Convenience Stores and the Marketing of Foods and Beverages Through Product Assortment

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Background: Product assortment (presence and variety) is a key in-store marketing strategy to influence consumer choice. Quantifying the product assortment of healthier and less-healthy foods and beverages in convenience stores can inform changes in the food environment.

Purpose: To document product assortment (i.e., presence and variety of specific foods and beverages) in convenience stores.

Methods: Observational survey data were collected onsite in 2011 by trained promotora-researchers in 192 convenience stores. Frequencies of presence and distributions of variety were calculated in 2012. Paired differences were examined using the Wilcoxon matched-pairs signed-rank test.

Results: Convenience stores displayed a large product assortment of sugar-sweetened beverages (median 86.5 unique varieties); candy (76 varieties); salty snacks (77 varieties); fried chips (44 varieties); cookies and pastries (19 varieties); and frozen sweets (21 varieties). This compared with 17 varieties of non-sugar sweetened beverages and three varieties of baked chips. The Wilcoxon signed-rank test confirmed a \((p<0.001)\) greater variety of sugar-sweetened than non-sugar-sweetened beverages, and of fried chips compared with baked chips. Basic food items provided by convenience stores included milk (84% of stores); fresh fruit (33%); fresh vegetables (35%); canned vegetables (78%); white bread (71%); and deli-style packaged meat (57%). Healthier versions of milk, canned fruit, canned tuna, bread, and deli-style packaged meat were displayed in 17%–71% of convenience stores.

Conclusions: Convenience stores in this area provide a greater assortment of less-healthy compared with healthier foods and beverages. There are opportunities to influence consumer food choice through programs that alter the balance between healthier and less-healthy foods and beverages in existing convenience stores that serve rural and underserved neighborhoods and communities.

Introduction

The prevalence of childhood obesity has increased steadily over the past 2 decades, and this trend has been more marked among socioeconomically disadvantaged groups, such as Mexican-American children, than among the general population.\(^1\) Studies of Mexican-origin households in economically deprived Texas–Mexico border areas have shown an association between obesity and the severity of food insecurity.\(^2\) Overall, childhood obesity and reduced diet quality have paralleled the growth in consumption of less-healthy snack foods and sugar-sweetened beverages.\(^3\)

A recent study in the Texas border region found that Mexican-origin children who reported very low food security consumed greater amounts of calories, fat, and added sugars than food-secure children.\(^4\) In response to an imbalance in availability between healthier and less-healthy foods, research has focused on aspects of the neighborhood food environment, primarily spatial access to supermarkets.\(^5\) However, convenience stores may provide greater access to foods and beverages than supermarkets or small grocery stores and thus influence food choice and consumption, especially in underserved areas and among children and adolescents.\(^6\)–\(^10\)

Limited access to healthier food is being addressed in urban areas through a variety of policy options to...
Since convenience stores are smaller than supermarkets or grocery stores and have limited display space, the cumulative shelf-space availability (product assortment) of both healthier and less-healthy foods and beverages is important.\(^\text{20}\) However, there are apparently no studies that examine the presence and variety of foods and beverages in convenience stores, especially in areas that serve the growing population of Mexican-origin children and adults, such as the expanding colonias (substandard residential areas developed from subdivided agricultural lands in response to a deficit in low-income housing) along the Texas–Mexico border.\(^\text{8}\) Sugar-sweetened beverages and less-healthy snack foods, such as chips, cookies, and candy, are not usually present in colonia households\(^\text{19}\); however, Mexican-origin children regularly purchase beverages and snacks for immediate consumption, most frequently from neighborhood convenience stores (JRS, unpublished observations, 2012). This is similar to prior reports that among children, intake of unhealthy snacks, such as high fat/sugar snacks, cookies, candies, and carbonated/sugared beverages was positively associated with purchase by children themselves.\(^\text{10,21}\)

Although there are a number of regulatory and taxing policy options to reduce consumption of less-healthy snacks and sugar beverages, a voluntary approach is being utilized in urban corner stores.\(^\text{17}\) Cultural and economic acceptability by customers and storeowners, degree of in-store change in stocking, and sustainability beyond the intervention have been key to the success of these approaches.\(^\text{17}\) However, it is unclear how urban corner store approaches will translate into policy development and adoption by convenience stores in low-income colonia areas. Factors that influence the various decisions behind food-purchasing behavior must be well understood in order to develop policies and guidance for convenience stores in rural and underserved areas that will help eliminate barriers to healthy eating and improve the availability of healthier foods to children. As a first step, this formative study uses observations of product assortment completed within Texas-border convenience stores to directly measure the presence and variety of beverages and foods.

**Methods**

**Setting**

The Hidalgo County TX study area included communities and small towns that ranged in population from \(<1000\) to \(\sim35,000\); greater than 90% of the population is of Mexican origin.\(^\text{22}\) Much of the area is located outside a small town or city, with legal authority at the county level. Using the 2007 North America Industry Classification System (NAICS) and prior experience gained from ground-truthing,\(^\text{8,23}\) the convenience store category included corner stores in rural and underserved areas, convenience stores located within walking distance from home provide ample opportunity for frequent use by children and families with limited transportation and greater intra-month variation in household food supplies.\(^\text{8,19}\) In the Texas border region, there is much greater spatial access, in terms of proximity (minimum distance) and coverage (number of different opportunities), to convenience stores than to other types of retail food stores (supercenters, supermarkets, grocery stores, or dollar stores).\(^\text{8}\) For example, the median distance to the nearest convenience store was 0.08 miles (compared with 3 miles to a supermarket or supercenter), whereas the median number of convenience stores within 1 neighborhood mile was two (compared with no supermarkets or supercenters).\(^\text{8}\)
venience stores (code 445120); meat markets (code 445210); and gasoline stations with convenience stores (code 447110).

In 2011, all roads in the study area were driven systematically by four promotora-researchers (indigenous community health workers trained in research methods) to identify convenience stores or food marts (n = 198) that primarily engage in retailing a limited line of goods that generally include milk, bread, soda, and snacks. Teams of two promotora-researchers entered each store and asked permission to conduct an observational survey of beverages and foods; 97% (N = 192) of store owners/managers consented (six convenience stores refused).

In-Store Observational Survey

The survey instrument was developed to capture product assortment: presence (whether a food or beverage category or subcategory was offered) and variety (number of unique items within a category or subcategory). Variety did not include the number of different packages or liquid container sizes. The instrument was reviewed by a nutritionist for face validity, translated into Spanish, and modified, and pilot-tested in six stores. Four promotora-researchers received 8 hours of classroom and in-store training over 2 days. During pilot-testing, reliability was examined, and a half-day of supplemental training was provided.

Beverage categories included sugar beverages (carbonated soft drinks, fruit drinks, sports drinks, energy drinks, flavored milk/milk drinks, coffee and tea with added sugar, flavored/sugar-sweetened water, and other sugar-sweetened beverages); 100% juice (fruit juice, vegetable juice, and juice blend); and water (plain water and flavored/unsweetened water). Snack foods included candy; salty snacks (chips, nuts, chicharrones/pork rinds, popcorn, crackers, and salted meat snacks); sweet snacks (candied nuts and sugar-sweetened snack mix); prepackaged cookies and pastries (snack cakes, doughnuts, and fruit pies); baked items not in packages; and frozen sweets (popsicles and ice cream novelties). Basic food items included milk (whole, 2%, and 1% or nonfat); fresh fruit; fresh vegetables; canned fruit (in syrup and in juice); canned vegetables; tuna (in oil and in water); canned poultry (chicken or turkey); bread (white, whole grain, or whole wheat); brown rice; and deli-style ham, bologna, turkey, or chicken (regular or low-fat).

Data Analysis

Descriptive statistics were performed in 2012 using Stata, version 11. Store size was described using a count of cash registers present. Frequencies were calculated to describe presence of a specific food or beverage category or subcategory, and medians, means, and SDs were calculated to describe product variety as the number of unique items within a category or subcategory. Wilcoxon matched-pairs signed-rank test was used to test equalities in mean, median, and distribution of variety measures.

Results

Using a count of cash registers, 143 (74.5%) convenience stores were considered small (one register); 33 (17.2%) medium (two registers); or 16 (8.3%) large (three to four registers). Table 1 shows the presence and variety of beverages and snack foods in 97% of all convenience stores in the study area (N = 192). All convenience stores marketed sugar-sweetened beverages (median variety of 86.5 unique sugar beverages). Sugar-containing soft drinks provided the greatest variety, followed by sports drinks, energy drinks, and fruit drinks. The product assortment of sugared soft drinks included Mexican soft drinks (e.g., Jarritos, Yoli, Charritos, Mexican Coca-Cola), which contain granulated natural sugar, are sold in glass bottles, and are popular among Mexican-Americans.

Convenience stores marketed a median variety of 17 non–sugar sweetened beverages (combination of juices and unsweetened waters). In addition, convenience stores marketed a greater variety of sugar-sweetened beverages compared with non–sugar sweetened beverages (p < 0.001), regardless of store size. All convenience stores marketed candy, with a median variety of 78 unique candies; 81% of stores marketed candy from both the U.S. and Mexico. Convenience stores marketed a large variety of salty snacks (median 77); fried chips (median 44); sweet snacks (median 4); cookies and pastries (median 18); and frozen sweets (median 21). The variety of baked chips was limited to a median variety of three unique items, which differed from the variety of fried chips (p < 0.001).

Table 2 shows the presence of basic food items for 192 convenience stores and by store size. The food items most frequently present were milk, canned vegetables, white bread, canned tuna, deli-style packaged meat, and canned fruit in syrup, which were displayed in a greater percentage of medium- or large-size convenience stores compared with smaller stores. One third of all stores provided fresh fruit (primarily avocados or mangos), and 35% provided fresh vegetables (primarily tomatoes or onions). Canned vegetables (primarily green beans, black beans, or refried beans) were available in 150 stores. Healthier types of food items were displayed in a larger percentage of medium and large stores: canned fruit in juice, canned tuna in water, whole grain or whole wheat bread, and low-fat deli-style packaged meat.

Discussion

A thorough understanding of the influence of the neighborhood food environment on food choice and nutritional health requires knowledge of food stores frequented by children and families and the foods and beverages marketed within these stores. Prior work in this region as well as another rural Texas region demonstrated that convenience stores provided greater spatial access (distance and number of shopping opportunities) to food items than supercenters, supermarkets, or grocery stores. Although there are a greater number of convenience or corner stores than supermarkets in both urban and rural areas, few studies have examined...
in-store marketing to document exposure to healthier and less-healthy foods and beverages in small stores. Farley, Rose, and colleagues measured the linear shelf-space to determine exposure in small stores in southeastern Louisiana and Los Angeles County; however, this measurement does not take into account multilevel shelves and product assortment (presence and variety).

Findings from the current study expand the understanding of an important component of in-store marketing: product assortment. This is apparently the first study to document the presence of specific food and beverage categories and subcategories and variety (number of unique items within each category or subcategory) in convenience stores known to be frequented by Mexican-origin adults and children. Results present evidence of a large assortment of sugar-sweetened drinks and energy-dense snack foods in neighborhood convenience stores, regardless of size. The greater presence and variety of different types of beverages and snack foods suggest more options for purchase, which could lead to increased impulse purchases and greater consumption of less-healthy choices, especially by children and adolescents.

In the current study, there were 198 convenience stores, with 192 agreeing to participate in the study. Although convenience stores are frequented by both adults and children, convenience stores have been identified by Mexican-origin children (aged 6–11 years) as the most popular (i.e., convenient) place to purchase snacks on weekdays and weekends (JRS, unpublished observations, 2012). This has been confirmed by studies that report that convenience stores provide ample opportunities for children to purchase and consume energy-dense foods.

### Table 1. Product assortment (presence and variety) of beverages and snacks in convenience stores (N=192)

<table>
<thead>
<tr>
<th>Beverages</th>
<th>Presencea n (%)</th>
<th>Variety M (SD) Median</th>
<th>Snack foods</th>
<th>Presencea n (%)</th>
<th>Variety M (SD) Median</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUGAR-SWEETENED BEVERAGES</strong></td>
<td></td>
<td></td>
<td>Candy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft drinks</td>
<td>192 (100)</td>
<td>91.4 (47.0) 86.5</td>
<td>U.S.-brand</td>
<td>191 (99.5)</td>
<td>78.2 (65.3) 55</td>
</tr>
<tr>
<td>U.S.-brand</td>
<td>191 (99.5)</td>
<td>23.6 (11.3) 21</td>
<td>Mexico-brand</td>
<td>184 (95.8)</td>
<td>32.4 (25.4) 25</td>
</tr>
<tr>
<td>Mexico-brand</td>
<td>176 (91.7)</td>
<td>8.0 (4.3) 8</td>
<td>SALTY SNACKS</td>
<td>192 (100)</td>
<td>83.1 (38.1) 77</td>
</tr>
<tr>
<td>Fruit drinks</td>
<td>174 (90.6)</td>
<td>11.7 (10.4) 10</td>
<td>Chips, fried</td>
<td>192 (100)</td>
<td>46.9 (22.1) 44</td>
</tr>
<tr>
<td><strong>Soft drinks</strong></td>
<td>189 (98.4)</td>
<td>12.3 (6.7) 12</td>
<td>Potato</td>
<td>191 (99.5)</td>
<td>26.4 (18.2) 24</td>
</tr>
<tr>
<td>Energy drinks</td>
<td>185 (96.3)</td>
<td>12.5 (9.4) 10</td>
<td>Cheese/corn</td>
<td>191 (99.5)</td>
<td>14.8 (8.7) 12</td>
</tr>
<tr>
<td>Flavored milk/milk drinks</td>
<td>171 (89.1)</td>
<td>6.7 (5.7) 5</td>
<td>Chicharrón</td>
<td>185 (96.3)</td>
<td>6.1 (3.5) 5</td>
</tr>
<tr>
<td>Coffee and teas3</td>
<td>184 (95.8)</td>
<td>9.6 (6.8) 8</td>
<td>Chips, baked</td>
<td>83 (43.2)</td>
<td>3.5 (3.1) 3</td>
</tr>
<tr>
<td>Water</td>
<td>113 (58.8)</td>
<td>5.1 (3.7) 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other drinks</strong></td>
<td>165 (85.9)</td>
<td>8.8 (6.5) 7</td>
<td>SWEET SNACKS</td>
<td>171 (89.1)</td>
<td>4.6 (3.7) 4</td>
</tr>
<tr>
<td><strong>NON-SUGAR SWEETENED BEVERAGES</strong></td>
<td></td>
<td></td>
<td>Cookies and pastries</td>
<td>189 (98.4)</td>
<td>23.6 (18.7) 19</td>
</tr>
<tr>
<td>Juice, 100%</td>
<td>186 (96.9)</td>
<td>13.3 (8.0) 11</td>
<td>Cookies</td>
<td>188 (97.9)</td>
<td>17.0 (14.5) 14</td>
</tr>
<tr>
<td>Fruit juice</td>
<td>184 (95.8)</td>
<td>6.7 (3.9) 6</td>
<td>Snack pies/cakes</td>
<td>142 (74.0)</td>
<td>8.7 (8.7) 6</td>
</tr>
<tr>
<td>Vegetable juice</td>
<td>168 (87.5)</td>
<td>2.5 (1.6) 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juice blend</td>
<td>154 (80.2)</td>
<td>5.3 (4.8) 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>192 (100)</td>
<td>6.9 (4.2) 6</td>
<td>Frozen sweets</td>
<td>178 (92.7)</td>
<td>22.9 (10.2) 21</td>
</tr>
<tr>
<td>Plain</td>
<td>192 (100)</td>
<td>4.2 (2.3) 4</td>
<td>Popsicles</td>
<td>175 (91.1)</td>
<td>9.9 (6.0) 9</td>
</tr>
<tr>
<td>Flavored</td>
<td>160 (83.3)</td>
<td>3.3 (2.5) 3</td>
<td>Ice Cream</td>
<td>176 (91.7)</td>
<td>13.3 (7.0) 12</td>
</tr>
</tbody>
</table>

*aPresence = number and percentage of convenience stores in which the product category or subcategory was present  
*Variety = number of unique items present within a product category or subcategory; calculated on convenience stores where the product is present and reported as M (SD)  
*Salty snacks includes chips, nuts, popcorn, crackers, and salted meat snacks  
*With added sugar  
*Sweet snacks includes candied nuts and sugar-sweetened snack mix; Chicharrón is deep-fried pork rind
such as chips, candy, and sugar-sweetened beverages. This may be attributed to convenience stores being within walking distance and having the best availability of foods and beverages marketed to youth.29

In the present study, the data illustrate the great imbalance between healthier and less-healthy food and beverage assortments in convenience stores, regardless of size. This is of serious concern considering that increased spatial proximity of convenience stores to the residence is associated with greater risk of overweight/obesity and an increase in BMI among children.30 The influence of convenience stores may well be a result of large assortments of less-healthy foods and beverages and minimal assortments of healthier options.

### Strengths

There are a number of strengths of the present study. First, there were fewer refusals for stores to be observed (3%) than previously reported for Louisiana (28%) and Los Angeles County (34%).20 This was due in large part to the study’s trained promotora-researchers, who are accepted and trusted by the community.4,31 Second, this is apparently the first study that focused on product assortment, a key in-store marketing strategy, in a variety of types and sizes of convenience stores. Third, prior work focused on convenience stores in proximity to schools32; however, in areas where children and adolescents primarily take the school bus, school proximity is not as important for snack purchase as residential proximity (JRS, unpublished observations, 2012).

Finally, Texas border colonias are a population of great demographic importance. They are an archetypal example of the many new-destination Mexican-immigrant communities expanding throughout the U.S. These data are relevant for voluntary, as well as regulatory, policy approaches that seek to educate convenience-store owners of the marketing benefits of a larger selection of healthier beverages and foods, both for the success of the store and the health of the community.

### Limitations

There are several limitations that warrant mention. Data were collected during one season of the year, which limits the ability to determine seasonal variation in product assortment. This could have important implications during periods when children spend more time at home,
such as the summer months. Second, data were not collected on stocking frequency or the factors that influence space allocation. Third, the observation of convenience stores did not include consumer measures, which would assist in the determination of the frequency of store visits, or the relationship of in-store marketing and frequency of store visits on purchase and consumption. Fourth, information was not collected on promotion, placement, or price, which may influence the number of purchases by children. Finally, data were not collected on the variety of basic food items, which limits comparisons of product assortment between basic food items and beverages and snack foods.

Conclusion

Despite these limitations, the results of this study further the understanding of in-store marketing of sugar-sweetened beverages and snack foods to adults and children, especially Mexican-origin children who are at great risk for poor nutrition and nutrition-related health conditions. Convenience stores offer greater spatial access to foods and beverages; in this area, they market a greater assortment of less-healthy compared with healthier foods and beverages. There are opportunities to influence consumer food choice through programs that alter the balance between healthier and less-healthy foods and beverages in existing convenience stores that serve rural and underserved neighborhoods and communities.

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