	2,686±59	2,656±37	NS
Fat intake					
≤ 30% of energy from fat	1,348	43.1	35.6	34.6	**
> 30% of energy from fat	2,049	56.9	64.4	65.4	
Number of eating occasions					
≤ 3 times/day	890	32.5	23.1	17.9	****
4 times/day	886	23.5	25.7	23.5	
5 times/day	728	21.7	19.8	22.2	
6 times/day	466	13.4	16.8	17.0	
≥ 7 times/day	426	8.9	14.7	19.5	
Energy intake reporting status					
Under-reporter	724	23.4	18.9	15.9	**
Adequate-reporter	2,481	70.4	72.3	79.0	
Over-reporter	193	6.3	8.8	5.1	

Table 52 (cont'd)

Variables	n	Women (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	3,343	33.5	24.1	42.5	N/A
Male	N/A	N/A	N/A	N/A	
Race/ethnicity					
Non-Hispanic White	1,766	69.1	80.0	90.6	****
Non-Hispanic Black	732	19.4	13.6	6.5	
Mexican-Americans	845	11.5	6.5	2.9	
Education					
< High school	1,074	37.1	17.6	5.8	****
High school graduate	814	32.2	32.3	20.8	
> High school	1,451	30.7	50.2	73.4	
Age					
20-29 yrs	484	23.9	14.3	9.4	****
30-39 yrs	543	19.7	23.6	17.9	
40-49 yrs	650	16.7	18.2	31.3	
50-59 yrs	467	9.9	13.9	24.3	
60+ yrs	1,199	29.8	30.1	17.2	
Marital status					
Married	1,640	36.9	56.8	73.3	****
Widowed, divorced, or separated	957	36.5	24.8	14.2	
Never married or living with partner	577	26.6	18.4	12.5	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	2,496	68.4	75.7	85.0	****
Smoker	599	31.6	24.3	15.0	
Daily hrs of TV, video or computer use					
≤ 1 hr	995	27.2	28.1	35.2	****
2-3 hrs	1,465	40.4	45.4	48.4	
≥ 4 hrs	877	32.3	26.5	16.5	
Alcohol consumption (# drinks/wk)	2,445	2±0.3	2±0.2	3±0.2	**

Table 52 (cont'd)

Variables	n	Women (%) Low	Middle	High	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	908	29.8	21.8	26.6	**
Walk a lot	1,905	53.2	58.2	54.5	
Carry light or heavy loads	526	16.9	20.1	18.9	
Leisure time activity/month					
No activities	1,362	48.5	36.5	25.3	****
1st quintile	334	11.4	11.6	12.6	
2nd quintile	365	12.0	15.5	13.8	
3rd quintile	391	11.5	14.1	16.5	
4th quintile	339	7.6	12.8	17.8	
5th quintile	292	8.9	9.5	14.0	
Reproductive history					
Breast fed your child[3]					
Yes	1,498	46.1	45.1	50.2	*
No	1,100	40.9	39.1	30.9	
Never been pregnant	411	13.1	15.8	19.0	
Number of live birth[3]					
0 and never been pregnant	527	15.2	18.8	23.9	****
1	432	18.0	14.2	14.7	
2	724	19.0	25.4	33.7	
3	633	20.1	24.1	17.2	
4	326	11.8	9.8	5.9	
≥ 5	484	15.9	7.9	4.6	
Age at the first menarche[3]					
≤ 11 yrs old	582	19.2	16.4	21.1	NS
12-15 yrs old	2,226	74.1	77.0	73.6	
≥ 16 yrs old	200	6.8	6.6	5.3	
Weight status and related perceptions and behaviors					
BMI	3,343	29.4±0.3	29.1±0.3	27.6±0.3	***
Weight status					
Normal weight	1,045	33.3	31.3	42.6	***
Overweight	1,032	26.6	30.6	28.7	
Obese	1,266	40.2	38.0	28.7	

Table 52 (cont'd)

Variables	n	Women (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	81	2.8	1.5	0.5	**
About right	1,057	33.5	27.0	29.4	
Overweight	2,196	63.7	71.5	70.1	
Weight status assessment					
Under-assessor	452	15.6	8.4	4.4	****
Accurate assessor	2,458	75.0	81.3	78.9	
Over-assessor	298	9.5	10.3	16.7	
Desired weight changes					
Weigh more	89	2.9	1.4	0.4	****
Stay about the same	836	26.6	20.2	18.8	
Weigh less	2,413	70.5	78.3	80.8	
Attempt to lose weight in the past year					
Yes	1,204	33.5	46.7	49.9	***
No	1,782	66.5	53.3	50.1	
Attempt not to gain weight in the past year					
Yes	1,481	38.9	48.2	57.8	****
No	1,859	61.2	51.8	42.2	
Component 1[4]	3,334	5.3±0.0	5.5±0.0	5.5±0.0	***
Component 1[5]	2,978	6.6±0.1	6.9±0.1	7.0±0.1	****
Component 2[6]	2,985	2.7±0.0	2.9±0.0	3.0±0.0	****
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	972	36.1	24.1	13.9	****
1 time/wk	804	25.3	23.2	25.1	
2-3 times/wk	883	26.4	29.9	32.1	
≥ 4 times/wk	557	12.2	22.9	28.9	
Breakfast consumption					
Yes	2,609	74.4	84.8	86.2	***
No	605	25.6	15.2	13.9	

Table 52 (cont'd)

Variables	n	Women (%) Low	Middle	High	P^2
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	3,217	1,794±33	1,844±30	1,855±25	NS
Fat intake					
≤ 30% of energy from fat	1,228	37.8	31.4	35.8	NS
> 30% of energy from fat	1,989	62.2	68.6	64.2	
Number of eating occasions					
≤ 3 times/day	766	27.7	20.4	14.7	****
4 times/day	875	28.2	25.5	23.3	
5 times/day	741	19.5	23.5	27.2	
6 times/day	441	13.8	14.4	16.4	
≥ 7 times/day	391	10.8	16.3	18.4	
Energy intake reporting status					
Under-reporter	872	27.2	24.6	20.6	**
Adequate-reporter	2,246	69.0	71.3	76.7	
Over-reporter	99	3.8	4.2	2.8	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; non-whites, blacks, or -Mexican Americans; and underweight subjects.
Percent might not be add up to 100% due to rounding.

[2] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by income levels were tested by ANOVA.

[3] Based on females only.

[4] Sum of responses to perceived weight status and desired weight status

[5] Sum of responses to perceived weight status, desired weight status, and attempt to lose weight to make this variable comparable to the one in the NHANES 1988-94

[6] Sum of responses to attempt to lose weight and attempt not to gain weight

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

In 1988-94: Subjects' characteristics were very similar between two samples (Table 53 and Table 11). However, the percent of low-income women was larger before the exclusion compared to the percent after the exclusion (55.3 in Table 53 vs. 49.5% in Table 11).

4. Racial/ethnic subpopulation groups

In 1999-2002: Subjects' characteristics were very similar between the two samples before and after excluding respondents who did not have responses on all the variables of the interest (Table 54 and Table 12). However, there were some exceptions. The percent of Mexican-American women in the sample was also larger before the exclusion (43.5% in Table 54) compared to the percent after the exclusion (35.9% in Table 12). The percent of blacks who attempted not to gain weight in the past year in the sample was larger before the exclusion (39.6% in Table 54) compared to the percent after the exclusion (30.0% in Table 12). The percent of Mexican-Americans who attempted not to gain weight in the past year was also larger before the exclusion (52.3% Table 54) compared to the percent after the exclusion (31.5% in Table 12).

In 1988-94: Subjects' characteristics were very similar between the two samples (Table 55 and Table 13). However, the percent of women was larger for any race/ethnic groups before the exclusion compared to the percent after the exclusion (50.2 vs. 45.6 % in whites; 54.1 vs. 48.1% in blacks; and 45.0 vs. 37.6% in Mexican-Americans in Table 55 and Table 13).

5. Subpopulation groups by income and gender

In 1999-2002: In men, most of the subjects' characteristics were very similar between the two samples (Table 52 and Table 10). However, there were some exceptions. Alcohol

Table 53. Subjects' characteristics by income and gender[1] (NHANES 1988-94 before the regression)

Variables	n	Total (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	7,044	55.3	49.2	47.7	****
Male	6,707	44.7	50.8	52.3	
Race/ethnicity					
Non-Hispanic White	6,045	67.3	86.4	92.9	****
Non-Hispanic Black	4,006	21.4	10.1	5.3	
Mexican-Americans	3,700	11.4	3.5	1.8	
Education					
< High school	5,378	45.0	21.7	7.6	****
High school graduate	4,320	34.2	41.7	29.7	
> High school	3,983	20.8	36.6	62.8	
Age					
20-29 yrs	2,730	28.3	21.0	14.7	****
30-39 yrs	2,810	22.0	26.6	23.5	
40-49 yrs	2,235	13.1	18.3	25.6	
50-59 yrs	1,570	8.9	10.6	17.5	
60+ yrs	4,406	27.7	23.5	18.8	
Marital status					
Married	8,564	52.4	69.5	76.7	****
Widowed, divorced, or separated	2,981	28.9	15.5	11.0	
Never married or living with partner	2,189	18.8	15.0	12.3	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	9,630	61.9	68.8	76.8	****
Smoker	3,775	38.1	31.2	23.2	
Alcohol consumption (# drinks/wk)	10,968	4±0.3	4±0.3	4±0.2	NS
Leisure time activity/month					
No activities	2,930	22.7	13.5	7.4	****
1st quintile	2,820	20.2	20.6	16.2	
2nd quintile	1,863	12.7	16.7	16.8	
3rd quintile	1,880	13.5	15.3	17.4	
4th quintile	2,477	18.1	20.5	23.9	
5th quintile	1,781	12.8	13.5	18.3	

Table 53 (cont'd)

Variables	n	Total (%) Low	Middle	High	P^2
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	1,3751	27.2±0.2	27.1±0.2	26.3±0.1	****
Weight status					
Normal weight	5,227	41.8	42.2	45.2	****
Overweight	4,909	31.9	33.0	35.8	
Obese	3,615	26.3	24.8	19.0	
Perceived own weight status					
Underweight	679	5.6	4.3	2.6	****
About right	5,880	42.6	37.8	40.1	
Overweight	7,185	51.8	57.9	57.3	
Weight status assessment					
Under-assessor	2,916	20.2	15.1	14.3	****
Accurate assessor	9,331	71.1	73.8	71.3	
Over-assessor	1,047	8.7	11.1	14.4	
Desired weight changes					
Weigh more	904	7.6	7.0	4.1	****
Stay about the same	4,869	35.3	27.0	29.1	
Weigh less	7,972	57.2	66.1	66.8	

Table 53 (cont'd)

Variables	n	Total (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight in the past year					
Yes	5,265	36.9	43.6	45.9	****
No	8,482	63.1	56.4	54.1	
Component 1[4]	13,734	6.3±0.0	6.6±0.0	6.6±0.0	****
Dietary behaviors					
Restaurant food consumption					
Consumer	2,080	12.8	19.1	29.3	****
Non-consumer	11,216	87.2	80.9	70.7	
Breakfast consumption					
Yes	10,365	76.6	80.4	82.8	***
No	2,931	23.4	19.6	17.3	
Energy intake (kcal/d)	13,301	2,103±33	2,250±23	2,253±36	****
Fat intake					
≤ 30% of energy from fat	4,820	36.4	31.6	36.5	**
> 30% of energy from fat	8,481	63.6	68.4	63.5	
Number of eating occasions					
≤ 3 times/day	3,916	29.9	18.2	16.7	****
4 times/day	3,663	28.5	24.6	22.7	
5 times/day	2,755	19.6	24.0	27.2	
6 times/day	1,506	11.5	15.6	14.1	
≥ 7 times/day	1,456	10.4	17.6	19.3	
Energy intake reporting status					
Under-reporter	3,302	26.4	19.0	17.9	****
Adequate-reporter	9,355	67.4	75.6	76.9	
Over-reporter	644	6.2	5.3	5.3	

Table 53 (cont'd)

Variables	n	Men (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	6,690	25.8	34.3	39.9	
Race/ethnicity					
Non-Hispanic White	2,903	66.2	86.5	92.6	****
Non-Hispanic Black	1,874	20.1	9.6	5.5	
Mexican-Americans	1,930	13.7	3.9	2.0	
Education					
< High school	2,783	46.7	24.6	8.5	****
High school graduate	1,884	31.4	37.1	26.8	
> High school	2,000	21.9	38.4	64.8	
Age					
20-29 yrs	1,385	31.7	23.8	14.2	****
30-39 yrs	1,299	22.6	27.3	24.6	
40-49 yrs	1,082	13.9	18.3	25.2	
50-59 yrs	743	9.0	9.5	17.7	
60+ yrs	2,198	22.8	21.2	18.3	
Marital status					
Married	4,704	63.4	72.8	77.9	****
Widowed, divorced, or separated	869	14.4	9.3	9.1	
Never married or living with partner	1,129	22.2	18.0	13.0	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	4,399	57.1	65.0	73.8	****
Smoker	2,124	43.0	35.0	26.2	
Alcohol consumption (# drinks/wk)	5,899	7±0.5	6±0.5	6±0.3	NS
Leisure time activity/month					
No activities	1,085	18.1	9.8	5.6	****
1st quintile	1,269	19.2	20.3	13.2	
2nd quintile	920	11.7	16.5	16.6	
3rd quintile	979	13.9	16.2	18.5	
4th quintile	1,333	20.6	21.4	24.9	
5th quintile	1,121	16.4	15.8	21.2	

Table 53 (cont'd)

Variables	n	Men (%) Low	Middle	High	P^2
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	6,707	26.6±0.2	27.2±0.2	26.7±0.1	NS
Weight status					
Normal weight	2,535	43.7	36.5	37.3	***
Overweight	2,749	35.5	40.6	44.6	
Obese	1,423	20.8	22.9	18.2	
Perceived own weight status					
Underweight	443	8.7	6.3	3.7	****
About right	3,545	54.4	44.2	47.1	
Overweight	2,715	37.0	49.4	49.1	
Weight status assessment					
Under-assessor	1,993	30.0	24.0	23.5	****
Accurate assessor	4,273	67.5	72.2	70.2	
Over-assessor	199	2.5	3.8	6.3	
Desired weight changes					
Weigh more	632	12.6	11.3	6.5	****
Stay about the same	3,032	46.3	32.9	36.1	
Weigh less	3,038	41.1	55.8	57.4	

Table 53 (cont'd)

Variables	n	Men (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight in the past year					
Yes	1,799	21.6	33.2	35.3	****
No	4,906	78.4	66.8	64.7	
Component 1[4]	6,696	5.8±0.1	6.2±0.1	6.3±0.1	****
Dietary behaviors					
Restaurant food consumption					
Consumer	1,176	14.9	21.4	31.7	****
Non-consumer	5,288	85.2	78.6	68.3	
Breakfast consumption					
Yes	4,965	75.6	77.9	80.3	NS
No	1,499	24.4	22.1	19.7	
Energy intake (kcal/d)	6,469	2,615±49	2,701±36	2,687±44	NS
Fat intake					
≤ 30% of energy from fat	2,270	34.8	29.6	33.7	*
> 30% of energy from fat	4,199	65.2	70.4	66.4	
Number of eating occasions					
≤ 3 times/day	1,944	29.5	19.7	17.9	****
4 times/day	1,762	28.9	22.5	22.9	
5 times/day	1,290	17.7	23.1	26.1	
6 times/day	705	12.1	16.0	12.6	
≥ 7 times/day	763	11.9	18.7	20.5	
Energy intake reporting status					
Under-reporter	1,286	20.6	15.1	12.1	****
Adequate-reporter	4,756	69.2	77.4	81.7	
Over-reporter	427	10.2	7.4	6.2	

Table 53 (cont'd)

Variables	n	Women (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	7,029	31.4	32.8	35.8	N/A
Male	N/A	N/A	N/A	N/A	
Race/ethnicity					
Non-Hispanic White	3,142	68.1	86.3	93.3	****
Non-Hispanic Black	2,132	22.4	10.7	5.1	
Mexican-Americans	1,770	9.5	3.1	1.6	
Education					
< High school	2,595	43.7	18.8	6.6	****
High school graduate	2,436	36.5	46.5	32.8	
> High school	1,983	19.8	34.9	60.5	
Age					
20-29 yrs	1,345	25.5	18.2	15.2	****
30-39 yrs	1,511	21.5	25.7	22.2	
40-49 yrs	1,153	12.4	18.3	25.9	
50-59 yrs	827	8.9	11.8	17.2	
60+ yrs	2,208	31.7	26.0	19.4	
Marital status					
Married	3,860	43.4	66.1	75.3	****
Widowed, divorced, or separated	2,112	40.6	21.9	13.2	
Never married or living with partner	1,060	16.0	12.0	11.6	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	5,231	65.9	72.7	80.1	****
Smoker	1,651	34.2	27.3	19.9	
Alcohol consumption (# drinks/wk)	5,069	2±0.2	2±0.2	3±0.2	NS
Leisure time activity/month					
No activities	1,845	26.4	17.2	9.3	****
1st quintile	1,551	21.1	20.9	19.5	
2nd quintile	943	13.5	17.0	17.0	
3rd quintile	901	13.2	14.3	16.2	
4th quintile	1,144	16.0	19.5	22.8	
5th quintile	660	9.8	11.1	15.2	

Table 53 (cont'd)

Variables	n	Women (%) Low	Middle	High	P^2
Reproductive history					
Breast fed your child[3]					
Yes	3,055	47.8	44.4	42.1	****
No	2,541	40.0	39.9	33.1	
Never been pregnant	958	12.3	15.8	24.9	
Number of live birth[3]					
0 and never been pregnant	1,273	15.4	19.8	31.0	****
1	1,103	16.6	16.7	15.8	
2	1,665	24.6	28.0	31.6	
3	1,121	17.5	18.6	12.3	
4	692	11.2	8.0	5.4	
≥ 5	1,021	14.7	8.9	4.0	
Age at the first menarche[3]					
≤ 11 yrs old	1,324	18.7	17.9	20.7	NS
12-15 yrs old	4,971	74.7	76.4	74.5	
≥ 16 yrs old	445	6.5	5.8	4.8	
Weight status and related perceptions and behaviors					
BMI	7,044	27.8±0.2	26.9±0.3	25.9±0.2	****
Weight status					
Normal weight	2,692	40.2	48.2	54.0	****
Overweight	2,160	29.0	25.2	26.2	
Obese	2,192	30.8	26.7	19.8	
Perceived own weight status					
Underweight	236	3.1	2.3	1.3	**
About right	2,335	33.1	31.2	32.4	
Overweight	4,470	63.8	66.6	66.3	
Weight status assessment					
Under-assessor	923	12.3	6.0	4.2	****
Accurate assessor	5,058	74.0	75.5	72.5	
Over-assessor	848	13.7	18.5	23.2	
Desired weight changes					
Weigh more	272	3.5	2.5	1.4	****
Stay about the same	1,837	26.4	20.9	21.5	
Weigh less	4,934	70.1	76.6	77.1	

Table 53 (cont'd)

Variables	n	Women (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight in the past year					
Yes	3,466	49.3	54.2	57.5	**
No	3,576	50.7	45.8	42.5	
Component 1[4]	7,038	6.8±0.0	6.9±0.0	7.0±0.0	***
Dietary behaviors					
Restaurant food consumption					
Consumer	904	11.1	16.8	26.8	****
Non-consumer	5,928	88.9	83.2	73.2	
Breakfast consumption					
Yes	5,400	77.4	83.0	85.4	****
No	1,432	22.6	17.0	14.6	
Energy intake (kcal/d)	6,832	1,691±23	1,791±22	1,782±31	**
Fat intake					
≤ 30% of energy from fat	2,550	37.7	33.7	39.6	*
> 30% of energy from fat	4,282	62.3	66.3	60.4	
Number of eating occasions					
≤ 3 times/day	1,972	30.2	16.6	15.3	****
4 times/day	1,901	28.2	26.8	22.5	
5 times/day	1,465	21.2	24.9	28.5	
6 times/day	801	11.1	15.2	15.8	
≥ 7 times/day	693	9.3	16.4	18.0	
Energy intake reporting status					
Under-reporter	2,016	31.0	23.0	24.1	***
Adequate-reporter	4,599	66.0	73.9	71.7	
Over-reporter	217	3.0	3.1	4.2	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than white, black, or Mexican American; and underweight subjects.

[2] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by income levels were tested by ANOVA. [3] Based on females only.

[4] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

Table 54. Subjects' characteristics by race/ethnicity and gender[1] (NHANES 1999-2002 before the regression)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	3,343	49.8	53.9	43.5	****
Male	3,542	50.2	46.1	56.5	
Poverty Income Ratio (PIR)					
≤ 1.85	2,771	25.5	47.8	57.4	****
1.86-3.5	1,751	24.1	26.2	24.7	
> 3.5	2,363	50.4	26.0	17.9	
Education					
< High school	2,287	14.1	35.5	55.3	****
High school graduate	1,627	28.0	23.2	18.6	
> High school	2,961	57.9	41.4	26.1	
Age					
20-29 yrs	1,066	15.4	20.1	33.1	****
30-39 yrs	1,128	19.7	24.6	26.0	
40-49 yrs	1,315	23.1	24.7	21.5	
50-59 yrs	955	17.8	14.1	9.8	
60+ yrs	2,421	24.1	16.5	9.7	
Marital status					
Married	3,800	64.0	34.2	62.1	****
Widowed, divorced, or separated	1,424	17.1	27.1	11.6	
Never married or living with partner	1,321	18.9	38.8	26.4	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	4,816	73.8	69.7	76.2	NS
Smoker	1,488	26.2	30.3	23.8	
Daily hrs of TV, video or computer use					
≤ 1 hr	1,913	28.6	23.7	36.8	****
2-3 hrs	3,131	48.0	39.2	45.3	
≥ 4 hrs	1,832	23.5	37.1	17.9	
Alcohol consumption (# drinks/wk)	5,599	4±0.2	4±0.7	5±0.3	NS

Table 54 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	1,695	24.6	28.8	16.0	****
Walk a lot	3,651	49.4	51.8	55.5	
Carry light or heavy loads	1,532	25.9	19.4	28.5	
Leisure time activity/month					
No activities	2,585	28.7	48.0	47.6	****
1st quintile	758	13.8	11.6	12.2	
2nd quintile	748	14.1	8.9	11.6	
3rd quintile	805	14.6	10.4	11.0	
4th quintile	749	14.5	9.8	8.9	
5th quintile	725	14.3	11.4	8.6	
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	6,885	28.1±0.2	29.7±0.2	28.4±0.2	****
Weight status					
Normal weight	2,114	34.7	29.0	29.0	****
Overweight	2,538	35.2	31.7	39.4	
Obese	2,233	30.1	39.3	31.5	

Table 54 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	303	3.4	6.5	4.8	****
About right	2,762	36.2	42.6	41.5	
Overweight	3,802	60.4	50.9	53.7	
Weight status assessment					
Under-assessor	1,535	16.4	28.8	26.8	****
Accurate assessor	4,692	75.1	68.5	68.5	
Over-assessor	371	8.5	2.7	4.8	
Desired weight changes					
Weigh more	391	4.5	10.2	6.3	****
Stay about the same	2,293	27.0	36.4	34.7	
Weigh less	4,191	68.5	53.4	59.0	
Attempt to lose weight in the past year					
Yes	1,979	35.6	30.3	32.9	**
No	4,202	64.4	69.7	67.1	
Attempt not to gain weight in the past year					
Yes	2,671	45.2	34.9	35.8	****
No	4,207	54.8	65.2	64.2	
Component 1[4]	6,865	5.2±0.0	4.9±0.0	5.0±0.1	****
Component 1[5]	6,165	6.5±0.0	6.1±0.1	6.3±0.1	****
Component 2[6]	6,179	2.8±0.0	2.6±0.0	2.7±0.0	****
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	1,870	19.6	31.0	26.2	****
1 time/wk	1,525	22.3	21.4	26.0	
2-3 times/wk	1,786	29.0	28.3	27.0	
≥ 4 times/wk	1,432	29.2	19.3	20.7	

Table 54 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	6,615	2,248±19	2,153±32	2,208±34	NS
Fat intake					
≤ 30% of energy from fat	2,576	35.0	39.3	45.8	****
> 30% of energy from fat	4,038	65.0	60.7	54.2	
Number of eating occasions					
≤ 3 times/day	1,656	19.6	33.9	27.9	****
4 times/day	1,761	23.8	28.8	29.0	
5 times/day	1,469	23.1	19.2	21.8	
6 times/day	907	16.4	11.2	12.0	
≥ 7 times/day	817	17.1	6.9	9.3	
Energy intake reporting status					
Under-reporter	1,596	19.8	30.6	22.4	****
Adequate-reporter	4,727	75.6	63.4	71.7	
Over-reporter	292	4.7	6.0	6.0	

Table 54 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	3,542	80.8	10.6	8.5	
Poverty Income Ratio (PIR)					
≤ 1.85	1,348	22.3	42.9	56.9	****
1.86-3.5	906	24.5	26.3	25.7	
> 3.5	1,228	53.2	30.8	17.4	
Education					
< High school	1,213	14.3	36.3	56.6	****
High school graduate	813	27.1	23.9	19.5	
> High school	1,510	58.6	39.9	23.9	
Age					
20-29 yrs	582	16.9	22.7	35.9	****
30-39 yrs	585	20.6	24.3	27.4	
40-49 yrs	665	23.1	24.4	20.4	
50-59 yrs	488	17.8	14.2	8.5	
60+ yrs	1,222	21.7	14.4	7.7	
Marital status					
Married	2,160	67.0	39.8	63.7	****
Widowed, divorced, or separated	467	11.0	18.2	6.5	
Never married or living with partner	744	22.0	42.0	29.8	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	2,320	70.8	60.7	70.1	*
Smoker	889	29.2	39.3	29.9	
Daily hrs of TV, video or computer use					
≤ 1 hr	918	26.4	20.1	34.5	****
2-3 hrs	1,666	49.3	43.3	46.8	
≥ 4 hrs	955	24.2	36.6	18.6	
Alcohol consumption (# drinks/wk)	3,154	6±0.2	6±1.2	6±0.5	NS

Table 54 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	787	23.6	23.3	10.7	****
Walk a lot	1,746	44.3	49.9	50.4	
Carry light or heavy loads	1,006	32.1	26.9	38.8	
Leisure time activity/month					
No activities	1,223	26.0	40.8	46.7	****
1st quintile	424	15.3	11.7	13.7	
2nd quintile	383	13.7	9.3	11.8	
3rd quintile	414	13.8	12.9	9.1	
4th quintile	140	14.5	11.9	8.9	
5th quintile	433	16.8	13.4	9.7	
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	3,542	27.1±0.2	27.7±0.2	27.8±0.2	NS
Weight status					
Normal weight	1,069	29.6	37.3	30.4	*
Overweight	1,506	42.4	35.6	43.4	
Obese	967	28.0	27.1	26.2	

Table 54 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	222	5.6	10.2	6.4	****
About right	1,705	42.1	56.6	51.0	
Overweight	1,606	52.3	33.1	42.6	
Weight status assessment					
Under-assessor	1,083	25.6	39.8	35.6	****
Accurate assessor	2,234	71.7	59.2	62.2	
Over-assessor	73	2.7	1.0	2.2	
Desired weight changes					
Weigh more	302	8.2	16.7	8.5	****
Stay about the same	1,457	33.0	47.8	43.8	
Weigh less	1,778	58.8	35.5	47.7	
Attempt to lose weight in the past year					
Yes	775	27.6	18.3	22.6	***
No	2,420	72.4	81.7	77.4	
Attempt not to gain weight in the past year					
Yes	1,190	40.0	28.2	26.1	****
No	2,348	60.1	71.8	73.9	
Component 1[4]	3,531	5.0±0.0	4.4±0.1	4.8±0.1	****
Component 1[5]	3,187	6.2±0.0	5.5±0.1	5.9±0.1	****
Component 2[6]	3,194	2.6±0.0	2.4±0.0	2.4±0.0	****
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	898	17.2	29.4	24.4	***
1 time/wk	721	19.9	20.4	22.8	
2-3 times/wk	903	27.9	27.8	26.8	
≥ 4 times/wk	875	35.0	22.5	26.0	

Table 54 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	3,398	2,658±31	2,523±39	2,542±43	*
Fat intake					
≤ 30% of energy from fat	1,348	35.5	41.3	48.3	***
> 30% of energy from fat	2,049	64.5	58.7	51.8	
Number of eating occasions					
≤ 3 times/day	890	21.1	34.5	29.0	****
4 times/day	886	23.1	29.2	27.4	
5 times/day	728	21.7	18.8	22.6	
6 times/day	466	17.0	11.4	11.2	
≥ 7 times/day	426	17.2	6.1	9.8	
Energy intake reporting status					
Under-reporter	724	17.6	27.1	18.4	****
Adequate-reporter	2,481	76.3	65.2	73.8	
Over-reporter	193	6.0	7.7	7.7	

Table 54 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	3,343	80.9	12.5	6.6	N/A
Male	N/A	N/A	N/A	N/A	
Poverty Income Ratio (PIR)					
≤ 1.85	1,423	28.6	51.9	58.1	****
1.86-3.5	845	23.8	26.1	23.4	
> 3.5	1,075	47.6	22.0	18.5	
Education					
< High school	1,074	13.9	34.7	53.7	****
High school graduate	814	28.9	22.6	17.4	
> High school	1,451	57.2	42.7	29.0	
Age					
20-29 yrs	484	13.9	17.8	29.4	****
30-39 yrs	543	18.7	24.9	24.2	
40-49 yrs	650	23.0	25.0	22.8	
50-59 yrs	467	17.9	14.0	11.3	
60+ yrs	1,199	26.5	18.3	12.3	
Marital status					
Married	1,640	61.1	29.5	60.0	****
Widowed, divorced, or separated	957	23.2	34.4	18.2	
Never married or living with partner	577	15.8	36.0	21.9	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	2,496	76.7	77.7	84.3	**
Smoker	599	23.3	22.3	15.7	
Daily hrs of TV, video or computer use					
≤ 1 hr	995	30.7	26.8	39.7	****
2-3 hrs	1,465	46.6	35.6	43.4	
≥ 4 hrs	877	22.7	37.6	16.9	
Alcohol consumption (# drinks/wk)	2,445	2±0.2	2±0.3	2±0.2	**

Table 54 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Lifestyle factors (cont'd)					
Daily physical activity					
Mainly sit	908	25.7	33.6	22.8	****
Walk a lot	1,905	54.6	53.5	62.2	
Carry light or heavy loads	526	19.7	13.0	15.1	
Leisure time activity/month					
No activities	1,362	31.5	54.1	48.8	****
1st quintile	334	12.2	11.4	10.4	
2nd quintile	365	14.6	8.6	11.4	
3rd quintile	391	15.3	8.3	13.5	
4th quintile	339	14.5	7.9	8.8	
5th quintile	292	11.9	9.7	7.2	
Reproductive history					
Breast fed your child[3]					
Yes	1,498	47.6	38.5	63.0	****
No	1,100	35.1	50.5	24.7	
Never been pregnant	411	17.3	11.0	12.4	
Number of live birth[3]					
0 and never been pregnant	527	20.7	16.5	14.7	**
1	432	15.2	19.3	14.2	
2	724	27.7	23.9	21.7	
3	633	19.9	17.4	23.0	
4	326	8.3	11.0	10.7	
≥ 5	484	8.2	11.9	15.8	
Age at the first menarche[3]					
≤ 11 yrs old	582	18.5	22.9	23.0	*
12-15 yrs old	2,226	75.6	66.6	72.4	
≥ 16 yrs old	200	5.9	8.5	4.6	
Weight status and related perceptions and behaviors					
BMI	3,343	28.1±0.2	31.4±0.3	29.2±0.4	****
Weight status					
Normal weight	1,045	39.9	21.8	27.3	****
Overweight	1,032	28.0	28.4	34.2	
Obese	1,266	32.1	49.8	38.5	

Table 54 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Perceived own weight status					
Underweight	81	1.1	3.2	2.6	NS
About right	1,057	30.2	30.7	29.2	
Overweight	2,196	68.7	66.1	68.2	
Weight status assessment					
Under-assessor	452	7.0	19.2	15.5	****
Accurate assessor	2,458	78.6	76.6	76.4	
Over-assessor	298	14.4	4.2	8.1	
Desired weight changes					
Weigh more	89	0.8	4.7	3.5	***
Stay about the same	836	20.9	26.6	22.9	
Weigh less	2,413	78.3	68.8	73.6	
Attempt to lose weight in the past year					
Yes	1,204	43.7	40.8	46.7	NS
No	1,782	56.3	59.2	53.4	
Attempt not to gain weight in the past year					
Yes	1,481	50.5	40.6	48.5	**
No	1,859	49.5	59.5	51.5	
Component 1[4]	3,334	5.5±0.0	5.3±0.1	5.4±0.1	**
Component 1[5]	2,978	6.9±0.0	6.6±0.1	6.8±0.1	**
Component 2[6]	2,985	2.9±0.0	2.8±0.1	2.9±0.0	*
Dietary behaviors					
Restaurant food consumption					
< 1 time/wk	972	22.1	32.4	28.6	**
1 time/wk	804	24.6	22.2	30.1	
2-3 times/wk	883	30.0	28.7	27.3	
≥ 4 times/wk	557	23.3	16.6	14.0	

Table 54 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Dietary behaviors (cont'd)					
Energy intake (kcal/d)	3,217	1,837±22	1,831±39	1,782±32	NS
Fat intake					
≤ 30% of energy from fat	1,228	34.5	37.6	42.7	***
> 30% of energy from fat	1,989	65.5	62.4	57.3	
Number of eating occasions					
≤ 3 times/day	766	18.0	33.4	26.4	****
4 times/day	875	24.6	28.4	30.9	
5 times/day	741	24.6	19.6	20.8	
6 times/day	441	15.8	11.1	13.1	
≥ 7 times/day	391	17.1	7.6	8.7	
Energy intake reporting status					
Under-reporter	872	21.9	33.7	27.4	**
Adequate-reporter	2,246	74.8	61.7	69.0	
Over-reporter	99	3.3	4.5	3.7	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; non-whites, blacks, or -Mexican Americans; and underweight subjects.

Percent might not be add up to 100% due to rounding.

[2] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by income levels were tested by ANOVA.

[3] Based on females only.

[4] Sum of responses to perceived weight status and desired weight status

[5] Sum of responses to perceived weight status, desired weight status, and attempt to lose weight to make this variable comparable to the one in the NHANES 1988-94

[6] Sum of responses to attempt to lose weight and attempt not to gain weight

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

Table 55. Subjects' characteristics by race/ethnicity and gender[1] (NHANES 1988-94 before the regression)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	7,044	50.2	54.1	45.0	****
Male	6,707	49.8	45.9	55.0	
Poverty Income Ratio (PIR)					
≤ 1.85	6,441	23.1	53.1	63.6	****
1.86-3.5	4,092	34.7	29.5	23.0	
> 3.5	3,218	42.2	17.4	13.4	
Education					
< High school	5,378	19.8	31.2	57.1	****
High school graduate	4,320	35.3	37.8	24.3	
> High school	3,983	44.9	31.0	18.7	
Age					
20-29 yrs	2,730	19.2	25.5	34.9	****
30-39 yrs	2,810	23.4	27.5	27.4	
40-49 yrs	2,235	19.7	19.3	18.4	
50-59 yrs	1,570	13.2	11.1	9.1	
60+ yrs	4,406	24.6	16.6	10.3	
Marital status					
Married	8,564	70.1	45.3	70.5	****
Widowed, divorced, or separated	2,981	16.7	26.7	12.1	
Never married or living with partner	2,189	13.2	28.0	17.4	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	9,630	70.5	63.8	73.1	****
Smoker	3,775	29.5	36.2	26.9	
Alcohol consumption (# drinks/wk)	10,968	4±0.2	4±0.7	5±0.3	NS
Leisure time activity/month					
No activities	2,930	12.0	21.4	25.5	****
1st quintile	2,820	18.4	20.0	23.2	
2nd quintile	1,863	16.2	12.9	12.4	
3rd quintile	1,880	16.0	13.9	12.7	
4th quintile	2,477	22.2	16.1	14.7	
5th quintile	1,781	15.3	15.8	11.5	

Table 55 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	13,751	26.6±0.1	28.0±0.2	27.5±0.2	****
Weight status					
Normal weight	5,227	44.7	36.8	34.5	****
Overweight	4,909	33.5	33.1	39.1	
Obese	3,615	21.8	30.2	26.4	
Perceived own weight status					
Underweight	679	3.6	7.2	4.2	****
About right	5,880	39.6	41.8	43.3	
Overweight	7,185	56.8	51.1	52.5	
Weight status assessment					
Under-assessor	2,916	14.8	23.9	23.2	****
Accurate assessor	9,331	72.4	70.5	70.2	
Over-assessor	1,047	12.8	5.6	6.6	
Desired weight changes					
Weigh more	904	5.4	11.0	5.4	****
Stay about the same	4,869	29.2	34.8	36.5	
Weigh less	7,972	65.5	54.3	58.1	

Table 55 (cont'd)

Variables	n	Total (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight in the past year					
Yes	5,265	43.5	38.4	36.8	****
No	8,482	56.5	61.6	63.2	
Component 1[4]	13,734	6.6±0.0	6.3±0.0	6.4±0.0	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	11,216	76.9	89.9	85.2	****
Consumer	2,080	23.1	10.2	14.8	
Breakfast consumption					
Yes	10,365	82.1	69.8	73.1	****
No	2,931	17.9	30.2	27.0	
Energy intake (kcal/d)	13,301	2,216±26	2,140±26	2,250±28	**
Fat intake					
≤ 30% of energy from fat	4,820	34.7	33.1	41.5	***
> 30% of energy from fat	8,481	65.3	66.9	58.5	
Number of eating occasions					
≤ 3 times/day	3,916	18.0	36.4	33.8	****
4 times/day	3,663	24.5	27.3	28.6	
5 times/day	2,755	24.9	19.0	20.1	
6 times/day	1,506	14.7	9.6	9.0	
≥ 7 times/day	1,456	17.8	7.7	8.4	
Energy intake reporting status					
Under-reporter	3,302	19.6	29.2	19.9	****
Adequate-reporter	9,355	74.9	65.3	73.7	
Over-reporter	644	5.5	5.5	6.4	

Table 55 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	6,707	83.7	10.7	5.7	
Poverty Income Ratio (PIR)					
≤ 1.85	2,970	20.4	48.6	62.3	****
1.86-3.5	2,055	35.5	31.0	23.8	
> 3.5	1,682	44.1	20.5	14.0	
Education					
< High school	2,783	20.4	32.9	57.7	****
High school graduate	1,884	31.5	36.2	22.9	
> High school	2,000	48.1	31.0	19.4	
Age					
20-29 yrs	1,385	20.3	27.1	38.3	****
30-39 yrs	1,299	24.5	27.6	27.7	
40-49 yrs	1,082	20.2	19.4	17.3	
50-59 yrs	743	13.1	11.2	8.0	
60+ yrs	2,198	21.9	14.8	8.7	
Marital status					
Married	4,704	74.8	52.7	74.0	****
Widowed, divorced, or separated	869	9.9	18.2	5.9	
Never married or living with partner	1,129	15.3	29.1	20.2	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	4,399	67.6	58.0	66.4	****
Smoker	2,124	32.4	42.0	33.6	
Alcohol consumption (# drinks/wk)	5,899	6±0.3	7±0.4	7±0.4	NS
Leisure time activity/month					
No activities	1,085	9.1	13.8	21.2	****
1st quintile	1,269	16.9	16.5	21.9	
2nd quintile	920	15.7	13.3	12.5	
3rd quintile	979	17.1	14.4	13.2	
4th quintile	1,333	23.5	18.8	16.1	
5th quintile	1,121	17.7	23.2	15.1	

Table 55 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Reproductive history					
Breast fed your child[3]					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	
Number of live birth[3]					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche[3]					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	6,707	26.8±0.1	26.7±0.2	26.9±0.2	NS
Weight status					
Normal weight	2,535	38.5	42.1	35.0	**
Overweight	2,749	41.2	36.5	44.7	
Obese	1,423	20.4	21.4	20.3	
Perceived own weight status					
Underweight	443	5.4	10.2	5.1	****
About right	3,545	46.7	55.5	53.0	
Overweight	2,715	47.9	34.2	41.9	
Weight status assessment					
Under-assessor	1,993	23.8	34.7	30.7	****
Accurate assessor	4,273	71.3	63.6	66.3	
Over-assessor	199	4.9	1.8	3.0	
Desired weight changes					
Weigh more	632	9.1	16.4	7.2	****
Stay about the same	3,032	35.9	46.6	45.9	
Weigh less	3,038	55.0	37.0	46.9	

Table 55 (cont'd)

Variables	n	Men (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight in the past year					
Yes	1,799	32.4	23.4	25.7	****
No	4,906	67.6	76.6	74.3	
Component 1[4]	2,898	6.2±0.0	5.7±0.0	6.0±0.0	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	5,288	74.4	87.0	82.8	****
Consumer	1,176	25.6	13.0	17.2	
Breakfast consumption					
Yes	4,965	80.1	67.2	72.0	****
No	1,499	19.9	32.8	28.1	
Energy intake (kcal/d)	6,469	2,687±33	2,577±39	2,654±38	NS
Fat intake					
≤ 30% of energy from fat	2,270	31.9	32.2	42.9	***
> 30% of energy from fat	4,199	68.1	67.8	57.1	
Number of eating occasions					
≤ 3 times/day	1,944	18.7	37.2	33.3	****
4 times/day	1,762	23.6	27.1	28.7	
5 times/day	1,290	23.7	18.1	19.9	
6 times/day	705	14.5	9.2	8.2	
≥ 7 times/day	763	19.4	8.4	9.9	
Energy intake reporting status					
Under-reporter	1,286	14.4	22.9	14.6	****
Adequate-reporter	4,756	77.9	69.5	76.9	
Over-reporter	427	7.7	7.6	8.5	

Table 55 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Demographic					
Gender					
Female	7,044	83.1	12.4	4.6	N/A
Male	N/A	N/A	N/A	N/A	
Poverty Income Ratio (PIR)					
≤ 1.85	3,471	25.7	56.9	65.2	****
1.86-3.5	2,037	34.0	28.3	22.1	
> 3.5	1,536	40.2	14.8	12.8	
Education					
< High school	2,595	19.3	29.8	56.3	****
High school graduate	2,436	39.0	39.2	26.0	
> High school	1,983	41.7	31.0	17.7	
Age					
20-29 yrs	1,345	18.1	24.1	30.7	****
30-39 yrs	1,511	22.3	27.4	26.9	
40-49 yrs	1,153	19.1	19.3	19.7	
50-59 yrs	827	13.2	11.0	10.5	
60+ yrs	2,208	27.2	18.2	12.2	
Marital status					
Married	3,860	65.5	39.0	66.3	****
Widowed, divorced, or separated	2,112	23.5	33.9	19.6	
Never married or living with partner	1,060	11.0	27.1	14.1	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	5,231	73.5	68.7	81.1	****
Smoker	1,651	26.5	31.3	18.9	
Alcohol consumption (# drinks/wk)	5,069	2±0.2	2±0.2	2±0.2	NS
Leisure time activity/month					
No activities	1,845	14.9	27.8	30.9	****
1st quintile	1,551	19.8	23.0	24.7	
2nd quintile	943	16.6	12.4	12.1	
3rd quintile	901	14.9	13.5	12.1	
4th quintile	1,144	20.8	13.7	13.0	
5th quintile	660	12.8	9.6	7.2	

Table 55 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Reproductive history					
Breast fed your child[3]					
Yes	3,055	45.3	36.8	53.3	****
No	2,541	35.8	51.4	33.3	
Never been pregnant	958	18.9	11.9	13.5	
Number of live birth[3]					
0 and never been pregnant	1,273	23.4	18.1	16.4	****
1	1,103	15.7	21.5	14.5	
2	1,665	29.3	24.0	20.7	
3	1,121	16.2	14.2	17.1	
4	692	7.8	8.1	13.5	
≥ 5	1,021	7.7	14.1	17.9	
Age at the first menarche[3]					
≤ 11 yrs old	1,324	18.5	22.5	23.1	****
12-15 yrs old	4,971	76.2	68.7	73.3	
≥ 16 yrs old	445	5.3	8.8	3.7	
Weight status and related perceptions and behaviors					
BMI	7,044	26.4±0.2	29.1±0.2	28.2±0.2	****
Weight status					
Normal weight	2,692	50.8	32.2	33.9	****
Overweight	2,160	25.9	30.2	32.3	
Obese	2,192	23.3	37.6	33.8	
Perceived own weight status					
Underweight	236	1.8	4.6	3.1	***
About right	2,335	32.6	30.1	31.3	
Overweight	4,470	65.6	65.4	65.6	
Weight status assessment					
Under-assessor	923	5.9	14.8	14.0	****
Accurate assessor	5,058	73.6	76.4	75.0	
Over-assessor	848	20.6	8.8	11.0	
Desired weight changes					
Weigh more	272	1.8	6.4	3.3	****
Stay about the same	1,837	22.4	24.7	24.9	
Weigh less	4,934	75.8	68.9	71.8	

Table 55 (cont'd)

Variables	n	Women (%) White	Black	Mex-Am	P^2
Weight status and related perceptions and behaviors (cont'd)					
Attempt to lose weight in the past year					
Yes	3,466	54.4	51.2	50.4	NS
No	3,576	45.6	48.8	49.6	
Component 1[4]	7,038	6.9±0.0	6.7±0.0	6.8±0.0	**
Dietary behaviors					
Restaurant food consumption					
Non-consumer	5,928	79.4	92.3	88.1	****
Consumer	904	20.6	7.7	11.9	
Breakfast consumption					
Yes	5,400	84.0	72.1	74.4	****
No	1,432	16.0	27.9	25.6	
Energy intake (kcal/d)	6,832	1,754±20	1,770±23	1,761±24	NS
Fat intake					
≤ 30% of energy from fat	2,550	37.4	33.8	39.7	*
> 30% of energy from fat	4,282	62.6	66.2	60.3	
Number of eating occasions					
≤ 3 times/day	1,972	17.4	35.8	34.5	****
4 times/day	1,901	25.3	27.4	28.4	
5 times/day	1,465	26.1	19.8	20.3	
6 times/day	801	14.9	10.0	10.1	
≥ 7 times/day	693	16.3	7.1	6.7	
Energy intake reporting status					
Under-reporter	2,016	24.6	34.6	26.3	****
Adequate-reporter	4,599	72.0	61.7	69.9	
Over-reporter	217	3.4	3.8	3.8	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than white, black, or Mexican American; and underweight subjects.

[2] Based on the chi-square test except alcohol and energy intakes; differences in alcohol and energy intakes by income levels were tested by ANOVA.

[3] Based on females only.

[4] Sum of responses to perceived weight status, desired weight status, and attempt to lose weight.

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

consumption did not differ statistically significantly by the income level before excluding respondents who did not have responses on all the variables of the interest (Table 52), while it differed statistically significantly by the income level after the exclusion (Table 10). When the weight status was categorized into normal, overweight, and obese based on BMI, it differed statistically significantly by the income level before the exclusion (Table 52), while it did not differ after the exclusion (Table 10). In addition, the percent of low-income men who attempted not to gain weight in the past year was larger before the exclusion (25.9% in Table 52) compared to the percent after the exclusion (19.4% in Table 10).

In women, most of the subjects' characteristics were very similar between the two samples (Table 10 and Table 52). However, there were some exceptions. While alcohol intakes differed statistically significantly by the income level before the exclusion (Table 52), it did not differ statistically significantly after the exclusion (Table 10). Non-leisure time activity differed statistically significantly by the income level before the exclusion (Table 52), while it did not differ statistically significantly after the exclusion (Table 10). Breastfeeding practices differed statistically significantly by the income level before the exclusion (Table 52), while it did not differ statistically significantly after the exclusion (Table 10). Mean score on the component score on desired weight status differed statistically significantly by the income level before the exclusion (Table 52), while it did not differ statistically significantly after the exclusion (Table 10). Energy intake reporting status differed statistically significantly by the income level before the exclusion (Table 52), while it did not differ statistically significantly after the exclusion (Table 10). In addition, the percent of low-income women who did not smoke was larger

before the exclusion (68.4% in Table 52) compared to the percent after the exclusion (60.1% in Table 10).

In 1988-94: In men, subjects' characteristics were very similar between the two samples. However, fat intake differed statistically significantly before the exclusion (Table 53), while it did not differ statistically significantly after the exclusion (Table 11).

In women, subjects' characteristics were very similar between the two samples. However, there were some exceptions. Alcohol intake did not differ statistically significantly before the exclusion (Table 53), while it differed statistically significantly after the exclusion (Table 11). While perception about subjects' own weight status differed statistically significantly before the exclusion (Table 53), it did not differ statistically significantly after the exclusion (Table 11). While attempt to lose weight in the past year differed statistically significantly before the exclusion (Table 53), it did not differ statistically significantly after the exclusion (Table 11). While mean score on the component 1 on desired weight status differed statistically significantly before the exclusion (Table 53), it did not differ statistically significantly after the exclusion (Table 11). Mean energy intake differed statistically significantly before the exclusion (Table 53), while it did not differ statistically significantly after the exclusion (Table 11). Fat intake also differed statistically significantly before the exclusion (Table 53), while it did not differ statistically significantly after the exclusion (Table 11). In addition, the percent of low-income women who did not smoke was larger before the exclusion compared to the percent after the exclusion (65.9% in Table 54 vs. 58.3% in Table 13).

6. Subpopulation groups by income, gender, and race/ethnicity in 1988-94

Most of subjects' characteristics were similar between the two samples (Table 56 and Table 14). However, there were some exceptions. In white men, while weight status differed statistically significantly by the income level before the exclusion (Table 56), it did not differ statistically significantly after the exclusion (Table 14). In Mexican-American men, while marital status did not differ statistically significantly by the income level before the exclusion (Table 56), it differed statistically significantly after the exclusion (Table 14).

In white women, alcohol consumption did not differ statistically significantly by the income level (Table 56), while it differed statistically significantly after the exclusion (Table 14). Weight status differed statistically significantly before the exclusion (Table 56), while it did not differ statistically significantly after the exclusion (Table 14). Accuracy of self-reported weight status differed statistically before the exclusion (Table 56), while it did not differ statistically significantly after the exclusion (Table 14). Mean energy intake differed statistically significantly before the exclusion (Table 56), while it did not differ after the exclusion (Table 14). Energy intake reporting status differed statistically significantly before the exclusion (Table 56), while it did not differ statistically significantly after the exclusion (Table 14).

In black women, while mean BMI differed statistically significantly before the exclusion (Table 56), while it did not differ statistically significantly after the exclusion (Table 14). Breakfast consumption did not differ statistically significantly by the income level before the exclusion (Table 56), while it differed statistically significantly after the exclusion (Table 14). In addition, the percent of black women who did not have any live birth or had never been pregnant was larger for any income level before the exclusion

Table 56. Subjects' characteristics among 18 subgroups by income, gender, and race/ethnicity (NHANES 1988-94 before the regression)[1]

Variables	n	White men (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	2,903	20.4	35.5	44.1	
Education					
< High school	862	40.8	24.0	8.1	****
High school graduate	857	33.5	36.8	26.3	
> High school	1,177	25.7	39.2	65.6	
Age					
20-29 yrs	366	30.1	22.5	13.9	****
30-39 yrs	431	21.1	27.1	24.0	
40-49 yrs	409	12.7	18.4	25.1	
50-59 yrs	392	9.3	9.4	17.9	
60+ yrs	1,305	26.9	22.6	19.0	
Marital status					
Married	2,220	65.9	74.6	79.1	****
Widowed, divorced, or separated	373	14.7	8.7	8.6	
Never married or living with partner	310	19.5	16.7	12.3	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	2,099	58.2	64.7	74.1	***
Smoker	763	41.8	35.3	25.9	
Alcohol intake (# of drinks/wk)	2,623	6.4±0.7	6.0±0.5	6.0±0.3	NS
Leisure time activity/month					
No activities	350	16.0	9.5	5.5	****
1st quintile	511	19.7	20.3	12.9	
2nd quintile	432	11.5	16.8	16.8	
3rd quintile	480	14.0	16.7	18.7	
4th quintile	672	22.4	22.0	25.2	
5th quintile	458	16.3	14.7	20.8	
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	

Table 56 (cont'd)

Variables	n	White men (%) Low	Middle	High	P^2
Reproductive history(cont'd)					
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	2,903	26.6±0.3	27.2±0.2	26.6±0.2	NS
Weight status					
Normal weight	1,099	43.6	36.3	37.8	**
Overweight	1,231	34.3	40.9	44.6	
Obese	573	22.1	22.8	17.6	
Perceived own weight status					
Underweight	160	8.1	6.2	3.5	****
About right	1,456	52.4	42.8	47.2	
Overweight	1,284	39.5	51.0	49.3	
Weight status assessment					
Under-assessor	764	27.8	22.7	22.9	**
Accurate assessor	1,916	69.4	73.2	70.6	
Over-assessor	120	2.8	4.1	6.6	
Desired weight changes					
Weigh more	208	11.9	11.0	6.2	****
Stay about the same	1,228	43.5	31.5	36.0	
Weigh less	1,466	44.7	57.5	57.8	
Attempt to lose weight					
Yes	848	22.6	34.2	35.5	****
No	2,054	77.4	65.8	64.5	

Table 56 (cont'd)

Variables	n	White men (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Component 1[3]	2,898	6±0.1	6±0.1	6±0.1	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	2,149	83.6	77.6	67.5	****
Consumer	654	16.4	22.4	32.5	
Breakfast consumption					
Yes	2,394	79.2	79.4	81.1	NS
No	409	20.9	20.6	18.9	
Energy intake (kcal/d)	2,803	2,648±69	2,708±41	2,688±48	NS
Fat intake					
≤ 30% of energy from fat	907	33.0	29.0	33.7	NS
> 30% of energy from fat	1,896	67.0	71.0	66.3	
Number of eating occasions					
≤ 3 times/day	590	24.7	17.6	16.9	****
4 times/day	732	28.9	22.0	22.6	
5 times/day	635	17.7	23.5	26.7	
6 times/day	385	14.5	16.9	12.6	
≥ 7 times/day	461	14.3	19.9	21.3	
Energy intake reporting status					
Under-reporter	486	20.4	14.4	11.7	***
Adequate-reporter	2,148	68.7	78.1	82.0	
Over-reporter	169	10.9	7.5	6.3	

Table 56 (cont'd)

Variables	n	Black men (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	1,874	48.6	31.0	20.5	
Education					
< High school	718	48.1	22.2	13.0	****
High school graduate	638	34.3	41.9	32.1	
> High school	500	17.6	35.9	54.9	
Age					
20-29 yrs	447	29.9	30.5	15.0	***
30-39 yrs	451	25.0	28.1	32.9	
40-49 yrs	337	16.8	17.9	27.7	
50-59 yrs	197	9.7	10.5	15.9	
60+ yrs	442	18.6	13.0	8.6	
Marital status					
Married	1,021	46.4	55.7	64.5	***
Widowed, divorced, or separated	346	20.4	15.0	17.9	
Never married or living with partner	503	33.2	28.4	20.5	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,056	49.7	64.6	68.1	****
Smoker	739	50.3	35.4	31.9	
Alcohol intake (# of drinks/wk)	1,590	8±0.5	6±0.6	6±0.5	**
Leisure time activity/month					
No activities	296	18.9	10.9	6.3	****
1st quintile	324	15.3	18.3	16.7	
2nd quintile	244	13.0	14.3	12.6	
3rd quintile	263	14.5	13.4	15.6	
4th quintile	347	18.5	18.2	20.2	
5th quintile	400	19.7	24.9	28.6	
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	

Table 56 (cont'd)

Variables	n	Black men (%) Low	Middle	High	P^2
Reproductive history(cont'd)					
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	1,874	26.1±0.2	27.1±0.3	27.4±0.3	***
Weight status					
Normal weight	787	48.9	38.6	31.4	***
Overweight	671	32.9	36.8	44.8	
Obese	416	18.3	24.7	23.8	
Perceived own weight status					
Underweight	188	12.7	8.2	7.3	***
About right	1,052	58.2	55.3	49.5	
Overweight	633	29.1	36.4	43.3	
Weight status assessment					
Under-assessor	624	34.5	34.6	35.0	NS
Accurate assessor	1,146	64.1	63.7	62.1	
Over-assessor	28	1.4	1.6	2.9	
Desired weight changes					
Weigh more	289	18.7	15.8	11.8	***
Stay about the same	901	51.8	42.8	40.3	
Weigh less	681	29.5	41.5	47.9	
Attempt to lose weight					
Yes	440	18.4	25.8	31.8	***
No	1,434	81.6	74.2	68.2	

Table 56 (cont'd)

Variables	n	Black men (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Component 1[3]	1,870	5.5±0.1	5.8±0.1	6.0±0.1	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	1,577	90.0	86.9	80.0	**
Consumer	217	10.0	13.1	20.0	
Breakfast consumption					
Yes	1,227	66.9	67.3	67.7	NS
No	567	33.2	32.8	32.3	
Energy intake (kcal/d)	1,799	2,538±65	2,619±59	2,608±88	NS
Fat intake					
≤ 30% of energy from fat	583	32.5	31.2	33.0	NS
> 30% of energy from fat	1,216	67.5	68.8	67.0	
Number of eating occasions					
≤ 3 times/day	693	39.7	34.3	35.6	NS
4 times/day	476	28.2	25.3	27.2	
5 times/day	315	16.7	20.4	18.0	
6 times/day	168	7.9	9.8	11.4	
≥ 7 times/day	142	7.6	10.2	7.9	
Energy intake reporting status					
Under-reporter	463	24.3	22.9	19.7	NS
Adequate-reporter	1,204	66.8	67.0	75.4	
Over-reporter	132	8.9	7.2	4.9	

Table 56 (cont'd)

Variables	n	Mexican-American men (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	N/A	N/A	N/A	N/A	N/A
Male	1,930	62.3	23.8	14.0	
Education					
< High school	1,203	73.1	42.6	15.2	****
High school graduate	389	17.1	32.0	32.9	
> High school	323	9.8	25.4	51.8	
Age					
20-29 yrs	572	42.4	35.8	24.4	**
30-39 yrs	417	26.5	29.3	30.6	
40-49 yrs	336	15.5	18.7	22.9	
50-59 yrs	154	6.7	8.3	13.2	
60+ yrs	451	9.0	7.9	8.9	
Marital status					
Married	1,463	76.2	71.9	67.8	NS
Widowed, divorced, or separated	150	4.8	6.9	8.9	
Never married or living with partner	316	19.1	21.1	23.3	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,244	62.3	71.7	75.5	**
Smoker	622	37.7	28.3	24.5	
Alcohol intake (# of drinks/wk)	1,686	7±0.5	6±0.4	6±0.6	NS
Leisure time activity/month					
No activities	439	26.9	13.4	8.7	****
1st quintile	434	22.3	23.4	17.7	
2nd quintile	244	11.0	15.1	15.2	
3rd quintile	236	12.7	12.5	16.7	
4th quintile	314	15.0	16.1	21.2	
5th quintile	263	12.2	19.6	20.5	
Reproductive history					
Breast fed your child					
Yes	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	
Never been pregnant	N/A	N/A	N/A	N/A	

Table 56 (cont'd)

Variables	n	Mexican-American men (%) Low	Middle	High	P^2
Reproductive history(cont'd)					
Number of live birth					
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	
2	N/A	N/A	N/A	N/A	
3	N/A	N/A	N/A	N/A	
4	N/A	N/A	N/A	N/A	
≥ 5	N/A	N/A	N/A	N/A	
Age at the first menarche					
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	
≥ 16 yrs old	N/A	N/A	N/A	N/A	
Weight status and related perceptions and behaviors					
BMI	1,930	26.7±0.2	27.2±0.3	27.6±0.4	*
Weight status					
Normal weight	649	36.5	33.9	29.7	NS
Overweight	847	45.3	44.3	42.7	
Obese	434	18.2	21.8	27.6	
Perceived own weight status					
Underweight	95	5.2	5.5	4.3	****
About right	1,037	58.3	47.9	38.2	
Overweight	798	36.5	46.6	57.5	
Weight status assessment					
Under-assessor	605	34.1	27.3	21.5	*
Accurate assessor	1,211	63.3	69.7	74.1	
Over-assessor	51	2.6	3.0	4.4	
Desired weight changes					
Weigh more	135	7.3	8.5	4.6	****
Stay about the same	903	52.1	38.1	31.9	
Weigh less	891	40.7	53.4	63.5	
Attempt to lose weight					
Yes	511	21.3	30.0	38.3	***
No	1,418	78.7	70.0	61.7	

Table 56 (cont'd)

Variables	n	Mexican-American men (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Component 1[3]	1,928	5.9±0.1	6.2±0.1	7±0.1	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	1,562	85.8	80.7	72.5	**
Consumer	305	14.2	19.3	27.5	
Breakfast consumption					
Yes	1,344	71.5	70.3	76.6	NS
No	523	28.5	29.7	23.4	
Energy intake (kcal/d)	1,867	2,567±46	2,749±68	2,882±107	**
Fat intake					
≤ 30% of energy from fat	780	46.5	40.0	31.5	*
> 30% of energy from fat	1,087	53.5	60.0	68.6	
Number of eating occasions					
≤ 3 times/day	661	37.4	31.1	18.3	***
4 times/day	554	29.9	25.8	28.3	
5 times/day	340	19.4	20.8	20.9	
6 times/day	152	6.5	10.0	12.7	
≥ 7 times/day	160	6.7	12.4	19.8	
Energy intake reporting status					
Under-reporter	337	16.7	11.5	10.1	NS
Adequate-reporter	1,404	74.8	79.9	81.4	
Over-reporter	126	8.5	8.6	8.6	

Table 56 (cont'd)

Variables	n	White women (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	3,142	25.7	34.0	40.2	N/A
Male	N/A	N/A	N/A	N/A	
Education					
< High school	809	40.2	18.3	6.7	****
High school graduate	1,200	38.0	46.8	33.1	
> High school	1,121	21.8	34.9	60.3	
Age					
20-29 yrs	399	23.8	17.5	15.0	****
30-39 yrs	529	19.3	25.1	21.9	
40-49 yrs	433	10.8	17.8	25.6	
50-59 yrs	434	8.5	11.8	17.4	
60+ yrs	1,347	37.6	27.9	20.1	
Marital status					
Married	1,906	45.6	68.0	76.1	****
Widowed, divorced, or separated	976	43.3	21.5	12.6	
Never married or living with partner	258	11.2	10.5	11.3	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	2,394	64.2	72.5	80.2	****
Smoker	694	35.8	27.5	19.9	
Alcohol intake (# of drinks/wk)	2,423	2±0.3	2±0.2	3±0.2	NS
Leisure time activity/month					
No activities	622	22.9	16.3	8.7	****
1st quintile	605	19.9	20.5	19.3	
2nd quintile	474	14.4	17.7	17.1	
3rd quintile	444	14.1	14.2	16.1	
4th quintile	643	17.9	20.0	23.4	
5th quintile	354	10.8	11.3	15.4	
Reproductive history					
Breast fed your child					
Yes	1,439	49.5	45.2	42.5	***
No	1,034	37.0	38.8	32.3	
Never been pregnant	486	13.5	15.9	25.2	

Table 56 (cont'd)

Variables	n	White women (%) Low	Middle	High	P^2
Reproductive history(cont'd)					
Number of live birth					
0 and never been pregnant	609	16.4	19.7	31.0	****
1	478	15.9	15.8	15.4	
2	882	26.1	28.6	31.9	
3	537	18.3	19.0	12.5	
4	281	10.9	8.2	5.4	
≥ 5	297	12.4	8.7	3.9	
Age at the first menarche					
≤ 11 yrs old	516	17.3	17.0	20.4	NS
12-15 yrs old	2,301	76.8	77.5	74.9	
≥ 16 yrs old	192	5.9	5.5	4.7	
Weight status and related perceptions and behaviors					
BMI	3,142	27.2±0.3	26.6±0.3	25.7±0.2	***
Weight status					
Normal weight	1,468	44.4	50.6	55.1	**
Overweight	918	27.5	24.9	25.8	
Obese	756	28.1	24.6	19.2	
Perceived own weight status					
Underweight	76	2.1	2.1	1.2	NS
About right	1,084	32.8	31.8	33.1	
Overweight	1,981	65.1	66.1	65.6	
Weight status assessment					
Under-assessor	296	9.3	5.4	4.1	***
Accurate assessor	2,226	73.7	74.8	72.4	
Over-assessor	523	17.0	19.8	23.5	
Desired weight changes					
Weigh more	73	2.1	2.1	1.3	NS
Stay about the same	813	25.3	21.0	21.8	
Weigh less	2,256	72.6	76.9	76.9	
Attempt to lose weight					
Yes	1,550	50.5	53.9	57.4	NS
No	1,591	49.5	46.1	42.6	

Table 56 (cont'd)

Variables	n	White women (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Component 1[3]	3,140	6.8±0.1	6.9±0.0	7.0±0.1	NS
Dietary behaviors					
Restaurant food consumption					
Non-consumer	2,493	86.2	82.4	72.6	****
Consumer	553	13.8	17.7	27.4	
Breakfast consumption					
Yes	2,640	80.4	84.2	86.2	*
No	406	19.6	15.8	13.9	
Energy intake (kcal/d)	3,046	1,661±30	1,791±25	1,782±33	**
Fat intake					
≤ 30% of energy from fat	1,170	37.8	33.9	40.1	NS
> 30% of energy from fat	1,876	62.2	66.1	60.0	
Number of eating occasions					
≤ 3 times/day	593	25.3	14.6	14.7	****
4 times/day	829	27.9	26.9	22.4	
5 times/day	734	22.6	25.4	28.8	
6 times/day	446	12.7	15.5	15.9	
≥ 7 times/day	444	11.6	17.7	18.2	
Energy intake reporting status					
Under-reporter	798	29.8	21.7	23.7	**
Adequate-reporter	2,163	67.5	75.4	71.9	
Over-reporter	85	2.6	2.9	4.4	

Table 56 (cont'd)

Variables	n	Black women (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	2,132	56.9	28.3	14.8	N/A
Male	N/A	N/A	N/A	N/A	
Education					
< High school	722	42.4	18.1	4.4	****
High school graduate	810	39.1	45.3	27.7	
> High school	590	18.5	36.6	67.9	
Age					
20-29 yrs	486	27.6	21.9	15.0	***
30-39 yrs	564	26.1	30.1	27.6	
40-49 yrs	399	15.0	21.1	32.1	
50-59 yrs	231	9.8	12.0	13.8	
60+ yrs	452	21.6	14.8	11.5	
Marital status					
Married	824	28.6	48.8	60.2	****
Widowed, divorced, or separated	732	39.8	27.9	22.9	
Never married or living with partner	567	31.6	23.3	16.9	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,427	65.1	71.3	77.6	*
Smoker	635	34.9	28.7	22.4	
Alcohol intake (# of drinks/wk)	1,509	3±0.3	2±0.3	2±0.2	**
Leisure time activity/month					
No activities	612	32.5	23.1	19.0	*
1st quintile	509	23.0	23.5	22.1	
2nd quintile	268	12.0	11.4	16.1	
3rd quintile	262	11.5	15.6	17.1	
4th quintile	285	12.6	16.3	12.9	
5th quintile	196	8.4	10.2	12.8	
Reproductive history					
Breast fed your child					
Yes	718	38.9	35.1	31.5	*
No	955	52.1	50.2	50.8	
Never been pregnant	247	9.0	14.7	17.7	

Table 56 (cont'd)

Variables	n	Black women (%) Low	Middle	High	P^2
Reproductive history(cont'd)					
Number of live birth					
0 and never been pregnant	386	13.8	21.0	28.6	****
1	398	20.4	23.2	22.2	
2	467	21.6	25.7	29.8	
3	300	15.5	14.9	8.3	
4	189	10.2	5.9	4.8	
≥ 5	321	18.5	9.5	6.3	
Age at the first menarche					
≤ 11 yrs old	436	22.2	23.0	23.0	NS
12-15 yrs old	1,408	68.4	68.3	70.8	
≥ 16 yrs old	185	9.4	8.8	6.2	
Weight status and related perceptions and behaviors					
BMI	2,132	29.4±0.3	29.4±0.3	27.8±0.4	***
Weight status					
Normal weight	645	30.8	32.9	36.6	NS
Overweight	639	31.2	26.0	34.0	
Obese	848	38.0	41.2	29.4	
Perceived own weight status					
Underweight	102	5.6	3.9	1.9	**
About right	663	33.3	27.9	21.9	
Overweight	1,365	61.1	68.3	76.2	
Weight status assessment					
Under-assessor	342	18.9	10.8	7.2	***
Accurate assessor	1,572	75.0	80.2	74.4	
Over-assessor	147	6.1	9.0	18.4	
Desired weight changes					
Weigh more	140	7.3	6.0	4.0	***
Stay about the same	546	28.8	20.7	16.5	
Weigh less	1,446	64.0	73.3	79.6	
Attempt to lose weight					
Yes	1,074	47.0	55.9	58.4	***
No	1,058	53.0	44.1	41.6	

Table 56 (cont'd)

Variables	n	Black women (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Component 1[3]	2,130	6.6±0.1	6.9±0.1	7.1±0.1	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	1,913	95.7	89.5	84.6	****
Consumer	150	4.3	10.5	15.4	
Breakfast consumption					
Yes	1,480	70.1	74.7	74.4	NS
No	583	29.9	25.3	25.6	
Energy intake (kcal/d)	2,063	1,762±33	1,794±40	1,762±48	NS
Fat intake					
≤ 30% of energy from fat	705	35.2	32.1	31.6	NS
> 30% of energy from fat	1,358	64.8	67.9	68.4	
Number of eating occasions					
≤ 3 times/day	781	41.9	29.5	24.2	****
4 times/day	560	28.7	26.8	23.7	
5 times/day	391	17.8	21.4	24.4	
6 times/day	191	7.3	13.5	13.5	
≥ 7 times/day	140	4.3	8.8	14.3	
Energy intake reporting status					
Under-reporter	730	36.6	32.6	30.5	*
Adequate-reporter	1,260	59.3	62.9	68.2	
Over-reporter	73	4.1	4.4	1.3	

Table 56 (cont'd)

Variables	n	Mexican-American women (%) Low	Middle	High	P^2
Demographic					
Gender					
Female	1,770	65.2	22.1	12.8	N/A
Male	N/A	N/A	N/A	N/A	
Education					
< High school	1,064	71.8	36.4	11.9	****
High school graduate	426	19.3	40.9	34.2	
> High school	272	9.0	22.6	53.9	
Age					
20-29 yrs	460	33.0	26.2	26.6	*
30-39 yrs	418	26.6	29.1	24.9	
40-49 yrs	321	18.2	21.8	24.0	
50-59 yrs	162	9.1	10.9	17.2	
60+ yrs	409	13.2	11.9	7.2	
Marital status					
Married	1,130	62.4	73.5	73.5	**
Widowed, divorced, or separated	404	23.5	11.8	13.4	
Never married or living with partner	235	14.1	14.8	13.1	
Lifestyle factors					
Smoking status in the past 5 days					
Non-smoker	1,410	79.3	84.1	85.4	NS
Smoker	322	20.7	15.9	14.6	
Alcohol intake (# of drinks/wk)	1,137	2±0.3	2±0.4	2±0.3	NS
Leisure time activity/month					
No activities	611	37.1	24.1	10.6	****
1st quintile	437	25.2	23.5	24.4	
2nd quintile	201	10.3	14.8	16.8	
3rd quintile	195	10.7	14.1	16.0	
4th quintile	216	10.5	15.2	22.1	
5th quintile	110	6.3	8.3	10.1	
Reproductive history					
Breast fed your child					
Yes	898	55.3	51.2	45.7	**
No	552	34.2	34.2	26.2	
Never been pregnant	225	10.5	14.6	28.2	

Table 56 (cont'd)

Variables	n	Mexican-American women (%) Low	Middle	High	P^2
Reproductive history(cont'd)					
Number of live birth					
0 and never been pregnant	278	12.1	17.1	36.9	****
1	227	12.6	18.5	17.5	
2	316	20.6	20.6	21.2	
3	284	16.7	20.8	12.7	
4	222	15.6	10.8	7.5	
≥ 5	403	22.5	12.2	4.3	
Age at the first menarche					
≤ 11 yrs old	372	21.2	23.5	31.9	*
12-15 yrs old	1,262	74.6	73.9	65.5	
≥ 16 yrs old	68	4.2	2.7	2.6	
Weight status and related perceptions and behaviors					
BMI	1,770	28.3±0.3	28.4±0.4	27.0±0.5	NS
Weight status					
Normal weight	579	31.9	33.6	44.8	NS
Overweight	603	34.1	30.8	26.0	
Obese	588	34.0	35.6	29.2	
Perceived own weight status					
Underweight	58	4.2	1.0	1.6	***
About right	588	34.8	25.0	24.3	
Overweight	1,124	61.0	74.0	74.1	
Weight status assessment					
Under-assessor	285	18.6	6.4	3.6	****
Accurate assessor	1,260	73.0	80.2	75.7	
Over-assessor	178	8.3	13.4	20.7	
Desired weight changes					
Weigh more	59	4.3	1.1	1.7	***
Stay about the same	478	28.5	19.5	15.8	
Weigh less	1,232	67.2	79.4	82.5	
Attempt to lose weight					
Yes	842	45.6	57.7	62.4	***
No	927	54.4	42.3	37.6	

Table 56 (cont'd)

Variables	n	Mexican-American women (%) Low	Middle	High	P^2
Weight status and related perceptions and behaviors (cont'd)					
Component 1[3]	1,768	6.7±0.1	7.1±0.1	7.2±0.1	****
Dietary behaviors					
Restaurant food consumption					
Non-consumer	1,522	92.3	84.2	73.1	***
Consumer	201	7.7	15.8	26.9	
Breakfast consumption					
Yes	1,280	73.0	76.2	78.5	NS
No	443	27.0	23.8	21.5	
Energy intake (kcal/d)	1,723	1,743±27	1,771±41	1,837±62	NS
Fat intake					
≤ 30% of energy from fat	675	42.8	32.6	36.5	*
> 30% of energy from fat	1,048	57.2	67.4	63.5	
Number of eating occasions					
≤ 3 times/day	598	38.4	29.9	22.1	**
4 times/day	512	29.7	25.8	26.4	
5 times/day	340	18.9	24.7	20.4	
6 times/day	164	8.5	11.6	15.3	
≥ 7 times/day	109	4.5	8.0	15.8	
Energy intake reporting status					
Under-reporter	488	26.1	27.1	25.9	NS
Adequate-reporter	1,176	70.8	67.8	68.7	
Over-reporter	59	3.1	5.2	5.4	

[1]Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; and underweight subjects.

[2]Based on the chi-square test except alcohol, energy intakes, and BMI; differences in alcohol, energy intakes, and BMI by income levels were tested by ANOVA.

[3]Sum of responses to perceived weight status, desired weight status, and attempt to lose weight.

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

compared to the percent after the exclusion (13.8 vs. 7.1% in the low-income group; 21.0 vs. 14.9% in the middle-income group; and 28.6 vs. 19.2% in the high-income group in Table 56 and Table 14).

In Mexican-American women, an age distribution differed statistically significantly by the income level before the exclusion (Table 56), while it did not differ statistically significantly after the exclusion (Table 14). While smoking status did not differ statistically significantly before the exclusion (Table 56), it differed statistically significantly after the exclusion (Table 14). Age at first menarche differed statistically significantly before the exclusion (Table 56), while it did not differ statistically significantly after the exclusion (Table 14). Attempt to lose weight in the past year differed statistically significantly before the exclusion (Table 56), while it did not differ statistically significantly after the exclusion (Table 14).

In addition, the percent of low-income Mexican-American women was larger before the exclusion compared to the percent after the exclusion (65.2 in Table 56 vs. 59.2% in Table 14). The percent of low-income Mexican-American women who had never participated in any leisure time activity was larger before the exclusion compared to the percent after the exclusion (37.1 in Table 56 vs. 30.5% in Table 14). The percent of high-income Mexican-American women who did not have any live birth was larger before the exclusion compared to the percent after the exclusion (36.9% in Table 56 vs. 28.1% in Table 14).

CHANGES IN PREDICTORS OF OBESITY AMONG THE SUBPOPULATION GROUPS OVER THE PAST DECADE

1. Log-transformed BMI as an outcome variable

Men: Two variables predicted mean BMI in 1999-2002 (Table 24) but did not predict in 1989-94 (Table 25): being in the low-income group relative to being in the high-income group (β=0.01 in 1989-94; β=0.03 at $p<0.01$ in 1999-2002) and eating meals/snacks 6 times/day relative to eating meals or snacks $\geq$ 7 times/day (β=0.00 in 1989-94; β=0.02 at $p<0.05$ in 1999-2002). Six variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: having less than high school education relative to having more than high school education (β=0.04 at $p<0.0001$ in 1989-94; β=0.01 in 1999-2002), being in the middle-income group relative to being in the high-income group (β=0.01 at $p<0.05$ in 1989-94; β=0.02 in 1999-2002), being 40-49 years old relative to being 20-29 years old (β=0.03 at $p<0.001$ in 1989-94; β=0.02 in 1999-2002), being a non-smoker relative to being a smoker (β=0.03 t $p<0.001$ in 1989-94; β=0.02 in 1999-2002), alcohol consumption (β=-0.01 at $p<0.01$ in 1989-94; β=0.00 in 1999-2002), and eating meals/ snacks 4 times/day relative to eating meals/snacks $\geq$ 7 times/day (β=0.03 at $p< 0.01$ in 1989-94; β=0.01 in 1999-2002).

Five variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative to being white (β=0.02 at $p<0.001$ in 1989-94; β=0.03 at $p<0.05$ in 1999-2002), having high school education relative to having more than high school education (β=0.03 at $p<0.0001$ in 1989-94; β=0.03 at $p<0.001$ in 1999-2002), being 50-59 years old relative to being 20-29 years old (β=0.04 at $p<0.001$ in 1989-94; β=0.04 at $p<0.05$ in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.03 at $p<0.0001$ in 1989-94; β=0.03 at $p<0.05$ in 1999-2002), not participating in any leisure time activity in the past 30 days relative to participating in leisure-time activity at the highest level (5th quintile)

(β= 0.03 at p<0.01 in 1989-94; β=0.04 at p<0.01 in 1999-2002), participating leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.03 at p<0.01 in 1989-94; β=0.03 at p< 0.05 in 1999-2002), and eating meals/snacks ≤ 3 times/day relative to eating meals/ snacks ≥ 7 times/day (β=0.04 at p<0.01 in 1989-94; β=0.03 at p< 0.05 in 1999-2002).

Women: Six variables predicted mean BMI in 1999-2002 (Table 24) but did not predict in 1989-94 (Table 25): being in the middle-income group relative to being in the high-income group (β=0.01 in 1989-94; β=0.03 at p<0.05 in 1999-2002), having one live birth relative to having no live births or never being pregnant (β=0.00 in 1989-94; β=-0.04 at p<0.01 in 1999-2002), having 3 live births relative to having no live birth or never being pregnant (β=-0.02 in 1989-94; β=-0.04 at p<0.05 in 1999-2002), having menarche at 12-15 years old relative to having menarche at ≥ 16 years old (β=0.02 in 1989-94; β=0.06 at p<0.01 in 1999-2002), eating restaurant food (β=-0.02 if consuming restaurant food the day before the interview relative to not eating in 1989-94; β=0.04 at p<0.05 if eating ≥ 4 times/week relative to eating restaurant food less than 1 time/week in 1999-2002), not eating breakfast (β=0.01 in 1989-94; β=0.04 at p<0.05 in 1999-2002), and eating more than 30% of energy from fat (β=0.01 in 1989-94; β=0.02 at p<0.05 in 1999-2002).

Four variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: being Mexican-American relative to being white (β=0.03 at p<0.01 in 1989-94; β=-0.01 in 1999-2002), having less than high school education relative to having more than high school education (β=0.03 at p< 0.05 in 1989-94; β=0.03 in 1999-2002), having high school education relative to having more than high school education (β=0.02 at p<0.05 in 1989-94; β=0.00 in 1999-2002), energy intake (β=0.03 at p<0.01 in 1989-94; β=0.00 in

1999-2002), eating meals/snacks ≤ 3 times/day relative to eating meals/snacks ≥ 7 times/day (β=0.04 at p<0.01 in 1989-94; β=0.03 in 1999-2002), and eating meals/snacks 4 times/day relative to eating meals/snacks ≥ 7 times/day (β=0.03 at p<0.05 in 1989-94; β=0.02 in 1999-2002).

Nine variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative to being white (β=0.08 at p<0.0001 in 1989-94; β=0.09 at p<0.0001 in 1999-2002), being in the low-income group relative to being in the high-income group (β=0.03 at p<0.05 in 1989-94; β=0.06 at p<0.001 in 1999-2002), being 30-39 years old relative to being 20-29 years old (β=0.06 at p<0.001 in 1989-94; β=0.06 at p<0.01 in 1999-2002), being 40-49 years old relative to being 20-29 years old (β=0.08 at p<0.0001 in 1989-94; β=0.07 at p<0.001 in 1999-2002), being 50-59 years old relative to being 20-29 years old (β=0.12 at p<0.0001 in 1989-94; β=0.05 at p<0.01 in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.12 at p<0.0001 in 1989-94; β=0.07 at p<0.001 in 1999-2002), being a non-smoker relative to being a smoker (β=0.02 at p<0.01 in 1989-94; β=0.05 at p<0.01 in 1999-2002), alcohol consumption (β=-0.02 at p<0.0001 in 1989-94; β=-0.02 at p<0.0001 in 1999-2002), not participating in any leisure time activity in the past 30 days relative to participating in leisure-time activity at the highest level (5th quintile) (β= 0.09 at p<0.0001 in 1989-94; β=0.11 at p<0.0001 in 1999-2002), participating leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.05 at p<0.001 in 1989-94; β=0.05 at p< 0.05 in 1999-2002), having 2 live births relative to not having any live births (β=-0.03 at p<0.05 in 1989-94; β=-0.05 at p<0.01 in 1999-2002), having first

menarche at ≤ 11 years old relative to having first menarche at ≥ 16 years old (β=0.07 at p<0.0001 in 1989-94; β=0.13 at p<0.0001 in 1999-2002), and mean score on the component on attempt to lose weight (β=0.09 at p<0.0001 in 1989-94; β=0.10 at p<0.0001 in 1999-2002).

Low-income subjects: Two variables predicted mean BMI in 1999-2002 (Table 26) but did not predict in 1989-94 (Table 27): participating in leisure-time activity at the middle level (3rd quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.02 in 1989-94; β=0.05 at p< 0.05 in 1999-2002), eating restaurant food (β=-0.01 if eating the restaurant food the day before the interview relative to not eating in 1989-94; β=0.05 at p< 0.05 if eating 1 time/week relative to not eating and β=0.02 at p< 0.05 if eating 2-3 times/week relative to not eating in 1999-2002).

Five variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: having less than high school education relative to having more than high school education (β=0.05 at p<0.01 in 1989-94; β=0.02 in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.07 at p<0.0001 in 1989-94; β=0.02 in 1999-2002), alcohol consumption (β=-0.01 at p<0.05 in 1989-94; β=-0.01 in 1999-2002), participating in leisure-time activity at the lowest degree (1st quintile) relative to participating in leisure-time activity at the highest degree (5th quintile) (β=0.04 at p<0.05 in 1989-94; β=0.04 in 1999-2002), energy intake (β=0.03 at p<0.001 in 1989-94; β=0.02 in 1999-2002), eating meals/snacks ≤ 3 times/day relative to eating meals/snacks ≥ 7 times/day (β=0.05 at p<0.001 in 1989-94; β=0.03 in 1999-2002), and eating meals/ snacks 4 times/day relative to eating meals/snacks ≥ 7 times/day (β=0.03 at p<0.05 in 1989-94; β=0.01 in 1999-2002).

Seven variables predicted mean BMI in both 1999-2002 and 1989-94: being a woman relative to being a man (β=-0.06 at $p<0.0001$ in 1989-94; β=-0.05 at $p<0.001$ in 1999-2002), having high school education relative to having more than high school education (β=0.04 at $p< 0.01$ in 1989-94; β=0.03 at $p<0.05$ in 1999-2002), being black relative to being white (β=0.05 at $p<0.0001$ in 1989-94; β=0.04 at $p<0.05$ in 1999-2002), being 30-39 years old relative to being 20-29 years old (β=0.05 at $p<0.01$ in 1989-94; β=0.06 at $p<0.05$ in 1999-2002), being 40-49 years old relative to being 20-29 years old (β=0.07 at $p<0.0001$ in 1989-94; β=0.07 at $p<0.001$ in 1999-2002), being 50-59 years old relative to being 20-29 years old (β=0.08 at $p<0.0001$ in 1989-94; β=0.05 at $p<0.05$ in 1999-2002), being a non-smoker relative to being a smoker (β=0.05 at $p<0.0001$ in 1989-94; β=0.05 at $p<0.001$ in 1999-2002), not participating in any leisure time activity in the past 30 days relative to participating in leisure-time activity at the highest level (5th quintile) (β= 0.05 at $p<0.01$ in 1989-94; β=0.09 at $p<0.0001$ in 1999-2002), and mean score on the component on attempt to lose weight (β=0.09 at $p<0.0001$ in 1989-94; β=0.10 at $p<0.0001$ in 1999-2002).

Middle-income subjects: One variable predicted mean BMI in 1999-2002 (Table 26) but did not predict in 1989-94 (Table 27): eating more than 30% of energy from fat relative to eating $\leq$ 30 % of energy from fat (β=0.01 in 1989-94; β=0.03 at $p<0.05$ in 1999-2002). Seven variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: having less than high school education relative to having more than high school education (β=0.03 at $p<0.05$ in 1989-94; β=0.01 in 1999-2002), having high school education relative to having more than high school education (β=0.02 at $p<0.05$ in 1989-94; β=-

0.01 in 1999-2002), being Mexican-American relative to being white (β=0.02 at $p< 0.05$ in 1989-94; β=0.01 in 1999-2002), being 40-49 years old relative to being 20-29 years old (β=0.05 at $p<0.001$ in 1989-94; β=-0.01 in 1999-2002), being 50-59 years old relative to being 20-29 years old (β=0.06 at $p<0.0001$ in 1989-94; β=0.04 in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.06 at $p<0.0001$ in 1989-94; β=0.05 in 1999-2002), alcohol consumption (β=-0.01 at $p< 0.001$ in 1989-94; β=0.00 in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest degree (5th quintile) (β=0.05 at $p<0.01$ in 1989-94; β=0.01 in 1999-2002), energy intake (β=0.04 at $p< 0.01$ in 1989-94; β=0.03 in 1999-2002), eating meals/snacks $\leq$ 3 times/day relative to eating meals/snacks $\geq$ 7 times/day (β=0.03 at $p<0.05$ in 1989-94; β=0.05 in 1999-2002), and eating meals/snacks 4 times/day relative to eating meals/snacks $\geq$ 7 times/day (β=0.03 at $p<0.05$ in 1989-94; β=0.04 in 1999-2002).

Four variables predicted mean BMI in both 1999-2002 and 1989-94: being a woman relative to being a man (β=-0.08 at $p<0.0001$ in 1989-94; β=-0.05 at $p<0.001$ in 1999-2002), being black relative to being white (β=0.07 at $p<0.0001$ in 1989-94; β=0.08 at $p<0.0001$ in 1999-2002), not participating in leisure time activity relative to participating in leisure-time activity at the highest degree (5th quintile) (β=0.08 at $p<0.0001$ in 1989-94; β=0.05 at $p<0.05$ in 1999-2002), and mean score on the component on attempt to lose weight (β=0.08 at $p<0.0001$ in 1989-94; β=0.09 at $p<0.0001$ in 1999-2002).

High-income subjects: Three variable predicted mean BMI in 1999-2002 (Table 26) but did not predict in 1989-94 (Table 27): being a non-smoker relative to being a smoker (β=0.02in 1989-94; β=0.02 at $p<0.05$ in 1999-2002), skipping breakfast relative to consuming breakfast (β=0.00 in 1989-94; β=0.04 at $p<0.01$ in 1999-2002), and eating more than 30% of energy from fat relative to eating $\leq$ 30% of energy from fat (β=-0.00 in 1989-94; β=0.02 at $p<0.05$ in 1999-2002). Six variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: having high school education relative to having more than high school education (β=0.03 at $p<0.001$ in 1989-94; β=0.03 in 1999-2002), being Mexican-American relative to being white (β=0.02 at $p<0.05$ in 1989-94; β=0.02 in 1999-2002), being 30-39 years old relative to being 20-29 years old (β=0.04 at $p<0.05$ in 1989-94; β=0.01 in 1999-2002), participating in leisure-time activity at the second lowest level (2nd quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.03 at $p<0.01$ in 1989-94; β=0.03 in 1999-2002), eating meals/snacks $\leq$ 3 times/day relative to eating meals/snacks $\geq$ 7 times/day (β=0.04 at $p<0.01$ in 1989-94; β=0.01 in 1999-2002), and eating meals/snacks 4 times/day relative to eating meals/ snacks $\geq$ 7 times/day (β=0.03 at $p<0.01$ in 1989-94; β=0.01 in 1999-2002).

Seven variables predicted mean BMI in both 1999-2002 and 1989-94: being a woman relative to being a man (β=-0.08 at $p<0.0001$ in 1989-94; β=-0.08 at $p<0.0001$ in 1999-2002), having less than high school education relative to having more than high school education (β=0.04 at $p<0.01$ in 1989-94; β=0.05 at $p<0.01$ in 1999-2002), being black relative to being white (β=0.05 at $p<0.0001$ in 1989-94; β=0.07 at $p<0.001$ in 1999-2002), being 40-49 years old relative to being 20-29 years old (β=0.05 at $p<0.001$

in 1989-94; β=0.04 at p< 0.01 in 1999-2002), being 50-59 years old relative to being 20-29 years old (β=0.09 at p<0.0001 in 1989-94; β=0.04 at p<0.05 in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.08 at p<0.0001 in 1989-94; β=0.05 at p<0.001 in 1999-2002), alcohol consumption (β=-0.01 at p<0.01 in 1989-94; β=-0.02 at p<0.001 in 1999-2002), not participating in any leisure time activity in the past 30 days relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.05 at p<0.01 in 1989-94; β=0.07 at p<0.001 in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.05 at p<0.001 in 1989-94; β=0.05 at p<0.001 in 1999-2002), mean score on the component on attempt to lose weight (β=0.07 at p<0.0001 in 1989-94; β=0.09 at p<0.0001 in 1999-2002), and energy intake (β=0.03 at p<0.05 in 1989-94; β=0.03 at p<0.01 in 1999-2002).

Whites: Four variable predicted mean BMI in 1999-2002 (Table 28) but did not predict in 1989-94 (Table 29): being in the middle-income group relative to being in the high-income group (β=0.01 in 1989-94; β=0.03 at p<0.05 in 1999-2002), eating restaurant food (β=-0.01 if eating the restaurant food the day before the interview relative to not eating in 1989-94; β=0.02 at p< 0.05 if eating ≥ 4 times/week relative to eating < 1 time/week in 1999-2002), not eating breakfast relative to eating breakfast (β=0.01 in 1989-94; β=0.03 at p<0.01 in 1999-2002), and eating more than 30% of energy from fat relative to eating ≤ 30% of energy from fat (β=0.01 in 1989-94; β=0.02 at p<0.05 in 1999-2002). Two variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: having high school education relative to having more than high school

education (β=0.03 at p<0.0001 in 1989-94; β=0.01 in 1999-2002), and being 30-39 years old relative to being 20-29 years old (β=0.03 at p<0.01 in 1989-94; β=0.03 in 1999-2002).

Ten variables predicted mean BMI in both 1999-2002 and 1989-94: being a woman relative to being a man (β=-0.09 at p<0.0001 in 1989-94; β=-0.07 at p<0.0001 in 1999-2002), having less than high school education relative to having more than high school education man (β=0.04 at p<0.0001 in 1989-94; β=0.03 at p<0.05 in 1999-2002), being in the low-income group relative to being in the high-income group (β=0.02 at p<0.01 in 1989-94; β=0.06 at p<0.0001 in 1999-2002), being 40-49 years old relative to being 20-29 years old (β=0.05 at p<0.0001 in 1989-94; β=0.04 at p< 0.01 in 1999-2002), being 50-59 years old relative to being 20-29 years old (β=0.08 at p<0.0001 in 1989-94; β=0.04 at p<0.01 in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.07 at p<0.0001 in 1989-94; β=0.05 at p<0.01 in 1999-2002), being a non-smoker relative to being a smoker (β=0.02 at p<0.001 in 1989-94; β=0.04 at p<0.001 in 1999-2002), alcohol consumption (β=-0.01 at p<0.0001 in 1989-94; β=-0.01 at p<0.05 in 1999-2002), not participating in any leisure time activity relative to participating in leisure time activity at the highest level (5th quintile) (β=0.06 at p<0.0001 in 1989-94; β=0.08 at p<0.0001 in 1999-2002), participating in leisure time activity at the lowest level (1st quintile) relative to participating in leisure time activity at the highest level (5th quintile) (β=0.04 at p<0.0001 in 1989-94; β=0.04 at p<0.05 in 1999-2002), mean score on the component on attempt to lose weight (β=0.08 at p<0.0001 in 1989-94; β=0.09 at p<0.0001 in 1999-2002), energy intake (β=0.03 at p<0.001 in 1989-94; β=0.03 at p<0.01 in 1999-2002), eating meals/snacks $\leq$ 3 times/day relative to eating meals/snacks $\geq$ 7

times/day (β=0.04 at $p<0.001$ in 1989-94; β=0.03 at $p<0.05$ in 1999-2002), and eating meals/snacks 4 times/day relative to eating meals/snacks $\geq$ 7 times/day (β=0.03 at $p<0.001$ in 1989-94; β=0.02 at $p<0.05$ in 1999-2002).

Low-income men: Four variable predicted mean BMI in 1999-2002 (Table 30) but did not predict in 1989-94 (Table 31): being 50-59 years old relative to being 20-29 years old (β=0.03 in 1989-94; β=0.07 at $p<0.01$ in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.03 in 1989-94; β=0.05 at $p<0.05$ in 1999-2002), participating in leisure time activity at the middle level (3rd quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.01 in 1989-94; β=0.07 at $p<0.01$ in 1999-2002), eating restaurant food (β=-0.01 if eating the restaurant food the day before the interview relative to not eating in 1989-94; β=0.04 at $p< 0.01$ if eating 2-3 times/week relative to eating less than 1 time/week in 1999-2002), and energy intake (β=0.01 in 1989-94; β=0.04 at $p<0.0001$ in 1999-2002). Three variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: having less than high school education relative to having more than high school education (β=0.04 at $p<0.01$ in 1989-94; β=0.02 in 1999-2002), being widowed, divorced, or separated relative to being married (β=-0.03 at $p<0.05$ in 1989-94; β=-0.01 in 1999-2002), and eating meals/snacks $\leq$ 3 times/day relative to eating meals/snacks $\geq$ 7 times/day (β=0.04 at $p<0.05$ in 1989-94; β=0.01 in 1999-2002).

Four variables predicted mean BMI in both 1999-2002 and 1989-94: having high school education relative to having more than high school education man (β=0.03 at $p<0.05$ in 1989-94; β=0.05 at $p<0.001$ in 1999-2002), being 40-49 years old relative to

being 20-29 years old (β=0.05 at $p<0.01$ in 1989-94; β=0.06 at $p<0.01$ in 1999-2002), being a non-smoker relative to being a smoker (β=0.04 at $p<0.0001$ in 1989-94; β=0.03 at $p<0.05$ in 1999-2002), and mean score on the component on attempt to lose weight (β=0.08 at $p<0.0001$ in 1989-94; β=0.09 at $p<0.05$ in 1999-2002).

Middle-income men: One variable predicted mean BMI in 1999-2002 (Table 30) but did not predict in 1989-94 (Table 31): eating meals/snacks $\leq$ 3 times/day relative to eating meals/snacks $\geq$ 7 times/day (β=0.03 in 1989-94; β=0.05 at $p<0.05$ in 1999-2002). Three variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: having less than high school education relative to having more than high school education (β=0.03 at $p<0.05$ in 1989-94; β=-0.02 in 1999-2002), having high school education relative to having more than high school education (β=0.03 at $p<0.01$ in 1989-94; β=-0.00 in 1999-2002), being 40-49 years old relative to being 20-29 years old (β=0.03 at $p<0.05$ in 1989-94; β=-0.02 in 1999-2002), and being a non-smoker relative to being a smoker (β=0.03 at $p<0.01$ in 1989-94; β=0.01 in 1999-2002).

Two variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative a being white (β=0.03 at $p<0.001$ in 1989-94; β=0.04 at $p<0.05$ in 1999-2002) and mean score on the component on attempt to lose weight (β=0.07 at $p<0.0001$ in 1989-94; β=0.09 at $p<0.0001$ in 1999-2002).

High-income men: There were no variables that predicted mean BMI in 1999-2002 (Table 30) but did not predict in 1989-94 (Table 31). Four variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: being 50-59 years old relative to being 20-29 years old (β=0.05 at $p<0.05$ in 1989-94; β=0.03 in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.05 at $p<0.01$ in 1989-94; β=0.02 in 1999-2002),

not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.05 at $p<0.05$ in 1989-94; β=0.03 in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest degree (5th quintile) (β=0.04 at $p<0.05$ in 1989-94; β=0.03 in 1999-2002), energy intake (β=0.03 at $p<0.05$ in 1989-94; β=0.03 in 1999-2002), eating meals/snacks $\leq$ 3 times/day relative to eating meals/snacks $\geq$ 7 times/day (β=0.04 at $p<0.05$ in 1989-94; β=0.01 in 1999-2002), and eating meals/snacks 4 times/day relative to eating meals/snacks $\geq$ 7 times/day (β=0.05 at $p<0.01$ in 1989-94; β=-0.00 in 1999-2002).

Four variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative a being white (β=0.03 at $p<0.01$ in 1989-94; β=0.05 at $p<0.01$ in 1999-2002), having less than high school education relative to having more than high school education (β=0.05 at $p<0.01$ in 1989-94; β=0.06 at $p<0.05$ in 1999-2002), having high school education relative to having more than high school education (β=0.03 at $p<0.001$ in 1989-94; β=0.03 at $p<0.01$ in 1999-2002), alcohol consumption (β=-0.01 at $p<0.05$ in 1989-94; β=-0.01 at $p<0.05$ in 1999-2002), and mean score on the component on attempt to lose weight (β=0.06 at $p<0.0001$ in 1989-94; β=0.08 at $p<0.0001$ in 1999-2002).

Low-income women: Two variables predicted mean BMI in 1999-2002 (Table 30) but did not predict in 1989-94 (Table 31): participating in leisure-time activity at the middle level (3rd quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.02 in 1989-94; β=0.07 at $p<0.05$ in 1999-2002) and having 2 live births relative to having no live births or never being pregnant (β=-0.02 in 1989-94; β=-0.06 at $p<0.05$ in 1999-2002). Five variables did not predict mean BMI in 1999-2002 but

predicted in 1989-94: having less than high school education relative to having more than high school education (β=0.04 at $p<0.05$ in 1989-94; β=0.01 in 1999-2002), having high school education relative to having more than high school education (β=0.04 at $p<0.05$ in 1989-94; β=-0.00 in 1999-2002), being 40-49 years old relative to being 20-29 years old (β=0.08 at $p<0.01$ in 1989-94; β=0.05 in 1999-2002), being 50-59 years old relative to being 20-29 years old (β=0.11 at $p<0.0001$ in 1989-94; β=0.00 in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.10 at $p<0.0001$ in 1989-94; β=-0.01 in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.06 at $p<0.01$ in 1989-94; β=0.05 in 1999-2002), having first menarche at 12-15 years old relative to having first menarche at $\geq$16 years old (β=0.04 at $p<0.05$ in 1989-94; β=0.05 in 1999-2002), and energy intake (β=0.03 at $p<0.05$ in 1989-94; β=-0.00 in 1999-2002).

Seven variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative to being white (β=0.08 at $p<0.0001$ in 1989-94; β=0.09 at $p<0.001$ in 1999-2002), being Mexican-American relative to being white (β=0.03 at $p<0.05$ in 1989-94; β=-0.05 at $p<0.001$ in 1999-2002), being 30-39 years old relative to being 20-29 years old (β=0.07 at $p<0.01$ in 1989-94; β=0.07 at $p<0.05$ in 1999-2002), being a non-smoker relative to being a smoker (β=0.05 at $p<0.001$ in 1989-94; β=0.07 at $p<0.001$ in 1999-2002), alcohol consumption (β=-0.02 at $p<0.01$ in 1989-94; β=-0.03 at $p<0.05$ in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.10 at $p<0.001$ in 1989-94; β=0.14 at $p<0.0001$ in 1999-2002), having first menarche at $\leq$ 11 years old relative to having first

menarche at ≥ 16 years old (β=0.12 at p<0.0001 in 1989-94; β=0.11 at p<0.01 in 1999-2002), and mean score on the component on attempt to lose weight (β=0.09 at p<0.0001 in 1989-94; β=0.11 at p<0.0001 in 1999-2002).

Middle-income women: Two variables predicted mean BMI in 1999-2002 (Table 30) but did not predict in 1989-94 (Table 31): having 2 live births relative to having no live births or never being pregnant (β=-0.03 in 1989-94; β=-0.12 at p<0.001 in 1999-2002), having 3 live births relative to having no live births or never being pregnant (β=-0.04 in 1989-94; β=-0.06 at p<0.01 in 1999-2002), and eating restaurant food (β=-0.02 if eating the restaurant food the day before the interview relative to not eating in 1989-94; β=0.05 at p< 0.05 if eating 1 time/week relative to eating less than 1 time/week in 1999-2002). Four variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: being 30-39 years old relative to being 20-29 years old (β=0.04 at p<0.05 in 1989-94; β=0.03 in 1999-2002), being 40-49 years old relative to being 20-29 years old (β=0.08 at p<0.01 in 1989-94; β=0.01 in 1999-2002), being 50-59 years old relative to being 20-29 years old (β=0.10 at p<0.0001 in 1989-94; β=0.06 in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.13 at p<0.0001 in 1989-94; β=0.09 in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.11 at p<0.001 in 1989-94; β=0.04 in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.07 at p<0.01 in 1989-94; β=-0.03 in 1999-2002), energy intake (β=0.04 at p<0.01 in 1989-94; β=0.01

in 1999-2002), and eating meals/snacks 4 times/day relative to eating meals/snacks ≥ 7 times/day (β=0.05 at p<0.01 in 1989-94; β=0.03 in 1999-2002).

Four variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative to being white (β=0.10 at p<0.0001 in 1989-94; β=0.11 at p<0.001 in 1999-2002), alcohol consumption (β=-0.02 at p<0.01 in 1989-94; β=-0.02 at p<0.05 in 1999-2002), having first menarche at ≤ 11 years old relative to having first menarche at ≥ 16 years old (β=0.08 at p<0.01 in 1989-94; β=0.07 at p<0.05 in 1999-2002), and mean score on the component on attempt to lose weight (β=0.10 at p<0.0001 in 1989-94; β=0.10 at p<0.0001 in 1999-2002).

High-income women: Three variables predicted mean BMI in 1999-2002 (Table 30) but did not predict in 1989-94 (Table 31): not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.04 in 1989-94; β=0.12 at p<0.01 in 1999-2002), having first menarche at ≤ 11 years old relative to having first menarche at ≥ 16 years old (β=0.03 in 1989-94; β=0.17 at p<0.001 in 1999-2002), and not eating breakfast relative to eating breakfast (β=0.00 in 1989-94; β=0.00 at p<0.05 in 1999-2002). Three variables did not predict mean BMI in 1999-2002 but predicted in 1989-94: being 30-39 years old relative to being 20-29 years old (β=0.07 at p<0.01 in 1989-94; β=0.05 in 1999-2002), having 2 live births relative to having no live births or never being pregnant (β=-0.05 at p<0.05 in 1989-94; β=-0.00 in 1999-2002), and eating meals/snacks ≤ 3 times/day relative to eating meals/snacks ≥ 7 times/day (β=0.05 at p<0.05 in 1989-94; β=0.01 in 1999-2002).

Five variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative to being white (β=0.05 at p<0.001 in 1989-94; β=0.09 at p<0.05 in 1999-2002),

being 40-49 years old relative to being 20-29 years old (β=0.09 at $p<0.001$ in 1989-94; β=0.09 at $p<0.05$ in 1999-2002), being 50-59 years old relative to being 20-29 years old (β=0.14 at $p<0.0001$ in 1989-94; β=0.07 at $p<0.05$ in 1999-2002), being 60+ years old relative to being 20-29 years old (β=0.13 at $p<0.0001$ in 1989-94; β=0.09 at $p<0.01$ in 1999-2002), alcohol consumption (β=-0.03 at $p<0.001$ in 1989-94; β=-0.02 at $p<0.01$ in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (β=0.05 at $p<0.05$ in 1989-94; β=-0.08 at $p<0.01$ in 1999-2002), and mean score on the component on attempt to lose weight (β=0.08 at $p<0.0001$ in 1989-94; β=0.10 at $p<0.0001$ in 1999-2002).

2. Risk of obesity as an outcome variable

Men: Two variables predicted the risk of obesity in 1999-2002 (Table 37) but did not predict in 1989-94 (Table 38): alcohol consumption (OR=0.92 [CI=0.80, 1.05] in 1989-94; OR=0.87 [CI=0.77, 0.99] in 1999-2002) and energy intake (OR=1.24 [CI=0.95, 1.64] in 1989-94; OR=1.69 [CI=1.04, 2.77] in 1999-2002). Four variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: having less than high school education relative to having more than high school education (OR=1.57 [CI=1.11, 2.21] in 1989-94; OR=1.37 [CI=0.93, 2.00] in 1999-2002), being in the middle-income group relative to being in the high-income group (OR=1.33 [CI=1.01, 1.75] in 1989-94; OR=1.26 [CI=0.81, 1.95] in 1999-2002), being 40-49 years old relative to being 20-29 years old (OR=1.58 [CI=1.06, 2.38] in 1989-94; OR=1.56 [CI=0.84, 2.92] in 1999-2002), being 50-59 years old relative to being 20-29 years old (OR=2.18 [CI=1.34, 3.55] in 1989-94; OR=1.78 [CI=0.89, 3.54] in 1999-2002), being 60+ years old relative to being

20-29 years old (OR=1.97 [CI=1.38, 2.81] in 1989-94; OR=1.88 [CI=0.92, 3.82] in 1999-2002), and participating in leisure-time activity at the lowest level (1st quintile) relative to participating at the highest degree (5th quintile) (OR=2.12 [CI=1.34, 3.34] in 1989-94; OR=1.44 [CI=0.80, 2.59] in 1999-2002).

Five variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative to being white (OR=1.50 [CI=1.16, 1.93] in 1989-94; OR=1.68 [CI=1.13, 2.50] in 1999-2002), having high school education relative to having more than high school education (OR=1.47 [CI=1.11, 1.95] in 1989-94; OR=1.51 [CI=1.11, 2.06] in 1999-2002), being in the low-income group relative to being in the high-income group (OR=1.58 [CI=1.03, 2.43] in 1989-94; OR=1.54 [CI=1.01, 2.35] in 1999-2002), being a non-smoker relative to being a smoker (OR=1.53 [CI=1.15, 2.04] in 1989-94; OR=0.78 [CI=0.61, 0.99] in 1999-2002), and mean score on the component on attempt to lose weight (OR=2.84 [CI=2.50, 3.22] in 1989-94; OR=3.39 [CI=2.84, 4.06] in 1999-2002).

Women: Six variables predicted the risk of obesity in 1999-2002 (Table 37) but did not predict in 1989-94 (Table 38): being in the low-income group relative to being in the high-income group (OR=1.31 [CI=0.96, 1.79] in 1989-94; OR=2.11 [CI=1.29, 3.44] in 1999-2002), being a non-smoker relative to being a smoker (OR=1.15 [CI=0.85, 1.56] in 1989-94; OR=1.61 [CI=1.07, 2.42] in 1999-2002), participating in leisure-time activity at the middle level (3rd quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=1.33 [CI=0.85, 2.07] in 1989-94; OR=1.78 [CI=1.11, 2.87] in 1999-2002), having first menarche at 12-13 years old relative to having first menarche at $\geq$ 16 years old (OR=1.27 [CI=0.76, 2.13] in 1989-94; OR=1.67 [CI=1.01, 2.77] in 1999-2002), eating restaurant food (OR=0.91 [CI=0.68, 1.21] in 1989-94 if

eating restaurant food the day before the interview relative to not eating; OR=1.67 [CI=1.04, 2.69] in 1999-2002 if eating ≥ 4 time/week relative to eating less than 1 time/week in 1999-2002), and not eating breakfast relative to eating breakfast (OR=1.08 [CI=0.78, 1.48] in 1989-94; OR=1.47 [CI=1.02, 2.12] in 1999-2002 in 1999-2002). Five variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being Mexican-American relative to being white (OR=1.41 [CI=1.06, 1.88] in 1989-94; OR=0.73 [CI=0.49, 1.07] in 1999-2002), being 50-59 years old relative to being 20-29 years old (OR=2.77 [CI=1.69, 4.53] in 1989-94; OR=1.55 [CI=0.91, 2.62] in 1999-2002), alcohol consumption (OR=0.75 [CI=0.66, 0.85] in 1989-94; OR=0.73 [CI=0.63, 0.85] in 1999-2002), participating in leisure-time activity at the second lowest level (2nd quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=1.65 [CI=1.02, 2.68] in 1989-94; OR=1.84 [CI=0.97, 3.50] in 1999-2002), and energy intake (OR=1.38 [CI=1.04, 1.83] in 1989-94; OR=1.05 [CI=0.71, 1.56] in 1999-2002).

Five variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative to being white (OR=1.73 [CI=1.37, 2.19] in 1989-94; OR=2.19 [CI=1.41, 3.40] in 1999-2002), being 30-39 years old relative to being 20-29 years old (OR=1.97 [CI=1.26, 3.08] in 1989-94; OR=1.89 [CI=1.09, 3.29] in 1999-2002), being 40-49 years old relative to being 20-29 years old (OR=1.89 [CI=1.18, 3.01] in 1989-94; OR=2.57 [CI=1.48, 4.46] in 1999-2002), being 60+ years old relative to being 20-29 years old (OR=2.34 [CI=1.52, 3.60] in 1989-94; OR=2.03 [CI=1.14, 3.60] in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.59 [CI=1.66, 4.03] in 1989-94; OR=3.54 [CI=1.92,

6.54] in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=1.99 [CI=1.25, 3.18] in 1989-94; OR=2.23 [CI=1.19, 4.19] in 1999-2002), having first menarche at ≤ 11 years old relative to having first menarche at ≥ 16 years old (OR=2.40 [CI=1.41, 4.08] in 1989-94; OR=3.17 [CI=1.50, 6.72] in 1999-2002), and mean score on the component on attempt to lose weight (OR=2.88 [CI=2.58, 3.21] in 1989-94; OR=3.33 [CI=2.81, 3.95] in 1999-2002).

Low-income subjects: Two variables predicted the risk of obesity in 1999-2002 (Table 39) but did not predict in 1989-94 (Table 40): being Mexican-American relative to being white (OR=0.95 [CI=0.66, 1.36] in 1989-94; OR=0.65 [CI=0.43, 0.99] in 1999-2002) and participating in leisure-time activity at the middle level (3rd quintile) relative to participating in leisure-time activity at the highest degree (5th quintile) (OR=1.19 [CI=0.67, 2.11] in 1989-94; OR=2.73 [CI=1.51, 4.92] in 1999-2002). Five variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being a woman relative to being a man (OR=0.67 [CI=0.46, 0.97] in 1989-94; OR=0.84 [CI=0.56, 1.26] in 1999-2002), having less than high school education relative to having more than high school education (OR=1.67 [CI=1.10, 2.53] in 1989-94; OR=1.43 [CI=0.87, 2.37] in 1999-2002), being 50-59 years relative to being 20-29 years (OR=2.24 [CI=1.20, 4.18] in 1989-94; OR=1.60 [CI=0.66, 3.86] in 1999-2002), being 60+ years relative to being 20-29 years (OR=1.84 [CI=1.14, 2.96] in 1989-94; OR=1.30 [CI=0.63, 2.69] in 1999-2002), energy intake (OR=1.38 [CI=1.03, 1.83] in 1989-94; OR=1.42 [CI=1.00, 2.02] in 1999-2002), and eating meals/snacks ≤ 3 times/day relative to eating meals/snacks ≥ 7 times/day (OR=1.79 [CI=1.08, 2.98] in 1989-94; OR=1.98 [CI=0.79, 4.95] in 1999-2002).

Five variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative to being white (OR=1.49 [CI=1.11, 2.00] in 1989-94; OR=1.90 [CI=1.02, 3.53] in 1999-2002), being 40-49 years old relative to being 20-29 years old (OR=2.15 [CI=1.37, 3.37] in 1989-94; OR=2.03 [CI=1.13, 3.63] in 1999-2002), being a non-smoker relative to being a smoker (OR=1.84 [CI=1.39, 2.45] in 1989-94; OR=1.35 [CI=1.03, 1.77] in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=1.94 [CI=1.03, 3.66] in 1989-94; OR=3.69 [CI=2.14, 6.34] in 1999-2002), and mean score on the component on attempt to lose weight (OR=3.10 [CI=2.77, 3.47] in 1989-94; OR=3.53 [CI=2.91, 4.29] in 1999-2002).

Middle-income subjects: There were no variables that predicted the risk of obesity in 1999-2002 (Table 39) but did not predict in 1989-94 (Table 40). Two variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being 50-59 years old relative to being 20-29 years old (OR=1.94 [CI=1.20, 3.16] in 1989-94; OR=1.92 [CI=0.74, 5.03] in 1999-2002), being 60+ years old relative to being 20-29 years old (OR=2.18 [CI=1.36, 3.48] in 1989-94; OR=2.12 [CI=0.86, 5.19] in 1999-2002), and not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.31 [CI=1.20, 4.46] in 1989-94; OR=2.24 [CI=0.98, 5.13] in 1999-2002).

Two variables predicted mean BMI in both 1999-2002 and 1989-94: being black relative to being white (OR=2.33 [CI=1.71, 3.18] in 1989-94; OR=3.19 [CI=2.03, 5.00] in 1999-2002) and mean score on the component on attempt to lose weight (OR=3.07 [CI=2.71, 3.49] in 1989-94; OR=3.32 [CI=2.56, 4.31] in 1999-2002).

High-income subjects: One variable predicted the risk of obesity in 1999-2002 (Table 39) but did not predict in 1989-94 (Table 40): having less than high school education relative to more than high school education (OR=1.54 [CI=0.92, 2.58] in 1989-94; OR=1.97 [CI=1.14, 3.39] in 1999-2002). Three variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being black relative to being white (OR=1.52 [CI=1.09, 2.12] in 1989-94; OR=1.36 [CI=0.73, 2.53] in 1999-2002), being Mexican-American relative to being white (OR=1.60 [CI=1.07, 2.40] in 1989-94; OR=1.20 [CI=0.78, 1.84] in 1999-2002), participating in leisure-time activity at the middle level (3rd quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=1.90 [CI=1.20, 2.99] in 1989-94; OR=1.30 [CI=0.71, 2.39] in 1999-2002), and eating meals/snacks $\leq$ 3 times/day relative to eating meals/snacks $\geq$ 7 times/day (OR=1.80 [CI=1.10, 2.93] in 1989-94; OR=1.34 [CI=0.85, 2.10] in 1999-2002).

Five variables predicted mean BMI in both 1999-2002 and 1989-94: being a woman relative to being a man (OR=0.73 [CI=0.54, 0.98] in 1989-94; OR=0.60 [CI=0.45, 0.81] in 1999-2002), being 40-49 years relative to being 20-29 years old (OR=1.92 [CI=1.08, 3.43] in 1989-94; OR=3.16 [CI=1.68, 5.96] in 1999-2002), being 50-59 years relative to being 20-29 years old (OR=3.54 [CI=1.80, 6.95] in 1989-94; OR=2.15 [CI=1.10, 4.19] in 1999-2002), being 60+ years relative to being 20-29 years old (OR=2.95 [CI=1.60, 5.45] in 1989-94; OR=2.89 [CI=1.75, 4.78] in 1999-2002), alcohol consumption (OR=0.74 [CI=0.63, 0.86] in 1989-94; OR=0.74 [CI=0.63, 0.86] in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=1.89 [CI=1.07, 3.37] in 1989-94; OR=2.29 [CI=1.18, 4.48] in 1999-2002), participating in leisure-time activity at the lowest level

(1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.59 [CI=1.52, 4.40] in 1989-94; OR=1.95 [CI=1.07, 3.56] in 1999-2002), and mean score on the component on attempt to lose weight (OR=2.53 [CI=2.12, 3.01] in 1989-94; OR=3.31 [CI=2.77, 3.95] in 1999-2002.

Whites: One variable predicted the risk of obesity in 1999-2002 (Table 41) but did not predict in 1989-94 (Table 42): eating restaurant food (OR=0.86 [CI=0.68, 1.10] in 1989-94 if eating restaurant food the day before the interview relative to not eating; OR=1.47 [CI=1.05, 2.06] in 1999-2002 if eating $\geq$ 4 time/week relative to eating less than 1 time/week in 1999-2002). Four variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being 30-39 years old relative to being 20-29 years old (OR=1.61 [CI=1.09, 2.37] in 1989-94; OR=1.45 [CI=0.80, 2.62] in 1999-2002), being a non-smoker relative to being a smoker (OR=1.28 [CI=1.04, 1.59] in 1989-94; OR=1.14 [CI=0.84, 1.53] in 1999-2002), energy intake (OR=1.33 [CI=1.04, 1.70] in 1989-94; OR=1.48 [CI=1.00, 2.17] in 1999-2002), and eating meals/snacks 4 times/day relative to eating meals/snacks $\geq$ 7 times/day (OR=1.36 [CI=1.06, 1.75] in 1989-94; OR=1.17 [CI=0.80, 1.69] in 1999-2002).

Eight variables predicted mean BMI in both 1999-2002 and 1989-94: being a woman relative to being a man (OR=0.65 [CI=0.53, 0.81] in 1989-94; OR=0.69 [CI=0.53, 0.89] in 1999-2002), having less than high school education relative to having more than high school education (OR=1.52 [CI=1.10, 2.09] in 1989-94; OR=1.45 [CI=1.05, 2.00] in 1999-2002), being in the low-income group relative to being in the high-income group (OR=1.50 [CI=1.13, 1.99] in 1989-94; OR=2.05 [CI=1.34, 3.13] in 1999-2002), being 40-49 years old relative to being 20-29 years old (OR=1.79 [CI=1.21, 2.66] in 1989-94;

OR=2.23 [CI=1.30, 3.84] in 1999-2002), being 50-59 years old relative to being 20-29 years old (OR=2.61 [CI=1.70, 4.01] in 1989-94; OR=1.87 [CI=1.03, 3.39] in 1999-2002), being 60+ years old relative to being 20-29 years old (OR=2.29 [CI=1.57, 3.33] in 1989-94; OR=2.33 [CI=1.36, 4.00] in 1999-2002), alcohol consumption (OR=0.83 [CI=0.75, 0.92] in 1989-94; OR=0.81 [CI=0.71, 0.92] in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.14 [CI=1.39, 3.31] in 1989-94; OR=2.66 [CI=1.57, 4.49] in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.18 [CI=1.46, 3.27] in 1989-94; OR=1.84 [CI=1.07, 3.15] in 1999-2002), mean score on the component on attempt to lose weight (OR=2.87 [CI=2.56, 3.22] in 1989-94; OR=3.44 [CI=2.91, 4.05] in 1999-2002), and eating meals/snacks $\leq$ 3 times/day relative to eating meals/snacks $\geq$ 7 times/day (OR=1.67 [CI=1.20, 2.23] in 1989-94; OR=1.59 [CI=1.10, 2.30] in 1999-2002).

Low-income men: Two variables predicted the risk of obesity in 1999-2002 (Table 43) but did not predict in 1989-94 (Table 44): having high school education relative to having more than high school education (OR=1.66 [CI=0.93, 2.97] in 1989-94; OR=2.94 [CI=1.53, 5.64] in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=1.42 [CI=0.63, 3.24] in 1989-94; OR=3.11 [CI=1.03, 9.40] in 1999-2002), participating in leisure-time activity at the middle level (3rd quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=1.24 [CI=0.51, 2.98] in 1989-94; OR=4.30 [CI=1.05, 17.57] in 1999-2002), and participating in leisure-time activity at the second highest level (4th quintile) relative to participating in leisure-time activity at the highest

level (5th quintile) (OR=0.83 [CI=0.40, 1.72] in 1989-94; OR=4.66 [CI=1.49, 14.57] in 1999-2002). Two variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being 40-49 years old relative to being 20-29 years old (OR=2.31 [CI=1.13, 4.74] in 1989-94; OR=2.15 [CI=0.80, 5.79] in 1999-2002), being 60+ years old relative to being 20-29 years old (OR=2.35 [CI=1.17, 4.75] in 1989-94; OR=2.22 [CI=0.76, 6.52] in 1999-2002), being a non-smoker relative to being a smoker (OR=2.00 [CI=1.27, 3.13] in 1989-94; OR=0.83 [CI=0.48, 1.44] in 1999-2002). One variable predicted mean BMI in both 1999-2002 and 1989-94: mean score on the component on attempt to lose weight (OR=3.23 [CI=2.76, 3.79] in 1989-94; OR=3.71 [CI=2.79, 4.92] in 1999-2002).

Middle-income men: Two variables predicted the risk of obesity in 1999-2002 (Table 43) but did not predict in 1989-94 (Table 44): being married relative to never been married or living with subjects' partners (OR=1.45 [CI=0.69, 3.02] in 1989-94; OR=2.61 [CI=1.04, 6.51] in 1999-2002) and not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=1.39 [CI=0.48, 4.03] in 1989-94; OR=4.10 [CI=1.18, 14.27] in 1999-2002). There were no variables that did not predict the risk of obesity in 1999-2002 but predicted in 1989-94. One variable predicted mean BMI in both 1999-2002 and 1989-94: mean score on the component on attempt to lose weight (OR=3.05 [CI=2.55, 3.64] in 1989-94; OR=4.19 [CI=2.86, 6.15] in 1999-2002).

High-income men: Two variables predicted the risk of obesity in 1999-2002 (Table 43) but did not predict in 1989-94 (Table 44): being Mexican-American relative to being white (OR=1.59 [CI=0.85, 3.00] in 1989-94; OR=1.90 [CI=1.19, 3.05] in 1999-2002) and being 40-49 years old relative to being 20-29 years old (OR=1.98 [CI=0.83, 4.71] in

1989-94; OR=2.47 [CI=1.21, 5.06] in 1999-2002). Two variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being 50-59 years old relative to being 20-29 years old (OR=2.94 [CI=1.11, 7.83] in 1989-94; OR=2.13 [CI=0.79, 5.78] in 1999-2002) and participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.69 [CI=1.14, 6.31] in 1989-94; OR=1.46 [CI=0.66, 3.22] in 1999-2002).

Three variables predicted mean BMI in both 1999-2002 and 1989-94: being 60+ years old relative to being 20-29 years old (OR=2.79 [CI=1.21, 6.46] in 1989-94; OR=2.51 [CI=1.03, 6.13] in 1999-2002), alcohol consumption (OR=0.75 [CI=0.60, 0.93] in 1989-94; OR=0.75 [CI=0.64, 0.89] in 1999-2002), and mean score on the component on attempt to lose weight (OR=2.57 [CI=2.01, 3.28] in 1989-94; OR=3.36 [CI=2.62, 4.30] in 1999-2002).

Low-income women: There were no variables that predicted the risk of obesity in 1999-2002 (Table 43) but did not predict in 1989-94 (Table 44). Three variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being black relative to being white (OR=1.66 [CI=1.13, 2.45] in 1989-94; OR=2.33 [CI=0.99, 5.47] in 1999-2002), being 50-59 years old relative to being 60+ years old (OR=2.26 [CI=1.02, 5.01] in 1989-94; OR=0.80 [CI=0.20, 3.24] in 1999-2002), having first menarche at ≤ 11 years old relative to having first menarche at ≥ 16 years old (OR=5.44 [CI=2.69, 10.99] in 1989-94; OR=3.41 [CI=0.82, 14.18] in 1999-2002), and having first menarche at 12-15 years old relative to having first menarche at ≥ 16 years old (OR=2.41 [CI=1.30, 4.47] in 1989-94; OR=1.76 [CI=0.52, 5.93] in 1999-2002).

Four variables predicted mean BMI in both 1999-2002 and 1989-94: being a non-smoker relative to being a smoker (OR=1.84 [CI=1.22, 2.77] in 1989-94; OR=1.83 [CI=1.17, 2.87] in 1999-2002), alcohol consumption (OR=0.76 [CI=0.60, 0.95] in 1989-94; OR=0.56 [CI=0.39, 0.80] in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.40 [CI=1.11, 5.16] in 1989-94; OR=4.56 [CI=1.26, 16.43] in 1999-2002), and mean score on the component on attempt to lose weight (OR=3.09 [CI=2.63, 3.61] in 1989-94; OR=3.99 [CI=3.07, 5.17] in 1999-2002).

Middle-income women: One variable predicted the risk of obesity in 1999-2002 (Table 43) but did not predict in 1989-94 (Table 44): eating more than 30% of subjects' energy intake from fat relative to eating ≤ 30% of their energy from fat (OR=1.11 [CI=0.74, 1.65] in 1989-94; OR=2.49 [CI=1.25, 4.98] in 1999-2002). Three variables did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being 40-49 years old relative to being 20-29 years old (OR=3.20 [CI=1.30, 7.90] in 1989-94; OR=2.16 [CI=0.61, 7.59] in 1999-2002), being 50-59 years old relative to being 20-29 years old (OR=2.58 [CI=1.19, 5.59] in 1989-94; OR=2.64 [CI=0.85, 8.17] in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=3.28 [CI=1.62, 6.63] in 1989-94; OR=1.08 [CI=0.37, 3.13] in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.10 [CI=1.02, 4.32] in 1989-94; OR=0.87 [CI=0.21, 3.52] in 1999-2002), and eating meals/snacks 4 times/day relative to eating meals/snacks ≥ 7 times/day (OR=1.76 [CI=1.03, 3.00] in 1989-94; OR=1.77 [CI=0.55, 5.66] in 1999-2002). Two variables predicted mean BMI in

both 1999-2002 and 1989-94: being 60+ years old relative to being 20-29 years old status (OR=3.79 [CI=1.75, 8.23] in 1989-94; OR=6.31 [CI=1.71, 23.28] in 1999-2002) and mean score on the component on attempt to lose weight (OR=3.42 [CI=2.81, 4.16] in 1989-94; OR=3.59 [CI=2.45, 5.25] in 1999-2002).

High-income women: Three variables predicted the risk of obesity in 1999-2002 (Table 43) but did not predict in 1989-94 (Table 44): being 40-49 years old relative to being 20-29 years old (OR=2.26 [CI=0.90, 5.66] in 1989-94; OR=4.71 [CI=1.36, 16.26] in 1999-2002), not participating in any leisure time activity relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.02 [CI=0.82, 4.96] in 1989-94; OR=6.60 [CI=2.42, 18.06] in 1999-2002), and having first menarche at $\leq$ 11 years old relative to having first menarche at $\geq$ 16 years old (OR=1.16 [CI=0.49, 2.73] in 1989-94; OR=4.88 [CI=1.27, 18.68] in 1999-2002). One variable did not predict the risk of obesity in 1999-2002 but predicted in 1989-94: being 30-39 years old relative to being 20-29 years old (OR=3.52 [CI=1.50, 8.24] in 1989-94; OR=3.15 [CI=0.58, 17.09] in 1999-2002), being 50-59 years old relative to being 20-29 years old (OR=5.12 [CI=2.30, 11.40] in 1989-94; OR=2.35 [CI=0.72, 7.66] in 1999-2002), and being 60+ years old relative to being 20-29 years old (OR=3.55 [CI=1.56, 8.07] in 1989-94; OR=2.38 [CI=0.78, 7.23] in 1999-2002). Three variables predicted mean BMI in both 1999-2002 and 1989-94: alcohol consumption (OR=0.69 [CI=0.52, 0.93] in 1989-94; OR=0.72 [CI=0.54, 0.97] in 1999-2002), participating in leisure-time activity at the lowest level (1st quintile) relative to participating in leisure-time activity at the highest level (5th quintile) (OR=2.30 [CI=1.02, 5.18] in 1989-94; OR=4.56 [CI=1.57, 13.23] in 1999-2002), participating in leisure-time activity at the second lowest level (2nd quintile) relative to participating in leisure-time

activity at the highest level (5th quintile) (OR=2.42 [CI=1.08, 5.44] in 1989-94; OR=3.34 [CI=1.09, 10.27] in 1999-2002), and mean score on the component on attempt to lose weight (OR=2.56 [CI=2.10, 3.11] in 1989-94; OR=3.48 [CI=2.51, 4.82] in 1999-2002).

THE EFFECT OF ENERGY INTATE INADEQUATE REPORTERS ON RESULTS

1. Weight status by the income level when age was controlled

Log-transformed BMI as an outcome variable: In 1999-2002, the income-BMI relationship in women and men after excluding energy intake inadequate reporters (Table 57) did not differ from the income-BMI relationship before excluding energy intake inadequate reporters (Table 46); being in low- and middle-income groups increased BMI compared to being in the high-income group in women (ß=0.09 at $p<0.001$ for the low-income group and ß=0.06 at $p<0.01$ for the middle-income group, respectively [Table 57]), while there was no statistically significant difference in BMI by the income level in men. There were not enough subjects to examine the relationship between BMI and the income level in white women and white men after excluding energy intake inadequate reporters.

In 1989-1994, the income-BMI relationship in women and men after excluding energy intake inadequate reporters (Table 58) did not differ from the income-BMI relationship before excluding energy intake inadequate reporters (Table 47); ß=0.07 at $p<0.0001$ for the low-income group and ß=0.03 at $p<0.05$ for the middle-income group, respectively in women (Table 58), while only being in the middle-income group increased BMI compared to being in the high-income group in men (ß=0.02 at $p<0.05$ [Table 58]). In white women, while being in low-income and middle-income groups

Table 57. Income-BMI relationship among subgroups[1]
(NHANES 1999-2002 after excluding inadequate energy intake reporters)

	W (n=1,277)	M (n=1,703)	WW (n=776)	BW (n=203)	MW (n=298)	WM (n=972)	BM (n=269)	MM (n=462)
Intercept	3.21****	3.23****	N/A	N/A	N/A	N/A	N/A	N/A
Income								
PIR <1.85	0.07***	0.01	N/A	N/A	N/A	N/A	N/A	N/A
1.85 ≤ PIR ≤ 3.5	0.05*	0.01	N/A	N/A	N/A	N/A	N/A	N/A
PIR >3.5	0.00	0.00	N/A	N/A	N/A	N/A	N/A	N/A
Age								
20-29 yrs	0.00	0.00	N/A	N/A	N/A	N/A	N/A	N/A
30-39 yrs	0.03	0.06***	N/A	N/A	N/A	N/A	N/A	N/A
40-49 yrs	0.08*	0.09****	N/A	N/A	N/A	N/A	N/A	N/A
50-59 yrs	0.08*	0.10****	N/A	N/A	N/A	N/A	N/A	N/A
60+ yrs	0.06*	0.09****	N/A	N/A	N/A	N/A	N/A	N/A
R^2	0.03	0.04	N/A	N/A	N/A	N/A	N/A	N/A

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; non-whites, blacks, or Mexican Americans; underweight subjects; those who did not have all the responses on the predictors included in the regression; and inadequate energy intake reporters.

W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men, MM: Mexican-American men

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, N/A: not applicable

Table 58. Income-BMI relationship among subgroups[1]
(NHANES 1988-94 for the regression after excluding inadequate energy intake reporters)

	W (n=3,176)	M (n=4,231)	WW (n=1,581)	BW (n=844)	MW (n=751)	WM (n=1,959)	BM (n=1,035)	MM (n=1,237)
Intercept	3.13****	3.21****	3.12****	3.18****	3.18****	3.20****	3.28****	3.25****
Income								
PIR <1.85	0.07****	0.00	0.05**	0.07**	0.05	0.01	-0.05***	-0.01
1.85 ≤ PIR ≤ 3.5	0.03*	0.02*	0.02	0.08**	0.02	0.02*	-0.01	0.00
PIR >3.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Age								
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.08***	0.05***	0.07**	0.08**	0.11****	0.06***	-0.01	0.04***
40-49 yrs	0.13****	0.07****	0.13****	0.13****	0.17****	0.08****	0.02	0.09****
50-59 yrs	0.16****	0.08****	0.15****	0.18****	0.14****	0.09****	0.02	0.09****
60+ yrs	0.10****	0.06****	0.10****	0.11**	0.13****	0.07****	0.02	0.05**
R^2	0.06	0.03	0.06	0.07	0.10	0.04	0.02	0.07

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; underweight subjects; those who did not have all the responses on the predictors included in the regression; and inadequate energy intake reporters.
W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men,
BM: Black men, MM: Mexican-American men
* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, N/A: not applicable

increased BMI compared to being in the high-income group in women before excluding energy intake inadequate reporters (Table 47), only being in the low-income group increased BMI compared to being in the high-income group after the exclusion (ß=0.05 at $p<0.01$ [Table 58]). In black women, being in low- and middle-income groups increased BMI compared to being in the high-income group after the exclusion (ß=0.07 at $p<0.01$ for the low-income group and ß=0.08 at $p<0.01$ for the middle-income group, respectively [Table 58]), corresponding to the income-BMI relationship observed before the exclusion. In Mexican-American women, while being in the low-income group increased BMI compared to being in the high-income group before the exclusion, there were no statistically significant differences in BMI by the income level after the exclusion (Table 58). In white men, being in the middle-income group increased BMI compared to being in the high-income group after the exclusion (ß=0.02 at $p<0.05$ [Table 58]), corresponding to the income-BMI relationship before the exclusion. In black men, being in the low-income group decreased BMI compared to being in the high-income group after the exclusion (ß=-0.05 at $p<0.001$ [Table 58]), corresponding to the income-BMI relationship before the exclusion. In Mexican-American men, there were no statistically significant differences in BMI by the income level after the exclusion, corresponding to the income-BMI relationship before the exclusion.

Risk of obesity as an outcome variable: In 1999-2002, the relationship between income and obesity risk in women and men after excluding energy intake inadequate reporters (Table 59) did not differ from the one between income and obesity risk before excluding energy intake inadequate reporters (Table 48); being in low-income and middle-income groups increased the risk of obesity relative to being in the high-income group in women

Table 59. Risk of obesity among subgroups[1]

(NHANES 1999-2002 for the regression after excluding inadequate energy intake reporters)

	W (n=1,277)		M (n=1,703)		WW (n=776)		BW (n=203)		MW (n=298)		WM (n=972)		BM (n=269)		MM (n=462)	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Intercept	0.19	(0.11, 0.32)	0.12	(0.07, 0.20)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Income																
PIR <1.85	2.14	(1.39, 3.28)	1.29	(0.94, 1.77)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.85 ≤ PIR ≤ 3.5	1.75	(1.16, 2.64)	1.26	(0.84, 1.89)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Age																
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30-39 yrs	1.25	(0.70, 2.24)	1.98	(1.13, 3.45)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
40-49 yrs	2.18	(1.18, 4.03)	2.79	(1.48, 5.27)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
50-59 yrs	1.84	(0.98, 3.46)	3.12	(1.59, 6.12)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
60+ yrs	1.57	(0.96, 2.57)	2.44	(1.38, 4.30)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R^2		0.03		0.02		N/A		N/A		N/A		N/A		N/A		N/A

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; non-whites, blacks, or Mexican Americans; underweight subjects; those who did not have all the responses on the predictors included in the regression; and inadequate energy intake reporters.

W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men,

BM: Black men, MM: Mexican-American men

Highlighted were statistically significant

(OR=2.14 [CI=1.39, 3.28] for the low-income group and OR=1.75 [CI=1.16, 2.64] for the middle-income group, respectively [Table 59]). There were no statistically significant differences in the risk of obesity by the income level in men (Table 59). There were not enough subjects to examine the relationship between the risk of obesity and the income level in white women and white men after excluding energy intake inadequate reporters.

In 1989-1994, all the relationships between the risk of obesity and the income level before the exclusion (Table 49) remained after the exclusion (Table 60) except in women, white women, and white men. In women, while being in low- and middle-income groups increased the risk of obesity relative to being in the high-income group before the exclusion (Table 49), only being in the low-income group increased the risk of obesity relative to being in the high-income group after the exclusion (OR=1.95 [CI=1.40, 2.73] in Table 60). In men, being in the middle-income group increased the risk of obesity relative to being in the high-income group after the exclusion (OR=1.4 [CI=1.04, 1.89] in Table 60) as seen before the exclusion (Table 49). In white women, while being in low- and middle-income groups increased the risk of obesity relative to being in the high-income group before the exclusion (Table 49), only being in the low-income group increased the risk of obesity relative to being in the high-income group after the exclusion (OR=1.77 [CI=1.18, 2.65] in Table 60). In black women, being in low- and middle-income groups increased the risk of obesity relative to being in the high-income group after the exclusion (OR=2.19 [CI=1.21, 3.96] for the low-income group and OR=2.52 [CI=1.36, 4.68] for the middle-income group, respectively in Table 60) as seen before the exclusion (Table 49). In Mexican-American women, there were no statistically

Table 60. Risk of obesity among subgroups[1]
(NHANES 1988-94 for the regression after excluding inadequate energy intake reporters)

	W (n=3,176)		M (n=4,231)		WW (n=1,581)		BW (n=844)	
	OR	CI	OR	CI	OR	CI	OR	CI
Intercept	0.11	(0.07, 0.18)	0.11	(0.08, 0.15)	0.11	(0.06, 0.21)	0.11	(0.06, 0.23)
Income								
PIR <1.85	1.95	(1.40, 2.73)	1.29	(0.92, 1.79)	1.77	(1.18, 2.65)	2.19	(1.21, 3.96)
1.85 ≤ PIR ≤ 3.5	1.37	(0.97, 1.93)	1.40	(1.04, 1.89)	1.26	(0.86, 1.83)	2.52	(1.36, 4.68)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age								
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.95	(1.16, 3.28)	1.46	(0.94, 2.28)	1.93	(0.99, 3.75)	2.10	(1.27, 3.45)
40-49 yrs	2.78	(1.64, 4.74)	2.26	(1.57, 3.26)	2.65	(1.33, 5.26)	3.12	(1.94, 5.00)
50-59 yrs	3.29	(1.93, 5.61)	2.64	(1.62, 4.31)	3.27	(1.71, 6.26)	3.97	(2.14, 7.36)
60+ yrs	1.67	(1.06, 2.63)	2.09	(1.44, 3.02)	1.66	(0.95, 2.90)	2.96	(1.42, 6.20)
R^2		0.03		0.02		0.02		0.06

Table 60 (cont'd)

	MW (n=751)		WM (n=1,959)		BM (n=1,035)		MM (n=1,237)	
	OR	CI	OR	CI	OR	CI	OR	CI
Intercept	0.26	(0.12, 0.56)	0.10	(0.06, 0.16)	0.29	(0.18, 0.40)	0.17	(0.09, 0.34)
Income								
PIR <1.85	1.07	(0.63, 1.81)	1.42	(0.95, 2.12)	0.69	(0.43, 1.10)	0.74	(0.43, 1.26)
1.85 ≤ PIR ≤ 3.5	0.98	(0.54, 1.76)	1.43	(1.03, 1.98)	1.03	(0.63, 1.70)	0.99	(0.55, 1.78)
PIR >3.5	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age								
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.75	(0.94, 3.25)	1.62	(0.92, 2.84)	0.93	(0.63, 1.37)	1.33	(0.86, 2.07)
40-49 yrs	3.60	(1.90, 6.82)	2.52	(1.58, 4.01)	1.19	(0.78, 1.81)	2.80	(1.48, 5.28)
50-59 yrs	2.33	(1.11, 4.87)	3.09	(1.71, 5.61)	0.80	(0.42, 1.50)	2.94	(1.59, 5.43)
60+ yrs	2.06	(1.04, 4.08)	2.36	(1.46, 3.81)	1.16	(0.80, 1.68)	1.68	(0.99, 2.86)
R^2	0.04		0.02		0.01		0.03	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; subjects other than whites, blacks, or Mexican Americans; underweight subjects; those who did not have all the responses on the predictors included in the regression; and inadequate energy intake reporters.
W: women, M: men, WW: white women, BW: black women, MW: Mexican-American women, WM: white men, BM: Black men, MM: Mexican-American men
Highlighted were statistically significant

significant differences in the risk of obesity by the income level after the exclusion (Table 60) as seen before the exclusion (Table 49). In white men, while being low- and middle-income groups increased the risk of obesity before the exclusion (Table 49), only being in the middle-income group increased the risk of obesity after the exclusion (OR= 1.43 [CI=1.03, 1.98] in Table 60). In black men, there were no statistically significant differences in the risk of obesity by the income level after the exclusion (Table 60) as seen before the exclusion (Table 49). In Mexican-American men, there were no statistically significant differences in the risk of obesity by the income level after the exclusion (Table 60) as seen before the exclusion (Table 49).

2. Predictors of obesity

(1) Log-transformed BMI as an outcome variable

There were some changes in the variables that predicted BMI after excluding energy intake inadequate reporter:

In 1999-2002: the following did not predict BMI in low-income men after the exclusion (Table 61), while they did before the exclusion (Table 23): being 50-59 years old relative to being 20-29 years old, being a non-smoker relative to being a smoker, and eating restaurant food 2-3 times/week relative to eating less than 1 time/week. In middle-income men, being black did not predict BMI after the exclusion, while it did before the exclusion. On the other hand, being 50-59 years old predicted BMI after the exclusion, while it did not before the exclusion. In high-income men, being Mexican-American and alcohol consumption did not predict BMI after the exclusion, while they did before the exclusion. On the other hand, energy intake predicted BMI after the exclusion, while it did not before the exclusion.

Table 61. Predictors of BMI by income and gender[1]
(NHANES 1999-2002 after excluding inadequate energy intake reporters)

	LIM		MIM		HIM	
Variables	β	SE	β	SE	β	SE
Intercept	1.28****	0.24	2.06****	0.36	1.82****	0.23
Race/ethnicity						
Non-Hispanic White	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hispanic Black	-0.02	0.02	0.04	0.02	0.04*	0.02
Mexican-Americans	0.01	0.01	0.02	0.02	0.03	0.01
Education						
< High school	0.01	0.01	-0.01	0.02	0.07*	0.03
High school graduate	0.06**	0.02	0.02	0.01	0.04**	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.04	0.03	-0.01	0.02	0.00	0.02
40-49 yrs	0.06*	0.02	0.00	0.02	0.01	0.02
50-59 yrs	0.06	0.04	0.08*	0.04	0.02	0.02
60+ yrs	0.07*	0.03	0.05	0.04	0.03	0.02
Marital status						
Married	0.00	0.02	0.03	0.02	0.01	0.01
Widowed, divorced, or separated	-0.05*	0.02	-0.03	0.04	0.00	0.03
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.03	0.02	0.01	0.02	0.00	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Daily hrs of TV, video or computer use						
≤ 1 hr	0.00	0.00	0.00	0.00	0.00	0.00
2-3 hrs	0.00	0.02	0.01	0.02	0.00	0.01
≥ 4 hrs	0.03	0.02	0.01	0.02	0.01	0.02
Alcohol consumption (# of drinks/wk)[2]	0.00	0.01	0.01	0.01	-0.01	0.01
Daily physical activity						
Mainly sit	-0.01	0.02	0.06*	0.03	0.03	0.02
Walk a lot	-0.00	0.01	0.00	0.01	0.02	0.01
Carry light or heavy loads	0.00	0.00	0.00	0.00	0.00	0.00
Leisure time activity/month						
No activities	0.04	0.02	0.01	0.03	0.03	0.03
1st quintile	0.01	0.02	-0.00	0.03	0.01	0.02
2nd quintile	0.01	0.03	-0.02	0.03	0.01	0.01
3rd quintile	0.10***	0.02	0.00	0.03	-0.01	0.01
4th quintile	0.06	0.03	-0.01	0.03	0.00	0.02
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00

Table 61 (cont'd)

Variables	LIM β	LIM SE	MIM β	MIM SE	HIM β	HIM SE
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	0.09****	0.01	0.08****	0.01	0.09****	0.01
Component 2[4]	0.03**	0.01	0.04**	0.01	0.02**	0.01
Restaurant food consumption						
< 1 time/wk	0.00	0.00	0.00	0.00	0.00	0.00
1 time/wk	0.02	0.02	-0.01	0.03	-0.01	0.01
2-3 times/wk	0.03	0.02	-0.00	0.02	-0.00	0.01
≥ 4 times/wk	-0.02	0.02	-0.01	0.02	0.00	0.02
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	-0.00	0.01	-0.00	0.02	-0.00	0.02
Energy intake (kcal/d)[2]	0.18****	0.03	0.08	0.04	0.12***	0.03
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	-0.02	0.02	0.01	0.01	0.00	0.01
Number of eating occasions						
≤ 3 times/day	0.02	0.03	0.03	0.03	0.01	0.02
4 times/day	0.02	0.04	0.03	0.03	-0.00	0.02
5 times/day	0.00	0.03	0.04	0.04	0.03	0.02
6 times/day	0.02.	0.03	0.06	0.03	0.02	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.62		0.58		0.51	

Table 61 (cont'd)

Variables	LIW β	LIW SE	MIW β	MIW SE	HIW β	HIW SE
Intercept	N/A	N/A	1.83****	0.31	1.54****	0.21
Race/ethnicity						
Non-Hispanic White	N/A	N/A	0.00	0.00	0.00	0.00
Non-Hispanic Black	N/A	N/A	0.09**	0.03	0.04	0.03
Mexican-Americans	N/A	N/A	0.03	0.02	0.02	0.02
Education						
< High school	N/A	N/A	0.02	0.03	0.04	0.04
High school graduate	N/A	N/A	-0.04	0.03	0.01	0.02
> High school	N/A	N/A	0.00	0.00	0.00	0.00
Age						
20-29 yrs	N/A	N/A	0.00	0.00	0.00	0.00
30-39 yrs	N/A	N/A	0.01	0.05	0.02	0.03
40-49 yrs	N/A	N/A	0.02	0.05	0.06	0.04
50-59 yrs	N/A	N/A	0.06	0.05	0.03	0.03
60+ yrs	N/A	N/A	0.08	0.05	0.06	0.03
Marital status						
Married	N/A	N/A	-0.04	0.04	-0.01	0.03
Widowed, divorced, or separated	N/A	N/A	-0.02	0.03	0.01	0.03
Never married or living with partner	N/A	N/A	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	N/A	N/A	0.02	0.02	0.02	0.02
Smoker	N/A	N/A	0.00	0.00	0.00	0.00
Daily hrs of TV, video or computer use						
≤ 1 hr	N/A	N/A	0.00	0.00	0.00	0.00
2-3 hrs	N/A	N/A	0.08***	0.02	0.02	0.02
≥ 4 hrs	N/A	N/A	0.05*	0.02	0.09***	0.02
Alcohol consumption (# of drinks/wk)^2	N/A	N/A	-0.02*	0.01	-0.02**	0.01
Daily physical activity						
Mainly sit	N/A	N/A	0.06*	0.02	0.03	0.02
Walk a lot	N/A	N/A	0.03	0.02	-0.00	0.01
Carry light or heavy loads	N/A	N/A	0.00	0.00	0.00	0.00
Leisure time activity/month						
No activities	N/A	N/A	0.02	0.05	0.13***	0.03
1st quintile	N/A	N/A	-0.02	0.04	0.06**	0.02
2nd quintile	N/A	N/A	-0.05	0.04	0.05	0.02
3rd quintile	N/A	N/A	-0.03	0.04	0.01	0.03
4th quintile	N/A	N/A	-0.01	0.03	0.01	0.02
5th quintile	N/A	N/A	0.00	0.00	0.00	0.00

Table 61 (cont'd)

Variables	LIW β	LIW SE	MIW β	MIW SE	HIW β	HIW SE
Breast fed your child						
Yes	N/A	N/A	0.03	0.05	0.03	0.04
No	N/A	N/A	0.05	0.05	0.02	0.04
Never been pregnant	N/A	N/A	0.00	0.00	0.00	0.00
Number of live birth						
0 and never been pregnant	N/A	N/A	0.00	0.00	0.00	0.00
1	N/A	N/A	-0.07*	0.03	-0.05	0.03
2	N/A	N/A	-0.13***	0.03	-0.03	0.03
3	N/A	N/A	-0.07*	0.03	-0.04	0.03
4	N/A	N/A	0.00	0.00	0.00	0.00
≥ 5	N/A	N/A	-0.05	0.04	-0.03	0.04
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	0.05	0.04	0.17***	0.04
12-15 yrs old	N/A	N/A	0.00	0.03	0.10*	0.04
≥ 16 yrs old	N/A	N/A	0.00	0.00	0.00	0.00
Component 1[3]	N/A	N/A	0.10****	0.01	0.12****	0.01
Component 2[4]	N/A	N/A	0.04**	0.01	0.02*	0.01
Restaurant food consumption						
< 1 time/wk	N/A	N/A	0.00	0.00	0.00	0.00
1 time/wk	N/A	N/A	0.04	0.02	0.02	0.03
2-3 times/wk	N/A	N/A	-0.00	0.03	0.03	0.02
≥ 4 times/wk	N/A	N/A	0.00	0.03	0.07**	0.02
Breakfast consumption						
Yes	N/A	N/A	0.00	0.00	0.00	0.00
No	N/A	N/A	0.02	0.03	0.03	0.02
Energy intake (kcal/d)[2]	N/A	N/A	0.09*	0.03	0.10***	0.03
Fat intake						
≤ 30% of energy from fat	N/A	N/A	0.00	0.00	0.00	0.00
> 30% of energy from fat	N/A	N/A	0.04	0.02	0.02	0.01

Table 61 (cont'd)

	LIW		MIW		HIW	
Variables	β	SE	β	SE	β	SE
Number of eating occasions						
≤ 3 times/day	N/A	N/A	0.03	0.04	-0.03	0.03
4 times/day	N/A	N/A	0.05	0.03	0.03	0.03
5 times/day	N/A	N/A	0.02	0.03	-0.00	0.02
6 times/day	N/A	N/A	0.03	0.03	-0.02	0.02
≥ 7 times/day	N/A	N/A	0.00	0.00	0.00	0.00
R^2	N/A		0.52		0.57	

[1] Dependent variable was log-transformed BMI.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and desired weight status

[4] Sum of responses to questions on attempt to lose weight and attempt not to gain weight

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

Predictors of obesity were not obtained in low-income women, since there was not enough sample size to conduct the statistics. In middle-income women, spending the day mainly by sitting, having one live birth, and energy intakes predicted BMI after the exclusion, while they did not before the exclusion. In high-income women, eating restaurant food ≥ 4 times/week and energy intake predicted BMI after the exclusion, while they did not before the exclusion. On the other hand, the following did not predict BMI after the exclusion, while they did before the exclusion: being black, being 40-49 years old, being 60+ years old, and watching TV or using a computer for 2-3 hours/day.

In 1989-1994: being 60+ years old and energy intake predicted BMI in low-income men after the exclusion (Table 62), while they did not before the exclusion (Table 31). On the other hand, having high school education, and eating meals/snacks ≤ 3 times/day did not predict BMI after the exclusion, while they did before the exclusion. In middle- income men, the following predicted BMI after the exclusion, while they did not before the exclusion: being 60+ years old, energy intake, and eating meals/snacks ≤ 3 times/day. In high-income men, the following did not predict BMI after the exclusion, while they did before the exclusion: alcohol consumption, not participating any leisure time activity in the past month, participating in leisure time activity at the lowest level (1st quintile), and eating meals/snacks ≤ 3 times/day.

In low-income women, the following did not predict BMI after the exclusion, while they did before the exclusion: having less than high school education, having high school education, being a non-smoker, and participating leisure time activity at the lowest degree (1st quintile). In middle-income women, being a Mexican-American predicted BMI after the exclusion, while it did not before the exclusion. In high-income women,

Table 62. Predictors of BMI by income and gender[1]
(NHANES 1988-94 after excluding inadequate energy intake reporters)

	LIM		MIM		HIM	
Variables	β	SE	β	SE	β	SE
Intercept	1.93****	0.18	1.98****	0.15	2.03****	0.17
Race/ethnicity						
Non-Hispanic White	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hispanic Black	0.02	0.01	0.03**	0.01	0.04**	0.01
Mexican-Americans	0.00	0.01	0.01	0.01	0.02	0.01
Education						
< High school	0.03*	0.02	0.04**	0.01	0.05***	0.02
High school graduate	0.02	0.01	0.03**	0.01	0.04***	0.01
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.02	0.01	0.01	0.01	0.02	0.02
40-49 yrs	0.05**	0.02	0.03*	0.01	0.03	0.02
50-59 yrs	0.02	0.03	0.04	0.02	0.05*	0.02
60+ yrs	0.03**	0.02	0.03*	0.01	0.07***	0.02
Marital status						
Married	0.00	0.01	0.01	0.01	-0.02	0.01
Widowed, divorced, or separated	-0.04*	0.02	0.01	0.02	-0.00	0.02
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.04***	0.01	0.03**	0.01	0.01	0.01
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol consumption (# of drinks/wk)[2]	0.00	0.00	-0.00	0.00	-0.01	0.00
Leisure time activity/month						
No activities	0.01	0.02	0.01	0.02	0.03	0.02
1st quintile	0.01	0.02	0.03	0.02	0.02	0.02
2nd quintile	0.02	0.02	-0.01	0.02	0.01	0.02
3rd quintile	0.01	0.02	0.01	0.02	0.01	0.01
4th quintile	0.01	0.02	-0.00	0.01	-0.00	0.01
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A

Table 62 (cont'd)

Variables	LIM β	LIM SE	MIM β	MIM SE	HIM β	HIM SE
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	0.08****	0.00	0.07****	0.00	0.06****	0.00
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Consumer	-0.01	0.01	-0.01	0.01	0.01	0.01
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.01	0.01	0.01	0.01	0.00	0.01
Energy intake (kcal/d)[2]	0.10****	0.02	0.10****	0.02	0.10****	0.02
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	-0.00	0.01	0.01	0.01	-0.01	0.01
Number of eating occasions						
≤ 3 times/day	0.03	0.02	0.04*	0.02	0.03	0.02
4 times/day	0.02	0.02	0.00	0.01	0.05**	0.02
5 times/day	0.01	0.02	0.01	0.01	0.01	0.01
6 times/day	0.03	0.02	-0.01	0.01	0.01	0.01
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.54		0.51		0.42	

Table 62 (cont'd)

Variables	LIW β	LIW SE	MIW β	MIW SE	HIW β	HIW SE
Intercept	1.28****	0.22	0.96****	0.23	1.41****	0.20
Race/ethnicity						
Non-Hispanic White	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hispanic Black	0.07***	0.02	0.11****	0.02	0.04	0.02
Mexican-Americans	0.05**	0.02	0.04*	0.02	0.03	0.02
Education						
< High school	0.04	0.02	0.03	0.02	0.02	0.02
High school graduate	0.03	0.02	0.01	0.02	0.02	0.02
> High school	0.00	0.00	0.00	0.00	0.00	0.00
Age						
20-29 yrs	0.00	0.00	0.00	0.00	0.00	0.00
30-39 yrs	0.08***	0.02	0.05*	0.02	0.08***	0.02
40-49 yrs	0.09**	0.03	0.11***	0.03	0.11****	0.03
50-59 yrs	0.13****	0.03	0.13****	0.02	0.15****	0.02
60+ yrs	0.13****	0.02	0.17****	0.03	0.16****	0.02
Marital status						
Married	-0.02	0.02	-0.01	0.03	-0.01	0.02
Widowed, divorced, or separated	0.00	0.02	-0.02	0.03	-0.00	0.03
Never married or living with partner	0.00	0.00	0.00	0.00	0.00	0.00
Smoking status in the past 5 days						
Non-smoker	0.02	0.01	-0.00	0.02	0.02	0.02
Smoker	0.00	0.00	0.00	0.00	0.00	0.00
Alcohol consumption (# of drinks/wk)^2	-0.03***	0.01	-0.02*	0.01	-0.03***	0.01
Leisure time activity/month						
No activities	0.08*	0.03	0.13***	0.04	-0.01	0.03
1st quintile	0.05	0.03	0.07**	0.02	0.03	0.03
2nd quintile	0.02	0.03	0.04	0.03	0.01	0.03
3rd quintile	0.01	0.03	0.03	0.03	-0.02	0.02
4th quintile	0.02	0.03	0.02	0.02	-0.04	0.02
5th quintile	0.00	0.00	0.00	0.00	0.00	0.00
Breast fed your child						
Yes	0.01	0.03	0.03	0.04	-0.01	0.02
No	0.05	0.03	0.04	0.04	0.00	0.03
Never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00

Table 62 (cont'd)

Variables	LIW β	LIW SE	MIW β	MIW SE	HIW β	HIW SE
Number of live birth						
0 and never been pregnant	0.00	0.00	0.00	0.00	0.00	0.00
1	-0.02	0.03	0.02	0.03	0.01	0.03
2	-0.04	0.03	-0.04	0.03	-0.03	0.02
3	-0.03	0.03	-0.03	0.04	0.00	0.02
4	0.00	0.00	0.00	0.00	0.00	0.00
≥ 5	0.01	0.03	0.06	0.04	0.03	0.05
Age at the first menarche						
≤ 11 yrs old	0.13****	0.02	0.08*	0.04	0.01	0.03
12-15 yrs old	0.07**	0.02	0.04	0.03	-0.05	0.03
≥ 16 yrs old	0.00	0.00	0.00	0.00	0.00	0.00
Component 1[3]	0.08****	0.00	0.09****	0.00	0.07****	0.00
Restaurant food consumption						
Non-consumer	0.00	0.00	0.00	0.00	0.00	0.00
Consumer	-0.01	0.02	-0.00	0.02	-0.01	0.02
Breakfast consumption						
Yes	0.00	0.00	0.00	0.00	0.00	0.00
No	0.01	0.01	0.03	0.02	0.00	0.02
Energy intake (kcal/d)[2]	0.15****	0.03	0.19****	0.03	0.16****	0.03
Fat intake						
≤ 30% of energy from fat	0.00	0.00	0.00	0.00	0.00	0.00
> 30% of energy from fat	0.02	0.01	-0.01	0.01	0.01	0.01
Number of eating occasions						
≤ 3 times/day	0.04	0.03	-0.00	0.02	0.06*	0.02
4 times/day	-0.00	0.03	0.06**	0.02	0.03	0.02
5 times/day	0.02	0.03	0.02	0.02	0.02	0.02
6 times/day	0.01	0.03	0.01	0.02	0.03	0.02
≥ 7 times/day	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.47		0.47		0.42	

[1] Dependent variable was log-transformed BMI

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

energy intake predicted BMI after the exclusion, while it did not before the exclusion. On the other hand, being a black and participating in leisure-time activity at the lowest level (1st quintile) did not predict BMI after the exclusion, while they did before the exclusion.

(2) Risk of obesity as an outcome variable

There were also some changes in predictors of the risk of obesity after excluding energy intake inadequate reporter:

In 1999-2002: watching TV or using a computer for ≥ 4 hours/day, participating in leisure time activity at the middle level (3rd quintile), and energy intake predicted the risk of obesity in low-income men after the exclusion (Table 63), while they did not before the exclusion (Table 36). On the other hand, participating in leisure time activity at the second highest level (4th quintile) did not predict the risk of obesity after the exclusion, while it did before the exclusion. In middle-income men, the following did not predict the risk of obesity after the exclusion, while they did before the exclusion: being black, being 30-39 years old, and not participating in any leisure time activity in the past month, mean score on the component score on attempt to lose weight. In high-income men, being 40-49 years old did not predict the risk of obesity after the exclusion, while it did before the exclusion.

Predictors of obesity were not obtained in low-income women, since there was not an enough sample size to conduct the statistics. In middle-income women, the following predicted the risk of obesity after the exclusion, while they did not before the exclusion: being widowed, divorced, or separated, not having breastfed subjects' child, having one live birth, mean score on the component score on attempt to lose weight,

Table 63. Predictors of obesity risk by income and gender[1]
(NHANES 1999-2002 after excluding inadequate energy intake reporters)

	LIM		MIM		HIM	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	1.11	(0.46, 2.65)	2.22	(0.70, 7.09)	1.11	(0.41, 3.01)
Mexican-Americans	0.99	(0.57, 1.72)	1.08	(0.26, 4.56)	**2.39**	**(1.21, 4.74)**
Education						
< High school	1.09	(0.43, 2.72)	1.20	(0.40, 3.57)	2.41	(0.72, 8.05)
High school graduate	3.43	(1.53, 7.69)	2.08	(0.95, 4.55)	1.43	(0.70, 2.94)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	3.19	(0.74, 13.71)	0.39	(0.14, 1.12)	1.33	(0.27, 6.42)
40-49 yrs	2.65	(0.72, 9.84)	0.46	(0.11, 1.99)	2.38	(0.59, 9.56)
50-59 yrs	3.03	(0.53, 17.20)	3.12	(0.71, 13.70)	1.57	(0.31, 8.04)
60+ yrs	3.89	(0.75, 20.27)	1.75	(0.16, 19.08)	2.33	(0.57, 9.50)
Marital status						
Married	1.28	(0.52, 3.18)	**3.62**	**(1.14, 11.53)**	0.66	(0.20, 2.11)
Widowed, divorced, or separated	0.55	(0.14, 2.23)	0.90	(0.17, 4.73)	0.44	(0.13, 1.53)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 63 (cont'd)

Variables	LIM OR	LIM 95% CI	MIM OR	MIM 95% CI	HIM OR	HIM 95% CI
Smoking status in the past 5 days						
Non-smoker	0.81	(0.34, 1.93)	0.44	(0.13, 1.53)	0.61	(0.32, 1.18)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Daily hrs of TV, video or computer use						
≤ 1 hr	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
2-3 hrs	1.82	(0.69, 4.78)	0.80	(0.24, 2.61)	1.10	(0.69, 1.75)
≥ 4 hrs	2.97	(1.21, 7.29)	0.95	(0.34, 2.66)	1.36	(0.56, 3.28)
Alcohol intake (# of drinks/wk)[2]	0.91	(0.71, 1.17)	1.04	(0.76, 1.44)	0.71	(0.57, 0.89)
Daily physical activity						
Mainly sit	1.31	(0.57, 3.02)	2.01	(0.66, 6.13)	1.38	(0.65, 2.93)
Walk a lot	1.49	(0.57, 3.91)	1.42	(0.59, 3.44)	1.62	(0.75, 3.51)
Carry light or heavy loads	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Leisure time activity/month						
No activities	1.82	(0.48, 6.95)	2.17	(0.55, 8.59)	0.89	(0.33, 2.42)
1st quintile	1.08	(0.29, 3.99)	0.53	(0.13, 2.15)	1.07	(0.45, 2.53)
2nd quintile	1.58	(0.31, 8.15)	0.50	(0.12, 2.06)	0.63	(0.25, 1.63)
3rd quintile	5.51	(1.11, 27.41)	1.25	(0.18, 8.53)	0.62	(0.22, 1.75)
4th quintile	3.31	(0.56, 19.53)	0.55	(0.12, 2.60)	0.75	(0.31, 1.86)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 63 (cont'd)

Variables	LIM OR	LIM 95% CI	MIM OR	MIM 95% CI	HIM OR	HIM 95% CI
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	4.85	(2.89, 8.13)	5.85	(3.67, 9.32)	6.39	(3.75, 10.87)
Component 2[4]	1.16	(0.71, 1.89)	1.87	(0.96, 3.64)	1.23	(0.88, 1.73)

Table 63 (cont'd)

Variables	LIM OR	LIM 95% CI	MIM OR	MIM 95% CI	HIM OR	HIM 95% CI
Restaurant food consumption						
< 1 time/wk	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	1.15	(0.47, 2.80)	0.91	(0.29, 2.90)	0.86	(0.31, 2.37)
2-3 times/wk	1.03	(0.38, 2.77)	0.85	(0.33, 2.14)	0.82	(0.33, 2.06)
≥ 4 times/wk	0.41	(0.13, 1.29)	2.00	(0.76, 5.28)	0.71	(0.31, 1.64)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	0.71	(0.34, 1.48)	0.64	(0.20, 2.11)	0.52	(0.19, 1.38)
Energy intake (kcal/d)[2]	21.76	(3.85, 123.12)	4.33	(0.31, 59.66)	6.04	(1.59, 23.00)
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	0.87	(0.45, 1.70)	0.96	(0.34, 2.69)	0.82	(0.45, 1.48)
Number of eating occasions						
≤ 3 times/day	2.00	(0.42, 9.44)	1.35	(0.35, 5.23)	1.37	(0.35, 5.29)
4 times/day	0.98	(0.22, 4.49)	0.63	(0.18, 2.20)	1.11	(0.43, 2.89)
5 times/day	0.88	(0.20, 3.81)	0.64	(0.14, 2.89)	1.52	(0.66, 3.53)
6 times/day	1.50	(0.36, 6.32)	1.46	(0.51, 4.16)	1.55	(0.57, 4.19)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.39		0.37		0.27

Table 63 (cont'd)

	LIW		MIW		HIW	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	N/A	N/A	0.00	(0.00, 0.03)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	N/A	N/A	7.40	(1.74, 31.39)	0.31	(0.08, 1.17)
Mexican-Americans	N/A	N/A	0.97	(0.47, 2.01)	0.89	(0.25, 3.10)
Education						
< High school	N/A	N/A	1.09	(0.39, 2.99)	0.87	(0.19, 3.97)
High school graduate	N/A	N/A	0.56	(0.19, 1.61)	1.08	(0.49, 2.36)
> High school	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	N/A	N/A	1.00	(0.21, 4.77)	1.31	(0.23, 7.30)
40-49 yrs	N/A	N/A	4.02	(0.71, 22.79)	3.11	(0.71, 13.72)
50-59 yrs	N/A	N/A	2.66	(0.44, 16.03)	0.89	(0.21, 3.75)
60+ yrs	N/A	N/A	6.57	(0.94, 45.71)	1.06	(0.26, 4.40)
Marital status						
Married	N/A	N/A	0.42	(0.11, 1.60)	0.49	(0.15, 1.65)
Widowed, divorced, or separated	N/A	N/A	0.19	(0.07, 0.51)	0.93	(0.19, 4.52)
Never married/living with partner	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 63 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Smoking status in the past 5 days						
Non-smoker	N/A	N/A	1.24	(0.41, 3.75)	2.29	(0.81, 6.45)
Smoker	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Daily hrs of TV, video or computer use						
≤ 1 hr	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
2-3 hrs	N/A	N/A	6.11	(3.13, 11.96)	1.37	(0.61, 3.09)
≥ 4 hrs	N/A	N/A	4.49	(1.49, 13.52)	5.01	(1.68, 14.96)
Alcohol intake (# of drinks/wk)^2	N/A	N/A	0.84	(0.55, 1.27)	0.72	(0.52, 0.98)
Daily physical activity						
Mainly sit	N/A	N/A	2.81	(0.82, 9.71)	3.59	(1.17, 10.98)
Walk a lot	N/A	N/A	2.35	(0.66, 8.38)	1.69	(0.73, 3.94)
Carry light or heavy loads	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Leisure time activity/month						
No activities	N/A	N/A	0.53	(0.14, 2.01)	10.84	(2.03, 57.86)
1st quintile	N/A	N/A	0.83	(0.23, 3.00)	4.52	(0.81, 25.30)
2nd quintile	N/A	N/A	0.24	(0.05, 1.12)	4.19	(0.92, 19.14)
3rd quintile	N/A	N/A	0.24	(0.04, 1.30)	2.91	(0.55, 15.54)
4th quintile	N/A	N/A	0.20	(0.04, 0.96)	1.97	(0.39, 10.08)
5th quintile	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 63 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Breast fed your child						
Yes	N/A	N/A	3.72	(0.66, 20.85)	0.76	(0.14, 4.23)
No	N/A	N/A	6.19	(1.02, 37.70)	1.43	(0.21, 9.82)
Never been pregnant	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Number of live birth						
0 and never been pregnant	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1	N/A	N/A	0.16	(0.03, 0.86)	0.59	(0.13, 2.77)
2	N/A	N/A	0.07	(0.01, 0.38)	1.27	(0.31, 5.18)
3	N/A	N/A	0.31	(0.06, 1.67)	1.22	(0.27, 5.60)
4	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
≥ 5	N/A	N/A	0.13	(0.03, 0.56)	2.38	(0.40, 14.13)
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	0.75	(0.10, 5.35)	5.65	(1.19, 26.77)
12-15 yrs old	N/A	N/A	0.64	(0.10, 3.98)	2.67	(0.66, 10.73)
≥ 16 yrs old	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	N/A	N/A	6.86	(2.39, 19.73)	97.93	(11.32, 847.09)
Component 2[4]	N/A	N/A	1.60	(1.03, 2.51)	1.28	(0.75, 2.19)

Table 63 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Restaurant food consumption						
< 1 time/wk	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1 time/wk	N/A	N/A	3.45	(1.47, 8.10)	2.36	(0.73, 7.62)
2-3 times/wk	N/A	N/A	1.15	(0.47, 2.85)	1.82	(0.50, 6.58)
≥ 4 times/wk	N/A	N/A	2.12	(0.71, 6.32)	3.48	(0.99, 12.28)
Breakfast consumption						
Yes	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	N/A	N/A	1.64	(0.58, 4.66)	1.04	(0.33, 3.28)
Energy intake $(kcal/d)^2$	N/A	N/A	1.48	(0.40, 5.45)	5.06	(1.62, 15.79)
Fat intake						
≤ 30% of energy from fat	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	N/A	N/A	2.31	(1.13, 4.69)	1.19	(0.46, 3.10)

Table 63 (cont'd)

	LIW		MIW		HIW	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Number of eating occasions						
≤ 3 times/day	N/A	N/A	1.51	(0.36, 6.39)	0.78	(0.20, 3.03)
4 times/day	N/A	N/A	3.86	(1.01, 14.78)	1.98	(0.45, 8.68)
5 times/day	N/A	N/A	1.22	(0.38, 3.92)	2.15	(0.73, 6.32)
6 times/day	N/A	N/A	3.25	(0.61, 17.47)	1.12	(0.40, 3.17)
≥ 7 times/day	N/A	N/A	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.38		0.42		0.52	

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and desired weight status

[4] Sum of responses to the questions on attempt to lose weight and attempt not to gain weight

[5] The analysis was not completed due to small sample size.

Highlighted were statistically significant

eating restaurant food 1 time/week, and eating meals/snacks 4 times/day. On the other hand, being 60+ years old did not predict the risk of obesity after the exclusion, while it did before the exclusion. In high-income women, alcohol consumption and energy intake predicted the risk of obesity after the exclusion, while they did not before the exclusion. On the other hand, being a non-smoker and participating in leisure time activity at the lowest level (1st quintile) did not predict the risk of obesity after the exclusion, while they did before the exclusion.

In 1989-1994, the following predicted the risk of obesity in low-income men after the exclusion (Table 64), while they did not before the exclusion (Table 44): being Mexican-American, alcohol consumption, and energy intake. In middle-income men, being a non-smoker, energy intake, and eating meals/snacks ≤ 3 times/day predicted the risk of obesity after the exclusion, while they did not before the exclusion. In high-income men, being 50-59 years old and participating in leisure time activity at the lowest degree (1st quintile) did not predict the risk of obesity after the exclusion, while they did before the exclusion.

In low-income women, energy intake predicted the risk of obesity after the exclusion, while it did not before the exclusion. On the other hand, the following did not predict the risk of obesity after the exclusion, while they did before the exclusion: being black, being a non-smoker, and not participating in any leisure time activity in the past month. In middle-income women, the following predicted the risk of obesity after the exclusion, while they did not before the exclusion: being Mexican-American, being 30-39 years old, participating in leisure time activity at the second lowest level (2nd quintile), and energy intake. In high-income women, the following predicted the risk of obesity

Table 64. Predictors of obesity risk by income and gender[1]
(NAHNES 1988-94 after excluding inadequate energy intake reporters)

	LIM		MIM		HIM	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	1.08	(0.61, 1.89)	1.96	(1.20, 3.20)	1.78	(0.94, 3.38)
Mexican-Americans	0.52	(0.29, 0.93)	0.87	(0.53, 1.44)	1.53	(0.82, 2.87)
Education						
< High school	1.46	(0.81, 2.62)	1.96	(0.92, 4.19)	2.04	(0.93, 4.46)
High school graduate	1.45	(0.79, 2.65)	1.52	(0.90, 2.56)	1.22	(0.69, 2.17)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.61	(0.76, 3.43)	0.97	(0.50, 1.90)	1.14	(0.41, 3.22)
40-49 yrs	3.02	(1.35, 6.75)	1.66	(0.78, 3.53)	1.89	(0.78, 4.56)
50-59 yrs	1.73	(0.44, 6.84)	1.82	(0.72, 4.60)	2.34	(0.83, 6.59)
60+ yrs	2.99	(1.23, 7.25)	1.87	(0.93, 3.76)	3.02	(1.12, 8.13)
Marital status						
Married	1.23	(0.53, 2.87)	1.70	(0.76, 3.82)	0.59	(0.28, 1.24)
Widowed, divorced, or separated	0.83	(0.29, 2.33)	0.60	(0.22, 1.65)	0.72	(0.26, 2.04)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 64 (cont'd)

Variables	LIM OR	LIM 95% CI	MIM OR	MIM 95% CI	HIM OR	HIM 95% CI
Smoking status in the past 5 days						
Non-smoker	2.73	(1.54, 4.83)	1.76	(1.12, 2.76)	1.26	(0.68, 2.32)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	1.30	(1.03, 1.65)	1.12	(0.91, 1.38)	0.72	(0.56, 0.93)
Leisure time activity/month						
No activities	2.13	(0.89, 5.10)	1.50	(0.42, 5.38)	1.40	(0.52, 3.76)
1st quintile	1.87	(0.76, 4.61)	1.66	(0.57, 4.85)	2.00	(0.75, 5.31)
2nd quintile	2.04	(0.69, 6.07)	0.70	(0.24, 2.05)	1.22	(0.54, 2.77)
3rd quintile	1.41	(0.57, 3.44)	0.97	(0.34, 2.74)	1.16	(0.58, 2.35)
4th quintile	0.72	(0.25, 2.08)	0.64	(0.23, 1.75)	1.21	(0.58, 2.51)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A

Table 64 (cont'd)

Variables	LIM OR	LIM 95% CI	MIM OR	MIM 95% CI	HIM OR	HIM 95% CI
Number of live birth						
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche						
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	3.58	(2.87, 4.46)	3.28	(2.69, 4.01)	2.37	(1.86, 3.01)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	0.60	(0.30, 1.22)	0.76	(0.45, 1.27)	1.20	(0.74, 1.94)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.36	(0.74, 2.48)	1.21	(0.66, 2.23)	1.34	(0.75, 2.39)
Energy intake (kcal/d)[2]	3.93	(1.48, 10.44)	4.36	(1.76, 10.82)	2.84	(0.88, 9.18)

Table 64 (cont'd)

	LIM		MIM		HIM	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.18	(0.70, 1.98)	1.34	(0.81, 2.24)	0.92	(0.58, 1.43)
Number of eating occasions						
≤ 3 times/day	2.09	(0.78, 5.59)	2.14	(1.01, 4.54)	1.20	(0.58, 2.48)
4 times/day	2.02	(0.75, 5.46)	0.82	(0.46, 1.48)	1.66	(0.79, 3.46)
5 times/day	1.24	(0.44, 3.49)	0.90	(0.46, 1.79)	0.78	(0.38, 1.57)
6 times/day	1.42	(0.54, 3.76)	0.48	(0.23, 1.00)	1.00	(0.49, 2.02)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2	0.28		0.26		0.17	

Table 64 (cont'd)

	LIW		MIW		HIW	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.00	(0.00, 0.01)	0.00	(0.00, 0.03)	0.00	(0.00, 0.00)
Race/ethnicity						
Non-Hispanic White	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Non-Hispanic Black	1.51	(0.94, 2.42)	3.77	(2.16, 6.59)	0.86	(0.43, 1.69)
Mexican-Americans	1.51	(0.88, 2.58)	1.90	(1.10, 3.28)	1.79	(0.87, 3.70)
Education						
< High school	1.37	(0.74, 2.55)	2.19	(0.89, 5.35)	1.24	(0.47, 3.27)
High school graduate	1.44	(0.73, 2.84)	1.76	(0.91, 3.38)	1.43	(0.82, 2.49)
> High school	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Age						
20-29 yrs	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
30-39 yrs	1.44	(0.68, 3.04)	2.53	(1.11, 5.81)	3.92	(1.48, 10.39)
40-49 yrs	1.92	(0.99, 3.75)	5.82	(2.24, 15.12)	3.52	(1.28, 9.63)
50-59 yrs	3.22	(1.37, 7.57)	5.15	(2.21, 11.98)	5.76	(2.22, 14.97)
60+ yrs	1.72	(0.73, 4.05)	7.21	(2.97, 17.51)	5.14	(2.03, 13.02)
Marital status						
Married	0.78	(0.35, 1.74)	1.42	(0.58, 3.47)	0.70	(0.26, 1.92)
Widowed, divorced, or separated	1.30	(0.63, 2.69)	1.16	(0.45, 3.04)	1.30	(0.44, 3.86)
Never married/living with partner	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 64 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Smoking status in the past 5 days						
Non-smoker	1.35	(0.80, 2.28)	0.69	(0.41, 1.19)	1.20	(0.49, 2.98)
Smoker	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Alcohol intake (# of drinks/wk)[2]	0.73	(0.58, 0.92)	0.79	(0.60, 1.04)	0.66	(0.46, 0.93)
Leisure time activity/month						
No activities	2.44	(0.79, 7.54)	6.10	(2.03, 18.28)	0.99	(0.27, 3.61)
1st quintile	1.85	(0.67, 5.15)	3.56	(1.21, 10.48)	1.57	(0.56, 4.38)
2nd quintile	1.16	(0.36, 3.71)	3.20	(1.03, 9.99)	1.33	(0.37, 4.77)
3rd quintile	1.12	(0.40, 3.17)	2.25	(0.77, 6.55)	0.66	(0.20, 2.12)
4th quintile	1.06	(0.42, 2.65)	2.88	(0.93, 8.92)	0.64	(0.21, 2.02)
5th quintile	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Breast fed your child						
Yes	0.85	(0.30, 2.39)	0.62	(0.21, 1.85)	0.53	(0.19, 1.49)
No	1.74	(0.67, 4.56)	0.74	(0.26, 2.11)	0.68	(0.25, 1.88)
Never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

Table 64 (cont'd)

	LIW		MIW		HIW	
Variables	OR	95% CI	OR	95% CI	OR	95% CI
Number of live birth						
0 and never been pregnant	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1	0.72	(0.27, 1.87)	1.89	(0.75, 4.74)	1.32	(0.44, 4.02)
2	0.52	(0.21, 1.24)	1.13	(0.45, 2.82)	0.59	(0.23, 1.49)
3	0.86	(0.39, 1.91)	0.83	(0.30, 2.26)	1.22	(0.38, 3.90)
4	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
≥ 5	1.47	(0.67, 3.26)	2.20	(0.78, 6.15)	1.52	(0.39, 5.94)
Age at the first menarche						
≤ 11 yrs old	11.79	(5.00, 27.81)	2.12	(0.55, 8.18)	0.75	(0.28, 2.06)
12-15 yrs old	5.91	(2.54, 13.77)	1.74	(0.51, 5.89)	0.30	(0.14, 0.68)
≥ 16 yrs old	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Component 1[3]	2.95	(2.46, 3.55)	3.00	(2.38, 3.78)	2.29	(1.82, 2.88)
Restaurant food consumption						
Non-consumer	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Consumer	1.09	(0.55, 2.17)	1.13	(0.66, 1.93)	0.81	(0.48, 1.38)
Breakfast consumption						
Yes	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
No	1.18	(0.77, 1.81)	1.55	(0.74, 3.24)	0.81	(0.43, 1.54)
Energy intake (kcal/d)[2]	5.68	(2.13, 15.13)	10.10	(3.94, 25.85)	15.49	(5.58, 43.03)

Table 64 (cont'd)

Variables	LIW OR	LIW 95% CI	MIW OR	MIW 95% CI	HIW OR	HIW 95% CI
Fat intake						
≤ 30% of energy from fat	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
> 30% of energy from fat	1.23	(0.78, 1.94)	0.93	(0.60, 1.46)	1.33	(0.79, 2.25)
Number of eating occasions						
≤ 3 times/day	1.40	(0.56, 3.47)	0.82	(0.37, 1.83)	**2.67**	**(1.14, 6.25)**
4 times/day	0.98	(0.43, 2.23)	**2.04**	**(1.08, 3.85)**	1.30	(0.62, 2.76)
5 times/day	1.37	(0.53, 3.53)	1.29	(0.63, 2.66)	1.60	(0.71, 3.59)
6 times/day	1.12	(0.44, 2.80)	0.89	(0.40, 1.96)	1.13	(0.49, 2.61)
≥ 7 times/day	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
R^2		0.28		0.27		0.20

[1] Dependent variable was obese vs. non-obese.

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight.

Highlighted were statistically significant

after the exclusion, while they did not after the exclusion: being 40-49 years old, having first menarche at 12-15 years old, energy intake, and eating meals/snacks $\leq$ 3 times/day. On the other hand, the following did not predict the risk of obesity after the exclusion, while they did before the exclusion: participating in leisure time activity at the lowest level (1st quintile) and participating in leisure time activity at the second lowest level (2nd quintile).

DISCUSSION

Sociodemographic differences in obesity prevalence and their changes over the past decades:

The prevalence of obesity was record high in the U.S. and the increase was not due to aging population. It was confirmed that the obesity prevalence differed not only by income level but also its combination with gender and race/ethnicity. The highest increase in the obesity prevalence was observed in Mexican-American high-income women (25.1 to 39.3%) whereas the prevalence did not change in Mexican-American low-income men (23.6 to 23.4%) and Mexican-American middle-income women (35.9 to 35.2%).

Predictors that accounted for differences in obesity prevalence among the subpopulation groups:

Lifestyle, reproductive, and psychosocial predictors that differentiated obesity prevalence among subpopulation groups by income, gender, or race/ethnicity alone differed from those that were based on their combinations (Appendix 3a-c). Since the sample size among subpopulation groups by income, gender, and race/ethnicity combined in 1999-2002 was too small, the present study failed to identify the predictors among these subpopulation groups and their changes over the past decade. Thus, discussion from now on will focus on subpopulation groups by gender, income, and race/ethnicity alone, and subpopulation groups by income and gender combined.

Most associations between predictors and obesity risk were in accordance with ones reported previously (Hedley et al., 2004; Harrell and Gore, 1998; Zhang and Wang, 2004; Winkleby et al., 1996; Centers for Disease Control and Prevention, 2002; King et al., 2001; Hu et al., 2003; Binkley et al., 2000; Cooper et al., 2000; Mandel et al., 2004;

Laitinen et al., 2001; Wamala et al., 1997; Chang et al., 1990; Salmon and Flatt, 1985; Rolls and Shide, 1992); being black, older, non-smoker, being at lower SES, watching TV or using a computer for longer hours, having a sedentary lifestyle, not participating in leisure-time activity, having first menarche at younger age, consuming higher energy intake, and consuming a diet high in fat increased the obesity risk compared to their counterparts.

Unexpected were: being Mexican-American as a negative predictor of obesity in low-income subjects in 1999-2002, consuming restaurant food as a negative predictor of obesity in Mexican-Americans and Mexican-American low-income women in 1988-94, and having two or ≥ five live births as a negative predictor of obesity in low- and middle-income women in 1999-2002. Although the study design of NHANES 1988-94 and 1999-2002 was very similar, consumption of restaurant food was measured differently between these two datasets. In NHANES 1988-94, restaurant food consumers were identified if they reported consuming food from fast food or non-fast food restaurants in the 24 hour recall. On the other hand, subjects' frequency of usual restaurant food consumption was asked in NHANES 1999-2002. Consuming restaurant food ≥ 4 times/week significantly increased the risk of obesity relative to consuming restaurant food less than weekly in women and whites in 1999-2002 before controlling for non-leisure time activity, hours of TV watching or computer use, attempt not to gain weight, which made the dataset comparable with the NHANES 1988-94. However, once these variables were controlled for, consuming restaurant food ≥ 4 times/week did not appear as a predictor of the risk of obesity. Frequent fast food restaurant use has been associated with increase in body weight over 3 years (French et al., 2000) or over 15 years (Pereira

et al., 2005), and higher BMI (Satia et al., 2004; Bowman and Vinyard, 2004; Duffey et al., 2007; Jeffery et al., 2006). Frequency of consuming commercially prepared food was positively associated with BMI (Kant and Gradubard, 2004). On the other hand, Duffey et al. (2007) reported differential effects of restaurant food and fast food intakes on BMI; frequency of fast food consumption and both fast food and non-fast food restaurant food consumption were positively associated with change in BMI over three years, while non-fast food restaurant food consumption only was not associated with change in BMI. Thus, the association between consumption of restaurant food and weight status may depend on the type of restaurant food. Restaurant food in the NHANES 1988-94 includes both fast food and non-fast food restaurant, while the information on the type of restaurant food in the NHANES 1999-2002 was not available. Compared to the previous studies, the present study controlled for a wider ranges of confounding variables on the relationship between restaurant food consumption and obesity risk such as psychosocial variables. While majority of previous studies used a measurement of frequency of usual restaurant food consumption, the measurement used in the NHANES 1988-94 was based on one-day 24 hours recall. Because the place where the food was obtained was not identifiable in the 24 hour dietary recall in NHANES 1999-2002, the present study failed to identify the association between frequency of usual restaurant food consumption and the consumption based on the one-day 24 recall method. Thus, differences in study designs may have resulted in an unexpected negative relationship between restaurant food consumption and obesity risk in 1988-94.

Despite several studies reported the higher obesity prevalence in Mexican-Americans compared to Caucasians (Schoenborn et al., 2002; Hedley et al., 2004; Flegal

et al., 2002; Flegal et al., 1998), being Mexican-American decreased obesity risk in low-income subjects in 1999-2002 in the present study. This might be partially because previous studies in which being Mexican-American appeared as a positive predictor were based on a total population, while negative predictability of being Mexican-American for obesity risk in the present study was based on low-income subjects. Understanding obesity among Mexican-Americans is challenging since their behaviors may be influenced by their countries of birth or degrees of acculturation, increasing the diversity of the group. For immigrant populations from the countries where the prevalence of obesity is lower than in the U.S., acculturation to U.S. norms can lead to the adaptation of a more sedentary lifestyle, which may result in excess weight gain and obesity (Goel et al., 2004; Gordon-Larson et al., 2003). Dixon et al. (2000) reported that more Mexican-Americans born in Mexico met the dietary guidelines or recommended nutrient intakes than those born in the United States even after controlling for education level and age. However, the information on the country of birth or degree of acculturation was not always controlled in the past studies. In the present study, whether Mexican-Americans were healthier than other racial/ethnic groups depended on their income, gender, lifestyle, psychosocial, and reproductive variables. For example, the prevalence of non-smokers in high-income Mexican-American men was similar to that of high-income white men and higher than that of high-income black men. On the other hand, the percent of low-income Mexican-American men who did not engage in any leisure time activity in the past month was higher than that of low-income white men and low-income black men. The information regarding acculturation was available in the present datasets. However, the sample size became too small to conduct the analyses when Mexican Americans were

categorized further based on the acculturation in addition to gender and income. Because the negative predictability of being Mexican-American appeared only in low-income subjects who are likely to be less acculturated, they may still retain healthier behaviors and thus, be at lower risk of obesity. Further investigation of their meal compositions, for example, may help us to determine their degree of acculturation. Future studies require a larger sample size of Mexican-Americans to account for the bias from the degree of acculturation in studying obesity among Mexican-Americans.

Having two or ≥ five live births decreased the risk of obesity relative to having no live birth or never been pregnant in low- and middle-income women in the present study. While many studies in the past reported the positive relationship between parity and the risk of obesity (Bastian et al., 2005; Wamala et al., 1997; Wolf et al., 1997), a few studies reported otherwise; Lee et al. (2005) reported that white women in non-metropolitan areas with two children had a statistically significant negative relationship between parity and BMI compared to nulliparous counterparts. In this study, a weak negative relationship was also obtained in black women in non-metropolitan areas, although the relationship was not statistically significant. Brown et al. (1992) also reported that women with lifetime parity of one or two live births had lower BMI and a percent of overweight than either nulliparous women or those with ≥ three lifetime births at each age category. Lee et al. (2005) suggested that the negative relationship between parity and BMI may have been due to maternal depletion syndrome during their pregnancies. While this is possible, Gunderson et al. (2004) reported that the risk of overweight by parity depends on subjects' smoking status; the risk among women who continued to smoke decreased, while the risk increased among women who had never smoked.

Smoking prevalence, mean energy intake, and non-leisure time activity were compared by the number of parity in the present study. However, there was no evidence that suggests these variables to explain the negative relationship between having two or ≥ five live births and a risk of obesity (data not shown). Another point which needs to be addressed is a measurement of parity. A number of children, which was used as a measurement of parity, cannot distinguish childbearing from childrearing. Thus, it is possible that the factors that were associated with childrearing rather than childbearing may have reduced the risk of obesity in the present study.

Very limited number of studies attempted to identify the predictors of obesity among subpopulation groups that are defined by combinations of gender, income, and race/ethnicity, while controlling for other variables. Thus, it is difficult to compare the present study with other studies. However, most associations between predictors and obesity risk corresponded to the results in the past, suggests that the associations between predictors and obesity risk do not differ among subpopulation groups; if people did not participate in any leisure time activity, their risks of obesity increase regardless of their sociodemographic subpopulation groups, for example. Then, why does the obesity prevalence differ among subpopulation groups? One explanation is percent or mean differences in lifestyle, reproductive, and psychosocial variables among subpopulation groups. As reported in the past, many lifestyle, reproductive, and psychosocial variables that increase the risk of obesity were more prevalent in low-income subjects than in high-income subjects; the percent of smokers, breakfast skippers, subjects who did not participate in any leisure-time activity in the past month, women with ≥ five live births, and subjects who were unable to report their energy intakes accurately was higher in low-

income subjects than in the high-income subjects. On the other hand, other variables that would protect subjects from obesity were more prevalent in low- and middle-income subjects than in high-income subjects; the percent of men who spent their days by carrying light or heavy loads rather than sitting or walking a lot and the percent of men who consumed ≤ 30% of energy from fat were higher in low- and middle-income groups than in the high-income group in 1999-2002, for example. Thus, percent or mean of lifestyle, reproductive, and psychosocial variables differed not only among subpopulation groups. Differences in interactions of these variables must have resulted in one variable being a predictor of obesity in one group but not in the other group.

Changes in sociodemographic, lifestyle, reproductive, and psychosocial variables among the subpopulation groups over the past decade:

The present study confirmed that the changes in lifestyle, reproductive, psychosocial variables over the past decade varied among the subpopulation groups. It was unexpected and a serious concern that the percent of subjects who did not participate in any leisure time activity in the past month increased in all the subpopulation groups. Ham et al. (2004) reported that the percent of U.S. adults aged ≥ 18 years old who did not participate in any leisure-time activity decreased from 31.5% in 1989 to 25.1% in 2002 based on the data from the Behavioral Risk Factor Surveillance System (BRFSS). According to the National Health Interview Survey, the percentage of U.S. adults aged ≥ 18 years old who engaged in light-to-moderate physical activity increased from 24% to 30%, and the percentage of those who participated in vigorous activities decreased from 16% to 14% between 1991 and 1998 (National Center of Health Statistics, 2001). On the other hand, Kant and Graubard (2006) reported that the percent of the U.S. adults aged 25-74 year old who did not participate in any leisure-time activity increased from 21.2%

in 1988-94 to 33.9% in 1999-2002 based on the NHANES 1988-94 and 1999-2002. These inconsistencies are partially due to differences in the measurement on leisure-time activity used across studies. The result in the present study requires caution because the question format in assessing leisure-time physical activity in NHANES 1988-94 and 1999-2002 was not identical; participants in NHANES 1999-2002 were asked their participation in 61 leisure-time activities, while subjects in NHANES 1988-94 were asked their participation in only 8 activities. It was expected that the percent of subjects who did not participate in any leisure time activity in the past month would be lower in 1999-2002 than in 1988-94, given the larger number of activities for 1999-2002 participants to report for. However, the result was opposite. Another possibility is that participants decided not to answer the questions because of a large number of items to report for. Whenever the question format changes in the NHANES, it is recommended that the NCHS conducts bridging studies to assess the effect of changes on the response rate.

Another problem was that the percent of subjects who attempted to lose weight in the past year decreased over the past year in almost all subpopulation groups, while the percent of obese subjects increased in almost all subpopulation groups. Maynard et al. (2006) reported that the mean value of Americans' desired weight increased between 1994 and 2003, suggesting that the U.S. adults may be becoming more tolerant about their weight status. In the present study, the percent of subjects who wanted to weigh less ranged from 33.7% in black men to 80.1% in high-income women in 1999-2002, and it did not change noticeably over the past year. Thus, people's attitudes toward their weight

status haven't changed, but taking actions toward their desires became much more challenging over the past decade.

Predictors that were associated with changes in obesity prevalence among the subpopulation groups over the past decade:

As hypothesized, lifestyle, reproductive, and psychosocial predictors were associated with changes in obesity prevalence among the subpopulation groups over the past decade (Appendix 4). More specifically, alcohol intakes, energy intakes, not participating in any leisure-time activity, participating leisure-time activity at third or fourth quintile level, being a non-smoker, having first menarche at ≤11 years old or at 12-15 years old, skipping breakfast, and consuming more than 30% of energy from fat increased the risk of obesity in the subpopulation groups in 1999-2002 but not in 1988-94, suggesting that they must have contributed to the increase in obesity prevalence in the subpopulation groups over the past decade. Test of equality in confidence intervals for the associations between these predictors and the risk of obesity over the past decade showed that the associations did not change over the past decade, suggesting that the processes of these predictors contributing to the risk of obesity did not change over the past decade (data not shown). The percent of non-smokers, subjects who did not participate in any leisure-time activity, and subjects who consumed more than 30% of energy from fat increased over the past decade. Thus, if these increases were mainly from obese subjects, these increases must have contributed to the increase in obesity prevalence among the subpopulation groups over the past decade.

Although the processes of the predictors contributing to the risk of obesity in the present study did not change over the past decade, it is possible that they may change in the future. For example, restaurant menu might become healthier and consuming

restaurant food may become a negative predictor of obesity in the future even though it is currently suggested as a positive predictor of obesity in the literature. Thus, continuous efforts should be made to identify the predictors of obesity that contribute to the changes in obesity prevalence among subpopulation groups.

Consistency between predictors identified in the multiple regression vs. in logistic regression:

In the present study, predictors for obesity risk were not necessarily the same as those predicting BMI. However, the directions of the associations between predictors for obesity risk and obesity risk were same as the directions between the corresponding variables and BMI.

Influence on the results by inadequate energy intake reporters: When subjects who under-reported or over-reported their energy intakes (inadequate energy intake reporters) were excluded, the analysis could not be continued in low-income women due to the small sample size. The predictors for the risk of obesity in other subpopulation groups by income and gender after excluding energy intake inadequate reporters were not necessarily the same as those obtained with all subjects included. However, the directions of the associations between the variables tested for their predictability and the risk of obesity with and without inadequate energy intake reporters were same. Subjects who under-reported their energy intakes tended to be low-income subjects. Subjects' characteristics before and after excluding energy intake inadequate reporters did not change largely. Since subjects who inadequately reported their energy intakes may not necessarily have reported inaccurate information about other variables associated with obesity, adjusting the energy intakes of inadequate reporters to the lowest or highest

values from the acceptable distribution of energy intakes would be better than excluding inadequate reporters.

Strengths and limitations of the present study: The present study is the first to identify a wide range of obesity predictors that were associated with the change in prevalence of obesity among the U.S. subpopulation groups by income, gender, and race/ethnicity alone as well as by their combinations with the minimum bias of differences in study designs. Furthermore, while many studies did not clearly address the issue on multi-collinearity among variables they examined, the present study assured that the variables examined were not highly correlated to one another, increasing the validity of predictors identified. Low associations among variables in the present study suggested that nutrition intervention programs need to tackle on lifestyle, reproductive, or psychosocial aspects one at a time.

The limitation of the present study, however, is that causality of the predictors cannot be identified from the present study since the study was based on cross-sectional data. Although the present study identified that the income-obesity relationship depended on subjects' gender and races/ethnicities, it failed to identify the predictors for obesity risk in subpopulation groups by gender, income, and race/ethnicity due to the inadequate sample size. Another limitation is that the trends of eating out and non-leisure-time activity, which have been suggested as contributors to the recent increase in obesity, could not be identified because these variables were not available in one of the datasets examined in the present study. There are other variables that have been suggested to have contributed to the recent increase in obesity but not available in the present study (i.e. sleep deprivation, ambient temperature, endocrine disruptor [Keith et al., 2006]).

Thus, the future national surveys need to increase the sample size to well represent sociodemographic subpopulation groups and to increase the number of variables to resolve the complexity of obesity, even though it is very challenging for survey designers as well as participants.

CONCLUSIONS

The prevalence of obesity differed widely among the U.S. subpopulation groups in 1999-2002: 21.7% in black low-income men to 53.3% in black middle-income women. This reflects changes from 1988-94: 17.0% in white high-income men to 42.4% in black middle-income women. Simultaneously, the rate of obesity prevalence varied widely from -0.2% in Mexican-American low-income men to 14.2% in Mexican-American high-income women. Lifestyle, reproductive, and psychosocial variables, specifically smoking, hours of TV watching or computer use, alcohol intake, leisure-time and non-leisure-time activity, the number of live births, age at the first menarche, perception and attitude about own weight status, attempt to lose weight, energy intake, fat intake, breakfast intake, and the number of eating occasions explained the differences in obesity prevalence among the subpopulation groups. Smoking, alcohol intake, leisure-time activity, age at the first menarche, energy intake, fat intake, and breakfast intake were also associated with the changes in obesity prevalence among the subpopulation groups. These predictors, therefore, need to be incorporated in the development of nutrition intervention programs to decrease the obesity prevalence among the subpopulation groups in the future.

FUTURE DIRECTIONS

Based on the predictors identified in the present study that are specific to the subpopulation groups, nutrition intervention programs need to be developed to test whether changing these predictors would reduce obesity prevalence within the subpopulation groups. During the process, several focus groups can be conducted to obtain the detail information that was not obtainable in the present study to increase the efficacy of the programs (i.e. barriers to leisure-time activity, type of restaurant food, stress management).

Increase in use of restaurant food and more sedentary lifestyle have been suggested as contributors to the recent increase in obesity by many researchers. However, these variables were not available in one of datasets, and the present study failed to examine these variables in relation to changes in obesity prevalence. NHANES 2003-2004 is now available with these variables. Thus, it is recommend to examine whether these variables have contributed to the change in obesity prevalence among the subpopulation groups from 1999-2002 to 2003-2004.

The present study confirmed that the income-obesity relationship depended not only on gender but also on race/ethnicity. The present study failed to identify the predictors of obesity among subpopulation groups by income, gender, and race/ethnicity due to the lack of sample sizes. Thus, it is recommended that the NCHS needs to increase the sample size of racial/ethnic minorities in the future NHANES to well represent subpopulation groups by income, gender, and race/ethnicity. Furthermore, it is recommended for the future NHANES to include other questions that were not available in the past to better understand obesity problem in the U.S. Currently ongoing effort to

add the Flexible Consumer Behavior Survey Module (FCBSM) to the future NHANES by Economic Research Service (ERS) and NCHS, for example, will be exciting opportunities for researchers to understand underlying reasons of consumers' behaviors such as food shopping and frequency of eating food away from home (National Academy of Sciences, 2005). Finally, asking a wide range of questions to understand the complex issues such as obesity without burdening survey participants is a challenge. Thus, it is important to develop a small set of question items to cover a wide range of topics without redundant information. Continuous efforts need to be made to develop reliable and valid question items to provide additional information to understand obesity problem in the U.S.

Appendix 1. Subjects' characteristics by weight in 1999-2002[1]

Variables	n	%[2]	Weight status: Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P[3]
Demographic							
Gender							
Female	3,412	50.3	74.6	54.4	40.3	55.4	****
Male	3,580	49.8	25.4	45.6	59.7	44.6	
Race/ethnicity							
Non-Hispanic White	3,766	81.0	87.2	83.5	81.0	77.8	****
Non-Hispanic Black	1,463	11.5	9.8	10.0	10.4	14.6	
Mexican-Americans	1,763	7.5	3.0	6.6	8.5	7.7	
Education							
< High school	2,322	19.8	26.9	16.6	20.8	21.7	**
High school graduate	1,647	26.6	17.6	25.9	25.8	28.7	
> High school	3,013	53.6	55.5	57.5	53.4	49.6	
Age							
20-29 yrs	1,097	17.6	34.4	23.3	15.6	12.7	***
30-39 yrs	1,147	20.7	21.7	23.4	19.6	19.1	
40-49 yrs	1,334	23.1	20.8	21.7	22.6	25.3	
50-59 yrs	961	16.6	5.6	13.5	17.7	19.3	
60+ yrs	2,453	22.0	17.6	18.1	24.5	23.7	
Poverty Income Ratio (PIR)							
≤ 1.85	2,822	30.7	43.4	31.2	27.5	33.0	***
1.86-3.5	1,779	24.5	28.6	22.1	24.9	26.5	
> 3.5	2,391	44.8	28.1	46.7	47.6	40.6	
Marital status							
Married	3,833	60.0	36.1	55.5	63.1	62.9	****
Widowed, divorced/ separated	1,457	18.0	30.1	17.1	17.8	18.6	
Never married/living with partner	1,358	22.0	33.9	27.5	19.1	18.5	
Lifestyle factors							
Smoking status in the past 5 d							
Non-smoker	4,875	73.4	62.8	68.1	74.9	78.1	***
Smoker	1,527	26.6	37.2	32.0	25.1	21.9	
Daily hrs of TV, video or computer use							
≤ 1 hr	1,954	28.9	41.6	35.7	27.7	22.0	****
2-3 hrs	3,171	46.5	34.1	45.3	49.2	45.6	
≥ 4 hrs	1,858	24.6	24.3	19.0	23.1	32.4	
Alcohol intake (# drinks/wk)	5,687	4±0.1	3±0.8	5±0.2	5±0.3	3±0.2	****

Appendix 1 (cont'd)

Variables	n	%[2]	Weight status: Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P[3]
Lifestyle factors (cont'd)							
Daily physical activity							
Mainly sit	1,720	24.4	22.3	19.9	23.0	31.0	****
Walk a lot	3,706	50.1	46.4	51.6	49.2	49.8	
Carry light or heavy loads	1,559	25.5	31.3	28.5	27.8	19.2	
Leisure time activity/month							
No activities	2,626	32.4	38.0	27.6	30.5	39.6	****
1st quintile	734	12.7	12.8	11.3	13.0	14.0	
2nd quintile	829	14.6	9.8	14.4	14.8	14.8	
3rd quintile	863	14.7	20.9	16.5	14.8	12.2	
4th quintile	781	13.9	15.0	15.8	14.4	11.2	
5th quintile	635	11.7	3.5	14.4	12.5	8.2	
Reproductive history							
Breast fed your child[4]							
Yes	1,520	47.2	32.5	48.5	49.9	44.7	*
No	1,127	36.5	45.4	32.2	36.7	40.0	
Never been pregnant	424	16.4	22.1	19.3	13.4	15.3	
Number of live birth[4]							
0 and never been pregnant	545	20.1	29.8	23.1	17.8	17.9	**
1	443	15.5	11.1	18.2	15.2	13.2	
2	738	26.8	23.1	28.8	25.9	25.6	
3	645	19.9	22.6	18.4	21.5	20.0	
4	332	8.7	6.6	6.1	9.9	10.7	
≥ 5	490	9.0	6.9	5.4	9.7	12.6	
Age at the first menarche[4]							
≤ 11 yrs old	585	18.9	4.8	14.1	18.9	25.3	***
12-15 yrs old	2,277	74.8	81.8	78.2	75.6	69.9	
≥ 16 yrs old	207	6.3	13.4	7.7	5.6	4.8	
Weight status and related perceptions and behaviors							
BMI (Log-transformed)	6,992	28.1±0.1	17.4±0.1	22.5±0.1	27.4±0.0	35.5±0.1	****
Weight status							
Underweight	107	1.9	100.0	0.0	0.0	0.0	N/A
Normal weight	2,114	33.0	0.0	100.0	0.0	0.0	
Overweight	2,538	34.5	0.0	0.0	100.0	0.0	
Obese	2,233	30.7	0.0	0.0	0.0	100.0	
Perceived own weight status							
Underweight	367	4.9	61.7	10.4	0.7	0.4	****
About right	2,804	37.3	36.9	67.1	36.1	6.7	
Overweight	3,803	57.8	1.5	22.5	63.3	92.9	

Appendix 1 (cont'd)

Variables	n	%[2]	Weight status: Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P[3]
Weight status and related perceptions and behaviors (cont'd)							
Weight status assessment							
Under-assessor	1,535	18.3	0.0	10.2	37.0	6.8	*
Accurate assessor	4,752	73.6	60.8	67.2	63.1	93.2	
Over-assessor	411	8.2	39.2	22.7	0.0	0.0	
Desired weight changes							
Weigh more	458	6.3	59.5	14.0	1.5	0.2	****
Stay about the same	2,332	28.8	39.0	51.4	27.3	5.7	
Weigh less	4,192	64.8	1.5	34.6	71.2	94.1	
Attempt to lose weight in the past year							
Yes	1,981	34.1	2.8	18.3	36.6	52.2	****
No	4,305	65.9	97.2	81.7	63.4	47.8	
Attempt not to gain weight in the past year							
Yes	2,676	42.6	7.4	29.4	47.0	54.1	****
No	4,309	57.4	92.6	70.6	53.0	45.9	
Dietary behaviors							
Restaurant food consumption							
<1 time/wk	1,910	21.7	36.0	21.8	21.1	21.3	*
1 time/wk	1,543	22.4	21.9	23.5	22.2	21.6	
2-3 times/wk	1,806	28.6	18.6	26.5	30.2	29.4	
≥ 4 times/wk	1,454	27.3	23.5	28.1	26.5	27.7	
Breakfast consumption							
Yes	5,314	79.9	22.3	19.4	21.1	19.8	NS
No	1,396	20.1	77.7	80.6	78.9	80.2	
Energy intake (kcal/d)	6,715	2,235±152	2,251±131	2,256±35	2,260±34	2,184±26	NS
Fat intake							
≤ 30% of energy from fat	2,618	36.4	41.3	39.9	36.9	31.8	*
> 30% of energy from fat	4,096	63.6	58.7	60.1	63.1	68.2	
Number of eating occasions							
≤ 3 times/day	1,679	21.8	21.8	20.1	21.9	23.6	*
4 times/day	1,784	24.7	22.5	24.1	24.8	25.4	
5 times/day	1,492	22.5	17.8	22.2	23.8	21.6	
6 times/day	915	15.4	10.4	16.3	14.7	15.5	
≥7 times/day	840	15.6	27.6	17.3	14.9	13.9	

Appendix 1 (cont'd)

Variables	n	%[2]	Weight status: Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P[3]
Dietary behaviors (cont'd)							
Energy intake reporting status							
Under-reporter	1,606	20.9	4.8	13.3	20.1	30.8	****
Adequate-reporter	4,809	74.1	84.0	78.8	76.2	66.1	
Over-reporter	300	5.0	11.2	7.9	3.7	3.1	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; and non-whites, -blacks, or -Mexican-Americans.

[2] Percent might not add up to 100% due to rounding.

[3] Based on the chi-square test except alcohol intakes and energy intakes mean values of which were compared by the weight status by ANOVA.

[4] Based on females only.

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

Appendix 2. Subjects' characteristics by weight for men and women[1]

Variables	Weight status (Men) n	Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2	Weight status (Women) n	Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2
Demographic												
Race/ethnicity												
Non-Hispanic White	1,946	69.2	78.5	82.1	81.6	***	1,820	93.3	87.7	79.5	74.8	****
Non-Hispanic Black	725	27.4	13.0	9.1	10.4		738	3.8	7.4	12.5	17.9	
Mexican-Americans	909	3.4	8.5	8.9	8.1		854	2.9	4.9	8.0	7.3	
Education												
< High school	1,233	34.2	21.6	19.5	19.9	NS	1,089	24.4	12.4	22.8	23.3	****
High school graduate	820	17.8	24.6	25.7	28.5		827	17.6	27.0	26.1	28.8	
> High school	1,521	48.0	53.8	54.9	51.7		1,492	58.1	60.6	51.1	47.9	
Age												
20-29 yrs	594	47.7	27.7	16.6	13.6	****	503	29.8	19.6	14.2	11.9	****
30-39 yrs	590	18.3	24.4	20.8	19.6		557	22.8	22.5	17.9	18.7	
40-49 yrs	670	6.7	20.1	23.6	25.3		664	25.6	23.0	21.1	25.3	
50-59 yrs	493	15.6	11.7	18.2	19.5		468	2.2	15.1	16.8	19.1	
60+ yrs	1,233	11.7	16.2	20.8	22.1		1,220	19.6	19.8	30.1	25.0	
Poverty Income Ratio (PIR)												
≤ 1.85	1,370	52.2	32.3	25.0	25.8	**	1,452	40.4	30.3	31.2	38.7	***
1.86-3.5	918	40.4	24.0	24.1	26.7		861	24.5	20.5	25.9	26.3	
> 3.5	1,292	7.4	43.7	50.8	47.5		1,099	35.1	49.2	42.9	35.0	
Marital status												
Married	2,169	16.5	52.8	67.6	70.4	****	1,664	41.8	57.7	56.5	56.9	***
Widowed, divorced, or separated	475	16.0	13.7	11.0	9.4		982	34.2	19.9	27.7	26.0	
Never married or living with partner	763	67.4	33.6	21.4	20.2		595	23.9	22.4	15.8	17.1	

Appendix 2 (cont'd)

Variables	Weight status (Men) n	Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2	Weight status (Women) n	Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2
Lifestyle factors												
Smoking status in the past 5 days												
Non-smoker	2,337	67.7	60.2	72.6	76.0	***	2,538	61.5	74.4	78.2	79.7	NS
Smoker	903	32.3	39.8	27.4	24.0		624	38.5	25.7	21.8	20.3	
Daily hrs of TV, video or computer use												
≤ 1 hr	927	20.1	30.4	27.0	21.3	**	1,027	48.9	40.1	28.8	22.7	****
2-3 hrs	1,681	38.8	47.1	51.1	46.2		1,490	32.5	43.8	46.4	45.1	
≥ 4 hrs	969	41.2	22.5	21.9	32.6		889	18.6	16.1	24.8	32.2	
Alcohol consumption (# drinks/wk)	3,184	7±2.6	7±0.4	7±0.4	5±0.4	*	2,503	2±0.4	3±0.2	3±0.2	2±0.1	****
Daily physical activity												
Mainly sit	795	15.1	18.6	21.8	27.6	**	925	24.8	21.0	24.7	33.8	****
Walk a lot	1,766	49.4	45.0	45.3	46.1		1,940	45.4	57.1	55.0	52.7	
Carry light or heavy loads	1,016	35.5	36.4	32.9	26.3		543	29.8	21.9	20.3	13.6	
Leisure time activity/month												
No activities	1,240	45.1	29.9	27.3	31.5	**	1,386	35.6	25.7	35.3	46.2	****
1st quintile	407	8.8	10.7	15.6	15.6		327	14.2	11.8	9.1	12.7	
2nd quintile	417	8.6	12.8	15.3	14.1		412	10.3	15.8	14.2	15.4	
3rd quintile	450	19.1	15.7	13.6	13.2		413	21.5	17.1	16.6	11.3	
4th quintie	421	11.5	15.1	12.8	14.8		360	16.2	16.4	16.9	8.3	
5th quintile	386	6.9	15.7	15.5	10.8		249	2.3	13.3	8.0	6.1	

Appendix 2 (cont'd)

Variables	n	Weight status (Men) Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2	n	Weight status (Women) Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2
Reproductive history												
Breast fed your child[3]												
Yes	N/A	N/A	N/A	N/A	N/A	N/A	1,520	32.5	48.5	49.9	44.7	*
No	N/A	N/A	N/A	N/A	N/A		1,127	45.4	32.2	36.7	40.0	
Never been pregnant	N/A	N/A	N/A	N/A	N/A		424	22.1	19.3	13.4	15.3	
Number of live birth[3]												
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A	545	29.8	23.1	17.8	17.9	**
1	N/A	N/A	N/A	N/A	N/A		443	11.1	18.2	15.2	13.2	
2	N/A	N/A	N/A	N/A	N/A		738	23.1	28.8	25.9	25.6	
3	N/A	N/A	N/A	N/A	N/A		645	22.6	18.4	21.5	20.0	
4	N/A	N/A	N/A	N/A	N/A		332	6.6	6.1	9.9	10.7	
≥ 5	N/A	N/A	N/A	N/A	N/A		490	6.9	5.4	9.7	12.6	
Age at the first menstruation[3]												
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A	585	4.8	14.1	18.9	25.3	***
12-15 yrs old	N/A	N/A	N/A	N/A	N/A		2,277	81.8	78.2	75.6	69.9	
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A		207	13.4	7.7	5.6	4.8	
Weight status and related perceptions and behaviors												
BMI (Log-transformed)	3,580	17.3±0.2	22.7±0.1	27.5±0.0	34.7±0.2	****	3,412	17.4±0.1	22.3±0.1	27.4±0.1	36.2±0.2	****
Perceived own weight status												
Underweight	248	78.6	18.4	0.9	0.6	****	119	55.9	3.7	0.2	0.3	****
About right	1,717	21.4	73.7	45.5	10.4		1,087	42.2	61.6	22.2	3.7	
Overweight	1,606	0.0	7.9	53.5	89.0		2,197	2.0	34.8	77.6	96.1	

Appendix 2 (cont'd)

Variables	n	Weight status (Men) Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2	n	Weight status (Women) Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2
Weight status and related perceptions and behaviors (cont'd)												
Weight status assessment												
Under-assessor	1,083	0.0	18.1	46.6	10.7	****	452	0.0	3.6	22.7	3.7	****
Accurate assessor	2,259	80.2	73.9	53.4	89.3		2,493	54.3	61.6	77.3	96.3	
Over-assessor	83	19.8	8.1	0.0	0.0		328	45.7	34.8	0.0	0.0	
Desired weight changes												
Weigh more	332	86.5	26.2	2.4	0.5	****	126	50.3	3.8	0.2	0.1	****
Stay about the same	1,465	13.5	60.7	35.1	8.5		867	47.7	43.6	15.8	3.5	
Weigh less	1,778	0.0	13.2	62.5	91.0		2,414	2.0	52.5	84.0	96.5	
Attempt to lose weight in the past year												
Yes	775	0.0	6.8	29.5	45.5	****	1,206	3.8	28.4	47.5	57.4	****
No	2,458	100.0	93.2	70.6	54.5		1,847	96.2	71.6	52.5	42.6	
Attempt not to gain weight in the past year												
Yes	1,190	0.0	16.7	43.1	52.1	****	1,486	10.0	40.1	52.9	55.7	****
No	2,386	100.0	83.3	56.9	47.9		1,923	90.0	59.9	47.1	44.3	
Dietary behaviors												
Restaurant food consumption												
<1 time/wk	912	34.8	19.6	19.2	18.3	NS	998	36.4	23.7	23.1	23.7	**
1 time/wk	725	13.6	20.7	20.4	19.5		818	24.6	25.8	24.9	23.4	
2-3 times/wk	913	27.3	24.8	29.0	29.3		893	15.7	27.9	32.1	29.5	
≥ 4 times/wk	882	24.3	34.9	31.5	32.9		572	23.2	22.6	19.0	23.5	
Breakfast consumption												
Yes	2,656	26.3	24.9	23.2	17.6	*	2,658	21.0	14.8	18.0	21.6	**
No	775	73.7	75.1	76.9	82.4		621	79.0	85.2	82.0	78.4	

Appendix 2 (cont'd)

Variables	Weight status (Men) n	Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2	Weight status (Women) n	Under-weight (%)	Normal (%)	Over-weight (%)	Obese (%)	P^2
Dietary behaviors (cont'd)												
Energy intake (kcal/d)	3,433	2,843±374	2,704±62	2,587±35	2,630±48	NS	3,282	2,053±106	1,883±30	1,775±31	1,826±31	*
Fat intake												
≤ 30% of energy from fat	1,367	49.8	42.6	37.1	31.5	**	1,251	38.5	37.7	36.6	32.0	NS
> 30% of energy from fat	2,065	50.2	57.5	62.9	68.5		2,031	61.5	62.3	63.4	68.0	
Number of eating occasions												
≤ 3 times/day	900	20.1	23.3	22.0	24.8	****	779	22.3	17.4	21.7	22.6	**
4 times/day	896	33.3	24.2	25.0	22.5		888	18.9	24.0	24.4	27.8	
5 times/day	737	23.3	20.7	22.8	20.3		755	16.0	23.6	25.3	22.7	
6 times/day	467	1.4	15.8	15.1	17.3		448	13.4	16.7	14.2	14.0	
≥ 7 times/day	431	21.9	16.1	15.1	15.1		409	29.4	18.4	14.5	13.0	
Energy intake reporting status												
Under-reporter	730	6.0	12.0	17.5	27.8	****	876	4.4	14.4	24.1	33.3	****
Adequate-reporter	2,507	74.6	77.4	77.7	68.3		2,302	87.1	79.9	74.0	64.3	
Over-reporters	196	19.5	10.6	4.9	4.0		104	8.5	5.7	1.9	2.4	

[1] Adults aged 20 years old and over; excluded were: pregnant/lactating women; those who did not respond to all the questions on income, weight status, race/ethnicity, and gender; non-Mexican-American Hispanics; and non-whites, -blacks, or -Mexican Americans.
Percent might not be add up to 100% due to rounding.

[2] Based on the chi-square test except alcohol and energy intakes mean values of which were compared by the weight status by ANOVA.

[3] Based on females only.

* P<0.05, ** P<0.01, *** P<0.001, ****P<0.0001, NS: not significant, N/A: not applicable

Appendix 3a. Summary of predictors for the risk of obesity among the subpopulation groups in 1999-2002[1]

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Gender														
Men	N/A	N/A	R	R	R	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Women	N/A	N/A			-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Income														
PIR <1.85		+	N/A	N/A	N/A	+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.85 ≤ PIR ≤ 3.5			N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIR >3.5	R	R	N/A	N/A	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Race/ethnicity														
Non-Hispanic White	R	R	R	R	R	N/A	N/A	N/A	R	R	R	R	R	R
Non-Hispanic Black	+	+	+	+		N/A	N/A	N/A		+			+	
Mexican-Americans			-			N/A	N/A	N/A			+			
Education														
< High school					+	+	N/A	N/A						
High school graduate	+						N/A	N/A	+					
> High school	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
Age														
20-29 yrs	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
30-39 yrs							N/A	N/A		-				
40-49 yrs		+			+	+	N/A	N/A			+			
50-59 yrs							N/A	N/A						
60+ yrs					+		N/A	N/A					+	

Appendix 3a (cont'd)

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Marital status														
Married							N/A	N/A		+				
Widowed, divorced, or separated							N/A	N/A						
Never married/living with partner	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
Smoking status in the past 5 days														
Non-smoker		+	+				N/A	N/A				+		+
Smoker	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
Daily hrs of TV, video or computer use														
≤ 1 hr	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
2-3 hrs		+		+		+	N/A	N/A					+	
≥ 4 hrs		+		+	+	+	N/A	N/A					+	+
Alcohol intake (# of drinks/wk)[2]	+	+			+	+	N/A	N/A			+	+		
Daily physical activity														
Mainly sit		+			+	+	N/A	N/A						+
Walk a lot		+				+	N/A	N/A						
Carry light or heavy loads	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
Leisure time activity/month														
No activities		+	+			+	N/A	N/A		+		+		+
1st quintile		+					N/A	N/A						+
2nd quintile							N/A	N/A						
3rd quintile		+	+				N/A	N/A						
4th quintile							N/A	N/A	+				-	
5th quintile	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R

Appendix 3a (cont'd)

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Breast fed your child														
Yes	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
No	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Never been pregnant	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	R	R
Number of live birth														
0 and never been pregnant	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	R	R
1	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
2	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	-	
3	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
4	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
≥ 5	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		-	
Age at the first menarche														
≤ 11 yrs old	N/A	+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			+
12-15 yrs old	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
≥ 16 yrs old	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	R	R
Component 1[3]	+	+	+	+	+	+	N/A	N/A	+	+	+	+	+	+
Component 2[4]	+	+	+	+		+	N/A	N/A		+		+		
Restaurant food consumption														
< 1 time/wk	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
1 time/wk							N/A	N/A						
2-3 times/wk							N/A	N/A						
≥ 4 times/wk							N/A	N/A						

Appendix 3a (cont'd)

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Breakfast consumption														
Yes	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
No							N/A	N/A						
Energy intake (kcal/d)[2]							N/A	N/A			+			
Fat intake														
≤ 30% of energy from fat	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
> 30% of energy from fat							N/A	N/A					+	
Number of eating occasions														
≤ 3 times/day						+	N/A	N/A						
4 times/day							N/A	N/A						
5 times/day							N/A	N/A						
6 times/day							N/A	N/A						
≥ 7 times/day	R	R	R	R	R		N/A	N/A	R	R	R	R	R	R

[1] Only those that were significant are listed.

W: women, M: men, L: low-income, M: middle-income, H: high-income, LIM: low-income men, MIM: middle-income men, HIM: high-income men, LIW: low-income women, MIW: middle-income women, HIW: high-income women

R:reference group

[2] Log-transformed

[3] Sum of responses to the questions on perceived weight status and on desired weight status

[4] Sum of responses to the questions on attempt to lose weight and attempt not to gain weight

Appendix 3b. Summary of predictors for the risk of obesity among the subpopulation groups in 1988-94[1]

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Gender														
Men	N/A	N/A							N/A	N/A	N/A	N/A	N/A	N/A
Women	N/A	N/A	-		-	-			N/A	N/A	N/A	N/A	N/A	N/A
Income														
PIR <1.85	+		N/A	N/A	N/A	+	+		N/A	N/A	N/A	N/A	N/A	N/A
1.85 ≤ PIR ≤ 3.5	+		N/A	N/A	N/A		+		N/A	N/A	N/A	N/A	N/A	N/A
PIR >3.5	R	R	N/A	N/A	N/A	R	R	R	N/A	N/A	N/A	N/A	N/A	N/A
Race/ethnicity														
Non-Hispanic White	R	R	R	R	R	N/A	N/A	N/A	R	R	R	R	R	R
Non-Hispanic Black	+	+	+	+	+	N/A	N/A	N/A		+		+	+	
Mexican-Americans		+			+	N/A	N/A	N/A						
Education														
< High school	+		+			+								
High school graduate	+					+								
> High school	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Age														
20-29 yrs	R	R	R	R	R	R	R	R	R	R	R	R	R	R
30-39 yrs		+				+	+							+
40-49 yrs	+	+	+		+	+	+	+	+				+	
50-59 yrs	+	+	+	+	+	+	+	+			+	+	+	+
60+ yrs	+	+	+	+	+	+	+	+	+		+		+	+

Appendix 3b (cont'd)

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Marital status														
Married														
Widowed, divorced, or separated														
Never married/living with partner	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Smoking status in the past 5 days														
Non-smoker	+		+			+	+		+			+		
Smoker	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Alcohol intake (# of drinks/wk)[2]		+			+	+	+				+	+		+
Leisure time activity/month														
No activities		+	+	+	+	+	+	+				+	+	
1st quintile	+	+			+	+					+		+	+
2nd quintile		+			+			+						+
3rd quintile														
4th quintile														
5th quintile	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Breast fed your child														
Yes	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
No	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Never been pregnant	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	R	R

Appendix 3b (cont'd)

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Number of live birth														
0 and never been pregnant	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	R	R
1	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
2	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
3	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
4	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
≥ 5	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Age at the first menarche														
≤ 11 yrs old	N/A	+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	+		
12-15 yrs old	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	+		
≥ 16 yrs old	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	R	R
Component 1[3]	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Restaurant food consumption														
Non-consumer	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Consumer								-						
Breakfast consumption														
Yes	R	R	R	R	R	R	R	R	R	R	R	R	R	R
No														
Energy intake (kcal/d)[2]		+	+			+	+	+						

Appendix 3b (cont'd)

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Fat intake														
≤ 30% of energy from fat	R	R	R	R	R	R	R	R	R	R	R	R	R	R
> 30% of energy from fat														
Number of eating occasions														
≤ 3 times/day			+		+	+								
4 times/day						+							+	
5 times/day														
6 times/day														
≥ 7 times/day	R	R	R	R	R	R	R	R	R	R	R	R	R	R

Appendix 3b (cont'd)

Predictors	Income x Gender x Race/Ethnicity								
	WLIM	BLIM	MLIM	WMIM	BMIM	MMIM	WHIM	BHIM	MHIM
Gender									
Men	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Women	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Income									
PIR <1.85	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.85 ≤ PIR ≤ 3.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIR >3.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Race/ethnicity									
Non-Hispanic White	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Non-Hispanic Black	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mexican-Americans	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Education									
< High school									
High school graduate									
> High school	R	R	R	R	R	R	R	R	R
Age									
20-29 yrs	R	R	R	R	R	R	R	R	R
30-39 yrs									
40-49 yrs			+						
50-59 yrs			+				+		
60+ yrs			+				+		

Appendix 3b (cont'd)

Predictors	Income x Gender x Race/Ethnicity								
	WLIM	BLIM	MLIM	WMIM	BMIM	MMIM	WHIM	BHIM	MHIM
Marital status									
Married			+						
Widowed, divorced, or separated									
Never married/living with partner	R	R	R	R	R	R	R	R	R
Smoking status in the past 5 days									
Non-smoker	+		+						
Smoker	R	R	R	R	R	R	R	R	R
Alcohol intake (# of drinks/wk)[2]			+				+		
Leisure time activity/month									
No activities						+			
1st quintile						+	+		
2nd quintile						+			
3rd quintile						+			
4th quintile						+			
5th quintile	R	R	R	R	R	R	R	R	R
Breast fed your child									
Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix 3b (cont'd)

Predictors	Income x Gender x Race/Ethnicity								
	WLIM	BLIM	MLIM	WMIM	BMIM	MMIM	WHIM	BHIM	MHIM
Number of live birth									
0 and never been pregnant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
≥ 5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Age at the first menarche									
≤ 11 yrs old	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12-15 yrs old	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
≥ 16 yrs old	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Component 1[3]	+	+	+	+	+	+	+	+	+
Restaurant food consumption									
Non-consumer	R	R	R	R	R	R	R	R	R
Consumer									
Breakfast consumption									
Yes									
No			+						
Energy intake (kcal/d)[2]		+							

Appendix 3b (cont'd)

Predictors	Income x Gender x Race/Ethnicity								
	WLIM	BLIM	MLIM	WMIM	BMIM	MMIM	WHIM	BHIM	MHIM
Fat intake									
≤ 30% of energy from fat	R	R	R	R	R	R	R	R	R
> 30% of energy from fat									
Number of eating occasions									
≤ 3 times/day									
4 times/day		+							
5 times/day									
6 times/day									
≥ 7 times/day	R	R	R	R	R	R	R	R	R

Appendix 3b (cont'd)

Predictors	Income x Gender x Race/Ethnicity								
	WLIW	BLIW	MLIW	WMIW	BMIW	MMIW	WHIW	BHIW	MHIW
Gender									
Men	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Women	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Income									
PIR <1.85	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.85 ≤ PIR ≤ 3.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIR >3.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Race/ethnicity									
Non-Hispanic White	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Non-Hispanic Black	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mexican-Americans	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Education									
< High school									
High school graduate									
> High school	R	R	R	R	R	R	R	R	R
Age									
20-29 yrs	R	R	R	R	R	R	R	R	R
30-39 yrs		+			+		+		
40-49 yrs		+	+	+	+				
50-59 yrs		+		+			+		
60+ yrs		+	+	+			+		

Appendix 3b (cont'd)

Predictors	Income x Gender x Race/Ethnicity								
	WLIW	BLIW	MLIW	WMIW	BMIW	MMIW	WHIW	BHIW	MHIW
Marital status									
Married					+				
Widowed, divorced, or separated					+				
Never married/living with partner	R	R	R	R	R	R	R	R	R
Smoking status in the past 5 days									
Non-smoker		+	+		+				
Smoker	R	R	R	R	R	R	R	R	R
Alcohol intake (# of drinks/wk)[2]									
Leisure time activity/month									
No activities				+				+	
1st quintile							+		
2nd quintile					+		+		
3rd quintile									
4th quintile									
5th quintile	R	R	R	R	R	R	R	R	R
Breast fed your child									
Yes									
No									
Never been pregnant	R	R	R	R	R	R	R	R	R

Appendix 3b (cont'd)

Predictors	Income x Gender x Race/Ethnicity								
	WLIW	BLIW	MLIW	WMIW	BMIW	MMIW	WHIW	BHIW	MHIW
Number of live birth									
0 and never been pregnant	R	R	R	R	R	R	R	R	R
1									
2									
3									
4									
≥ 5								+	
Age at the first menarche									
≤ 11 yrs old	+	+							
12-15 yrs old	+								
≥ 16 yrs old	R	R	R	R	R	R	R	R	R
Component 1[3]	+	+	+	+	+	+	+	+	+
Restaurant food consumption									
Non-consumer	R	R	R	R	R	R	R	R	R
Consumer			-						
Breakfast consumption									
Yes	R	R	R	R	R	R	R	R	R
No									
Energy intake (kcal/d)[2]									

Appendix 3b (cont'd)

Predictors	Income x Gender x Race/Ethnicity								
	WLIW	BLIW	MLIW	WMIW	BMIW	MMIW	WHIW	BHIW	MHIW
Fat intake									
≤ 30% of energy from fat	R	R	R	R	R	R	R	R	R
> 30% of energy from fat			-					-	
Number of eating occasions									
≤ 3 times/day				+					
4 times/day									
5 times/day									
6 times/day									
≥ 7 times/day	R	R	R	R	R	R	R	R	R

[1]Only those that were significant are listed.

W: women, M: men, L: low-income, M: middle-income, H: high-income, LIM: low-income men, MIM: middle-income men, HIM: high-income men, LIW: low-income women, MIW: middle-income women, HIW: high-income women

WLIM: white low-income men, BLIM: black low-income men, MLIM: Mex-Am low-income men, WMIM: white middle-income men, BMIM: black middle-income men, MMIM: Mex-Ame middle-income men, WHIM: white high-income men, BHIM: black high-income men, MHIM: Mex-Am high-income men, WLIW: white low-income women, BLIW: black low-income women, MLIW: Mex-Am low-income women, WMIW: white middle-income women, BMIW: black middle-income women, MMIW: Mex-Ame middle-income women, WHIW: white high-income women, BHIM: black high-income men, WHIW: white high-income women, BHIW: black high-income women, MHIW: Mex-Am high-income women, R: reference group

[2]Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight

Appendix 3c. Summary of predictors for the risk of obesity among the subpopulation groups (NHANES 1999-2002 to compare with NHANES 1988-94)[1]

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Gender														
Men	N/A	N/A					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Women	N/A	N/A			-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Income														
PIR <1.85	+	+	N/A	N/A	N/A	+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.85 ≤ PIR ≤ 3.5			N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIR >3.5	R	R	N/A	N/A	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Race/ethnicity														
Non-Hispanic White	R	R	R	R	R	N/A	N/A	N/A	R	R	R	R	R	R
Non-Hispanic Black	+	+	+	+		N/A	N/A	N/A		+			+	
Mexican-Americans			-			N/A	N/A	N/A			+			
Education														
< High school					↑	+	N/A	N/A						
High school graduate	+						N/A	N/A	+					
> High school	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
Age														
20-29 yrs	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
30-39 yrs		+					N/A	N/A						
40-49 yrs		+	+		+	+	N/A	N/A			+			+
50-59 yrs					+	+	N/A	N/A						
60+ yrs		+			+	+	N/A	N/A			+		+	

Appendix 3c (cont'd)

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Marital status														
Married							N/A	N/A		+				
Widowed, divorced, or separated							N/A	N/A						
Never married/living with partner	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
Smoking status in the past 5 days														
Non-smoker	-	+	+				N/A	N/A				+		
Smoker	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
Alcohol intake (# of drinks/wk)[2]	+				+	+	N/A	N/A			+	+		+
Leisure time activity/month														
No activities		+	+		+	+	N/A	N/A	+	+		+		+
1st quintile		+			+	+	N/A	N/A						+
2nd quintile							N/A	N/A						+
3rd quintile		+	+				N/A	N/A	+					
4th quintile							N/A	N/A	+					
5th quintile	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
Breast fed your child														
Yes	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
No	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Never been pregnant	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	R	R

Appendix 3c (cont'd)

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Number of live birth														
0 and never been pregnant	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	R	R
1	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
2	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	-	
3	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
4	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
≥ 5	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Age at the first menarche														
≤ 11 yrs old	N/A	+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			+
12-15 yrs old	N/A	+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
≥ 16 yrs old	N/A	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R	R	R
Component 1[3]	+	+	+	+	+	+	N/A	N/A	+	+	+	+	+	+
Restaurant food consumption														
< 1 time/wk	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
1 time/wk							N/A	N/A						
2-3 times/wk							N/A	N/A						
≥ 4 times/wk		+				+	N/A	N/A						
Breakfast consumption														
Yes	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
No		+					N/A	N/A						
Energy intake (kcal/d)[2]	+													

Appendix 3c (cont'd)

Predictors	Gender		Income			Race/ethnicity			Income x Gender					
	M	W	L	M	H	White	Black	Mex-Am	LIM	MIM	HIM	LIW	MIW	HIW
Fat intake														
≤ 30% of energy from fat	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R
> 30% of energy from fat							N/A	N/A					+	
Number of eating occasions														
≤ 3 times/day						+	N/A	N/A						
4 times/day							N/A	N/A						
5 times/day							N/A	N/A						
6 times/day							N/A	N/A						
≥ 7 times/day	R	R	R	R	R	R	N/A	N/A	R	R	R	R	R	R

[1]Only the ones that were significant are listed as arrows in this table.

W: women, M: men, L: low-income, M: middle-income, H: high-income, LIM: low-income men, MIM: middle-income men, HIM: high-income men, LIW: low-income women, MIW: middle-income women, HIW: high-income women, R: reference group

[2]Log-transformed

[3] Sum of responses to the questions on perceived weight status, desired weight status, and attempt to lose weight

Appendix 4. Summary of the changes in predictors among the subpopulation groups over the past decade

Predictors	1988-94	1999-2002	Change in percent or mean
Men			
Being black	+	+	NC
Having < high school degree	+		NC
Being high school graduate	+	+	↓
Being low-income	+	+	NC
Being middle-income	+		↓
Being 40-49 years old	+		↑
Being 50-59 years old	+		NC
Being 60+ years old	+		NC
Being non-smoker	+	-	NC
Component 1 on desired weight status	+	+	↓
Participation leisure time activity at 1st Qn level	+		NC
Alcohol intake		+	NC
Energy intake		+	↓
Women			
Being black	+	+	NC
Being Mexican-American	+	+	NC
Being low-income		+	NC
Being 30-39 years old	+	+	↓
Being 40-49 years old	+	+	↑
Being 50-59 years old	+		↑
Being 60+ years old	+	+	NC
Being non-smoker		+	↑
Alcohol intake	+	+	NC
Not participating in any leisure-time activity	+	+	↑
Participating leisure-time activity at 1st Qn level	+	+	NC
Participating leisure-time activity at 2nd Qn level	+		NC
Participating leisure-time activity at 3rd Qn level		+	NC
≤ 11 years old at first menarche	+	+	NC
12-15 years old at first menarche		+	NC
Component 1 on desired weight status	+	+	↓
Energy intake	+		↑
Eating restaurant food ≥ 4 times/wk		+	N/A
Skipping breakfast		+	NC
Low-income subjects			
Being female	-		NC
Being black	+	+	NC
Being Mexican-American		-	↑

Appendix 4 (cont'd)

Predictors	1988-94	1999-2002	Change in percent or mean
Low-income subjects (cont'd)			
Having less than high school education	+		NC
Being 40-49 years old	+	+	↑
Being 50-59 years old	+		NC
Being 60+ years old	+		NC
Being non-smoker	+	+	NC
Participating leisure-time activity at 3rd Qn level		+	NC
Component 1 on desired weight status	+	+	↓
Energy intake	+		↑(32 kcal)
Eating meals 3 times/day	+		NC
Middle-income subjects			
Being black	+	+	NC
Being 50-59 years old	+		NC
Being 60+ years old	+		↑
Not participating in any leisure-time activity	+		↑
Component 1 on desired weight status	+	+	↓
High-income subjects			
Being female	-	-	NC
Being black	+		NC
Being Mexican-American	+		NC
Having less than high school education		+	NC
Being 40-49 years old	+	+	↑(4.1%)
Being 50-59 years old	+	+	↑
Being 60+ years old	+	+	NC
Alcohol intake	+	+	NC
Not participating in any leisure-time activity	+	+	↑
Participating leisure-time activity at 1st Qn level	+	+	NC
Component 1 on desired weight status	+	+	NC
Eating meals ≤ 3 times/day	+		NC
Low-income men			
Being high school graduate		+	NC
Being 40-49 years old	+		NC
Being 60+ years old	+		NC
Being non-smoker	+		NC
Not participating in any leisure-time activity		+	↑
Participating leisure-time activity at 3rd Qn level		+	↓
Participating leisure-time activity at 4th Qn level		+	↓
Component 1 on desired weight status	+	+	↓

Appendix 4 (cont'd)

Predictors	1988-94	1999-2002	Change in percent or mean
Middle-income men			
Being black	+	+	NC
Being married		+	↓
Not participating in any leisure-time activity		+	↑
Component 1 on desired weight status	+	+	↓
High-income men			
Being Mexican-American		+	NC
Being 40-49 years old		+	NC
Being 50-59 years old	+		NC
Being 60+ years old	+	+	NC
Alcohol intake	+	+	NC
Participating leisure-time activity at 1st Qn level	+		↑
Component 1 on desired weight status	+	+	NC
Low-income women			
Being black	+		NC
Being 50-59 years old	+		NC
Being non-smoker	+	+	NC
Alcohol intake	+	+	NC
Not participating in any leisure-time activity	+	+	↑
Component 1 on desired weight status	+	+	↓
Having 2 live births		-	↓
≤ 11 years old at first menarche	+		NC
12-15 years old at first menarche	+		NC
Middle-income women			
Being black	+	+	NC
Being 40-49 years old	+		NC
Being 50-59 years old	+		NC
Being 60+ years old	+	+	↑
Not participating in any leisure-time activity	+		NC
Participating leisure-time activity at 1st Qn level	+		NC
Component 1 on desired weight status	+	+	↓
Eating meals 4 times/day	+		NC
>30% of energy from fat		+	↑
Having 2 live births		-	NC
High-income women			
Being 30-39 years old	+		↓
Being 40-49 years old		+	↑

Appendix 4 (cont'd)

Predictors	1988-94	1999-2002	Change in percent or mean
High-income women (cont'd)			
Being 50-59 years old	+		↑
Being 60+ years old	+		NC
Alcohol intake	+	+	NC
Not participating in any leisure-time activity		+	↑
Participating leisure-time activity at 1st Qn level	+	+	NC
Participating leisure-time activity at 2nd Qn level	+	+	NC
Component 1 on desired weight status	+	+	NC
≤ 11 years old at first menarche		+	NC

NC: No significant change over the past decade, N/A: not applicable
Component 1 is a sum of responses to questions on perceived weight status, desired weight status, and attempt to lose weight.

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