

Midwest Consumer Shopping Habits, Nutrition Knowledge, and Latino *Tienda* Use

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Objective: In this study, we assessed the intrapersonal, interpersonal, and community influences on nutrition knowledge, views on healthy foods, grocery store choice, and grocery shopping patterns specifically at Latino *tiendas*, among Midwestern adults by Hispanic or non-Hispanic ethnicity. **Methods:** We surveyed a convenience sample of adults on an open-ended definition of healthy foods, nutrition knowledge, shopping behaviors, and reasons for store choice. **Results:** Of the 149 respondents, no ethnic differences were observed in qualitative definitions of healthy foods (low fat, unprocessed, high nutrient content). Fewer Hispanics than non-Hispanics correctly identified healthier options for rice, canned fruits, and canned tuna. Respondents indicated that proximity to home and food price were motivators of store choice. Significantly more Hispanics than non-Hispanics shopped at Walmart (42% vs 15%; $p < .001$), and at *tiendas* (77% vs 14%; $p < .001$). Food selection was the most frequent reason given by all for shopping at *tiendas*. **Conclusions:** Hispanics and non-Hispanics share similar views of healthy food definitions and important store characteristics. Non-Hispanics could potentially use *tiendas* more frequently considering expressed interests in food prices and selection. Some healthier food options that are culturally important were less known by Hispanics. Further research with a larger sample is needed to substantiate these preliminary findings.

Key words: nutrition knowledge; food safety; healthcare; Latinas; Mexican-Americans; *tiendas*
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Food availability, accessibility, and affordability have central roles in shaping an individual's diet and subsequent health outcomes.¹ In turn, a consumer's knowledge and attitudes toward food affects purchasing, and consumer demand influences what is sold in neighboring stores.² Multiple socio-ecological influences mediate food choice behaviors and nutrition across populations.³ Individuals purchase foods based on a complex system of taste preferences, sensory appeal, convenience, economic value, social norms, observation of shopping behaviors of others, and community or policy structure.^{3,4} Whereas many nutrition studies focus on increasing knowledge of the specific attributes of foods, such as fiber, protein content, or chronic disease health benefits, other food characteristics and socio-ecological factors may be more important influencers for purchases.⁵

To serve immigrant and multicultural populations, there is an increasing need for available, accessible, and affordable culturally diverse food resources in the communities where they live. Low income and rural areas are disproportionately affected by a paucity of stores.⁶ These geographic areas may be characterized as "food deserts" due to a lack of mainstream grocery outlets.⁷ Poor nutrition environments have limited healthy, quality, and affordable foods accessible to buyers.¹ If healthy foods are not obtainable from local grocery stores, shoppers already motivated to purchase such items are restricted from buying them, and potentially interested shoppers are more likely to continue making less beneficial choices. Research supports that higher fruit and vegetable availability in stores increases the likelihood of consumer purchase.⁸ Indirectly, improving food access can foster increased

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vegetable intakes, one of the leading health indicators for Healthy People 2020.⁹ Healthier food access is a developmental objective under the nutrition and weight status topic for Healthy People 2020.⁹ Thus, integrative models that examine diverse levels of food access and behaviors can potentially improve intervention efficacy for public health nutrition programs.^{3,10}

Hispanics, defined as those with origins from a Spanish-speaking country, may retain cultural practices as part of the bidirectional continuum of dietary acculturation and adaptation to a new host culture.^{4,11} Some dietary practices from the country of origin may be healthier than those adopted or adapted in the United States (US), but these behaviors are often dependent on the obtainability of traditional foods.¹² For Hispanics, small ethnic grocery stores called “*tiendas*” or “*bodegas*” provide familiar foods, serve as cultural hubs, and contribute to the local economy.¹³ In fact, *tiendas* in California were found to carry a selection of fresh produce priced lower than the local supermarkets.¹⁴ With greater awareness and incorporation into the local food system, *tiendas* can fill broader community nutrition needs for all residents, not just those who identify as Hispanic.¹²⁻¹⁴

The current project was part of overarching research to develop the Latino Nutrition Environment Measures Survey for Stores,^{15,16} and a *tienda*-based intervention for increasing healthy foods in Iowa (Shop Healthy Iowa).¹⁷ The main goals of this descriptive study were to examine nutrition knowledge and food purchases among Midwestern Hispanic and non-Hispanic adults using a socio-ecological model (SEM) framework.^{3,18} The SEM recognizes that interactions between levels of influence at the intrapersonal, interpersonal, and community levels are variable and can be mutually reinforcing.

Input from non-Hispanics was desired to assess if they were aware of *tiendas* as a grocery shopping option. With greater interest in ethnic foods and fresh produce, *tiendas* could serve a broader market share of customers.^{13,15} Increased sales at these community stores would build food access capacity in neighborhoods.¹³ The research objectives were to: (1) explore qualitative definitions of healthy foods; (2) determine consumer nutrition knowledge for 13 foods frequently found in *tiendas*; (3) compare grocery shopping frequency and reasons for store

choice between mainstream retail versus Latino *tiendas*; and (4) identify what foods, products, or services consumers buy at *tiendas*.

METHODS

Study Design and Procedures

A convenience sample of Hispanic and non-Hispanic adults aged 18 or older completed surveys between September and November 2016. Participants for the face-to-face data collection in Iowa were recruited by a bilingual research team at 2 health clinics, 2 Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) offices, and a Cooperative Extension outreach fair on 1-3 non-consecutive days. An information booth was set up at each site. Interested persons approached the researchers to complete the paper survey. In-person respondents received an insulated grocery bag valued at \$5 as an incentive. To increase sample size, online participants were recruited through a Facebook web link that asked about shopping behaviors as the subject. Sharing of the link was facilitated by a direct email to known Latino colleagues which resulted in snowball sampling by participants. Responses from Midwestern states adjacent to Iowa were allowed in sampling due to similarities in demographics and food access.⁶ Both Hispanics and non-Hispanics were eligible to assess familiarity and knowledge of *tiendas*. As this was a pilot investigation, no limitations were put on respondents for income, nor were they required to currently shop at *tiendas*. Online participants had the option of entering their email to be eligible for a \$50 Amazon gift card raffle. Surveys were available in English or Spanish in person and online. The survey took about 12 minutes to finish, and completion of the survey was considered consent.

Instruments and Measures

The socio-ecological model (SEM) guided the survey structure.^{3,18} Intrapersonal factors were age, sex, ethnicity, definition of healthy foods, nutrition knowledge, education, income, and shopping behaviors. Demographic and household composition questions were drawn from previous surveys with adults.¹⁹ Interpersonal influences were peer or family use of the individual's preferred store, store

customer service, and feeling welcome at store. Community level variables were store characteristics such as proximity to home, and food selection, quality, and prices.^{3,18} The institutional and policy level factors were not evaluated for levels 4 and 5 of the SEM.^{3,18}

We presented 13 nutrition knowledge items for respondents to select the ‘healthier’ choice of 2 foods, state no difference, or do not know. The category options followed the 2015-2020 Dietary Guideline recommendations for increasing whole grains and decreasing saturated fat, sodium, and added sugar intake.²⁰ The food items were the less healthy and healthier options from the Latino NEMS-S.^{15,16} These included: flour or corn tortillas, white or brown rice, fruit nectars or 100% juice, sugared soda or mineral water, refried or whole canned beans, chicken leg or breast, short ribs or sirloin tip beef, fruits canned in syrup or 100% juice, regular canned vegetables or canned vegetables with less sodium, lard or oil for cooking, white or brown eggs, whole or low fat milk, and tuna canned in oil or in water.^{15,16} Nutrition knowledge question formatting was adapted from Jones et al.²¹

Questions from the Perceived Nutrition Environment Measures Survey (NEMS-P) on grocery shopping frequency, store type, and influences on store choice were asked in reference to mainstream grocery outlets first.²² We provided a description of *tiendas*; we asked respondents if they shopped at this type of store. If they said “yes,” the same NEMS-P questions were asked regarding shopping frequency and influences on store choice for *tiendas*. If respondents said “no,” they were prompted for reasons why not.

We asked those who reported shopping at *tiendas* if they purchased specific foods, services, or products from a pre-determined list of items/services drawn from the development of the Latino NEMS for Store (Latino NEMS-S).^{15,16} Items for inclusion were based on general grocery purchases (N = 6, milk, eggs, rice, beverages, cooking oil, other groceries), common convenience store purchases (N = 4, alcohol, cigarettes, lottery tickets, money transfers), culturally specific foods (N = 3, *pan dulce* (Mexican pastries), tortillas, dry beans),¹² and items known to be sold at *tiendas*.^{15,16} If respondents indicated they purchased “other groceries such as meats, fruits, vegetables,” follow-up ques-

tions were asked about the type of meats selected (beef, chicken, pork, fish, organ meats, other) and the form of fruits and vegetables purchased (fresh, canned, or frozen).

The survey was translated into Spanish by a bilingual, bicultural research assistant and back-translated by a different native Spanish speaker. It was pilot-tested in Spanish with 4 bilingual, bicultural health professionals, and in English online with 12 non-Iowa laypersons. Feedback and data from the formative evaluation were reviewed and analyzed to refine questions and adjust the survey sequence for greater clarity and flow prior to data collection.

Data Transformations and Analysis

The individual qualitative responses for definitions of healthy food were sorted and split first into categories independently by the co-authors. In reviewing groups, consensus was reached and items with fewer mentions were subsequently grouped together under an umbrella construct.²³ For example, the “low fat” category included terms of low fat, non-fat, and less fat. Healthy food descriptors of “natural, organic,” and “no preservatives” were included in one category as well. The co-authors agreed upon 15 thematic groups.

Survey data were analyzed with SPSS v. 25 (IBM, Armonk, NY). Relationships between demographic and shopping variables were explored by Hispanic/non-Hispanic ethnicity, gender, and years of education using correlations, chi-square for categorical variables, and ANOVA for continuous measures. During preliminary analysis variables were examined by language chosen as a proxy for acculturation among the Hispanic respondents (non-Hispanic, Hispanic-Spanish, Hispanic-English). We found no differences in responses. Hispanic respondents were pooled for further analysis. Demographic and nutrition knowledge variables were analyzed by survey delivery mode (online or paper) for response differences due to methodology. Differences were significantly greater for ethnicity and gender than data collection mode. Each of the nutrition knowledge questions were recoded into a dichotomous variable representing a “correct” or an “incorrect” response. A nutrition knowledge summary score was calculated for each participant by adding the total number of correct responses. There were 8 individuals missing one different response in this sur-

Table 1
Demographic and Household Characteristics of Consumer Survey Respondents
by Ethnicity (N = 149)

Characteristics	Total	Hispanic 30% (N = 45)	Non-Hispanic 70% (N = 104)
	mean ± standard deviation		
Age in years	38.7 ± 13.5	37.6 ± 14.5	39.2 ± 13.1
Children under age 18	2.1 ± 1.3	2.2 ± 1.3	2.1 ± 1.3
Total household size	3.1 ± 1.7	3.3 ± 1.8	3.0 ± 1.6
	%		
Gender ***			
Male	26.8	46.7	18.3
Female	73.2	53.3	81.7
Years of Education***			
12th grade or less	12.2	30.2	4.8
Some college or tech school	13.6	14.0	13.5
Associates	12.9	11.6	13.5
Bachelors	36.1	11.6	46.2
Masters or more	25.2	32.6	22.1
Marital Status			
Single	18.6	24.4	16.0
Married	65.5	62.2	67.0
Cohabiting	9.0	8.9	9.0
Divorced/Widowed/Separated	6.9	4.4	8.0
Household Income*			
Prefer not to answer	6.9	11.1	5.0
\$0-24,999	13.8	20.0	11.0
\$25-49,999	25.5	35.6	21.0
\$50-74,999	20.0	15.6	22.0
\$75-99,999	17.9	8.9	22.0
\$100,000 or more	15.9	8.9	19.0

*p < .05; ***p < .001

vey section. Their correct responses were summed, then calculated as a ratio out of 13, and entered as an imputed variable. Four respondents at health clinics were unable to complete nutrition knowledge questions because they had to leave for their provider appointments and were excluded from analysis of this section.

RESULTS

A total of 172 adults began the survey with a final sample of 149 for analysis. Overall, 32 adults

began the face-to-face survey. Two were excluded from analysis because of incomplete data. Of the 140 who accessed the online survey, 10 responses were incomplete. To improve sample homogeneity, 11 online respondents from non-Midwestern states were excluded from further analysis. For the 149 total surveys analyzed, 87% were from Iowa, with Kansas (6%), Michigan (4%), and Wisconsin (3%) contributing cases. Altogether, 80% of the surveys were completed online. The mean age of online participants was significantly lower than those who completed the survey in person (37 ±

Table 2
Frequency of Mention of Thematic Categories of Definition of Healthy Foods
by Hispanic Ethnicity (N = 132)

Food Characteristics	Total N = 132	Hispanic N = 35	Non-Hispanic N = 97
1. Low fat or oil	41	15	26
2. Less processed or few ingredients	37	6	31
3. Vitamins and minerals or nutrients	32	10	22
4. Natural, organic, no preservatives	30	5	25
5. Fresh	25	6	19
6. Low sugar or less added sugar	22	5	17
7. Low salt or no added salt	20	4	16
8. Low calorie or less calories	19	2	17
9. Fruits and/or vegetables	19	4	15
10. Protein including meat, lean meat	13	3	10
11. Carbohydrates including low carb or complex carbs	12	3	9
12. Whole foods	12	1	11
13. Local or homemade	9	4	5
14. Fiber	9	1	8
15. Whole grains	4	1	3

12 years vs 45 ± 16 years; $p = .008$), but there were no differences in age by ethnicity or gender. Thirty percent of the total sample self-identified as Hispanic with 12% of these taking the survey in Spanish. Sixty percent of all Hispanics took the survey online. Table 1 shows demographic and household characteristics for the participants by Hispanic or non-Hispanic ethnicity. A significantly higher percentage of non-Hispanic respondents were female ($p < .001$). Hispanic respondents had fewer years of education than non-Hispanics, as well as lower income ($p < .05$).

The most frequently mentioned personal definitions of healthy foods were: low fat; less processed; vitamins, minerals, or nutrients within foods; and the thematic concept of natural, organic, or no preservatives.²³ Table 2 shows the frequency distribution of these themes by ethnicity.

Respondents were asked to choose which food options were more nutritious or better for them to eat. Over 66% chose the correct choice for at least 11 of the 13 items. From 9% to 20% of respondents incorrectly stated there was no nutrition difference for 6 food item selections (beefsteak 20.7%; chicken 17.7%; juice 13.6%; canned beans

10.2%; tortillas 10.2%, canned vegetables 9.0%). About 10% did not know if there was a difference between the cooking oil and egg options, and 17.1% did not know which beefsteak alternative was healthier.

Table 3 shows the nutrition knowledge response options. There were statistically significant differences by ethnicity for 5 of the 13 nutrition knowledge food comparisons. More Hispanics than non-Hispanics incorrectly selected white rice over brown as healthier or stated there was no difference ($p = .008$), chose “no difference” for mineral water versus sugared soda ($p = .003$), and “no difference” for syrup or 100% juice packing for canned fruits ($p = .001$). Caloric content of tuna packaged in water or oil was less known by Hispanic respondents ($p = .001$). When comparing years of education to correct nutrition knowledge, we found statistically significant differences for milk ($p = .010$), rice ($p < .001$), canned tuna ($p = .007$), eggs ($p < .001$), and canned fruit ($p = .023$). The nutrition knowledge summary scale was normally distributed ($\mu 9.8 \pm 2.1$). We found statistically significant differences by ethnicity ($p < .001$) and gender ($p = .004$). Overall, the

Table 3
Nutrition Knowledge Responses of Midwest Adults
by Hispanic Ethnicity (N = 145; Percent)

Which type of food do you feel is more nutritious or better for you to eat?	Less healthy option	More healthy option	No difference	Do not know
1. Tortillas	Flour	Corn		
	12.9	70.1	10.2	6.8
Hispanic	15.9	77.3	6.8	0
Non-Hispanic	11.7	67.0	11.7	9.7
2. Rice*	White	Brown		
	8.8	80.4	6.1	4.7
Hispanic	18.2	63.6	11.4	6.8
Non-Hispanic	4.8	87.5	3.8	3.8
3. Juice	Fruit nectar	100%		
	10.9	66.7	13.6	8.8
Hispanic	13.6	75.0	9.1	2.3
Non-Hispanic	9.7	63.1	15.5	11.7
4. Beverage**	Sugared soda	Mineral water		
	2.0	90.5	4.8	2.7
Hispanic	7.0	79.1	11.6	2.3
Non-Hispanic	0	95.2	1.9	2.9
5. Canned beans	Refried	Whole		
	4.8	78.2	10.2	6.8
Hispanic	4.7	67.4	18.6	9.3
Non-Hispanic	4.8	82.7	6.7	5.8
6. Chicken	Leg	Breast		
	8.2	69.4	17.7	4.8
Hispanic	7.0	74.4	14.0	4.7
Non-Hispanic	8.7	67.3	19.2	4.8
7. Beefsteak	Short Ribs	Sirloin tip		
	2.7	60.3	20.7	17.1
Hispanic	7.1	57.1	19.0	16.7
Non-Hispanic	1.0	61.5	20.2	17.3
8. Canned fruits**	Syrup	100% juice		
	7.5	87.0	3.4	2.1
Hispanic	9.5	73.8	11.9	4.8
Non-Hispanic	6.7	92.3	0	1.0
9. Canned vegetables	Regular	Less sodium		
	9.7	77.9	9.0	3.4
Hispanic	14.3	64.3	14.3	7.1
Non-Hispanic	7.8	83.5	6.8	1.9
10. Cooking fat	Lard	Oil		
	8.3	73.8	8.3	9.7
Hispanic	9.5	73.8	7.1	9.5
Non-Hispanic	7.8	73.8	8.7	9.7

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Table 3 (cont.)
Nutrition Knowledge Responses of Midwest Adults
by Hispanic Ethnicity (N = 145; Percent)

Which type of food do you feel is more nutritious or better for you to eat?	Less healthy option	More healthy option	No difference	Do not know
11. Eggs**	White	Brown		
	10.1	17.6	62.2	10.1
Hispanic	20.5	25.0	40.9	13.6
Non-Hispanic	5.8	14.4	71.2	8.7
12. Which type of milk contains the least amount of fat?	Whole	1-2%		
	2.7	96.6	0	1.0
Hispanic	7.0	93.0	0	0
Non-Hispanic	1.0	98.1	0	1.0
13. Which type of canned tuna has the most calories?***	In oil	In water		
	68.9	23.6	2.7	4.7
Hispanic	38.6	47.7	2.3	11.4
Non-Hispanic	81.7	13.5	2.9	1.9

*p < .05; ** p < .01; *** p < .001

non-Hispanic participants had greater nutrition knowledge scores (10.2 ± 2.0) compared to Hispanics (8.7 ± 2.3), and women had higher nutrition knowledge (10.1 ± 2.2) as compared to men (8.9 ± 1.9).

Table 4 displays the average shopping frequency per week, store type, and reasons for store choice. Most participants shopped for food 1-3 times per week with 81% of non-Hispanics and 53% of Hispanics purchasing most of their food at supermarkets. Walmart was chosen by 42% of Hispanics versus 15% non-Hispanics ($p = .002$). Participants could select multiple options for why they chose a store location. More non-Hispanics (65%) than Hispanics (56%) chose a store because it was close to home ($p = .044$). Food prices, selection, and quality influenced store selection for over 42%-52% of respondents. Thirty-two percent of the respondents reported shopping at a *tienda* for any items ($N = 48$). Of these, 77% of Hispanics and 14% of non-Hispanics reported purchasing foods from *tiendas* ($p < .001$). Almost 80% of all *tienda* shoppers went less than once per week. Food selection was the most frequent reason given (60%) for shopping at a *tienda*. For the 101 respondents who did not shop at a *tienda*, 54% stated it was because there was no *tienda* near them. More than

one-fourth of the non-Hispanic participants did not know this type of store existed.

Table 5 shows the frequency of items purchased at *tiendas* by ethnicity. Although not statistically significant, Hispanic respondents purchased milk, meats, fruits, vegetables, beverages, tortillas, and rice more often than non-Hispanic participants. Money orders, lottery tickets, cigarettes, and alcohol purchases were reported by only 2-3 respondents (data not shown). *Pan dulce* were purchased more frequently by Hispanics (63%) than non-Hispanics (13.3%; $p = .001$).

DISCUSSION

In this study, we examined Midwestern Hispanic and non-Hispanic adult consumer shopping patterns, knowledge of healthy food options, and use of Latino *tiendas*. Consumer shopping behaviors and nutritional knowledge and preferences were influenced at the intrapersonal, interpersonal and community social ecological levels in accordance with the SEM. *Tiendas* provide unique cultural foods and could help meet grocery needs for all residents, not just Hispanics. However, information on the degree of cultural engagement with *tiendas* is necessary to tailor and guide healthy eating messages for their use.

Table 4
Grocery Shopping Behaviors and Preferred Store Characteristics of Midwest Respondents
by Hispanic or Non-Hispanic Ethnicity (N = 149; Percent)

	Total	Hispanic 30% (N = 45)	Non-Hispanic 70% (N = 104)
Average Times/Week Food Shopping			
Less than one time/week	9.4	15.6	6.7
One time/week	44.3	48.9	42.3
2-3 times/week	40.3	31.1	44.2
4-5 times/week	6.0	4.4	6.7
Store location where majority of food purchased***			
Supermarkets or grocery stores	72.5	53.3	80.8
Walmart	23.5	42.2	15.4
Target, warehouse clubs, convenience stores, ethnic food stores, farmers market	4.0	4.4	3.8
Why Choose Store Location?			
Near to home*	62.4	55.6	65.4
Prices of foods	52.3	51.1	52.9
Selection of foods	47.0	44.4	48.1
Quality of foods	41.6	42.2	41.3
Good customer service	25.5	20.0	27.9
Feel welcome at this store	20.1	13.3	23.1
Friends/relatives shop at this store	3.4	6.7	1.9
Shop at <i>Tiendas</i> (small Latino stores)***			
Yes	32.4	77.3	13.5
No	67.6	22.7	86.5
Of the 48 respondents who shopped at <i>tiendas</i>...			
Average Times/Week Shop at <i>Tienda</i>			
Less than 1 time/week	78.8	64.7	84.6
One time/week	20.8	23.5	15.4
2-3 times/week	8.3	8.3	0
Why Choose to Shop at <i>Tienda</i>?			
Near to home	20.8	17.6	28.6
Prices of foods	8.3	8.8	7.1
Selection of foods	60.4	55.9	71.4
Quality of foods	16.7	14.7	21.4
Good customer service	18.8	20.6	14.3
Feel welcome at this store	20.8	26.5	7.1
Friends/relatives shop at this store	10.4	14.7	0

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Table 4 (cont.)
Grocery Shopping Behaviors and Preferred Store Characteristics of Midwest Respondents
by Hispanic or Non-Hispanic Ethnicity (N = 149; Percent)

	Total	Hispanic 30% (N = 45)	Non-Hispanic 70% (N = 104)
Of the 101 participants who did <u>not</u> shop at a <i>tienda</i>...			
There is no <i>tienda</i> near me	54.0	50.0	54.4
Do not know what a <i>tienda</i> is	25.0	0	27.8
I have no interest in shopping at a <i>tienda</i>	21.0	10.0	22.2
<i>Tiendas</i> do not have the food I want	4.0	0	4.0
Do not feel welcome at <i>tiendas</i>	4.0	0	4.4
My friends/relatives do not shop at <i>tiendas</i> *	3.0	20.0	1.1
I do not like the <i>tienda</i> near me	2.0	0	2.2
<i>Tiendas</i> are too expensive	1.0	10.0	0

*p < .05; **p < .01; ***p < .001

The first objective of this study was to explore personal definitions of ‘healthy food’ in respondents’ own words. These concepts represent strong intrapersonal influence on nutrition behavior, forming an individual’s value, attitude, and beliefs about healthy foods. Low-fat content was the most frequent theme mentioned, but concepts of healthy foods as being less processed, natural or without preservatives, and containing vitamins and minerals were stated more often than lower sugar, salt, or calories. In this sample, Hispanic and non-Hispanic respondents did not provide different themes although the written survey format did not allow for probing or elaboration of responses to discern if more detail or nuances existed. Most *tiendas* carry fresh meats, fruits, and vegetables along with tortillas and *pan dulce* made without preservatives and from small-scale bakeries.^{15,16} These product attributes may be preferred by consumers, even those unfamiliar with *tiendas*, as supported by their definitions of healthy foods. Other studies have found that “all natural” or clean label products are perceived as having higher quality and better taste.²⁴

Whereas nutrition knowledge is not the only reason for healthful food choices, it is a strong intrapersonal influence across ethnicities, gender, and age.²⁵ The evaluation of consumer nutrition knowledge for 13 foods frequently found in Latino *tiendas* revealed nutrition knowledge gaps between

Hispanics and non-Hispanics as well as between women and men. Some of the discrepancies may relate to cultural practices and acquired tastes.^{4,12}

These cultural and social norms are interpersonal and/or community factors that influence nutrition knowledge too. White rice, not brown rice, is the norm in Latin American countries.²⁶ Consumption of bottled beverages such as soda or mineral water and high sugar drinks like fruit nectars are common among Hispanics in and outside of the US as a hospitality ritual.²⁷ In some countries of origin, poor sanitation often leaves water unsafe to drink.²⁷ The knowledge differences observed could also indicate Hispanic consumers may not know the importance of, nor prioritize, certain food components such as fiber in rice or the calories and fat in oil-packed foods.⁵ Previous research shows that Hispanic dietary consumption for fruits and vegetables may be higher than non-Hispanics, but still less than dietary guideline recommendations.²⁸ Further research to gain culturally sensitive understanding of the rationale behind purchases could guide nutrition education or product placement to reinforce positive intrapersonal, interpersonal, and community influences. Encouraging consumers to think about the nutritional value of the foods they buy could potentially lead to purchasing more nutritious items or switching to culturally appropriate alternatives.

Table 5
Food Items Purchased at Latino Tiendas by Ethnicity of Respondents (N = 48)

	Total	Hispanic 71% (N = 34)	Non-Hispanic 29% (N = 14)
Items purchased from a tienda ...			
Tortillas	68.8	73.5	57.1
Other groceries (meats, fruits, vegetables)	66.7	73.5	50.0
Pan dulce or other pastries, cakes**	52.1	67.6	14.3
Dry or canned beans	43.8	44.1	42.9
Beverages (including soda, fruit juices, & nectars)	39.6	44.1	28.6
Cooking oil or lard	22.9	20.6	28.6
Milk	18.8	20.6	14.3
Rice	18.8	20.6	14.3
Eggs	14.6	14.7	14.3
Buy meats at a tienda (n=30)			
Yes	76.7	86.4	50.0
No	23.3	13.6	50.0
Of the 23 participants who purchased meat ...			
Beefsteak, roasts, ribs	87.0	89.5	75.0
Chicken	47.8	42.1	75.0
Pork	47.8	42.1	75.0
Organ meats like liver	21.7	15.8	50
Buy fruits at tienda (n=29)			
Yes	58.6	60.0	55.6
No	41.4	40.0	44.4
Of the 17 participants who purchased fruit at a tienda...			
Fresh fruit	94.1	100	80.0
Canned fruit	5.9	0	20.0
Frozen fruit	5.9	8.3	0
Buy vegetables at a tienda? (n=29)			
Yes	75.9	75.0	77.8
No	24.1	25.0	22.2
Of the 29 participants who purchased vegetables at a tienda...			
Fresh vegetables	95.5	100	85.7
Canned vegetables	4.5	0	14.3
Frozen vegetables	4.5	0	14.3

**p < .01

The third study objective was to describe consumer grocery shopping frequency and reasons for store choice between mainstream retail stores versus Latino *tiendas*. Shopping frequency and store choice reasons were similar between Hispanics and non-Hispanics. Community level influences of store choice included proximity to home, food price, and food selection which is similar to findings in other research on grocery shopping habits.^{29,30} In a store survey of 12 communities in rural Iowa, those with smaller populations had less availability and affordability of fresh produce than larger communities.³¹ However, this other study did not include *tiendas* which often have lower produce prices.¹⁴⁻¹⁶ In our study, Hispanics reported shopping at Walmart, a discount retailer, more often than non-Hispanics. Walmart's lower costs, availability of non-grocery items, and increased availability of some ethnic foods have contributed to this store choice for other shoppers.³² These might be contributing factors for the Hispanics in our study, who also had lower annual incomes than non-Hispanics.

As expected, the proportion of Hispanics who shopped at *tiendas* was greater than for non-Hispanics, but both groups of *tienda* shoppers stated that the food selection was the main reason for store choice. Shopping at small retailers like *tiendas* may be part of consumer "mind-set" or personal beliefs for quality of specialty products such as meat or other cultural foods.²⁹ Tortillas, meats, fresh fruits, and vegetables were the main items purchased. About 20% of Hispanic shoppers chose *tiendas* because they felt welcome, and their family and friends shopped there. These responses support the intrapersonal, interpersonal, and community level influences of *tiendas* that go beyond food.

Although we did not evaluate institutional or policy, outreach to non-Hispanics in the geographic locations of *tiendas* could benefit stores and consumers alike.¹³ Over 25% of non-Hispanic respondents did not know about *tiendas* as a store type. Bates¹³ has identified 4 components to increase purchasing in *tiendas*. These include working within small store capacity, building partnerships between local food systems, increasing local products in stores, and linking promotional materials between consumers and retail environments.¹³ Like many consumers nationally, low-income, non-Hispanic white women in Iowa were interested in locally grown dry beans in one survey.³² Other efforts

to incorporate local agriculture with *tiendas* have been successful through multi-sectorial partnerships with the Iowa Department of Public Health and Iowa State Extension.¹⁷

The fourth study objective was to identify the foods, products, or services consumers purchase at *tiendas* and add to this limited body of knowledge. Traditional Hispanic items such as tortillas, meats, fruits and vegetables, *pan dulce*, beans, and beverages may be preferred for their perceived quality of taste or familiarity than the options carried at larger mainstream supermarkets. In fact, *tiendas* may cater specifically to regional origin preferences in ethnic enclaves.¹⁸ These personal touches of "home" provide intrapersonal support to retain interpersonal cultural practices in a changing environment and bolster a sense of cohesion at the community level.^{4,13}

Limitations

There are several limitations to this study. The results are based on self-report and are only representative of the convenience sample of participants. It is not known if respondents lived in a food desert. The sample size for Hispanics is small. Data on the specific type of food items purchased at *tiendas* and participant dietary intakes were not obtained. Online participants were significantly younger than those who completed the survey in person. Age did not vary by ethnicity or gender.

Conclusions

These results support the potential for expanding the role of the *tienda* in promoting healthy, fresh, culturally appropriate foods for Hispanics and non-Hispanics alike. Findings indicate respondents believe healthy foods to be low fat, less processed, and nutrient rich, but there is some disconnect on the properties of foods that meet those criteria (eg, tuna in oil versus tuna in water). Effective education messages could target intrapersonal beliefs in views of healthy foods and reinforce nutrition knowledge and shopping behaviors to highlight the benefits of the *tienda* as a shopping destination. The *tienda* environment could bolster positive nutrition behaviors of customers by educating interested *tienda* owners on healthy stocking patterns, such as optimizing placement and price of healthier choices.¹⁸ Ultimately, these changes may create more positive health behaviors for *tienda* users. In creating these

educational materials, a focus should be made on positive intrapersonal, intrapersonal, and community influences to make healthy food choices.

IMPLICATIONS FOR HEALTH BEHAVIOR OR POLICY

Our findings have implications for the Healthy People 2020 goals of increasing vegetable intake, and increasing food access.⁹ Latino *tiendas* are a partial solution to meeting these objectives through the products they stock and their proximity to populations who may live in food deserts. *Tienda* customers value the food selection and quality the stores offer, and other survey respondents are interested in these same attributes where they shop. Although improved food access to vegetables does not equal increased intakes, *tiendas* may offer a local source of quality and affordable foods for all cultural groups.

Human Subjects Approval Statement

The Iowa State University Institutional Review Board approved this study (IRB#: 16-290).

Conflict of Interest Disclosure Statement

The authors declare no conflicts of interest.

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