HHS Public Access

Author manuscript

J Nutr Educ Behav. Author manuscript; available in PMC 2019 October 01.

Published in final edited form as:

J Nutr Educ Behav. 2018 October ; 50(9): 876–887. doi:10.1016/j.jneb.2018.05.019.

Nutrition Label Use and its Association with Dietary Quality among Latinos: The Roles of Poverty and Acculturation

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Abstract

Objective—To investigate how acculturation and poverty are independently and jointly associated with the use of the Nutrition Facts panel (nutrition label) and to examine the extent to which nutrition label use moderates the association of poverty and acculturation on dietary quality among Latinos.

Design—Cross-sectional analysis of 2007–2011 National Health and Nutrition Examination Survey data.

Participants—A total of 3,696 adults (aged >19 years) self-identified as Latino/Hispanic with food label use data from the most recent Consumer Behavior Phone Follow-up Modules.

Main Outcome Measure(s)—Nutrition label use and dietary quality.

Analysis—Logistic regression.

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Author contributions:

MDW was responsible for all phases of the research and performed the statistical analyses; ASR and LMSM contributed to the development of the research question, interpretation of findings, and revising the manuscript; JEA contributed to the literature review, interpretation of findings, and revising the manuscript. All authors reviewed and edited the manuscript through its final revision.

Conflict of Interest Statement: The authors have no financial disclosures to report.

Results—Acculturation moderated the association of income on the likelihood of using nutrition labels, such that lower-income English-speaking Latinos were half as likely as higher-income English-speakers to use nutrition labels (p-value=.01, OR=0.44, 95% CI:0.24–0.81); however, Spanish-speakers were equally likely to use nutrition labels across income levels (p-value=.99, OR=1.00, 95% CI:0.77–1.31). Nutrition label use moderated the association of acculturation on diet: Among English-speaking Latinos, those who read nutrition labels had less than half the risk of poor diet (p-value=.001, OR=0.43, 95% CI: 0.26–0.69); however, label use was not significantly associated with the diet quality of Spanish speakers (p-value=.07, OR=0.82, 95% CI: 0.67–1.02). Nutrition label use decreased risk of poor dietary quality regardless of poverty status.

Conclusions and Implications—Overall, results demonstrate a positive association between use of the Nutrition Facts panel for Latinos and dietary quality. An important nutrition education strategy among bicultural Latinos at risk of a poor diet as a result of acculturation may include label reading comprehension. This approach may also address the low rates of label utilization. The study provides evidence of segmented assimilation, wherein low-income, bicultural Latinos follow an underclass pattern of acculturation demonstrated by a lower likelihood of reading nutrition labels and higher-income, bicultural Latinos follow the more successful selective pattern.

Keywords

nutrition facts panel; poverty; segmented assimilation; dietary intake; Healthy Eating Index

INTRODUCTION

Background

The Nutrition Facts panel (here used this term interchangeably with ‘nutrition label’) is a population-level nutrition communication device that provides consumers at the point of purchase with information needed to comply with Dietary Guidelines for Americans[1,2]. There is a growing body of evidence suggesting that nutrition label use is positively associated with dietary quality[3–10]; however, there are important demographic differences in usage. In general, the research shows that individuals with lower incomes tend to use labels less frequently than those with higher incomes[7,11], a pattern that is mirrored by years of education[3,4,6,7]. Some research has also found differences by race and ethnicity, such that Latinos and African Americans are less likely to use food labels compared with non-Latino Whites[7,12,13]. In general, these findings are troubling because they suggest that labels are underutilized by the populations that may be in greatest need of nutrition information.

The present study examines nutrition label use frequency among U.S. Latinos, who are the largest ethnic minority group in the country, with a population of 56.6 million[14]. Latinos have a higher prevalence of being overweight and obese than other ethnic groups[15] and also higher mortality due to diet-related disease such as diabetes[16]. Latinos may be especially at risk for poor diet and obesity, and therefore in greater need of nutrition guidance, for economic and cultural reasons[17,18]. Latinos have lower incomes and double the rates of food insecurity of non-Latino Whites[19]. In addition, studies suggest that as Latinos become more acculturated to mainstream US culture, their diets become less healthful[20] and that they are more likely to suffer from obesity and diet-related illness[21,22]. This phenomenon, referred to

as the “dietary acculturation paradox,” is puzzling because the negative shift in diet quality occurs despite gains in income and education that would otherwise suggest a protective effect of acculturation[18,23]. For example, Guendelman and Abrams[24] showed that second generation (US-born) Mexican-American women have a higher risk of poor dietary quality compared to first generation (foreign-born), with the second generation diet being similar to White non-Latina women. This finding is of particular interest when considering that first generation Mexican-American women are at a higher risk of falling below the poverty line than either second generation Mexican-American or White non-Latina women. Specifically, studies have shown that increasing acculturation is associated with decreasing consumption of ethnic foods and increasing consumption of fats and sugars or other unhealthful nutrients[20,22,25–28]. Ayala and colleagues[29] performed a systematic review of the relationship between dietary intake and acculturation across a variety of measures of acculturation. They found consistent relationships across the various acculturation measures: the less acculturated consumed more fruit, rice, and beans; and less sugar and sugar-sweetened beverages.

While research has shown that nutrition label use is positively associated with dietary quality among the general population[5–10,30–33], relatively few studies have examined this association among Latino populations specifically. Two notable exceptions focus on Latinos with diabetes. The first is an intervention targeted at Latinos with type 2 diabetes that employed community health workers to deliver culturally-appropriate training on using the Nutrition Facts panel[34]. Just two lessons were enough to significantly increase label use frequency among the intervention group. Moreover, food label use significantly improved diet quality and accounted for 15% of the total effect of the intervention on HbA1C levels[34]. Second, in an observational study, Fitzgerald and colleagues[35] found that Latinas with diabetes who used food labels were more likely to consume fruits and vegetables and less likely to consume sweets, salty snacks, and sugar-sweetened soft drinks frequently. However, no studies have reported whether acculturation moderated the effect of food label use on diet quality. Past research suggests that acculturation influences the effects of communication interventions[36,37], making it an important factor to consider when evaluating effectiveness of nutrition labels within this population

As noted above, income is associated with acculturation; and is also related to both nutrition label use and diet quality in the general population[38–40]. Therefore, it is particularly important to consider within Latino populations. Latinos have lower average incomes, and are more likely to live in poverty compared with non-Latino Whites[14]. Sharif and colleagues[41] examined label use among 269 Latino adults in Southern California and found that those *below* the poverty line were *more* likely to use nutrition labels than were those at higher income levels. This suggests that poverty may affect the use of nutrition labels among Latinos differently than among other populations, where poverty more clearly has a negative effect on label use[4,42,43]. Such a pattern would be consistent with segmented assimilation theory, a social scientific framework that examines how immigrants’ and their descendants’ trajectories of integration are influenced by a complex interplay of individual, social, and structural factors[44,45]. Furthermore, label use may be influenced by a combination of income and acculturation. Sharif and colleagues[41] found no significant effects of acculturation on label use, but other work suggests the opposite: that increased acculturation (when measured

by language) is associated with increased use of nutrition labels[7]. These findings suggest that the effect of poverty on the frequency of nutrition label use among Latinos could vary with the degree of acculturation.

In general then, the effects of acculturation and income are important factors to consider when evaluating the effectiveness of nutrition label use among Latinos. Given that higher acculturation is a risk factor for poor diet, but is positively associated with education and income [46], and that income and education are related to reading nutrition labels and better diet in the general populations, their combined effects could be particularly important for understanding how to improve the nutrition label use among Latinos.

Thus, the aims of this study were (1) to understand how acculturation and income are independently and jointly associated with the use of nutrition labels, as reflected by self-reported frequency of nutrition label use, and (2) to examine the extent to which acculturation and poverty moderate the associations of nutrition label use on dietary quality among Latinos. The study was guided by the following research questions, which informed the development of the specific hypotheses tested in this study:

First, we hypothesized that low-income Latinos will have lower odds of using nutrition labels compared with higher-income Latinos; and that less-acculturated Latinos will have lower odds of using nutrition labels compared with more-acculturated Latinos. Second, it is hypothesized that poverty and acculturation interact to affect nutrition label use, such that poverty will lower the rate of nutrition label use among Spanish speakers more so than among English speakers. Third, it is hypothesized that acculturation moderates the association of nutrition label use and diet, such that using nutrition labels decreases the risk of poor dietary quality more for English speakers than for Spanish speakers. Fourth, it is hypothesized that nutrition label use decreases the risk of poor dietary quality more for Latinos below the poverty line compared to those above.

METHODS

Study Design and Participants

The National Health and Nutrition Examination Study (NHANES) is a nationally-representative health and nutrition survey of the U.S. population conducted by the National Center for Health Statistics. Data from 2007–2008 and 2009–2010[47] surveys was used, the most recent years that included food label use items as part of a Consumer Behavior Phone Follow-up Module, focusing on behavior related to the individual's own diet and health. The final sample of size 3696 consisted of Latino adults, ages 18–80. See Table 1 for the sample demographics. The NHANES data are obtained using a complex, multistage, probability sampling design to select participants that are representative of the civilian, non-institutionalized US population. Oversampling of certain population subgroups is done to increase the reliability and precision of health status indicator estimates for these groups[48].

Ethical approval for the NHANES survey was obtained from National Center for Health Statistics Research Ethics Review Board (Continuation of Protocol #2005–06).

Outcome variables

Nutrition Facts panel use—Frequency of nutrition label use was assessed as participants were asked to view a food label sample that was handed to them, using this question "The 'Nutrition Facts' panel of a food label is everything on this page except the list of ingredients in pink. How often do you use the Nutrition Facts panel when deciding to buy a food product?" Responses were made on a 5 point scale (always, most of the time, sometimes, rarely, or never). Label use was dichotomized, with label users defined as using food labels at least sometimes (3 or less on the scale) and nonusers defined as rarely or never using food labels (4 and 5 on the scale). The proportion of adults in the entire NHANES survey who used nutrition labels at least sometimes was 82.2%.

Dietary quality—Dietary intake data were taken from two 24-hour dietary recalls. Dietary quality was assessed using an average of the 2 recalls for each individual to calculate a Healthy Eating Index (HEI)-2010 score, which is an overall measure of how well dietary intake conforms to the Dietary Guidelines for Americans[49]. The HEI score is calculated as a summary of 12 components, 9 of which assess adequacy of the diet, including 1) total fruit; 2) whole fruit; 3) total vegetables; 4) greens and beans; 5) whole grains; 6) dairy; 7) total protein foods; 8) seafood and plant proteins; and 9) fatty acids. The remaining 3, refined grains, sodium, and empty calories (i.e., energy from solid fats, alcohol, and added sugars), assess dietary components that should be consumed in moderation. Higher scores reflect better diet quality because lower intakes of the moderation components are scored higher. The scores of the 12 components are summed to yield a total score with a maximum value of 100. The amount of food components consumed by individuals was calculated using data from the food-level dietary intake file from NHANES and the Food Pyramid Equivalent Database from USDA to convert grams to number of equivalent servings as expressed in the HEI[50]. The outcome measure used in this study was expressed as a dichotomized variable where 1=poor dietary quality, defined as an HEI score below the median score (51.6) of the entire sample of adults in the two NHANES survey waves.

Independent variables

Acculturation—Consistent with previous studies[51–55], a language-based surrogate measure to assess acculturation was used in the NHANES survey: "Now I'm going to ask you about language use. What language(s) do you usually speak at home?" Responses were made on a 5 point scale: only Spanish, more Spanish than English, both equally, more English than Spanish, only English. For this study, responses were dichotomized into two groups such that if Spanish was spoken at least some of the time (4 or less), the language at home was coded as Spanish; otherwise it was coded as English.

Poverty—To assess poverty, the poverty income ratio (PIR), which considers household income relative to the poverty threshold after accounting for inflation and family size, was used. Poverty was defined to be at or below a PIR of 130%, consistent with the eligibility level for the Supplemental Nutrition Assistance Program (SNAP)[56]. In 2008, this level approximated an income of $29,000 for a family of four, about 13.2% of the US population[57].

Control Variables

Sex was dichotomized with females as the reference group, that is female = 0, male = 1. Age was discretized into 3 groups: 18–34 years, 35–55 years, and 56 years and above. Participants who self-identified as “Mexican American” were coded as such regardless of their other race-ethnicity identities. Others who self-identified as “Latino” ethnicity were coded as “Other Latino.” Education was nominalized into two groups: those with at least a high school diploma and those without. Body Mass Index[58] was nominalized into 4 groups: underweight (BMI < 18.5), normal weight (18.5–24.9), overweight (25.0 – 29.9), and obese (30 or greater).

Data Analyses

Summary statistics for the sample demographics were calculated as means or percentages and 95% confidence intervals were calculated using the normal approximation. Univariate logistic regressions were used to test for associations between the covariates and the two response variables – dietary quality and nutrition label use. A multivariable logistic regression model was used to predict the odds of using nutrition labels from the interaction between poverty and acculturation while controlling for education, sex, BMI, country of origin, and age. A second logistic regression model was used to predict the odds of poor dietary quality from nutrition label use and its interaction with poverty and the interaction between nutrition label use and acculturation, while controlling for education, sex, BMI, country of origin, and age, as defined above. Individuals with missing values for a particular analysis were dropped from that analysis. The SAS® software SURVEY procedures for Windows® version 9.4 (SAS Institute, Cary, NC) were used for all analyses to correct for the sampling design using the cluster, strata, and weight variables provided by NHANES.

RESULTS

Demographic Characteristics

About 49% of the Latinos in the survey fell below the poverty line and about 49% spoke at least some Spanish at home. Notably, 80% reported using nutrition labels at least sometimes. Sample characteristics with their sample sizes and 95% confidence intervals are presented in Table 1.

Nutrition Facts Panel Use

Eighty percent of Hispanics in the NHANES survey reported using nutrition labels at least some of the time. In the univariate (unadjusted) analyses, nutrition label use was significantly higher for middle aged (35–55 years) and older (>55 years) adults compared to younger adults (18–34) (Table 2). Underweight individuals had only about one quarter the odds of using nutrition labels (p=.001, OR=0.22; CI: 0.09 – 0.52) compared with normal weight individuals. There were no significant differences between those of normal weight and the overweight (p=.70, OR = 1.02) or obese (p=.55, OR = 0.99). No other significant associations were observed in the unadjusted analyses.

In the multivariable logistic regression, acculturation moderated the association of poverty on the odds of using nutrition labels, adjusting for education, age, sex, country of origin, and

BMI (p=.01 for interaction) (Table 3). Among those who were considered acculturated (they spoke only English at home), the odds of using nutrition labels were 56% lower for low-income compared with higher-income individuals (p=.01, OR=0.44, 95% CI: 0.24 – 0.81). However, among the less-acculturated (those speaking at least some Spanish at home), there was no significant difference between the income groups in the odds of nutrition label use (p=.99, OR=1.0). See Table 3. As can be seen in Figure 1, those speaking at least some Spanish had about equal rates of nutrition label use irrespective of income and this rate was higher than for low income English-speakers and only slightly below the rate for higher income English-speakers.

Dietary Quality

In the unadjusted, univariate analyses, age, sex, and nutrition label use had a significant association with dietary quality. Adults over age 55 and the middle-aged (35–55) had a lower risk of poor diet quality compared with young adults (18–34) (respectively: p<.001, OR=0.66, 95% CI: 0.57–0.78; p<.001, OR=0.47, 95% CI: 0.38–0.58) (See Table 4). Men had higher odds of poor diet quality (p<.001, OR=1.54, 95% CI: 1.27–1.87). Those who use nutrition labels had lower odds of poor diet compared with those who did not use labels (p<.001, OR=0.70, 95% CI: 0.57–0.85). There were no differences in dietary quality by education, BMI, country of origin, income, or acculturation.

In the multivariable logistic regression examining the associations with poor quality diet, the odds of an HEI score below the median value varied significantly with age, and sex, but not education, BMI or country of origin (Table 5). Middle aged participants (p<.001, OR = 0.68, 95% CI: 0.58 – 0.80) and older participants (p<.001, OR = 0.48, 95% CI: 0.38 – 0.6) had lower odds of poor dietary quality compared to younger participants. Males had about 52% higher odds than females of a low quality diet (p<.001, OR = 1.52, 95% CI: 1.25 – 1.84). Nutrition label use moderated the association of acculturation (p=.008), but not of poverty (p=.59). Among those who spoke only English at home, the odds of a poor quality diet were significantly lower for those who used nutrition facts panels compared to those who did not (p=.001, OR=0.43; 95% CI: 0.26 – 0.69). However, among the less-acculturated (who spoke some Spanish at home), using nutrition labels did not change the odds of poor dietary quality (p=.07, OR=0.82, 95% CI: 0.67 – 1.02). As can be seen in Figure 2 the dietary quality of nutrition label users was similar across levels of acculturation, but Spanish speakers who did not use nutrition labels had higher dietary quality than English speakers who did not use them. Nutrition label use was associated with a reduced risk of poor diet irrespective of income level. For those falling below 130% of poverty, the odds of poor diet was 38% less than those not using nutrition labels (p=.01, OR=0.62, 95% CI: 0.43 – 0.89). For those falling above 130% of poverty, the odds of poor diet were 43% less (p<.001, OR=0.57, 95% CI: 0.42 – 0.77).

DISCUSSION

Our results demonstrate that frequent use of nutrition labels is associated with better diet quality for Latinos, for both income levels, but with a higher positive association for those below 130% of poverty. There was also a positive association between label use and dietary

quality for the more acculturated (p=.001) but not for the less acculturated (p=.07). Further, the current results suggest that nutrition label use could be a particularly effective strategy for nutrition education among the bicultural Latino segment, which may be more vulnerable to poor diet as a result of acculturation. Although our cross-sectional study precludes claims of causality, this population-based study adds to the body of literature suggesting a directional relationship; together with randomized experimental studies examining the effects of nutrition label use. This body of work suggests there may be a causal relationship between nutrition label use and improved dietary quality, at least for some groups.

For example, the previously-mentioned intervention to train Latinos with type 2 diabetes on using the nutrition facts panel found that use of the nutrition labels not only improved diet quality but also reduced HbA1C levels[34]. Thus, the nutrition label may be a useful tool for avoiding the negative dietary consequences of acculturation, at least among some groups who may be motivated to manage their health.

In this study, low-income, bicultural (English-speaking) Latinos follow an underclass pattern of acculturation demonstrated by a lower likelihood of reading nutrition labels; and higher-income, bicultural Latinos follow the more successful selective pattern.

As was hypothesized, the association of nutrition label use on dietary quality was larger for those speaking mainly English (highly acculturated) compared to those speaking mainly Spanish (less acculturated). Surprisingly, there was little association of poverty on the use of nutrition labels for those speaking Spanish, while there was a strong association for those speaking English. It is important to note that the unadjusted associations with nutrition label use for both acculturation and poverty were not significant in the univariate models and hence their associations are confounded if their interaction is not considered. Hence, failure to include interaction terms when examining complex issues can lead to faulty inference. One interpretation of this complex interaction could be that Latinos who have retained some Spanish-speaking ability have also retained some aspects of Latino culture, including diet. Hence, the lack of nutrition label use may not have as large an effect on dietary quality as it might for English speakers who may have more fully adopted the practice of eating the lower quality packaged foods that are so readily available in the US. This explanation is consistent with the observed “Latino dietary acculturation paradox”[59] – wherein immigrant Latino populations eat more fruits and vegetables and less fat, but these protective factors disappear through the process of acculturation – and with our results that for those who do not use nutrition labels, Spanish speakers are more likely to fall above the median HEI than English speakers (44% versus 31%). See Figure 2. Our results are also consistent with the recent findings of Ramirez and colleagues that found through in-depth interviews that English-speaking Mexican-American women perceived traditional Mexican food as unhealthy and the rejection of this food in favor of American food as healthier[60]. In conjunction with our results, this study suggests that effective nutrition label use could help Latinos identify the healthfulness of foods more effectively and hence make better dietary choices.

Considered with prior studies, these results shed light on one potential mechanism for the dietary acculturation paradox: The differential effectiveness of nutrition labels across levels

of acculturation and income. This study found evidence for differential effectiveness of a population wide communication based on nutrition labels, varying across degree of acculturation.

In terms of nutrition label use, our results again suggest that interactions between acculturation and poverty may be important. In the presence of an interaction, the estimate of the main effect of poverty can be confounded (i.e. non-significant or in the opposite direction of the true effect). This could explain the counter-intuitive results of Sharif and colleagues[41] where poverty had a *positive* effect on nutrition label use. It was found that English speakers below the poverty line were less likely to use food labels ($p<.001$, OR=0.44), while poverty had no effect for Spanish speakers ($p>.99$, OR=1.0).

Limitations

This study, along with the NHANES developers and many other studies, assumes that acculturation can at least be approximated by language use at home. While many other researchers have made the same assumption, a better measure of acculturation would improve studies such as these. Further work is needed to establish measures of immigrants' use and facility with nutrition labels to tease apart cultural attitudes versus English literacy. The income variable does not take into account geographic location, though the cost-of-living varies widely. The effect of this is likely to be an underestimation of observed effects, given that Latinos are concentrated in higher-cost-of-living regions[61]. Dietary quality in this population has been changing (as it has in other populations) so that assessments in these NHANES waves may not reflect present dietary patterns, although other recent data suggest that diet quality is not improving for Mexican Americans and that income disparities in diet quality are worsening[62]. As with all cross-sectional studies non-response bias is a potential problem and cause and effect cannot be inferred; hence associations may be spurious or confounded. Finally, this study relied on a label use frequency measure in the present study. A measure of nutrition label comprehension (or objective label use) would help disentangle the frequency of label use with the quality of label use[31], and how these aspects of label use relate to dietary quality.

Implications for Research and Practice

Our results show the importance of considering interactions between income, acculturation, and nutrition label use and their associations with diet quality in future research. Future directions of research could explore how to make nutrition labels more accessible and more effective across the spectrum of income and acculturation in the Latino community, and which aspects of dietary quality are most associated with acculturation. Examining the HEI sub-scores that measure total vegetable, greens and legumes, whole fruit, whole grains, fats, and sugars would potentially elucidate more detailed differences in dietary quality between less acculturated and more acculturated Hispanics and how these differences may interact with income levels.

The present study also provides evidence of segmented assimilation, a framework[63] that identifies three distinct patterns of integration: classic assimilation (the adoption of mainstream values and behaviors and rejection of original culture); underclass acculturation

(poverty, low educational attainment); and selective acculturation (retention of ethnic values along with economic and educational advancement).

This study extends previous research on nutrition label use by examining how acculturation and income influence Latinos' odds of using labels and by evaluating the extent to which acculturation and income modify the associations of using labels on dietary quality. English-speaking Latinos – who may be considered acculturated to mainstream U.S. culture – were more likely to use nutrition labels compared with Spanish-speaking, less acculturated Latinos. Moreover, English speakers appeared to benefit from using nutrition labels, whereas the less-acculturated Spanish speakers did not. These results suggest that nutrition labels hold promise as an intervention to decrease the risk of disparities in diet and diet-related diseases, and particularly for acculturation-based disparities, since the most benefit of their use was derived by English-speaking Latinos who have been identified in prior studies as particularly at risk of poor diet.

Acknowledgments

The project described was supported by the National Center for Advancing Translational Sciences, National Institutes of Health, through grant number UL1 TR001860 and by The National Institutes of Health (NIH/NCI) grant number R01CA 159447. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH. The data were obtained from the NHANES surveys 2007–2008 and 2009–2010.

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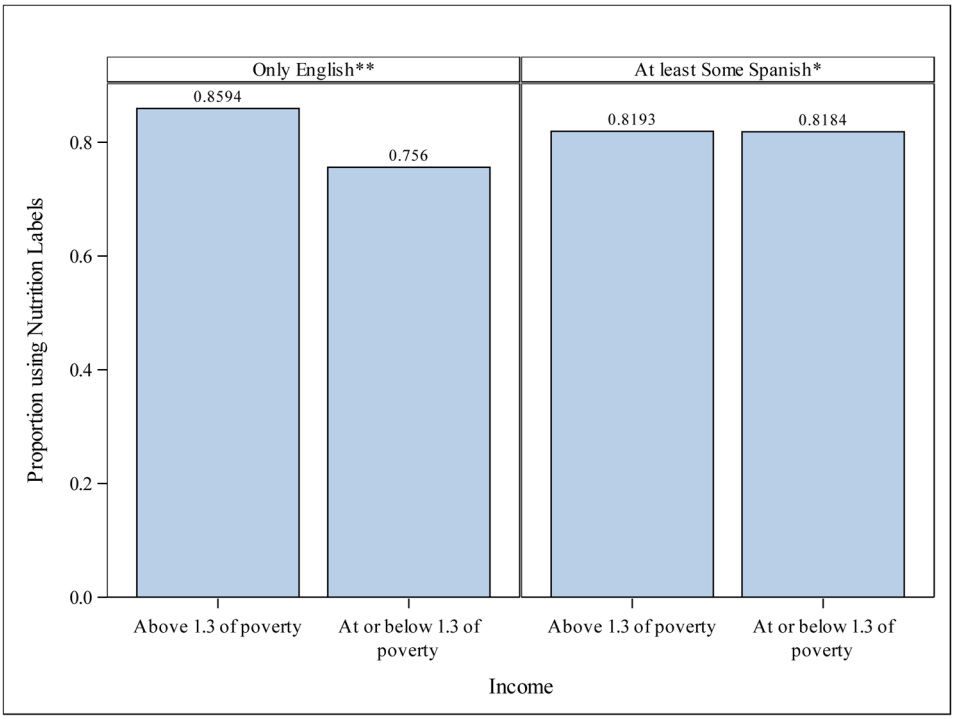

Figure 1.

Effects of the interaction between income and language spoken at home on nutrition label use for a sample of 3696 Latinos from NHANES 2007–2008 and 2009–2010.

** p = .011

*p = .99

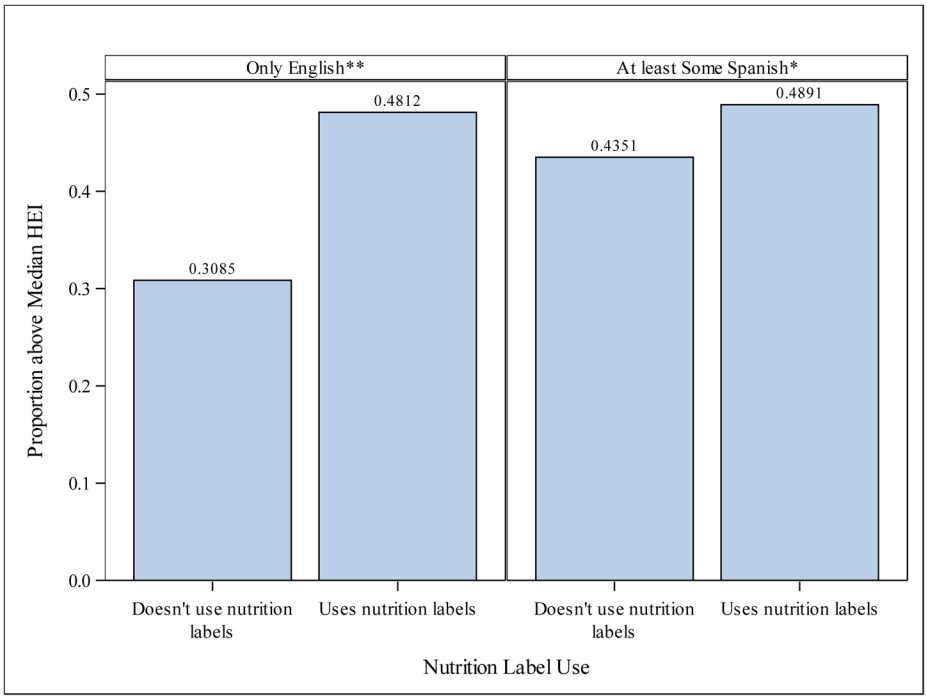

Figure 2.

Interaction effects of nutrition label use and language spoken at home on dietary quality for a sample of 3696 Latinos from NHANES 2007–2009 and 2009–2010.

** p = .004

*p = .46

Table 1

Sample Demographics of Latinos from NHANES 2007–2009 and 2009–2010, adjusted for sampling cluster and strata.

Variable		n	Percent	95% CI
Education				
	Less than High School	1891	49.0	(46.2, 51.8)
	High School or above	1664	51.0	(48.2, 53.8)
Sex				
	Female	1676	51.5	(49.9, 53.0)
	Male	1879	48.6	(47.0, 50.1)
Country of origin				
	Mexican American	2330	63.2	(53.6, 72.8)
	Other Latino	1325	36.8	(27.2, 46.4)
Poverty Income Ratio				
	Above 130%	1713	51.4	(45.3, 51.9)
	At or below 130%	1842	48.6	(48.1, 54.7)
Language at home				
	English Only	1746	50.8	(46.1, 55.6)
	Some Spanish	1809	49.2	(44.5, 53.9)
Age (years)				
	18–34	1172	42.7	(40.6, 44.9)
	35–55	1288	40.9	(39.2, 42.5)
	> 55	1095	16.4	(14.3, 18.5)
Body Mass Index (BMI)				
	Underweight (< 18.5)	30	0.8	(0.4, 1.2)
	Normal (18.5 – 24.9)	803	23.9	(21.5, 26.3)
	Overweight (25 – 29.9)	1349	38.4	(36.2, 40.7)
	Obese (≥30)	1336	36.9	(33.6, 40.1)
Nutrition Label Use				
	At least sometimes	2890	80.0	(78.3, 81.7)
	Rarely or never	665	20.0	(18.3, 21.7)
Healthy Eating Index (HEI) score *				
	Below median	1801	54.2	(50.6, 57.8)
	At or Above median	1754	45.8	(42.2, 49.4)

* Median HEI score was 51.6

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Table 2

Odds ratios from univariate logistic regressions, testing for associations with nutrition label use on dietary quality in a sample of Latinos from NHANES 2007–2008 and 2009–2010, adjusted for sampling cluster and strata.

Effect		n	P value	Odds Ratio*	95% Wald CL	
At least High School education						
	No (ref)	1891	--	--	--	--
	Yes	1664	.32	1.10	0.92	1.28
Age						
	18–34 (ref)	1172	--	--	--	--
	35–55	1288	**<.001**	**1.55**	1.23	1.94
	> 55	1095	**<.001**	**2.23**	1.69	2.96
Sex						
	Male (ref)	1879	--	--	--	--
	Female	1676	.27	1.10	0.92	1.32
Country of Origin						
	Mexican (ref)	2330	--	--	--	--
	Other Latino)	1325	.12	1.17	0.96	1.43
BMI				--	--	--
	Underweight	30	**.001**	**0.22**	0.09	0.52
	normal (ref)	803	--	--	--	--
	Overweight	1349	.70	1.08	0.85	1.38
	Obese	1336	.55	1.11	0.88	1.38
Poverty Income Ratio < 130%						
	Yes (ref)	1842	--	--	--	--
	No	1713	.26	1.16	0.89	1.51
Language spoken at home						
	English (ref)	1746	--	--	--	--
	Spanish	1809	.43	0.90	0.69	1.18

*Significant effects ($p < .05$) are in bold.

Table 3

Odds ratios from a multivariable logistic regression model, testing for associations with nutrition label use in a sample of 3555 Latinos from NHANES 2007–2008 and 2009–2010, adjusted for sampling cluster and strata.

Effect		Odds Ratio*	95% Wald CL	
At least a High School Education				
	(yes vs no)	1.07	0.87	1.32
Age				
	(35–55 vs 18–34)	**1.49**	1.19	1.88
	(> 55 vs 18–34)	**2.15**	1.59	2.91
Sex				
	(male vs. female)	0.92	0.76	1.10
Country of Origin				
	(Mexican vs Other Latino)	1.14	0.93	1.41
BMI				
	(Underweight vs normal)	**0.24**	0.10	0.57
	(Overweight vs normal)	1.02	0.80	1.30
	(Obese vs normal)	0.99	0.79	1.24
Interaction between Poverty and Acculturation				
	Poverty Income Ratio < 130% (yes vs. no) for English	**0.44**	0.24	0.81
	Poverty Income Ratio < 130% (yes vs. no) for Spanish	1.00	0.77	1.31

*Significant (p<.05) effects are in bold.

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Table 4

Odds ratios from univariate logistic regressions, testing for associations with poor dietary quality (HEI < 51.6) in a sample of 3555 Latinos from NHANES 2007–2008 and 2009–2010, adjusted for sampling cluster and strata.

Effect		n	P value	Odds Ratio*	95% Wald CL	
High School Education						
	Less than HS	1891	.13	1.11	0.97	1.28
	At least HS	1664	--	--	--	--
Age, years						
	18 – 34 (ref)	1172	--	--	--	--
	35–55	1288	**<.001**	**0.66**	0.57	0.78
	> 55	1095	**<.001**	**0.47**	0.38	0.58
Sex						
	Male	1879	**<.001**	**1.54**	1.27	1.87
	Female (ref)	1676	--	--	--	--
BMI						
	Underweight	30	.17	1.65	0.82	3.34
	Normal	803	--	--	--	--
	Overweight	1349	.91	1.03	0.84	1.28
	Obese	1336	.99	1.02	0.86	1.22
Country of Origin						
	Other Latino (ref)	2330	.08	0.81	0.65	1.02
	Mexican	1325		--	--	--
Nutrition Label Use						
	At least sometimes	2890	**.001**	**0.70**	0.57	0.85
	Rarely or never (ref)	665		--	--	--
Poverty Income Ratio < 130%						
	Yes	1842	.10	1.18	0.96	1.44
	No (ref)	1713		--	--	--
Language Spoken at Home						

Effect		n	P value	Odds Ratio*	95% Wald CL	
	Spanish	1809	.58	1.08	0.82	1.41
	English (ref)	1746		--	--	--

*Significant (p<.05) effects are in bold.

Table 5

Odds ratios from a multivariable logistic regression, testing for associations with poor dietary quality (HEI < 51.6) in a sample of 3518 Latinos from NHANES 2007–2008 and 2009–2010, adjusted for sampling cluster and strata.

Effect		P value	Odds Ratio*	95% CL	
Age					
	35–55 vs 18–34	**<.001**	**0.68**	0.58	0.80
	>55 vs 18–34	**<.001**	**0.48**	0.38	0.60
High school Education					
	no vs yes	.33	1.08	0.93	1.26
Sex					
	male vs female	**<.001**	**1.52**	1.25	1.84
Country of Origin					
	Mexican vs Other Latino	.23	0.86	0.67	1.10
BMI					
	Underweight vs normal	.28	1.49	0.73	3.08
	Overweight vs normal	.50	1.08	0.87	1.30
	Obese vs normal	.15	1.14	0.95	1.38
Interaction between NLU and Acculturation					
	Nutrition Label Use (yes vs no) for English	**.001**	**0.43**	0.26	0.69
	Nutrition Label Use (yes vs no) for Spanish	.07	0.82	0.67	1.02
Interaction between NLU and Income					
	Nutrition Label Use (yes vs no) for <130% poverty	**.010**	**0.62**	0.43	0.89
	Nutrition Label Use (yes vs no) For ≥ 130% poverty	**<.001**	**0.57**	0.42	0.77

*Significant (p < .05) effects are in bold.