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Availability of commonly consumed and culturally specific fruits and vegetables in African-American and Latino neighborhoods

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Abstract

Although the importance of culture in shaping individual dietary behaviors is well documented, cultural food preferences have received limited attention in research on the neighborhood food environment. The purpose of this study was to assess the availability of commonly consumed and culturally specific fruits and vegetables in retail food stores located in majority African-American and Latino neighborhoods in southwest Chicago. A cross-sectional survey of 115 stores (15% grocery stores, 85% convenience/corner stores) in African-American neighborhoods and 110 stores (45% grocery stores, 55% convenience/corner stores) in Latino neighborhoods was conducted between May and August 2006. Chi-square tests were used to test for differences in the availability (presence/absence) of commonly consumed (n=25) and culturally specific fruits and vegetables for African-Americans (n=16 varieties) and Latinos (n=18 varieties). Stores located in neighborhoods in which the majority of residents were African-American or Latino residents were more likely to carry fresh fruits and vegetables that were culturally relevant to the dominant group. For example, grocery stores located in Latino neighborhoods were more likely to carry chayote (82.0% vs. 17.6%, $p < 0.05$), while grocery stores located in African-American neighborhoods were more likely to carry black-eyed peas (52.9% vs. 20%, $p<0.05$). Most stores, however, carried

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less than 50% of commonly consumed or culturally specific fruits and vegetables. Findings from this study highlight that limited availability of culturally specific as well as commonly consumed fruits and vegetables in the neighborhood may serve as a barrier to fruit and vegetable consumption among African-Americans and Latinos.

Keywords

fruits; vegetables; African-American; Latinos; neighborhoods

Introduction

In the United States (US), African-Americans and Latinos are disproportionately affected by a number of chronic conditions compared to Caucasians, including obesity, diabetes mellitus, and certain types of cancers (1). While evidence suggests that diets rich in fruits and vegetables play an important role in chronic disease prevention and management (2,3,4,5,6,7), fruit and vegetable intakes among most Americans, particularly African-Americans and Latinos, fall short of recommended levels (8,9).

Although dietitians have traditionally focused their efforts on promoting fruit and vegetable intake at the individual level, an emerging body of evidence suggests that targeting retail food environments may have the greatest potential to create sustainable dietary change (10). Previous studies report that shopping at or living in close proximity to a large supermarket or grocery store (which tend to have the widest selection of fruits and vegetables) is associated with greater intake of fruits and vegetables (11,12,13,14), while convenience store proximity is negatively associated with fruit and vegetable consumption (15), even after controlling for individual-level characteristics. Compared to Caucasian neighborhoods, African-American and Latino neighborhoods have limited availability of supermarkets and fresh produce and greater availability of corner and convenience stores (13,16,17,18,19).

Yet, both epidemiologic research to understand, and increasingly, intervention research to evaluate effects of changes in neighborhood fruit and vegetable availability on consumption, are hampered by the paucity of reliable and valid measures of neighborhood food environments (20,21). While a large body of literature supports the importance of culturally relevant and sensitive measures to accurately assess dietary intake at the individual level (22,23,24,25), culture has received limited attention in studies measuring neighborhood food environments.

Due to their role in maintaining cultural traditions and affirming group identity, culturally specific, or culturally preferred, foods may be particularly important for minority populations, including African-Americans and Latinos (26,27,28). Yet, with some exceptions, measures of neighborhood fruit and vegetable availability generally focus on varieties that are commonly consumed in the general US population (17,29,30,31,32,33,34,35). In an effort to better understand availability of culturally specific fruits and vegetables, the purpose of this study was to examine the availability of both commonly consumed and culturally specific fruits and vegetables in retail food stores located in African-American and Latino neighborhoods in southwest Chicago.

Methods

Setting

This study was conducted in Chicago, Illinois, an excellent setting to address this topic due to large subpopulations of African-Americans (36.8%) and Latinos (26.0%) (36). The target

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area was southwest Chicago, because the study was undertaken in conjunction with two research projects: a diabetes prevention intervention study of the Illinois Prevention Research Center (37,38) and a food access study (39) that targeted African-Americans and Latinos residing in southwest Chicago. In addition to the five Community Areas (officially designated geographic communities in Chicago) (40) targeted by these studies, 13 additional contiguous Community Areas in southwest Chicago were selected to conduct observations. Within these 18 Community Areas, neighborhoods were defined as census block groups. Based on Census 2000 data, neighborhoods were classified as African-American (>50% non-Hispanic African-American residents; n=55), Latino (>50% Latino residents; n=41), Caucasian (>50% non-Hispanic Caucasian residents; n= 7), or racially mixed (<50% of residents belonging to one racial/ethnic group; n=3). This analysis focuses on stores located in majority African- American and Latino neighborhoods due to the small sample size for racially mixed and majority Caucasian neighborhoods. In 2000, the average median household income across neighborhoods was $29,619 ($6,044 to $61,010), which was fairly similar to the median income for all African-Americans ($29,000) but less than that for Latinos ($37,000) residing in Chicago based on Census 2000 estimates.

Sample

Identification of stores in the 18 Community Areas was based on zip code-based lists of retail food establishments obtained from the Chicago Department of Revenue, supplemented with field observations. Four-hundred and twenty-one “food stores” were identified in the study area. Of these, the participation rate for the store audit was 94.1% (23 stores refused), and 333 stores were located in a majority African-American or Latino neighborhood. The Chicago Department of Revenue does not classify establishments by type using North American Industry Classification System codes or any other definitions, nor does it provide potentially relevant information for classification (e.g., annual sales, number of employees). Based on Food Marketing Institute store definitions (41), Yellow Pages categories, and field observations, stores were classified into one of four broad categories: grocery stores (n=67), liquor stores (n=53), convenience/corner stores (n=158), and other food stores (n=55; e.g., delis, drug stores). Briefly, grocery stores included stores that had both fresh produce (including produce markets) and fresh meat sections; liquor stores sold liquor as the primary good or had “liquor” in the store name; “other” food stores were identified by primary good sold or store name; and convenience/corner stores sold gasoline or were classified by exclusion from the other categories. Due to limited availability of any fruits and vegetables and small sample sizes for the other store types, only grocery stores (n=67) and convenience/corner stores (n=158) were included in the final analysis.

Audit Instrument and Data Collection Procedures

Adapted from existing instruments from Baker, Sloane, and Zenk (29,35,42), the audit instrument included food products from the major food groups: fruits and vegetables (fresh, frozen, canned), meats and beans, dairy, and grains (37). The lists of fruits and vegetables from the existing instruments were supplemented based on feedback from experts with training in nutrition and public health, informal discussions with African-American and Latino community health workers from the diabetes prevention program at the Illinois Prevention Research Center (38), and the literature describing traditional/cultural food patterns among African-Americans and Latinos (43,44,45,46). Due to the high concentration of Mexican Americans in the study area, the Latino list was based primarily on cultural food traditions of Mexican Americans, (US Census Bureau, 2000), whereas the African American list largely reflected vegetables traditionally used in soul food preparation or indigenous to African Americans in the south. Prior to data collection, using the Geographic Information Systems software, ArcGIS (version 9.2, 2006, ESRI, Redlands, CA), store addresses from the Chicago Department of Revenue were geocoded. Store locations were confirmed by

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auditors based on field observations and canvassing of the study area. As described above, data were collected – using the same instrument and operational definitions – as part of two research projects. In the first project (37), stores were mailed letters, printed in both English and Spanish, providing an overview of the study. Letter recipients were also given the option to contact the Principal Investigator with questions or to decline participation in the study. In the food access study (39), introductory letters were not mailed, but permission was obtained by store owners/managers prior to conducting assessments. Three data collectors (graduate students) received 20 hours of didactic and field training, with practice opportunities at each of the store types (e.g. grocery store, convenience/corner store) included in the final study sample. The procedures followed for this study were designated as exempt in accordance with the ethical standards of the Institutional Review Board of the University of Illinois at Chicago.

Measures

Availability was based on the presence/absence of a particular kind of fresh fruit or vegetable [beans (dry) were included in the vegetable group]. The availability of 25 commonly consumed fruits and vegetables (32,47), 16 African-American culturally specific fruits and vegetables (43), and 18 Latino culturally specific fruits and vegetables (43,47) was measured. The mean percent agreement for availability of fruits and vegetables was 87.5% across pairs of observers.

Data Analyses

Descriptive statistics (e.g., frequencies) were used to describe availability of each of the 59 fruit and vegetable varieties (25 commonly consumed, 16 African-American, 18 Latino) at grocery stores and convenience/corner stores overall and in majority African-American and Latino neighborhoods. Conducted separately by store type, Chi-square tests were used to test for differences in the availability of fruits and vegetables between majority African-American and Latino neighborhoods. Analyses were run using the Statistical Package for the Social Sciences (version 16.0, 2007, SPSS Inc, Chicago, IL).

Results

Commonly Consumed Fruits and Vegetables

Table 1 presents results for the commonly consumed fruits and vegetables. Across all grocery stores, red leaf lettuce was least likely to be carried (4.0%), while tomatoes were the most commonly available vegetable (94.1%). Overall, 44.0% of the commonly consumed items (11 of 25) were available in the majority of grocery stores. At convenience/corner stores, the most commonly available fruit or vegetable was also tomatoes, carried at 20.8% of stores. Six of the items included on the list of commonly consumed fruits and vegetables (honeydew melon, watermelon, green leaf lettuce, red leaf lettuce, romaine lettuce, red cabbage) were not available at any convenience/corner store. With the exception of oranges and cucumbers (more likely to be carried at grocery stores in Latino neighborhoods than in African-American neighborhoods), there were no statistically significant differences in availability of commonly consumed fresh fruits and vegetables between grocery stores located in African-American and those located in Latino neighborhoods. When compared with convenience/corner stores in African-American neighborhoods, convenience/corner stores in Latino neighborhoods were more likely to carry bananas (21.7 % vs. 3.1%), carrots (11.7% vs. 2.0%), corn (10% vs. 2%), and tomatoes (28.3% vs. 13.3%).

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African-American Culturally Specific Fruits and Vegetables

Table 2 presents results for African-American culturally specific fruits and vegetables. When compared with commonly consumed fruits and vegetables, African-American culturally specific fruits and vegetables were available in fewer stores. Only 1.0% of grocery stores carried chard, while 89.0% of stores carried pinto beans. Overall, just one of the 16 African-American culturally specific items (pinto beans) was available in the majority of grocery stores. Among grocery stores in African-American neighborhoods, three items (black-eyed peas, kidney beans, pinto beans) were available in the majority of stores. As expected, grocery stores located in African-American neighborhoods when compared with Latino neighborhoods had greater availability of collard greens (41.2% vs. 8.0%), mustard greens (35.3% vs. 12.0%), turnip greens (41.2% vs. 14.0%), spinach (41.2% vs. 20.0%), and black-eyed peas (52.9% vs. 20.0%). Beets, however, were more likely to be carried by grocery stores in Latino neighborhoods (16.0.9 % vs. 5.9%).

Results for convenience/corner stores showed similar patterns. Half of the African-American culturally specific items were not available at any of the convenience/corner stores. Although few convenience/corner stores had fresh culturally specific African-American fruits and vegetables available, there were statistically significant differences in the availability of black-eyed peas (23.5% vs. 10.0%) and kidney beans (27.6% vs. 15.0%) between stores located in African-American and Latino neighborhoods.

Latino Culturally Specific Fruits and Vegetables

Table 3 presents results for Latino culturally specific fruits and vegetables. Overall, avocado was the most commonly available item (59.6%) in grocery stores, while garbanzo beans was the most commonly available item in convenience/corner stores (19.1%). Overall, three of the 18 Latino culturally specific items (avocado, papaya, tomatillo) were available in the majority of grocery stores. One-third of the Latino culturally specific items were not available at any of the convenience/corner stores. Among grocery stores in Latino neighborhoods, seven items (avocado, mango, papaya, chayote squash, tomatillo, black beans, garbanzo beans) were available in the majority of stores.

Among grocery stores, avocado (78.0% vs. 41.2%), coconut (24.0% vs. 5.9%), papaya (54.0% vs. 11.8%), chili peppers (42.0% vs. 0%) chayote (82.0% vs. 17.6%), tomatillos (86.0% vs. 23.5%), and cassava (10.0% vs. 0%) were more commonly available at stores in Latino neighborhoods as compared with stores in African-American neighborhoods. Compared with those in African-American neighborhoods, grocery stores in Latino neighborhoods were also more likely to carry black beans (72.0% vs. 23.5%) and garbanzo beans (74.0% vs. 23.5%). Among convenience stores, avocado, chayote and tomatillos, black beans, and garbanzo beans had greater availability in Latino neighborhoods than African-American neighborhoods.

Discussion

Overall, results of this study suggest limited availability of both commonly consumed and culturally specific fruits and vegetables in food stores located in majority African-American and Latino neighborhoods. Commonly consumed fruits and vegetables were more available, with 41.7% of the items (10 of 24) available in the majority of grocery stores. Primarily due to greater availability at convenience/corner stores, stores located in Latino neighborhoods had better availability of commonly consumed fruits and vegetables compared to stores in African-American neighborhoods. This finding is consistent with some prior studies that have found restricted availability of any fruits and vegetables in African-American neighborhoods (17,19,48). Given the scarcity of culturally specific fruits and vegetables,

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residents of predominately African-American neighborhoods may be at higher risk for poor dietary consumption of fruits and vegetables compared to residents of Latino neighborhoods.

Compared with commonly consumed fruits and vegetables, availability of culturally specific fruits and vegetables was limited in the majority African-American and Latino neighborhoods sampled. For example, only 6.3% of African-American items (one of 16) and 16.7% of Latino items (three of 18) were for sale in at least half of the grocery stores. Nonetheless, culturally specific fruits and vegetables were more likely to be carried at stores in neighborhoods of the predominant group. When compared to grocery stores in Latino neighborhoods, grocery stores in African-American neighborhoods, for example, were significantly more likely to carry 37.5% of the culturally specific African-American fruits and vegetables (six of 16). Moreover, as compared with grocery stores in African-American neighborhoods, grocery stores in Latino neighborhoods were significantly more likely to carry 50% of the culturally specific Latino fruits and vegetables (nine of 18). As cultural food preferences have received limited attention in neighborhood food environment research, these findings on the availability of culturally specific fruits and vegetables have important implications for both measurement and intervention.

With respect to measurement, the finding that the availability of several varieties of culturally specific fruits and vegetables (37.5% of African-American and 50.0% of Latino culturally specific fruits and vegetables) differed by neighborhood ethnic composition suggests the importance of incorporating fruits and vegetables that reflect the cultural food practices of these groups into food store survey instruments. Otherwise, studies risk underestimating the availability of fruits and vegetables in African-American and Latino neighborhoods or the effect of neighborhood fruit and vegetable availability on intake. While ample data at the individual level demonstrates an association between culture and dietary intakes (49,26,27,43,50) there is a paucity of studies exploring the relationship between the neighborhood availability of culturally specific fruits and vegetables and dietary intakes. Comprehensive assessments are vital to document racial and socioeconomic inequities in food environments, gain a clearer understanding of relationships between environmental contexts and dietary behaviors, identify appropriate targets for intervention, and evaluate these intervention efforts (51).

As corroborated by prior studies, these results also suggest that interventions are needed to increase the availability of culturally specific fruits and vegetables in Latino and especially African-American neighborhoods. In one study (26), Latino immigrants indicated that the lack of familiarity with fruits and vegetables at stores served as a barrier to their purchase. Another recent study found that even though the median cost per serving of these items were higher than other fruits and vegetables, culturally relevant fruits and vegetables such as greens and okra were more likely to be found in African-American homes (52). In a study that found that availability of a large grocery store in the neighborhood had a stronger effect on fruit and vegetable consumption of urban Latinos than African-Americans, researchers hypothesized that grocers serving the Latino population may have offered more fruits and vegetables preferred by Latinos, which facilitated their purchase and consumption (14). Taken together, these findings highlight the importance of working with retailers to provide fruits and vegetables that are consistent with the preferences of local residents in African-American and Latino neighborhoods.

This study has limitations. First, the lists of culturally specific fruits and vegetables were not based on actual dietary intake data for the populations of interest and thus may not reflect preferred fruits and vegetables. However, the lists derived from the literature were also reviewed by experts in the field and African-American and Latino residents of the study

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area. Second, although acculturation has been hypothesized to influence dietary habits of Latinos in the US (53), the study design precluded an examination of the impact of acculturation on the fruit and vegetable preferences of Latinos in the neighborhoods surveyed. Third, the sample of Latino neighborhoods were primarily Mexican-American, and these findings may not be as relevant for other large Latino subpopulations in the US such as Puerto Ricans or Cuban Americans.

Conclusions

Despite these limitations, consistent with previous studies (17), the results of this study suggest that inadequate access to commonly consumed and culturally specific fruits and vegetables may be a barrier to healthful eating in some urban African-American and Latino neighborhoods. More work is needed to develop measures to objectively assess availability of culturally-specific fruits and vegetables in African-American and Latino neighborhoods. Achieving sustainable increases in fruit and vegetable consumption among African-Americans and Latinos may require increasing neighborhood availability of both commonly consumed and culturally specific fruits and vegetables. Dietitians can play an important role in this process. For example, dietitians working with African-Americans and Latinos can partner with local stores to increase availability. Recent changes to the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) that include the provision of vouchers to clients for purchasing fruits and vegetables (54), also provide an excellent opportunity to increase availability of culturally specific fruits and vegetables. Dietitians can encourage WIC administrators to ensure culturally specific fruits and vegetables are stocked by WIC vendors. By working on multiple levels including environmental change, dietitians can have an even greater positive impact on promoting fruit and vegetable intake in ethnic minority populations.

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Table 1

Availability of commonly consumed fresh fruits and vegetables by store type and neighborhood ethnic composition[a]

	Grocery Stores			Convenience Stores		
	African-American Neighborhoods %	Latino Neighborhoods %	All Stores %	African-American Neighborhoods %	Latino Neighborhoods %	All Stores %
Item	n = 17	n = 50	n = 67	n = 98	n = 60	n = 158
Apples	82.4	90.0	86.2	7.1	16.7	11.9
Bananas[c]	82.4	90.0	86.2	3.1	21.7	12.4
Bell Peppers[d]	88.2	74.0	81.1	17.3	13.3	15.3
Broccoli	29.4	34.0	31.7	0.0	0.0	0.0
Cantaloupe	23.5	46.0	34.8	0.0	1.7	0.85
Cauliflower	35.3	40.0	37.8	0.0	1.7	0.85
Carrots[c]	70.6	74.0	72.3	2.0	11.7	6.7
Celery	64.7	64.0	64.4	3.1	5.0	4.1
Corn[c]	41.2	66.0	53.6	2.0	10.0	6.0
Cucumber[b]	29.4	70.0	49.7	4.1	6.7	5.4
Green Cabbage	82.4	78.0	80.4	9.2	13.3	11.3
Green Grapes	35.3	46.0	40.7	0.0	5.0	2.5
Green Leaf Lettuce	11.8	4.0	7.9	0.0	0.0	0.0
Honeydew Melon	17.6	26.0	21.8	0.0	0.0	0.0
Iceberg Lettuce	64.7	86.0	75.4	8.2	11.4	9.8
Oranges[b]	64.7	92.0	78.4	5.1	10.0	7.6
Peaches	29.4	42.0	35.7	1.0	0.0	0.5
Pears	35.3	52.0	43.7	2.5	0.0	1.3
Red Cabbage	11.8	16.0	13.9	0.0	0.0	0
Red Grapes	52.9	56.0	54.4	0.0	3.3	1.7
Red Leaf Lettuce	5.9	2.0	4.0	0.0	0.0	0.0
Romaine Lettuce	11.8	26.0	18.9	0.0	0.0	0.0
Strawberries	35.3	30.0	32.7	2.0	0.0	1.0

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	Grocery Stores			Convenience Stores		
	African-American Neighborhoods %	**Latino Neighborhoods %**	**All Stores %**	**African-American Neighborhoods %**	**Latino Neighborhoods %**	**All Stores %**
Tomatoes[c]	94.1	94.0	94.1	13.3	28.3	20.8
Watermelon	52.9	44.0	48.5	0.0	0.0	0.0

[a] Comparisons are for statistically significant differences in availability between stores in African-American and Latino neighborhoods using chi-square tests.

[b] Statistically significant difference in availability between African-American and Latino grocery stores, $p < .05$

[c] Statistically significant difference in availability between African-American and Latino convenience stores, $p < .05$

[d] Green, red, and yellow bell peppers

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Table 2

Availability of African-American culturally specific fresh fruits and vegetables by store type and neighborhood ethnic composition[a]

	Grocery Stores			Convenient Stores		
	African-American Neighborhoods %	**Latino Neighborhoods %**	**All Stores %**	**African-American Neighborhoods %**	**Latino Neighborhoods %**	**All Stores %**
Item	n = 17	n = 50	n = 67	n = 98	n = 60	n = 158
Acorn Squash	5.9	6.0	6.0	1.0	0.0	0.5
Beets[b]	5.9	16.0	10.9	0.0	0.0	0.0
Black Eye Peas[*, b, c]	52.9	20.0	36.4	23.5	10.0	16.8
Buttercup Squash	0.0	2.0	1.0	0.0	0.0	0.0
Butternut Squash	5.9	8.0	7.0	0.0	0.0	0.0
Chard	0.0	2.0	1.0	0.0	0.0	0.0
Collard[b] Greens	41.2	8.0	24.6	0.0	0.0	0.0
Kale	0.0	4.0	2.0	0.0	0.0	0.0
Kidney[c] Beans**	58.8	36.0	47.4	27.6	15.0	21.3
Mustard[b] Greens	35.3	12.0	23.5	0.0	0.0	0.0
Okra	11.8	4.0	7.9	1.0	0.0	0.5
Pinto Beans[*]	94.1	84.0	89.0	33.7	35.0	34.4
Red Beans[*]	5.9	8.0	7.0	5.1	8.3	6.7
Spinach[b]	41.2	20.0	30.6	1.0	1.7	1.4
Sweet Potatoes	47.1	26.0	37.0	3.1	3.3	3.2
Turnip Greens[b]	41.2[*]	14.0	27.6	0.0	0.0	0.0

[a] Comparisons are for statistically significant differences in availability between stores in African-American and Latino neighborhoods using chi-square tests.

[b] Statistically significant difference in availability between African-American and Latino grocery stores, p <.05

[c] Statistically significant difference in availability between African-American and Latino convenience stores, p <.05

[*] These items were included in the analysis as “dried” rather than “fresh”

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Table 3

Availability of Latino culturally-specific fresh fruits and vegetables by store type and neighborhood ethnic composition[a]

	Grocery Stores			Convenient Stores		
	African-American Neighborhoods %	Latino Neighborhoods %	All Stores %	African-American Neighborhoods %	Latino Neighborhoods %	All Stores %
Item	n = 17	n = 50	n = 67	n = 98	n = 60	n = 158
Avocado[b,c]	41.2	78.0	59.6	1.0	15.0	8.0
Black Beans[b,c]	23.5	72.0	47.8	4.1	23.3	13.7
Cactus	23.5	22.0	22.8	0.0	0.0	0.0
Cassava[b]	0.0	10.0	5.0	0.0	0.0	0.0
Chayote Squash[b,c]	17.6	82.0	49.8	1.0	10.0	5.5
Chili Peppers[b]	0.0	42.0	21	0.0	3.3	1.7
Cherimoya	0.0	1.0	0.5	0.0	0.0	0.0
Coconut[b]	5.9	24.0	15	0.0	0.0	0.0
Garbanzo Beans[*b,c]	23.5	74.0	48.8	8.2	30.0	19.1
Green Peas	5.9	6.0	6.0	1.0	1.7	1.4
Guava	11.8	4.0	7.9	0.0	0.0	0.0
Jicama	11.8	16.0	13.9	1.0	0.0	0.5
Mangoes	41.2	64.0	52.6	1.0	0.0	0.5
Papaya[b]	11.8	54.0	32.9	0.0	1.7	0.9
Passion Fruit	0.0	2.0	1.0	0.0	0.0	0.0
Pineapple	35.3	46.0	40.7	0.0	3.3	1.7
Plantains	11.8	30.0	20.9	0.0	1.7	0.9
Tomatillos[b,c]	23.5	86.0	54.8	1.0	16.7	8.9

[a] Comparisons are for statistically significant differences in availability between stores in African-American and Latino neighborhoods using chi-square tests.

[b] Statistically significant difference in availability between African-American and Latino grocery stores, $p < .05$

[c] Statistically significant difference in availability between African-American and Latino convenience stores, $p < .05$

[*] These items were included in the analysis as “dried” rather than “fresh”