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Association Between Sugar-Sweetened Beverage Intake and Proxies of Acculturation Among U.S. Hispanic and Non-Hispanic White Adults

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Abstract

Purpose—This study examined associations between sugar-sweetened beverage (SSB) intake and acculturation among a sample representing civilian noninstitutionalized U.S. adults.

Design—Quantitative, cross-sectional study.

Setting—National.

Subjects—The 2010 National Health Interview Survey data for 17,142 Hispanics and U.S.-born non-Hispanic whites (≥18 years).

Measures—The outcome variable was daily SSB intake (nondiet soda, fruit drinks, sports drinks, energy drinks, and sweetened coffee/tea drinks). Exposure variables were Hispanic ethnicity and proxies of acculturation (language of interview, birthplace, and years living in the United States).

Analysis—We used multivariate logistic regression to estimate adjusted odds ratios (ORs) for the exposure variables associated with drinking SSB ≥ 1 time/d after controlling for covariates.

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Manuscript format: research; Research purpose: relationship testing; Study design: quantitative; Outcome measure: SSB intake; Setting: national; Health focus: nutrition; Strategy: education, built environment; Target population age: adults; Target population circumstances: race/ethnicity

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Results—The adjusted odds of drinking SSB ≥ 1 time/d was significantly higher among Hispanics who completed the interview in Spanish (OR = 1.65) than U.S.-born non-Hispanic whites. Compared with those who lived in the United States for <5 years, the adjusted odds of drinking SSB ≥ 1 time/d was higher among adults who lived in the United States for 5 to <10 years (OR = 2.72), those who lived in the United States for 10 to <15 years (OR = 2.90), and those who lived in the United States for ≥15 years (OR = 2.41). However, birthplace was not associated with daily SSB intake.

Conclusion—The acculturation process is complex and these findings contribute to identifying important subpopulations that may benefit from targeted intervention to reduce SSB intake.

Keywords

Sugar-Sweetened Beverages; Hispanic; Acculturation; Language; Birthplace; Prevention Research

PURPOSE

Understanding the health and dietary status of the U.S. Hispanic population is important because Hispanics are the largest racial/ethnic minority group in the United States. As of July 1, 2011, a total of 52 million Hispanic people were living in the United States, constituting 16.7% of the total U.S. population. Furthermore, it is projected that by July 1, 2050, there will be 132.8 million Hispanic people living in the United States (~30% of total U.S. population).[1]

The process of adopting the cultural practices of a new dominant cultural group through repeated and continuous exposure, while retaining aspects of one's culture of origin, is known as acculturation.[2] Acculturation is a multidimensional process and is affected by various factors, such as generation status, language use, age at immigration, and years living in the United States,[2] which can be used as proxy measures for acculturation. Dietary acculturation (i.e., dietary changes associated with the migration and cultural change process) is associated with either healthful or unhealthful dietary changes.[2,3] After immigrating to the United States, immigrants with healthier diets in their countries of origin may adopt Western diets that may increase risk for obesity and chronic diseases (e.g., diets low in fruits and vegetables and/or high in added sugars).[3–6] However, as globalization occurs, dietary patterns are changing and with it, assumptions about the healthfulness of the food supply in a person's country of origin.[7]

Currently in the United States, sugar-sweetened beverages (SSBs) are the largest source of added sugars and a significant contributor of calories in the diet.[8] The 2010 Dietary Guidelines for Americans defined SSBs as "liquids that are sweetened with various forms of sugars that add calories. These beverages include, but are not limited to, soda, fruit ades and fruit drinks, and sports and energy drinks."[9] In addition to poor diet quality,[10] high consumption of SSBs has been associated with adverse health consequences, including obesity,[11–13] type 2 diabetes,[12,14,15] and increased risk for cardiovascular disease,[12,16–18] among adults. Based on the 2009–2010 National Health and Nutrition Examination Survey (NHANES) data, about half of U.S. adults consumed at least one SSB on any given day[19]

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and SSB intake varied by race/ethnicity.[20,21] For example, compared with non-Hispanic whites, the odds ratio of consuming any SSB per day was 1.39 for Hispanic adults and 1.88 for non-Hispanic black adults.[21]

Because most Hispanics living in the United States are of Mexican origin,[1] recent studies showing their distrust of tap water is relevant to consider in the context of examining SSB consumption. Recent data indicate that Mexico had the highest level of per capita bottled water consumption in the world,[22] and Mexican families spend about $140 per year on bottled water.[23] Mexico also had the highest per capita soft drink consumption in the world in 2010.[24] Furthermore, Mexican Americans living in the United States report higher SSB intake than non-Hispanic white Americans per national data from 2005–2008.[20] This raises an interesting research question on whether the acculturation process is associated with U.S. Hispanics' current SSB intake. Although a few studies have examined the influence of acculturation on SSB intake among U.S. Hispanic adults,[5,25] none of these studies have used a nationally representative sample. Identifying the extent that Hispanic ethnicity and proxies of acculturation are associated with SSB intake can help public health professionals identify subpopulations that may benefit from tailored intervention approaches aimed at reducing SSB intake. Thus, the purpose of this analysis was to examine the relationship of Hispanic ethnicity and proxies of acculturation with SSB intake among a sample representing the civilian noninstitutionalized U.S. Hispanic and non-Hispanic white adults.

METHODS

Design

Data from the 2010 National Health Interview Survey (NHIS) was used for this cross-sectional analysis.[26] The NHIS is a household survey conducted continuously since 1957 by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS). The NHIS uses a multistage sampling design, with face-to face interviews conducted, in a sample of households representative of the civilian noninstitutionalized U.S. population. Information about the health and other characteristics of each family member of the household is obtained. Some data were collected about all members of the family and more detailed data were collected from one randomly selected child (the "sample child") or one randomly selected adult (the "sample adult"). The Sample Adult Module response rate was 60.8%.

Sample

A total of 27,157 adults aged ≥18 years completed the Sample Adult Module in 2010. The 2010 Sample Adult Module collected data on sociodemographics, occupations, selected medical conditions, illness behavior/health status, limitation of functional activities, health behaviors, and health care access and utilization. In 2010 NHIS, the Cancer Control Supplement was asked for the Sample Adult and included adults' dietary intake data, which was used for the analyses in this present study. The NHIS was approved by the Research Ethics Review Board at NCHS.

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For the present study, we limited our analysis to Hispanics (U.S. born and foreign born) and non-Hispanic whites (U.S. born only). Of those 19,750 respondents who were classified as Hispanics and non-Hispanic whites, we excluded 2608 who did not provide valid responses concerning their consumption of any of the four SSB categories (regular [nondiet] soda, fruit drinks, sports and energy drinks, or sweetened coffee/tea drinks), acculturation variables (language of interview, birthplace, and years living in the United States among foreign born), or covariates. The analytic sample remaining consisted of 17,142 Hispanics and non-Hispanic white adults. The analytic sample had a slightly lower proportion of older adults (≥60 years) and females than the sample of respondents who were excluded (χ^2 test, $p < .05$).

Measures

The frequency of daily SSB intake was the outcome variable. Respondents were asked how often they drank each of the following beverages during the past month: regular soda or pop; fruit drinks (such as Kool-Aid, cranberry, and lemonade); sports and energy drinks (such as Gatorade, Red Bull, and Vitamin water); and coffee/tea drinks with added sugars (not counting drinks with noncaloric sweetener such as Splenda or Equal). For each beverage type, respondents reported either the number of times per day, per week, or per month they consumed each beverage. Weekly or monthly intake was converted to daily intake (dividing weekly intake by 7 and monthly intake by 30). To calculate frequency of total daily SSB intake, the consumption of regular soda, fruit drinks, sports/energy drinks, and coffee/tea drinks was summed. We created three mutually exclusive SSB intake categories (0, >0 to <1, or ≥1 time/d). The cut point of consuming SSBs 1 time/d was chosen to identify habitual SSB consumers (i.e., daily intake of SSB)[27,28] and was based on clinical studies.[29,30] Previous studies have found that SSB intake ≥ 1 time/d was associated with increased risk for coronary heart disease[29] and stroke[30] in women.

The exposure variables were Hispanic ethnicity and three proxies of acculturation (language of interview, birthplace, and years living in the United States among foreign born). Mutually exclusive response categories were created for each variable for language of interview (English language among U.S.-born non-Hispanic whites, English language among Hispanics, Spanish language among Hispanics, bilingual [English and Spanish] among Hispanics), birthplace (U.S.-born non-Hispanic whites, U.S.-born Hispanics, and foreign-born Hispanics), and years living in the United States among foreign-born Hispanics (<5, 5 to <10, 10 to <15, and ≥15 years). Of note, all non-Hispanic whites completed interviews in English, and non-Hispanic whites who were not born in the United States were excluded from the study.

We created mutually exclusive response categories for each covariate. Demographic and socioeconomic variables included were age (18–24, 25–39, 40–59, or ≥60 years), sex, and marital status (married/domestic partnership or not married). Not married included widowed, divorced, separated, or never married. Education level was categorized as less than high-school graduate, high-school graduate, or recipient of a general education development certificate, some college, or college graduate. Annual family income was categorized as < $35,000, $35,000–$74,999, $75,000–$99,999, or ≥$100,000. Adults with missing income

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data were excluded from the analysis. Region of U.S. residence was categorized as Northeast, Midwest, South, and West. Using body mass index (BMI) calculated from self-reported weight and height (kg/m^2), weight status was categorized as underweight (BMI < 18.5), normal weight (BMI 18.5 to <25), overweight (BMI 25 to <30), or obese (BMI ≥ 30).[31]

Analysis

Chi-square tests were used to examine the bivariate relationship between frequency of SSB intake and the exposure variables (language of interview, birthplace, and years living in the United States among foreign born), with $p < .05$ used as the cutoff for statistical significance. Multivariate logistic regression analyses were used to estimate crude odds ratios (ORs), adjusted ORs, and 95% confidence interval for the relationship between each of the exposure variables and the likelihood of drinking SSBs > 0 to < 1 time/d as well as ≥ 1 time/d during the previous month. Reference group for the logistic regression analyses consisted of adults with SSB intake of 0 times/d. Owing to possible multicollinearity among the exposure variables, each exposure variable was examined individually by using multivariate logistic regression while controlling for age, sex, marital status, education level, annual family income, region of residence, and weight status. All statistical analyses were performed by using SAS software version 9.3 (SAS Institute, Cary, North Carolina) and incorporated appropriate procedures to account for the complex sample design, using the sample weight variable from the Sample Adult File.

RESULTS

Selected characteristics of survey participants for the overall sample and stratified by Hispanic ethnicity are shown in Table 1. The age and sex of survey participants were somewhat evenly distributed. Approximately 64% of adults were married/domestic partnership, 28.1% were at least college graduate, 65.1% were in a household with an annual family income of <$75,000, 33.8% were living in the South region, and 63.4% were overweight or obese. There were significant differences in SSB in each of the three exposure groups (χ^2-test, $p \leq .001$; Table 2). The percentage of adults who consumed SSB ≥ 1 time/d was highest among Hispanics who completed the interview in both English and Spanish (74.6%), foreign-born Hispanics (71.1%), and foreign-born Hispanics who had lived in the United States for 10 to <15 years (74.5%) (Table 2).

The odds of drinking SSB > 0 to < 1 time/d was significantly higher among English speaking Hispanics (crude OR = 1.61) and Spanish-speaking Hispanics (crude OR = 2.00) than English-speaking, non-Hispanic whites, as based on the bivariable logistic regression model. However, after controlling for covariates, only the drinking pattern of Spanish-speaking Hispanics remained significant (adjusted OR = 1.78) (Table 3). The odds of drinking SSB > 0 to < 1 time/d was significantly higher among U.S.-born Hispanics (crude OR = 1.85) and foreign-born Hispanics (crude OR = 1.49) than U.S.-born, non-Hispanic whites. However, after controlling for covariates, only the drinking pattern of foreign-born Hispanics remained significant (adjusted OR = 1.30). Regarding years living in the United States among foreign-born Hispanic adults, the odds of drinking SSB > 0 to < 1 time/d was

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significantly higher among adults who had lived in the United States for 5 to <10 years (crude OR = 3.25) and those who have lived in the United States for 10 to <15 years (crude OR = 2.78) than among those who have lived in the United States for <5 years. After controlling for covariates, the odds of drinking SSB > 0 to < 1 time/d was significantly higher among adults who have lived in the United States for 5 to <10 years (adjusted OR = 3.21) and those who have lived in the United States for ≥15 years (adjusted OR = 2.30) than among those who have lived in the United States for <5 years (Table 3).

The odds of drinking SSB ≥ 1 time/d was significantly higher among English-speaking Hispanics (crude OR = 1.56), Spanish-speaking Hispanics (crude OR = 2.65), and bilingual (English/Spanish) Hispanics (crude OR = 2.15) than among English-speaking, non-Hispanic whites, from the bivariate logistic regression model. However, after controlling for covariates, only the drinking pattern of Spanish-speaking Hispanics remained significant (adjusted OR = 1.65) (Table 3). The odds of drinking SSB ≥ 1 time/d was significantly higher among U.S.-born Hispanics (crude OR = 1.68) and foreign-born Hispanics (crude OR = 1.90) than among U.S.-born, non-Hispanic whites. However, after controlling for covariates, the associations were no longer significant. Regarding years living in the United States among foreign-born Hispanic adults, the odds of drinking SSB ≥ 1 time/d was significantly higher among adults who had lived in the United States for 5 to <10 years (crude OR = 2.76), those who have lived in the United States for 10 to <15 years (crude OR = 3.38), and those who have lived in the United States for ≥15 years (crude OR =2.10) than among those who have lived in the United States for <5 years. After controlling for covariates, these associations persisted. The odds of drinking SSB ≥ 1 time/d was significantly higher among adults who have lived in the United States for 5 to <10 years (adjusted OR = 2.72), those who have lived in the United States for 10 to <15 years (adjusted OR = 2.90), and those who have lived in the United States for ≥15 years (adjusted OR = 2.41) than among those who have lived in the United States for <5 years (Table 3).

DISCUSSION

Hispanic ethnicity and proxies of acculturation were significantly associated with SSB intake among adults. We found that Spanish-speaking Hispanics (traditionally defined as a less acculturated group) had a 65% higher odds of drinking SSBs daily than English-speaking U.S.-born non-Hispanic whites after controlling for covariates. Since most U.S. Hispanics are of Mexican origin,[1] it is relevant to consider the high consumption of SSBs in Mexico. For example, in 2012, the mean per capita caloric intake from SSBs among Mexican adults was about 269 kcal/d.[32] In 2009–2010, the mean caloric intake from SSBs among U.S. adults was 151 kcal/d.[19] Thus, it is not surprising that the Spanish-speaking group was more likely to be daily consumers. In contrast to our findings, one study conducted with 174 low-income Puerto Rican women showed that women who lived in households where English was the primary language spoken had a higher consumption of artificial drinks (e.g., soft drinks), than those living in bilingual (English and Spanish) and Spanish-speaking households.[25] Differences in study findings may result from the more limited generalizability of the study by Himmelgreen et al.,[25] as it involved limited types of SSBs and a small number of low-income Puerto Rican women living in Connecticut,

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whereas our study included more types of SSBs and a large, nationally representative sample of Hispanic and non-Hispanic white men and women.

Birthplace of respondents was not significantly associated with daily SSB intake after controlling for covariates in our study. In contrast, Sharkey et al.[5] reported that 194 U.S.-born Mexican-origin women had significantly higher SSB intake than 405 Mexico-born women (1.9 vs. 1.6 cans or glasses/d, $p < .01$, based on a χ^2 test). The discrepancy in findings between studies may result from the more limited generalizability of the study by Sharkey et al.,[5] as it examined a small number of women of Mexican origin living in Texas, whereas our study included a large, nationally representative sample of Hispanic men and women. In addition, unlike the study of Sharkey et al.,[5] that limited its analysis to Mexican adults only, our analysis included non-Hispanic whites as the referent group.

After controlling for covariates, our results indicated that foreign-born Hispanics who had lived in the United States for 5 to <10 years, 10 to <15 years, and ≥15 years (more acculturated groups) had 2.7, 2.9, and 2.4 times, respectively, higher odds for drinking SSB daily than foreign-born Hispanics living in the United States for <5 years (less acculturated group). This finding suggests that living in the United States for more years is positively correlated with SSB intake, an interesting finding given the recent beverage sales/intake trends reported in Mexico.[22–24] Consistent with our results, Himmelgreen and colleagues[25] reported that the length of time a person lives the United States was significantly associated with a greater consumption of soft drinks among low-income Puerto Rican women.

Hispanics are the largest racial/ethnic minority population in the United States and constituted almost 17% of the total U.S. population in 2011.[1] Additionally, U.S. Hispanic adults have a greater consumption of SSBs and have a higher prevalence of obesity than the non-Hispanic white adults.[20,33] Tailored dietary interventions for Hispanics could consider methods for reaching these subpopulations at highest risk for SSB consumption. To our knowledge, this was the first study to examine the relationship between acculturation and SSB intake among a large, nationally representative sample of U.S. adults. However, this study was subject to limitations. First, the study was cross-sectional; therefore, the directionality of the associations between acculturation and SSB intake could not be determined. Second, the results were subject to potential reporting and recall bias, because NHIS data for sample adults were based on self-reports and recalls on beverage intake during the past month. However, other studies have shown that estimates of beverage intake derived from responses to food-frequency questionnaires were similar to estimates derived from responses to 24-hour dietary recalls or to food records.[34,35] Third, SSB intake was surveyed in terms of frequency. We cannot quantify associations between the volume of SSB intake and the exposure variables of study. Lastly, we used three exposure variables as proxies for acculturation rather than more detailed acculturation indicators, such as an acculturation rating scale,[36] because this information was not available in the data set.

In conclusion, this study demonstrates the importance of considering acculturation in the consumption of SSBs. Language of interview and years living in the United States were significantly associated with daily SSB intake after controlling for age, sex, marital status, education level, annual family income, region of residence, and weight status. Our findings

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indicated that Spanish-speaking Hispanics, as well as those who had lived in the United States for 5 or more years, were more likely to consume SSB daily. Because Hispanic adults are high SSB consumers and have a higher prevalence of obesity than the non-Hispanic white population,[20,33] dietary interventions targeted toward the Hispanic population could consider methods for reaching this subpopulation at highest risk, as identified in our study.

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SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Sugar-sweetened beverage (SSB) intake varied by race/ethnicity. For example, the odds of consuming any SSB per day was 39% higher among U.S. Hispanic adults than non-Hispanic whites. A few studies have examined the influence of acculturation on SSB intake among U.S. Hispanic adults, but none of these studies have used a nationally representative sample.

What does this article add?

The adjusted odds of drinking daily SSBs (i.e., ≥1 time/d) was significantly higher among Hispanics who completed the interview in Spanish than English-speaking U.S.-born non-Hispanic whites. Compared with those who had lived in the United States for <5 years, the adjusted odds of drinking daily SSB was higher among adults who had lived in the United States for ≥5 years.

What are the implications for health promotion practice or research?

The acculturation process is complex, and identifying the extent that Hispanic ethnicity and proxies of acculturation are associated with SSB intake will further aid efforts to promote healthier diets. Efforts to reduce SSB intake among Hispanics should consider acculturation status when designing tailored intervention.

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Table 1

Characteristics of the Study Population and by Hispanic Ethnicity and Birthplace Among U.S. Hispanic and Non-Hispanic White Adults—National Health Interview Survey, 2010

		Hispanic Ethnicity and Birthplace			
		Hispanic			
Characteristic	**Total (n = 17,142)*** **%†**	**All (n = 4490)*** **%†**	**U.S. Born (n = 1711)*** **%†**	**Foreign Born (n = 2779)*** **%†**	**Non-Hispanic White, U.S. Born (n = 12,652)*** **%†**
Age, y					
18–24	13.1	17.4	28.5	10.0	12.2
25–39	26.2	37.0	34.9	38.3	23.8
40–59	36.0	32.9	25.8	37.6	36.7
≥60	24.6	12.7	10.7	14.1	27.2
Sex					
Male	50.0	52.0	49.2	53.8	49.6
Female	50.0	48.0	50.8	46.2	50.4
Marital status					
Married/domestic partnership	63.6	62.4	51.2	69.8	63.8
Not married‡	36.4	37.6	48.8	30.2	36.2
Education level					
<High school	14.5	36.8	19.1	48.6	9.6
High school/GED	26.6	25.4	29.2	23.0	26.9
Some college	30.8	24.5	35.1	17.5	32.2
≥College graduate	28.1	13.2	16.7	10.9	31.4
Annual family income					
≤$34,999	31.9	45.3	35.3	52.0	29.0
$35,000–$74,999	33.2	35.3	37.4	33.9	32.8
$75,000–$99,999	12.8	8.8	11.9	6.7	13.7
≥$100,000	22.0	10.6	15.4	7.4	24.5
Region of residence					
Northeast	17.0	13.4	13.1	13.7	17.8

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Characteristic	Total (n = 17,142)* %†	Hispanic Ethnicity and Birthplace: Hispanic: All (n = 4490)* %†	Hispanic: U.S. Born (n = 1711)* %†	Hispanic: Foreign Born (n = 2779)* %†	Non-Hispanic White, U.S. Born (n = 12,652)* %†
Midwest	25.0	8.4	9.6	7.6	28.6
South	33.8	35.6	33.4	37.0	33.5
West	24.1	42.6	44.0	41.7	20.1
Weight status					
Underweight (BMI < 18.5 kg/m^2)	1.6	1.2	2.0	0.8	1.7
Normal weight (BMI 18.5 to <25 kg/m^2)	35.0	28.2	28.2	28.2	36.5
Overweight (BMI 25 to <30 kg/m^2)	35.1	39.5	32.6	44.1	34.2
Obese (BMI ≥ 30 kg/m^2)	28.3	31.1	37.2	27.0	27.6

*Unweighted sample size is presented. BMI indicates body mass index; and GED, general education development.

†Weighted percentage is presented and it may not add up to 100% because of rounding.

‡Widowed, divorced, separated, or never married.

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Table 2

Hispanic Ethnicity and Proxies of Acculturation and Their Associations With Frequency of Sugar-Sweetened Beverage* Intake Among U.S. Hispanic and Non-Hispanic White Adults—National Health Interview Survey, 2010

Hispanic Ethnicity and Proxies of Acculturation	Total %† (SE)	Percentage Distribution of Sugar-Sweetened Beverage Intake During the Past Month: 0 Times/d %† (SE)	>0 to <1 Time/d %† (SE)	≥1 Time/d %† (SE)	p‡
Language of interview (n = 17,142)§					<0.0001
English, non-Hispanic white, U.S. born	82.1 (0.4)	12.5 (0.4)	24.4 (0.5)	63.2 (0.5)	
English language, Hispanic	11.5 (0.3)	8.3 (0.7)	26.0 (1.1)	65.7 (1.2)	
Spanish language, Hispanic	3.8 (0.2)	5.5 (0.9)	21.3 (1.3)	73.2 (1.5)	
Bilingual (English and Spanish), Hispanic	2.6 (0.2)	6.9 (1.4)	18.5 (2.1)	74.6 (2.2)	
Birthplace (n = 17,142)§					<0.0001
U.S.-born, non-Hispanic white	82.1 (0.4)	12.4 (0.4)	24.4 (0.5)	63.2 (0.5)	
U.S.-born, Hispanic	7.2 (0.2)	7.6 (0.8)	27.6 (1.4)	64.8 (1.4)	
Foreign-born, Hispanic	10.7 (0.3)	7.4 (0.7)	21.5 (0.9)	71.1 (1.1)	
Years has been in the United States among foreign-born Hispanic adults (n = 2755)§					0.01
<5	6.5 (0.6)	14.1 (4.3)	21.6 (3.1)	64.2 (4.4)	
5 to <10	14.6 (0.9)	5.4 (1.7)	26.8 (2.9)	67.7 (3.0)	
10 to <15	17.4 (0.9)	4.9 (1.1)	20.7 (2.3)	74.5 (2.3)	
≥15	61.6 (1.2)	7.6 (0.7)	20.5 (1.1)	71.9 (1.4)	

*Included nondiet soda, fruit drinks, sports and energy drinks, and sweetened coffee/tea drinks.

†Weighted percentage is presented and may not add up to 100% because of rounding.

‡Chi-square tests were used for each variable to examine differences across categories.

§Unweighted sample size is presented.

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Table 3

Odds Ratios for Consuming Sugar-Sweetened Beverages[*] Among U.S. Hispanic and Non-Hispanic White Adults by Each Proxy of Acculturation—National Health Interview Survey, 2010

Hispanic Ethnicity and Proxies of Acculturation	Sugar-Sweetened Beverage Intake During the Past Month[†]							
	>0 to <1 Time/d				≥1 Time/d			
	Crude OR	95% CI	Adjusted OR[‡]	95% CI	Crude OR	95% CI	Adjusted OR[‡]	95% CI
Language of interview (n = 17,142)[§]								
English, non-Hispanic white, U.S.-born	Ref.		Ref.		Ref.		Ref.	
English language, Hispanic	**1.61**[//]	1.30, 1.98	1.18	0.94, 1.48	**1.56**[//]	1.29, 1.90	1.08	0.87, 1.34
Spanish language, Hispanic	**2.00**[//]	1.39, 2.87	**1.78**[//]	1.17, 2.69	**2.65**[//]	1.85, 3.78	**1.65**[//]	1.11, 2.44
Bilingual (English and Spanish), Hispanic	1.38	0.83, 2.29	1.13	0.66, 1.96	**2.15**[//]	1.41, 3.29	1.32	0.83, 2.11
Birthplace (n = 17,142)[§]								
U.S.-born, non-Hispanic white	Ref.		Ref.		Ref.		Ref.	
U.S.-born, Hispanic	**1.85**[//]	1.42, 2.42	1.20	0.90, 1.59	**1.68**[//]	1.32, 2.14	1.11	0.85, 1.45
Foreign-born, Hispanic	**1.49**[//]	1.21, 1.83	**1.30**[//]	1.02, 1.65	**1.90**[//]	1.54, 2.34	1.25	0.98, 1.59
Years in the United States among foreign-born Hispanic adults (n = 2755)[§]								
<5	Ref.		Ref.		Ref.		Ref.	
5 to <10	**3.25**[//]	1.18, 8.97	**3.21**[//]	1.20, 8.58	**2.76**[//]	1.07, 7.13	**2.72**[//]	1.07, 6.91
10 to <15	**2.78**[//]	1.06, 7.31	2.51	0.99, 6.33	**3.38**[//]	1.43, 7.99	**2.90**[//]	1.29, 6.54
≥15	1.78	0.84, 3.79	**2.30**[//]	1.11, 4.77	**2.10**[//]	1.01, 4.36	**2.41**[//]	1.19, 4.89

[*] Included nondiet soda, fruit drinks, sports and energy drinks, and sweetened coffee/tea drinks. OR indicates odds ratio; CI, confidence interval; and Ref., reference group.

[†] Due to possible collinear relationship, the logistic regression modeling was performed for each proxy of acculturation separately. The reference group was sugar-sweetened beverage intake 0 times/d.

[‡] Each model was controlled for age, sex, marital status, education level, annual family income, region of residence, and weight status.

[§] Unweighted sample size is presented.

[//] Confidence intervals for bolded odds ratios did not include 1.