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Racial and gender disparities in sugar consumption change efficacy among first-year college students

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INTRODUCTION

Obesity is a public health epidemic in the United States (U.S.); its prevalence rates have substantially risen over the past two decades in part due to the increase in the consumption of sugar sweetened foods and beverages (SSBs) (Bray & Popkin, 2014a, 2014b; Vasanti S Malik, Schulze, & Hu, 2006; Te Morenga, Mallard, & Mann, 2012). Excess dietary sugar has been implicated as a key factor in the obesity epidemic, and SSBs have been a primary source of delivery, especially among emerging adults (Bleich, Wang, Wang, & Gortmaker, 2009). Emerging adults tend to consume large quantities of SSBs (Kumar et al., 2014; Ogden, Kit, Carroll, & Park, 2011), and recent studies have noted the potential detrimental effects of excess dietary sugar (Bray & Popkin, 2014a; Johnson et al., 2009). Findings from recent clinical trials indicate that drinking two SSBs per day for six months can significantly increase risks for obesity and other metabolic conditions linked to cardiovascular diseases and some cancers (Bray & Popkin, 2014a). While some studies suggest the rates of SSB consumption has declined in recent years (Han & Powell, 2013), understanding determinants of sugar intake as a modifiable determinant of weight gain and obesity among individuals between 18 and 25 years of age is particularly important for groups such as African Americans because of their elevated risks for premature morbidity and mortality (Han & Powell, 2013). The potential hazards associated with excess sugar intake can be substantial for African Americans because this behavior may be linked to excess weight gain and other

CONFLICT OF INTEREST STATEMENT

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metabolic conditions (e.g., obesity, diabetes, hypertension, chronic kidney disease) for which this population has elevated risks for early onset, accelerated progression, and complications (Johnson et al., 2009; V. S. Malik, Popkin, Bray, Despres, & Hu, 2010; V. S. Malik, Popkin, Bray, Despres, Willett, et al., 2010; Nguyen, Choi, Lustig, & Hsu, 2009).

Reducing sugar consumption among emerging adults represents an important potential focus of efforts to reduce racial disparities and to improve overall population health. Because social and psychological attributes associated with behavioral patterns initiate and become established during this period, emerging adulthood is a critical developmental period that has important implications for long-term health outcomes (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008; Schwartz, Cote, & Arnett, 2005; VanKim, Larson, & Laska, 2012). Individuals may try different behaviors during emerging adulthood as they complete their education and training for future careers and gradually settle into adult roles (Arnett, 2000). Despite the changes and flexibility in gender roles, norms and expectations over time, stresses and psychological strains vary by gender (Griffith, Gunter, & Allen, 2011). There also have been consistent differences in patterns of obesity and SSB consumption between males and females (Ames et al., 2014; Bleich et al., 2009; Han & Powell, 2013; Vasanti S Malik et al., 2006), which highlights the importance of gender as a determinant of health and SSB consumption.

In addition, confidence in the ability to make changes can help individuals navigate this period and establish behavioral patterns having implications for health outcomes. A related concept, self-efficacy, has been a central focus in the weight management literature. The basic premise is that individual beliefs about their ability to achieve personal goals choices have implications for behavior change outcomes (Bui, Kemp, & Howlett, 2011; Gamble, Parra, & Beech, 2009; Richman, Loughnan, Droulers, Steinbeck, & Caterson, 2001). Self-efficacy is commonly used in nutrition and physical activity interventions particularly with youth and young adults. A few studies have examined the association between self-efficacy and weight-related behaviors among emerging adults by focusing on college student populations (Butler, Black, Blue, & Gretebeck, 2004; Franko et al., 2008). These studies suggest that studies focusing on college students may be useful in the effort to specify factors associated with obesity disparities as nearly half of emerging adults (48%) are enrolled in post-secondary educational institutions (United States Census Bureau., 2011) and the prevalence of obesity among the collegiate population is 35% (West et al., 2006). The purpose of this study was to examine race- and gender-specific disparities in self-efficacy associated with reducing sugar-sweetened beverage (SSB) and sugary snack (SSN) consumption among African American and White first year college students.

METHODS

Participants

Data for this analysis were drawn from a surveillance study collecting nutrition and physical activity information from incoming freshmen during the Fall 2005 semester at a medium-sized, state university located in a large southern city. The study was approved by the ***blinded university*** Institutional Review Board. Eligible participants for this study were first-time, first-year students attending classes during the Fall 2005 semester. In an effort to enroll as many first-year students as possible, freshmen were recruited via three methods: (1) presentations conducted by research staff during *ACAD* (*A*cademic support, *C*onnection to the University resources, *A*chievements, and *D*estination points) classes and dorm meetings at the beginning of their initial semester; (2) staffed information booths/tables at student orientation meetings and fairs; and (3) posted flyers in areas on campus frequented by freshmen (e.g., student activity center or student union). A research staff member provided additional information about the study to interested students, confirmed eligibility, and asked eligible students (first-time, first-year students) to sign the informed consent form and provide contact information, including permanent address.

Survey Questionnaire

Once informed consent was acquired, participants completed a self-administered survey at the recruitment sites. The survey was designed to assess the overall health of first-time, first-semester college students with an emphasis on obesity-related behaviors (i.e., nutrition, physical activity). The survey questionnaire consisted of items designed to measure self-perceptions of body image, body mass index (BMI), self-reported behavioral patterns, and confidence level regarding making healthy food choices. A substantial number of items on the survey were replicated from the Behavioral Risk Factor Surveillance System (BRFSS) Questionnaire. The BRFSS, designed by the Centers for Disease Control and Prevention (CDC), monitors modifiable risk and health behaviors or conditions related to the leading causes of death and disability such as cardiovascular disease, cancer, diabetes, and injuries (Centers for Disease Control and Prevention, 2000).

Study Variables—SSB consumption change efficacy and SSN consumption change efficacy were the outcomes of interest for this study. They were derived from an items asking about their confidence to “drink water instead of sweet drinks” and to “eat fewer sweet snacks”, respectively. The response categories for both items were “not sure” (coded 0), “sort of sure” (coded 1), and “very sure” (coded 2).

Body weight-related variables were also included in these analyses. BMI was a measure derived by dividing the self-reported weight (in pounds) by self-reported height (in inches) squared and multiplying the dividend by 703, which is the standard formula for calculating BMI for children and adolescents (Centers for Disease Control and Prevention, 2014). Body mass index percentiles are typically generated for individuals under 19 years of age; however, percentiles were not calculated because the sample included individuals who were 20 years of age or older. The “concerns about weight” and “attempts to lose weight” measures were drawn from items on the McKnight Risk Factor Survey (Shisslak et al., 1999). The complete survey was originally designed to identify risk factors for eating disorders in adolescent girls; however, research reported that young men have concerns about their body weight and some seek to address body image concerns through attempts to lose weight (Pritchard, King, & Czajka-Narins, 1997; Slater & Tiggemann, 2014). The “concerns about weight” measure is composite of seven items asking respondents about the frequency of thoughts and actions associated with having trepidation about their weight. The “attempts to lose weight” variable is a composite measure of five items asking study participants about the methods and frequency of their effort to lose weight. The response categories for both of the McKnight components were “never” (coded 1); “sometimes” (coded 2); and “a lot” (coded 3).

It has been established that diet and exercise can influence health behavior change (Blair, Jacobs, & Powell, 1985) and variables representing calorie-dense food intake and physical activity were included in the analyses. The takeout food frequency score was a composite of responses to 8 items beginning with the phrase, “How often do you eat the following foods from a restaurant…” Each item referred to a fast food item and the quick service restaurant where it could be purchased. The response categories were “less than once a month” (coded 1); “once or twice a month” (coded 2); “once a week” (coded 3); and “more than once a week” (coded 4). The physical activity variable for this analysis was a dichotomous variable indicating whether or not participants met national recommendations for exercise. This variable was derived from responses to three questions asking the number of days over the past week that respondents: “participated in physical activity for at least 20 minutes that made you sweat and breathe hard, such as basketball, soccer, running, swimming laps, fast bicycling, fast dancing, or similar aerobic activities”; “participate in physical activity for at least 30 minutes that did not make you sweat and breathe hard”; and “exercise to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting.” The responses to each of these questions ranged from “0 days” (coded 1) to “7 days” (coded 8). According to the *Physical Activity Guidelines for Americans* (U. S. Department of Health and Human Services, 2008), adults should engage in at least 150 minutes of moderate intensity, 75 minutes of vigorous intensity physical activity or an equivalent combination of the two types of aerobic exercise weekly. The guidelines also stated that physical activity should be bolstered with muscle-strengthening activity or at least moderate intensity for at least 2 days per week. Respondents who engaged in 20 minutes of vigorous activity for at least 4 days per week or 30 minutes of moderate intensity exercise for at least 5 days per week and had two or more days of strength training on a weekly basis were coded as 1, all others were coded 0.

The SSB consumption frequency score was a composite measure of responses to 4 items asking participants about their consumption frequency of regular soda or sweetened tea; milkshakes or sweetened coffee drinks; kool-aid or lemonade; and chocolate or flavored milk. The SSN consumption frequency score was derived from the composite of responses to 4 items asking participants about their consumption frequency of cookies, cakes, pies, and snack cakes; ice cream or frozen yogurt; chocolate candy; and other types of candy. The responses to each item in the SSB and sugary snack composite measures were “never” (coded 1); “1–3 times per month” (coded 2); “1–6 times per week” (coded 3); “1–2 times per day” (coded 4); and “3 or more times per day” (coded 5).

The remaining variables in the analyses were demographic measures such as age, self-reported race, and commuter status. Age was measured by a categorical variable asking participants to indicate whether they were younger than 18 years of age (coded 1); between 18 and 20 years of age (coded 2); or older than 21 years of age (coded 3). The age variable used in this analysis was derived from the original 6-category variable because there were no respondents in the “26–30”, “31–35”, or “36 and older” categories. Race was captured by an item asking respondents to identify themselves as white/Caucasian, black/African American, Hispanic, Asian/Pacific Islander, or other. Only African Americans and whites were included in the study and the race variable was a dichotomous variable in which whites were coded 0 and African Americans were coded 1. Commuter status was derived from an item asking participants if they lived on or off campus.

Statistical Analysis

Percentages, means, and standard deviations were calculated to characterize the total sample. Chi-square and T-tests were used to examine the mean and proportional differences by race and by gender for each of the variables. Ordinal logistic regression models were specified to examine the association between race, gender, and the outcome variables. The modeling strategy was employed in three steps. First, model 1 included the demographic variables: race, age, and commuter status. Next, model 2 included variables in Model 1 along with BMI, concerns about weight, and attempts to lose weight. Third, model 3 included variables from the previous two models as well as the takeout food frequency score, whether or not individuals met physical activity guidelines, and the SSB consumption frequency score for the SSB consumption change efficacy and the SSN consumption frequency score for the SSN consumption change efficacy. P-values < 0.05 were considered statistically significant and all tests were two-sided. All analyses were conducted using STATA version 14.

RESULTS

Table 1 reports the distribution of sample characteristics for the 499 first year college students completing surveys and by race. Approximately half of the sample is African American and 40.7% of the sample is male. Slightly over half of the sample (56.7%) responded that they were very sure they could replace SSB with water while 29.1% and 14.2% of participants were sort of sure and not sure, respectively. Approximately 44% of respondents indicated that they could eat fewer sugary snacks while 38.1% were sort of sure and 18.2% participants were not sure they could reduce sugary snack consumption. Descriptive results suggested that confidence to replace SSBs with water varied by race as the proportion of White students who were confident that they could reduce SSB (64.7%) were significantly larger than the proportion of African American students very sure they could replace SSB with water (48.4%). The results in Table 1 also indicated that the demographic characteristics for White students in the sample were different for African Americans in the study. African Americans college students in the study had a larger segment of participants under 18 years of age, and smaller proportions of men and commuters than White students in the sample.

The mean BMI for the total sample was 24.5±5.6 indicating that the average first-year, first semester student in the sample was in the upper bound of the normal weight category. The differences in BMI means across African American and White students were modest but significant as White students in the study (23.4±4.9), on average, could be classified as normal weight while African Americans in the sample (25.6±6.1) had mean values classifying them as overweight. The average scores on the concerns about weight and attempts to lose weight indicators were 8.6±2.7 and 12.7±3.7, respectively and the mean scores for African American and White students were similar across both McKnight indicators. The mean takeout food consumption score for the total sample was 9.7±4.1 and the corresponding scores for African American students (10.2±4.3) were higher than those for Whites in the study (9.1±3.8). Nearly 29% of the first-year college students in the study met national physical activity standards and the difference in the respective proportions for African American (27.2%) and White students (30.5%) were not statistically significant. The average sugared beverage consumption score for the total sample was 9.9±2.7 and the mean values for African Americans and White students in the sample are similar. The mean sugary snack consumption score for first-year college students was 10.8±3.0 and the results in Table 1 indicated that African Americans in the study had significantly higher mean scores (11.3±3.1) than White students in the sample (10.3±2.7).

The models examining the association between race, gender, and SSB consumption change efficacy are presented in Table 2. The results reported in Model 1 indicated that race and gender are both associated with confidence in substituting SSBs with water, adjusting for demographic variables. The odds of being more confident they could replace SSBs with water were lower for African American students (OR=0.41, CI: 0.25 – 0.67) and male students (OR=0.46, CI: 0.27 – 0.78) than Whites and females in the study, respectively. BMI, concerns about weight, and attempts to lose weight variables were added in Model 2; however, both African Americans and males continued to have lower odds of being more confident they could replace sugared beverages with water than White and female students, respectively. The takeout consumption frequency score, met physical activity guidelines, and SSB consumption frequency score variables were added in the full model and the race and gender differences in the odds of being more confident one could replace sugared beverages with water continued to persist. African American students had lower odds of being more confident in their ability to substitute SSBs with water students (OR=0.38, CI: 0.22 – 0.64) relative to White students. Similarly, males had a lower odds of being more confident that they could replace sugared beverages with water than females. SSB consumption also had an inverse relationship with confidence to substitute sugared beverages with water. As the SSB consumption score of students increased by one, the odds of sample members being more confident they could replace SSBs with water decreased by 8%.

Results from regression models of the association between race, gender, and SSN consumption change efficacy are reported in Table 3. Race and gender differences were not present in the models predicting confidence to reduce SSN consumption. The results in model 2 indicated that concerns about weight and attempts to lose weight were significant. The odds of being more confident they could eat fewer sweets increased as students in the study had more concerns about their weight (OR=1.24, CI: 1.13 – 1.36). Attempts to lose weight had an inverse relationship with sugary snack change efficacy as the results in model 2 indicated a one unit increase in the attempts to lose weight score was associated with a 7% lower odds in the students being more confident that they could eat fewer sweets. The results in model 3 indicate that weight related concerns continued to be related to confidence to reduce SSN consumption in the fully adjusted model. As student concerns about weight score increased by one, the odds of them being more confident they could reduce their consumption of SSNs increased by 22%. In contrast, a one unit increase in the attempts to lose weight score was associated with a modest decrease (OR=0.93, CI: 0.87 – 1.00) in the likelihood that participants would be more confident they could reduce SSN consumption.

SSN consumption had an inverse relationship with confidence to eat fewer sugary snacks. Every single point increase in the SSN consumption was associated with a corresponding 11% decrease in the odds of students being more confident they could eat fewer sweet snacks.

DISCUSSION

Emerging adulthood has been identified as an important developmental period to modify and establish behaviors that could lower health risks. Sugar consumption is an important target for behavioral interventions during this period in the life course for two reasons. First, sugar has been linked to initiation of a metabolic cascade that often begins with conditions like obesity, diabetes, and hypertension and ends with kidney diseases, cardiovascular diseases, and cancers (Johnson et al., 2009). Second, emerging adulthood is a period when sugar consumption is common among African Americans and males, two groups with elevated risks for disease, disability, and premature death (Kumar et al., 2014). Reducing sugar consumption has been identified as weight management and chronic disease prevention strategy (Johnson et al., 2009; Kumanyika, Grier, Lancaster, & Lassiter, 2011; Kumar et al., 2014); however, replacing consumption of sugared beverages and snacks with healthier options could be salient for high risk groups like African Americans to help reduce the likelihood and impact of obesity and related chronic diseases. Behavior change is difficult; however, only one study to our knowledge has assessed the perceived degree of difficulty making lifestyle modifications among emerging adults (Bruce, Beech, Thorpe, & Griffith, 2015). The current study used data drawn from a sample of African American and White first-year college students to assess racial and gender disparities in SSB and sugary snack behavioral modification efficacy.

The findings from the current study underscore the importance of race and gender for weight-related outcomes. Sample members were drawn from one university in the South; yet, there was considerable variation among the race- and gender-specific subgroups across the variables used in the analysis. The one exception was SSB consumption frequency scores. This finding was notable because a recent report presented data which suggested that African American emerging adults have significantly higher levels of SSB consumption than Whites the same age (Kumanyika et al., 2011). It is likely these discrepancies are due to study design and measurement differences. The data analyzed for our study used 30-day recall and did not collect information about sports and energy drink usage which differs from Kumanyika and colleagues (2011), reporting results from national data collected using 24-hour recall and items gathering information on the full complement of SSBs. It is likely that differing data collection strategies and procedures contributed significantly to the discrepancies in SSB consumption estimates (Kumar et al., 2014) and additional research is needed to reconcile these differences.

One finding of note is that African Americans and males were less likely to express confidence in their ability to substitute SSBs with water than White and female students, respectively. The pursuit of research questions exploring lower confidence among groups like African Americans or males to make behavioral changes presents an interesting avenue for future research. Self-efficacy is an important factor for behavior change and it is often presumed to be part of behavioral interventions (Glanz, Rimer, & Lewis, 2002). There has been some evidence in the social psychological literature to suggest that self-efficacy can vary by race and gender (Buchanan & Selmon, 2008). But, no research to our knowledge has explicitly examined how race, gender, and their interaction affect the degree to which individuals believe they can positively change their health behaviors.

The results from this study also emphasize the need for nuanced analyses using diverse samples because important similarities can be highlighted. Race and gender differences were not present in the any of the models predicting confidence to eat fewer sweets. However, it would be premature to declare that race or gender has no impact on student confidence to eat fewer snacks because behavioral patterns can be shaped by factors operating at levels beyond individuals. Gaining a deeper understanding of how social determinants like race or gender can impact self-efficacy associated with behavior change is critically needed.

The results from this study raise some interesting research questions about self-efficacy and its implications for behavioral modification and intervention development strategies focused on race- and gender-specific subgroups. However, there are some limitations worth noting. A number of potential important variables were not available to be included in the analysis. Motivation and nutrition knowledge have been found to have implications for diet modification (Beydoun, Powell, & Wang, 2009; Beydoun & Wang, 2008; Livia et al., 2016; Wardle, Parmenter, & Waller, 2000), these factors can also affect confidence to reduce SSB or SSN consumption. Further, socioeconomic status is a variable that has direct and indirect implications for race and gender disparities in outcomes like self-efficacy (Bruce & Thornton, 2004). The analytic models were estimated using data drawn from a sample of first year college students attending a single university in the South in 2005; therefore, the results are not generalizable to African American or White students not in college, those later in their collegiate careers, or those attending college in other regions of the country. The generalizability of the results is also limited given the sizeable segment of African American women in the study younger than 18 years of age. These individuals may represent a subset of advanced students who matriculated to college early. While not clear, this could be explored more as well as its implications for biased outcomes. The age of the data is also potential limitation because the number and type of sugary beverages and snacks available for consumption have changed considerably over the past decade. It is also important to note that the models in this study were estimated using cross-sectional data, which does not allow for the specification of temporal events or determination of causal inferences. The small sample size limits the number of independent variables included in regression analysis, thereby limiting the number of factors considered and potentially its robustness. All of the usual limitations associated with self-report data apply (Bruce, Sims, Miller, Elliott, & Ladipo, 2007); however, all of the questionnaire items have been used in well-established national surveys.

CONCLUSION

This study underscores the importance of self-efficacy for health behavior modification and how it can vary by race and gender among emerging adults. Additional studies are needed to determine the manner in which social, psychological, and behavioral factors have implications for behavior change self-efficacy well as those assessing the degree to which patterns of association vary across important characteristics including race, gender, ethnicity, age, and socioeconomic status. This line of research lays the foundation for tailored interventions designed to bolster confidence of participants to make desired lifestyle modifications. Results from this work could open avenues for research generating data that could enhance health promotion efforts and lead to novel interventions, which if successful could significantly impact behaviors, health outcomes, and health disparities.

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Table 1

Distribution of Sample Characteristics of First-year College Students for the Total Sample by Race and Gender

	Total Sample N=499	White Students N=249	African American Students N=250	*p-value*	Male Students N=203	Female Students N=296	*p-value*
Confidence replacing sugared beverages with water, %				.002			.070
Not sure	14.2	11.2	17.2		11.8	17.7	
Sort of sure	29.1	24.1	34.0		27.7	31.0	
Very sure	56.7	66.7	48.8		60.5	51.2	
Confidence eating fewer sugary snacks, %				.070			.500
Not sure	18.2	18.5	18.0		16.9	20.2	
Sort of sure	38.1	33.3	42.8		37.5	38.9	
Very sure	43.7	48.2	39.2		45.6	40.9	
African American, %	50.1	--	--		40.9	56.4	.001
Males, %	40.7	48.2	33.2	.001	--	--	
Age, %				.001			.001
<18	24.5	16.1	32.1		17.7	29.1	
18–21	69.7	78.7	60.8		78.2	63.5	
>21	5.8	5.2	6.4		3.5	7.4	
Live off campus,%	45.3	52.6	38.0	.001	42.4	47.3	.280
Body Mass Index, mean (sd)	24.5 (5.6)	23.4 (4.9)	25.6 (6.1)	.001	24.9 (5.8)	24.2 (5.5)	.210
McKnight: Concerns about weight, mean (sd)	8.6 (2.7)	8.7 (2.8)	8.6 (2.6)	.771	7.7 (2.4)	9.3 (2.7)	.001
McKnight: Attempts to lose weight, mean (sd)	12.7 (3.7)	13.0 (3.9)	12.4 (3.5)	.065	11.2 (3.1)	13.7 (3.7)	.001
Takeout Food Consumption, mean (sd)	9.7 (4.1)	9.1 (3.8)	10.2 (4.3)	.004	9.0 (3.9)	10.6 (4.1)	.001
Meets Physical Activity Guidelines, %	28.9	30.5	27.2	.413	38.9	22.0	.001
Sugared Beverage Consumption, mean (sd)	9.9 (2.7)	9.8 (2.7)	10.0 (2.7)	.436	10.1 (2.7)	9.7 (2.7)	.070
Sugary Snack Consumption, mean (sd)	10.8 (3.0)	10.3 (2.7)	11.3 (3.1)	.001	10.4 (3.0)	11.0 (2.9)	.060

Table 2

Association of Confidence to Reduce Sugar-sweetened Beverage Consumption among First-year College Students

Variable	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
African American	**0.41 (0.25–0.67)**	**0.40 (0.24–0.67)**	**0.38 (0.22–0.64)**
Male	**0.46 (0.27–0.78)**	**0.50 (0.29–0.88)**	**0.49 (0.27–0.88)**
Race by sex interaction term	1.56 (0.76–3.20)	1.60 (0.78–3.29)	1.69 (0.81–3.50)
Age*			
<18 years	0.78 (0.34–1.78)	0.83 (0.36–1.93)	0.83 (0.34–1.88)
18–20 years	1.03 (0.47–2.29)	1.10 (0.49–2.45)	1.00 (0.45–2.25)
Live off campus	0.76 (0.53–1.10)	0.81 (0.56–1.16)	0.83 (0.57–1.20)
Body Mass Index	---	1.01 (0.98–1.05)	1.01 (0.98–1.05)
Concerns about weight	---	1.07 (0.98–1.18)	1.07 (0.97–1.18)
Attempts to lose weight	---	1.00 (0.93–1.07)	1.00 (0.93–1.07)
Takeout Food Frequency	---	---	1.03 (0.98–1.08)
Meet Physical Activity Guidelines	---	---	0.97 (0.65–1.44)
Sugared Beverage Consumption	---	---	**0.90 (0.84–0.97)**
$Intercept_1$	−2.71	−1.69	−2.56
$Intercept_2$	−0.10	−0.10	−0.94
Brant test *p-value*+	0.10	0.23	0.26

Note: CI, confidence interval; OR, odds ratio

*The reference category contains individuals over 21 years of age

+The Brant test determines if the model violates the parallel regression assumption. A p-value greater than 0.5 indicates that the model does not violate the parallel regression assumption.

Table 3

Association of Confidence to Reduce Sugary Snack Consumption among First-year College Students

Variable	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
African American	0.86 (0.55–1.34)	0.88 (0.55–1.42)	0.98 (0.60–1.59)
Male	0.91 (0.56–1.47)	1.07 (0.63–1.82)	0.99 (0.57–1.71)
Race by sex interaction term	0.76 (0.38–1.49)	0.72 (0.36–1.43)	0.70 (0.35–1.42)
Age*			
<18 years	1.13 (0.54–2.37)	1.12 (0.52–2.42)	1.08 (0.49–2.36)
18–20 years	1.11 (0.55–2.27)	1.14 (0.55–2.37)	1.09 (0.52–2.29)
Live off campus	1.19 (0.85–1.68)	1.36 (0.95–1.93)	1.30 (0.91–1.86)
Body Mass Index	---	1.01 (0.97–1.04)	1.01 (0.98–1.04)
Concerns about weight	---	**1.24 (1.13–1.36)**	**1.22 (1.11–1.34)**
Attempts to lose weight,	---	**0.93 (0.86–0.99)**	**0.93 (0.87–1.00)**
Takeout Food Frequency	---	---	1.00 (0.95–1.04)
Meets Physical Activity Guidelines	---	---	1.36 (0.93–2.01)
Sugary Snack Consumption	---	---	**0.89 (0.84–0.95)**
$Intercept_1$	−1.49	−0.32	−1.57
$Intercept_2$	0.28	1.51	0.31
Brant test *p-value*+	0.12	0.26	0.33

Note: CI, confidence interval; OR, odds ratio

*The reference category contains individuals over 21 years of age.

+The Brant test determines if the model violates the parallel regression assumption. A p-value greater than 0.5 indicates that the model does not violate the parallel regression assumption.