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Weight loss strategies: Association with consumption of sugary beverages, snacks and values about food purchases

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Abstract

Objective—To examine whether weight loss strategies are associated with consumption of sugar-sweetened beverages (SSBs), snacks or food values.

Design and Methods—Cross-sectional analysis of 24-hour dietary recall data obtained from the National Health and Nutrition Examination Survey 2007–2010 (N=9,440).

Results—Adults trying to lose weight consumed roughly 2000 total calories, 250 calories from SSBs, 225 calories from salty snacks, and 350 calories from sweet snacks. Adults not trying to lose weight consumed roughly 2300 total calories, 300 calories from SSBs, 250 calories from salty snacks, and 380 calories from sweet snacks. While overweight and obese adults trying to lose weight consumed fewer calories than those who were not, heavier adults trying to lose weight using dietary strategies or a combination of diet and physical activity consumed more calories than healthy weight adults using that same weight loss strategy ($p < 0.05$). Price (>70%) and nutrition (>50%) were most when making food choices ($p < 0.05$) for all groups.

Conclusions—Consumption of discretionary calories is high regardless of body weight or weight loss intention.

Practice Implications—Promoting reduced SSB and snack consumption in the clinical setting may be important for weight loss, particularly among heavier individuals. Clinicians should consider values related to food purchasing to identify concrete behavioral targets.

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SNB conceived the study and developed the hypotheses. JAW analyzed the data. All authors contributed to the interpretation of study findings. SNB drafted the manuscript and all authors contributed to the final draft. SNB is the guarantor.

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Keywords

weight loss strategies; dietary patterns; food values; body weight; weight loss intention

1. INTRODUCTION

The obesity epidemic, which is associated with an increased burden of chronic conditions [1–3], affects a tenth of adults worldwide [4] and one third of American adults [5]. In the United States alone obesity costs \$147 billion in healthcare spending annually [6]. Even modest weight loss can have a significant impact on the elimination or reduction of adverse health conditions associated with obesity [7, 8], and recommendations for weight loss include both reduced caloric intake and increased physical activity [9].

Despite strong interest in weight loss programs in the United States – American adults spend tens of billions of dollars on commercial weight loss programs annually – the quality of the American diet is generally poor [10]. In particular, consumption of sugar-sweetened beverages (SSBs) and snacks – which are typically high in calories, fat, and sugar [11, 12] – is high. Two-thirds of adults (63%) drink SSBs, averaging 28 ounces per day, and 293 calories daily (15% of recommended 2000 kcal/day diet) [13]. From 1977 to 2001, energy intake from soft drinks and fruit drinks increased by 135% [14] and the prevalence of adult obesity doubled [15]. Over the past four decades, rates of snacking have increased from 59% to 90%, making snacking a quarter of total energy intake [16–18].

There is a consensus in the literature that a reduction in excess calories is helpful in preventing or delaying the onset of excess weight gain. Moreover, the consumption of a relatively small number of excess daily calories can lead to weight gain [19, 20]. While patterns of SSB [13, 14, 21, 22] and snack [16–18] consumption are well described along with effective intervention strategies to reduce their consumption [23–25], there has been little research looking focused on whether consumption of these discretionary calories differs by weight loss strategies (i.e., diet, exercise, or diet and exercise combined). No research has examined whether the patterns of SSB and snack consumption associated with weight loss strategies differ by body weight status. While there is a knowledge base describing the motives underlying food selection [26, 27], missing from the literature is evidence about whether individual values related to food purchasing differ by weight loss strategy or body weight status. Available studies focus on the overall population and find that values such as price, convenience and taste are key drivers of food consumption patterns [28]. Taken together, understanding the association between weight loss strategies, consumption of discretionary calories and food values is an important area of inquiry as it may help identify modifiable behavioral targets, particularly among overweight and obese adults.

The primary purpose of this study was to describe patterns of SSB and snack consumption by weight loss strategies among U.S. adults overall and by body weight category. The secondary purpose was to examine whether values related to food consumption (e.g., price, taste) were associated with weight loss strategies and body weight. This analysis does not

attempt to estimate the impact of SSB or snack intake on obesity incidence given our reliance on cross-sectional data.

2. METHODS AND PROCEDURES

2.1 Data and Design

Data was obtained from the nationally representative continuous National Health and Nutrition Examination Survey (NHANES). The NHANES is a population-based survey designed to collect information on the health and nutrition of the U.S. population. Participants were selected based on a multi-stage, clustered, probability sampling strategy. Our analysis combined the continuous NHANES data collection (2007–2010) to look at overall patterns during that time period. We selected 2007 as the start date for the study as that was the earliest year that our variables of interest were available. A complete description of data-collection procedures and analytic guidelines are available elsewhere (www.cdc.gov/nchs/nhanes.htm).

2.2 Study Sample

The study sample consists of adults ages 20 and older with completed 24-hour dietary recalls. Survey respondents were excluded if they were pregnant or had diabetes at the time of data collection or if their dietary recall was incomplete or unreliable (as determined by the NHANES staff). The final analytic sample included 9,440 adults.

2.3 Measures

Intention to lose weight and weight loss strategies—Intention to lose weight was assessed by self-reported intentional weight loss of 10 pounds in the past year or an affirmative response to the survey question, “During the past 12 months, have you tried to lose weight?” Respondents who answered “yes” to either question were categorized as trying to lose weight and, “no”, as not trying to lose weight. Respondents were first asked if they had intentional weight loss of 10 pounds, if they respond affirmatively, they are instructed to skip the next question regarding whether or not they were trying to lose weight. By using both questions to define weight loss intention, we captured individuals who succeeded in losing 10 pounds as well as those who were trying to lose weight but lost <10 pounds.

Respondents who reported trying to lose weight were further asked to report all of the ways they tried to lose weight. We categorized these weight control strategies into four mutually exclusive categories detailed in Appendix A: 1) dietary changes (e.g., ate less to lose weight, switched to foods with lower calories), 2) physical activity (e.g., exercised to lose weight, personal trainer), 3) diet and physical activity, or 4) commercial diet. We focused on adults using only dietary strategies or a combined approach of diet and physical activity to lose weight due to the small sample size in the physical activity alone and commercial weight loss groups. We excluded people from the analysis who exclusively took medication, laxatives, vomited or smoked cigarettes to lose weight due to small sample size and relevance.

Beverages and Snacks—Survey respondents reported all food and beverages consumed in a prior 24-hour period (midnight to midnight) and reported type, quantity and time of each food and beverage consumption occasion. Following the dietary interview, all reported food and beverage items were systemically coded using the U.S. Department of Agriculture (USDA) Food and Nutrient Database. Caloric content and other nutrients derived from each consumed food or beverage item were calculated based on the quantity of food and beverages reported and the corresponding nutrient contents by the National Center for Health Statistics (NCHS). We used the first dietary recall from each survey for this analysis.

We identified SSBs (from 162 beverage items) including the following drink types: soda (22 items), sport drinks (4 items), fruit drinks and punches (59 items), low-calorie drinks (25 items), and sweetened tea and other sweetened beverages (52 items). We identified two mutually exclusive snack categories (from 772 snack items): 1) salty snacks (including hush puppies, all type of chips, popcorn, pretzels, party mixes, french fries, and potato skins (76 items) and 2) sweet snacks, including ice cream, other desserts (custards, puddings, mousse, etc.), sweet rolls, cakes, pastries (crepes, cream puffs, strudels, croissants, muffins, sweet breads, etc.), cookies, pies, candy (696 items). The sweet snack category did not include solid foods with naturally occurring sugar such as fruit. See Appendix B for more details.

Food consumption values—Respondent food consumption values were based on responses to a series of questions assessing the importance of several domains (price, nutrition, taste, ease of food preparation, how well food keeps) related to food purchases. For example, the exact survey question for the price domain is: “When you buy food from a grocery store or supermarket, how important is price? Would you say that it is very important, somewhat important, not very important or not at all important?” Each domain had the same response categories. We dichotomized each food consumption value as very important vs. otherwise based on the cut points in the data. In particular the data were skewed towards more positive responses, so combining the categories for ‘very’ and ‘somewhat’ into a single category left insufficient variation for the analyses.

Body Weight Status—In the NHANES, body weight and height were measured using standard procedures in a mobile examination center. Healthy weight was defined as a body mass index (BMI) from 18.5 to 24.99 kg/m²; overweight, BMI from 25 to 29.99 kg/m²; and obese, BMI ≥ 30 kg/m². [29]

Other measures—Sociodemographic measures were categorized as follows: race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican-American and other), sex, age, marital status (married, married before, living with a partner, never married), education (less than high school, high school, more than high school) and employment status (unemployed (including retirees and those not actively looking for work), employed). The “other race” category includes non-Hispanic multiracial individuals and other non-Hispanic race categories that are too small to be included separately. The poverty income ratio (PIR) – the ratio of household income to a family’s appropriate poverty threshold – was based on self-reported household income. We dichotomized the PIR into lower and higher income groups based on eligibility for food assistance programs (i.e. ≥ 130% of the poverty level). As

consumption patterns may vary depending on the day of the week, we also controlled for whether or not the surveyed day was a weekday or weekend.

2.4 Analysis

All analyses were weighted to be representative of the general population and conducted using STATA, version 12 (StataCorp, L.P., College Station, TX) to account for the complex sampling structure. Multivariate linear and logistic regressions were used to adjust for potential differences in population characteristics, including race/ethnicity, sex, age, marital status, education, employment and poverty status. In particular, a logistic model was used for the binary outcomes (percentage of adults drinking SSBs, percentage of adults eating salty snacks, percentage of adults eating sweet snacks) and linear models were used for the continuous outcomes (total calories, calories from SSBs, calories from salty snacks, and calories from sweet snacks). From each model, we used post-estimation commands to calculate the predicted mean for the outcomes. Analyses of calories from SSBs, salty and sugary snacks were restricted to individuals who consumed those items. All tables and figures report predicted means based on the adjusted models. For all models, statistical significance was determined at $p < 0.05$.

3. RESULTS

The characteristics of the NHANES 2007–2010 sample are presented in Table 1, overall and by body weight category. The categories of body weight had comparable distributions of employment status, income, and the day of the week the respondents completed the survey. The obese category had more women, non-Hispanic Blacks and Mexican Americans, middle age (45–64), less educated (high school education or less), married and lower income adults ($p < 0.05$).

3.1 Distribution of weight loss strategies by body weight

Table 2 reports the distribution of weight loss strategies overall and by body weight category. Overall, 40 percent of adults reported trying to lose weight. Among this group, dietary changes (34%) or a combination of diet and physical activity changes (42%) were the most common weight loss strategies followed by commercial diets (18%) and physical activity only (7%). Among the body weight categories, 19 percent of healthy weight adults reported trying to lose weight compared to 36 percent of overweight and 44 percent of obese adults.

3.2 Frequency of SSB and snack consumption by weight loss strategies and body weight

Table 3 reports the percent of adults consuming beverages and snacks on a typical day by weight loss and body weight category. Roughly half of adults using dietary only strategies consumed SSBs (56%) and sweet snacks (60%) and a third consumed salty snacks (36%). With the exception of salty snacks, these patterns were similar to adults using both diet and physical activity to lose weight as well as adults not trying to lose weight. Salty snack consumption was higher among adults using a combined weight loss approach as compared to adults using diet only to lose weight (41% vs. 36%, $p = 0.04$).

Compared to adults not trying to lose weight, individuals using diet and physical activity strategies to lose weight were less likely to consume SSBs (54% vs. 61%, $p < 0.001$). Similarly, overweight and obese adults using dietary strategies or a combined approach for weight loss were less likely to consume SSBs (diet only vs. not trying among overweight: 54% vs. 62%, $p = 0.02$; diet only vs. not trying among obese: 58% vs. 64%, $p = 0.03$; diet and physical activity vs. not trying among overweight: 54% vs. 62%, $p = 0.004$; diet and physical activity vs. not trying among obese: 56% vs. 64%, $p = 0.01$). Healthy weight adults using diet and physical activity strategies for weight loss were also less likely to consume SSBs than healthy weight adults who were not trying to lose weight (49% vs. 59%, $p = 0.01$).

Among body weight categories, obese individuals using diet and physical activity to lose weight were less likely to consume sweet snacks than healthy weight individuals using the same weight loss approach (65% vs. 55%, $p = 0.01$). Conversely, obese individuals not trying to lose weight were more likely to consume salty snacks than healthy weight individuals not trying to lose weight (42% vs. 36%, $p < 0.001$).

3.3 Energy consumption from SSBs and snacks among weight loss strategies and body weight

Table 4 reports caloric consumption (total, beverage and solid food kcal) associated with each weight loss approach and body weight category. On a typical day, adults using dietary changes to lose weight consumed a total of 2024 kcal/day, which included 259 kcal/day from SSBs, 220 kcal/day from salty snacks, and 341 kcal/day from sweet snacks. Adults using both diet and physical activity to lose weight consumed a total of 2075 kcal/day, which included 251 kcal/day from SSBs, 245 kcal/day from salty snacks, and 330 kcal/day from sweet snacks. Adults not trying to lose weight consumed a total of 2296 kcal/day, which included 306 kcal/day from SSBs, 249 kcal/day from salty snacks, and 379 kcal/day from sweet snacks. Overall, and among each body weight category, adults trying to lose weight (using either diet only or a combination of diet and physical activity) consumed significantly fewer total calories than those not trying to lose weight ($p < 0.05$). Similarly, consumption of calories from SSBs and sweet snacks was significantly lower among adults trying to lose weight (regardless of approach), overall and among the overweight and obese, as compared to adults not trying to lose weight ($p < 0.05$).

Among adults using diet and physical activity to lose weight, overweight and obese adults consumed significantly more total calories as compared to healthy weight adults (healthy weight: 1867 kcal/day vs. overweight 2112 kcal/day, $p < 0.001$; healthy weight: 1867 kcal/day vs. obese: 2136 kcal/day, $p < 0.001$). This group also consumed significantly more calories from SSBs (healthy weight: 198 kcal/day vs. overweight 260 kcal/day, $p = 0.005$; healthy weight: 198 kcal/day vs. obese: 266 kcal/day, $p < 0.001$), salty snacks (healthy weight: 214 kcal/day vs. obese: 263 kcal/day, $p = 0.02$) and sweet snacks (healthy weight: 273 kcal/day vs. overweight 335 kcal/day, $p = 0.01$; healthy weight: 273 kcal/day vs. obese: 356 kcal/day, $p = 0.01$). Among adults not trying to lose weight, overweight and obese adults consumed significantly more calories from SSBs as compared to healthy weight

adults (healthy weight: 279 kcal/day vs. overweight 314 kcal/day, $p = 0.007$; healthy weight: 279 kcal/day vs. obese: 336 kcal/day, $p = 0.007$).

3.4 Food consumption values by weight loss strategies and body weight

Table 5 reports the distribution of food consumption values by weight loss strategy and body weight category. Overall, a majority of adults reported that taste and price were two of the most important priorities when making food decisions, regardless of weight loss intention or body weight status. Nutrition was more important among overweight adults trying to lose weight than overweight adults not trying to lose weight (dietary only: 62% vs. 54%, $p = 0.02$; diet and physical activity: 64% vs. 54%, $p = 0.003$) and among obese adults trying to lose weight as compared to obese adults not trying to lose weight (diet and physical activity: 60% vs. 51%, $p = 0.004$). Obese adults using diet and physical activity changes to lose weight were less likely to report that price and ease of food preparation were very important as compared to obese adults not trying to lose weight (price: 40% vs. 47%, $p = 0.04$; ease of food preparation: 24% vs. 31%, $p = 0.02$). Among adults not trying to lose weight, obese adults were more likely to report price as very important when making food decisions as compared to healthy weight and overweight adults (healthy weight vs. obese: 35% vs. 47%, $p = 0.01$; overweight vs. obese: 39% vs. 47%, $p < 0.001$).

4. DISCUSSION

The elimination of discretionary calories from the diet may help reduce the energy imbalance and promote weight loss or weight maintenance, particularly among heavier individuals, who require a relatively larger decrease in calories in order to lose weight [20]. Our results indicate that, on a typical day, roughly half of American adults consume sugary beverages and sweet snacks, regardless of their weight loss efforts or body weight and about one third consume sweet snacks. We found that the percentage of adults drinking sugary beverages and the caloric consumption (from total calories, SSB calories, and sweet snacks) was generally lower among adults trying to lose weight as compared to those who were not. While overweight and obese adults trying to lose weight consumed fewer calories than those who are not, heavier adults trying to lose weight using dietary strategies or a combination of diet and physical activity consumed more calories than healthy weight adults using that same weight loss strategy. Our results also suggest that taste, price and nutrition are most important to adults when making food choices; however, nutrition is more important among heavier adults trying to lose weight and price is less important among this group.

The recent guidelines on the treatment of obesity call for a combination of reduced calorie diet and increased physical activity to produce weight loss [30]. Consistent with other studies [31], our analysis showed that less than half of adults pursued both changes in diet and physical activity in order to lose weight. Our finding of high consumption of SSB and snack calories, regardless of weight loss intention or body weight category, support prior research showing that diet quality is generally poor among Americans [10]. Interestingly, we found that using a combined approach to weight loss was higher among healthy weight adults (48%) and lowest among obese adults (38% of adults). Our results related to food values are consistent with prior work suggesting that price, taste and nutrition are primary factors influencing food choices [32, 33].

While adults trying to lose weight may need to be encouraged to change their behavior related to both diet and physical activity, our finding that consumption of total calories and discretionary calories (from SSB beverages and snacks) is generally lower among individuals trying to lose weight suggests that messages about reducing caloric intake may be having a positive effect. It also suggests that encouraging weight loss efforts among overweight and obese people who are not currently trying to lose weight is important to motivate dietary changes. Therefore, continued efforts promoting the reduction or elimination of sugary beverages and snacks in clinical- and population-level obesity prevention are important for weight loss or weight maintenance efforts among adults, particularly if they are not already engaged in weight loss activities.

However, consumption of discretionary calories among adults trying to lose weight is still high. On a typical day, an adult trying to lose weight consumes roughly 250 calories from sugary beverages, 225 calories from salty snacks, and 350 calories from sweet snacks. This intake is lowest among healthy weight adults and higher among obese adults. Eliminating some or all of these discretionary calories could significantly help reduce the excess calories in the diet, particularly among heavier adults. Our finding that adults consume high levels of snacks and SSBs, regardless of weight loss intention, is consistent with a large body of research highlighting that the built environment in the United States promotes a food culture that is high in fat and sugar [34–36].

When it comes to making choices about which foods to buy, adults are most persuaded by taste and nutrition, regardless of their body weight or weight loss strategies. Among adults not trying to lose weight, obese individuals are more concerned about price and less concerned about nutrition than healthy weight individuals. Among obese individuals, price is less important and nutrition is more important among those using diet and physical activity changes to lose weight as compared to those who are not engaging in weight loss efforts.

The present study has several limitations. First, our reliance on single 24-hour dietary recalls may introduce inaccuracy and bias to our analyses due to: underreporting, unreliability, and conversion error. Previous research indicates that adults underreport their dietary consumption by approximately 25% [37, 38]. A single 24-hour dietary recall may not accurately represent usual dietary intake for an individual. Lack of reliability of the dietary recall, with respect to overall eating habits, will reduce the precision of our estimates but it will not bias our regression estimates where total energy intake is the dependent variable. [39] There exists inaccuracy in converting reported beverage consumption to energy intake because the assumptions on serving size and food composition are defined by the food and nutrient database. Using these standard database assumes a 'representative' nutritional content for a given food or beverage. The inevitable variation in actual intake and reporting bias may introduce measurement errors, particularly for the estimation of total energy intake. However, this error is likely less significant for packaged, standard-sized beverages. Second, the NHANES data are cross-sectional, which only allows us to address associations rather than causality. Third, our inclusion of low calorie beverages in the SSB category may bias our results related to energy intake towards zero. However, only a small fraction of all the beverages in the SSBs category are low calorie, so we do not expect this to significantly

impact the results. Fourth, self-reported weight loss strategies may be subject to recall bias if or misreporting; for example heavier weight adults may be more likely to over report efforts to lose weight [40].

4.1 Practice Implications

Continued efforts – such as price manipulations, education or restrictions [23–25] – targeted towards the reduction or elimination of sugary beverages and snacks in clinical- and population-level obesity prevention may be important for weight loss or weight maintenance efforts among adults, particularly among heavier individuals. Clinicians should consider individuals' values related to food purchasing when helping to identify concrete behavioral targets.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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TABLE 1

Characteristics of U.S. adults (aged 20 y) in the National Health and Nutrition Examination Survey (NHANES) 2007–2010¹, overall and by body weight category N (%)

	TOTAL	Healthy ⁴	Overweight	Obese	P for diff
Total	9,440 (100)	2,762 (32)	3,374 (35)	3,304 (33)	
Sex					
Male	4,667 (49)	1,293 (42)	1,867 (56)	1,507 (48)	<0.001
Female	4,773 (51)	1,469 (58)	1,507 (44)	1,797 (52)	
Race-ethnicity					
Non-Hispanic white	4,627 (70)	1,485 (72)	1,654 (71)	1,488 (67)	<0.001
Non-Hispanic black	1,707 (11)	458 (9)	518 (9)	731 (14)	
Mexican American/Hispanic	2,676 (13)	611 (10)	1,076 (15)	989 (15)	
Other ²	430 (6)	208 (9)	126 (5)	96 (4)	
Age					
20–44 y	4,288 (50)	1,438 (56)	1,379 (46)	1,471 (48)	<0.001
45–64 y	3,100 (35)	737 (30)	1,160 (38)	1,203 (38)	
65 y	2,052 (15)	587 (14)	835 (17)	630 (14)	
Education					
Less than high school	2,609 (18)	648 (15)	1,007 (19)	954 (20)	0.003
High school (or GED)	2,262 (24)	655 (22)	794 (24)	813 (26)	
More than high school	4,557 (58)	1,452 (62)	1,572 (56)	1,533 (55)	
Marital status					
Currently married	4,942 (57)	1,328 (52)	1,862 (59)	1,752 (58)	<0.001
Previously married	2,040 (17)	573 (16)	732 (17)	735 (18)	
Living with a partner	757 (8)	238 (9)	265 (8)	254 (7)	
Never married	1,698 (18)	621 (23)	515 (16)	562 (17)	
Employment status					
Unemployed	3,961 (34)	1,146 (34)	1,406 (32)	1,409 (35)	0.073
Employed	5,478 (66)	1,615 (66)	1,968 (68)	1,895 (65)	
Income					
Lower income ³	2,677 (19)	766 (18)	936 (18)	975 (20)	0.122

	TOTAL	Healthy ⁴	Overweight	Obese	P for diff
Higher income ³	6,763 (81)	1,996 (82)	2,438 (82)	2,329 (80)	
Day of the week					
Weekday	5,782 (61)	1,688 (61)	2,060 (60)	2,034 (62)	0.676
Weekend	3,658 (39)	1,074 (39)	1,314 (40)	1,270 (38)	

Note: p-value measured at the 0.05 level

¹ Percentage of US population estimated with survey weights to adjust for unequal probability of sampling

² Other includes non-Hispanic multiracial and any other non-Hispanic race categories not included in the above categories

³ Income level was dichotomized based on the poverty index ratio (ratio of annual family income to federal poverty line). Lower income refers to persons below 130% of poverty, which represents eligibility threshold for the federal food stamp program.

⁴ Healthy weight [BMI (kg/m2) 18.5–24.99], Overweight (BMI 25–29.99), Obese (BMI ≥30)

TABLE 2

Frequency of weight loss strategies among U.S. adults, overall and by body weight

	ALL	Body weight ^I			P for diff
		Healthy (%)	Overweight (%)	Obese (%)	
Trying to lose weight	3,782 (100)	572 (100)	1,392 (100)	1,889 (100)	
Dietary changes only	1,267 (29)	143 (23)	457 (30)	667 (31)	0.001
Physical activity only	247 (6)	43 (7)	93 (6)	111 (5)	
Diet and physical activity	1,603 (43)	277 (59)	618 (46)	709 (38)	
Commercial diets	664 (20)	95 (17)	199 (17)	370 (24)	
Other activities	71 (2)	14 (2)	25 (1)	32 (1)	
Not trying to lose weight	5,583	2,190	1,980	1,413	

^I Healthy weight [BMI (kg/m²) 18.5–24.99], Overweight (BMI 25–29.99), Obese (BMI 30)

Note: Other weight loss strategies such as laxative use, vomiting or smoking cigarettes to lose weight.

TABLE 3

Percentage of U.S. adults consuming SSBs, sweet snacks and salty snacks, overall and by body weight

	ALL	Body weight ^I		
		Healthy weight	Overweight	Obese
Trying to lose weight				
Dietary only				
Consumed SSB	56 ± 1.8	60 ± 3.5	54 ± 2.9 ^d	58 ± 2.2 ^d
Consumed salty snacks	36 ± 2.3	31 ± 4.9	35 ± 3.0	40 ± 3.2
Consumed sweet snacks	60 ± 1.6	65 ± 3.6	63 ± 2.3	56 ± 3.2
Diet and physical changes				
Consumed SSB	54 ± 1.8 ^d	49 ± 3.4 ^d	54 ± 2.2 ^d	56 ± 2.5 ^d
Consumed salty snacks	41 ± 1.8 ^b	39 ± 3.1	40 ± 2.0	42 ± 2.5
Consumed sweet snacks	58 ± 1.5	65 ± 3.9	57 ± 2.2	55 ± 2.3 ^a
Not trying to lose weight				
Consumed SSB	61 ± 1.2	59 ± 1.8	62 ± 1.7	64 ± 1.7
Consumed salty snacks	38 ± 1.3	36 ± 1.6	38 ± 1.5	42 ± 2.2 ^a
Consumed sweet snacks	62 ± 1.1	63 ± 1.4	62 ± 1.3	61 ± 2.0

Note: All values are mean ± SEM.

^I Healthy weight [BMI (kg/m²) 18.5–24.99], Overweight (BMI 25–29.99), Obese (BMI ≥ 30).

Note: Multivariate regression was used to adjust for use of dietary, physical, commercial or other weight loss strategies, sex, race/ethnicity, age, education, marital status, employment status, poverty, and weekend/weekday; S.E.M. = standard error of the mean.

^a significantly different from healthy weight at p<0.05^b significantly different from dietary only within body weight category group at p<0.05^c significantly different between overweight and obese at p<0.05^d significantly different from those not trying to lose weight within body weight category or the ALL group at p<0.05

TABLE 4

Energy consumption (mean kcal) among U.S. adults associated with weight loss strategies, overall and by body weight

	ALL	Body weight ^I			
		Healthy weight	Overweight	Obese	
	Mean ± SEM	Mean ± SEM	Mean ± SEM	Mean ± SEM	Mean ± SEM
Trying to lose weight					
Dietary changes only					
TOTAL calories	2024 ± 35 ^d	1887 ± 85 ^d	2036 ± 43 ^d	2077 ± 50 ^d	
SSB calories among drinkers	259 ± 10 ^d	240 ± 24	260 ± 17 ^d	267 ± 15 ^d	
Salty snack calories among eaters	220 ± 12	222 ± 37 ^d	211 ± 14 ^d	227 ± 16	
Sweet snack calories among eaters	341 ± 18 ^d	332 ± 28	348 ± 28	338 ± 27	
Diet and physical activity					
TOTAL calories	2075 ± 21 ^d	1867 ± 48 ^d	2112 ± 41 ^{ad}	2136 ± 42 ^{ad}	
SSB calories among drinkers	251 ± 15 ^d	198 ± 18 ^d	260 ± 17 ^{ad}	266 ± 20 ^{ad}	
Salty snack calories among eaters	245 ± 9	214 ± 15 ^d	238 ± 15	263 ± 13 ^a	
Sweet snack calories among eaters	330 ± 11 ^d	273 ± 18 ^d	335 ± 16 ^{ad}	356 ± 27 ^a	
Not trying to lose weight					
TOTAL calories	2296 ± 24	2235 ± 34	2353 ± 28	2319 ± 38	
SSB calories among drinkers	306 ± 11	279 ± 8	314 ± 14 ^a	336 ± 21 ^a	
Salty snack calories among eaters	249 ± 7	342 ± 9	262 ± 11	244 ± 15	
Sweet snack calories among eaters	379 ± 9	376 ± 16	387 ± 14	369 ± 16	

^I Healthy weight [BMI (kg/m²) 18.5–24.99], Overweight (BMI 25–29.99), Obese (BMI ≥ 30).

Note: Multivariate regression was used to adjust for use of dietary, physical, commercial or other weight loss strategies, sex, race/ethnicity, age, education, marital status, employment status, poverty, and weekend/weekday; S.E.M. = standard error of the mean.

^a significantly different from healthy weight at p<0.05

^b significantly different from dietary only within body weight category at p<0.05

^c significantly difference between overweight and obese at p<0.05

^d significantly different from those not trying to lose weight within body weight category or the ALL group at p<0.05

TABLE 5

Food consumption values among U.S. adults associated with weight loss strategies, overall and by body weight

	ALL	Body weight ^I		
		Healthy weight	Overweight	Obese
	Mean ± SEM	Mean ± SEM	Mean ± SEM	Mean ± SEM
Trying to lose weight				
Dietary changes only				
Ease of food preparation	30 ± 1.4	30 ± 4.4	31 ± 2.5	31 ± 2.4
How well food keeps	49 ± 1.7	43 ± 5.5	52 ± 3.2	49 ± 2.0
Nutrition	62 ± 2.2 ^d	69 ± 4.5	62 ± 3.4 ^d	58 ± 2.8
Price	42 ± 2.2	40 ± 5.0	41 ± 4.1	43 ± 3.0
Taste	79 ± 1.9	75 ± 4.7	83 ± 2.5	76 ± 2.8
Diet and physical changes				
Ease of food preparation	25 ± 1.6 ^{bd}	27 ± 3.1	25 ± 2.4	24 ± 2.1 ^d
How well food keeps	50 ± 1.5	45 ± 3.8	49 ± 1.7	55 ± 3.1
Nutrition	63 ± 1.5 ^d	66 ± 2.9	64 ± 2.9 ^d	60 ± 2.3 ^d
Price	38 ± 1.8	40 ± 3.3	34 ± 3.4	40 ± 2.3 ^d
Taste	77 ± 1.2	77 ± 2.9	74 ± 2.2 ^b	80 ± 2.4
Not trying to lose weight				
Ease of food preparation	30 ± 1.3	30 ± 1.4	30 ± 1.7	31 ± 2.1
How well food keeps	51 ± 1.2	51 ± 1.6	51 ± 1.7	50 ± 2.1
Nutrition	56 ± 1.4	62 ± 1.8	54 ± 1.8 ^a	51 ± 2.1 ^a
Price	41 ± 1.2	38 ± 1.5	39 ± 1.8	47 ± 2.4 ^{ac}
Taste	77 ± 1.1	77 ± 1.3	76 ± 1.9	78 ± 1.9

^I Healthy weight [BMI (kg/m²) 18.5–24.99], Overweight (BMI 25–29.99), Obese (BMI ≥ 30).

Note: Multivariate regression was used to adjust for use of dietary, physical, commercial or other weight loss strategies, sex, race/ethnicity, age, education, marital status, employment status, poverty, and weekend/weekday; S.E.M. = standard error of the mean.

^a significantly different from healthy weight at p<0.05

^b significantly different from dietary only within body weight category at p<0.05

^c significantly difference between overweight and obese at p<0.05

^d significantly different from those not trying to lose weight within body weight category at p<0.05