Published in final edited form as:

J Immigr Minor Health. 2015 April ; 17(2): 441–449. doi:10.1007/s10903-014-0107-7.

The Food Similarity Index: A New Dimension of Dietary Acculturation Based on Dietary Recall Data

Jennifer Van Hook, Susana Quiros, and Michelle Frisco

Department of Sociology and Criminology and Population Research Institute, The Pennsylvania State University, University Park, Pennsylvania (Jennifer Van Hook, Susana Quiros and Michelle Frisco)

Abstract

Background—This study introduces a flexible indicator of dietary acculturation that measures immigrants' eating behavior relative to U.S.-born persons.

Methods—Using 24-hour dietary recall data from the continuous National Health and Nutrition Examination Survey pooled across multiple years from 1999/00 through 2009/10, we developed and tested the validity of the “Food Similarity Index” (FSI), which indicates the similarity of the foods consumed by individuals to the foods most commonly consumed by same-aged U.S.-born persons of all racial/ethnic groups. We demonstrate its utility here for children and adults of four racial-ethnic groups.

Results—FSI was positively associated with the consumption of common American foods and negatively associated with eating Hispanic and Asian foods. In addition, FSI was associated with generational status among all racial/ethnic groups and duration of U.S. residence among Hispanics. FSI was also negatively associated with the Healthy Eating Index 2010.

Discussion—The FSI enables researchers to compare immigrants' dietary patterns over generations and across groups. It can be used to study how dietary acculturation shapes health risk factors and diseases.

Keywords

Acculturation; food similarity index (FSI); healthy eating index (HEI); immigrants

BACKGROUND

Obesity and diet-related health conditions increase among immigrants as they spend more time in the U.S. (1). This has fueled scholarly interest in dietary acculturation (2) and speculation that it is associated with a wide range of health problems (3–5).

Dietary acculturation is usually measured by comparing macronutrients, specific foods, or eating patterns across groups that are assumed to be more or less acculturated because of duration of U.S. residence, English language proficiency, or nativity (6). With few

exceptions (7–9), findings suggest that increased acculturation is associated with a less healthy diet (6, 10–12).

A limitation of dietary acculturation studies is that acculturation is determined by comparing eating behavior among persons within a single group of immigrants often from the same national origin, such as Mexicans (11, 13). We argue that new insights about dietary acculturation and its consequences can be gained by assessing how similar immigrants' eating behaviors are to U.S.-born people of all racial or ethnic groups. This approach better assesses the process of acculturation and whether it is similar for immigrants from different parts of the world because it estimates whether immigrants' diets tend to converge with American dietary patterns. Anchoring dietary acculturation to American dietary patterns also permits researchers to compare the extent of dietary change within and across groups.

We developed an anchored indicator of dietary acculturation, the “food similarity index” (FSI) and demonstrate its validity and utility among children and adults from multiple racial-ethnic groups. The FSI can be replicated for different groups using publicly available National Health and Nutrition Examination Survey (NHANES) data.

METHODS

Data and sample

This study was approved by the Institutional Review Board at the Pennsylvania State University (IRB #34780). It was conducted using data from the continuous NHANES, pooled across multiple years (1999/00 through 2009/10). NHANES is a publicly available, nationally-representative, repeated cross-sectional study conducted by the Centers for Disease Control and Prevention. NHANES samples households and collects data from selected household members; children and adults may be selected from the same household. We used data from the 18,349 5–19 year old children and 27,365 adults ages 20–84 who participated in the NHANES day 1 dietary recall and did not report extreme dietary recall values (Kcal<500 or >8000).

Measures

The *Food Similarity Index (FSI)* indicates how similar each individual's diet is to the diets of same aged U.S. born persons. It was constructed using NHANES dietary recall data collected by trained interviewers using the United States Department of Agriculture (USDA) Automated Multiple-pass Method. Day 1 recalls were conducted in person. Day 2 recalls were conducted by telephone 3–10 days afterwards. We only used Day 1 data due to high levels of missing data on Day 2. An adult familiar with the child's intake assisted in interviews with children ages 5–11. All recalled foods were coded by NHANES staff using the USDA Food and Nutrient Database for Dietary Studies (14–16).

Calculating the FSI required three steps. First, we used dietary recall data from U.S.-born persons of any racial or ethnic group (limited to those with U.S.-born householders in the case of children) to assign each USDA 5-digit food category a rank score, $r_{j,a}$. This score indicates its popularity, or rank ordering in grams, among all foods consumed by all U.S.-born Americans. To account for age variations in food preferences (17) we made these

calculations among six age groups ($a_1=5-9$, $a_2=10-14$, $a_3=15-19$, $a_4=20-39$, $a_5=40-59$, $a_6=60-84$). For example, among U.S.-born children of U.S.-born householders age 5–9, the rank of broccoli was 86 because 85 other foods were more commonly consumed. In step 2 we assigned *all* persons the mean rank score averaged across all foods they consumed that day (S_{ia}). Thus both the U.S.- and foreign-born received scores, as both groups may eat uncommon foods. In calculating these averages, we weighted the rank scores by the proportion of food eaten (in grams):

$$S_{ia} = \frac{\sum r_{ja} g_{i,j,a}}{\sum g_{i,j,a}} \quad (1)$$

where $g_{i,j,a}$ equals the grams consumed of food category j by person i of age group a . We used grams rather than calories to account for low calorie foods and zero-calorie drinks. The final step in creating FSI was transforming S_{ia} . It was reverse-scored so that higher values indicating greater food similarity and then converted to a percentile normed against U.S.-born individuals in the appropriate age group. Thus, an FSI value of 50 indicates that a respondent's diet was as American as the median U.S.-born person in his/her age group.

American, Hispanic, and Asian foods were identified by five different coders with very high reliability ($\alpha=.96$). “American” foods were two top-ranked foods eaten by U.S.-born adults and children in the NHANES: soda and pizza. “Hispanic” foods included foods like tortillas and tamales. “Asian” foods included items like dumplings and stir-fried vegetables.

We created an indicator of *time in the U.S.*, using generational status and duration of residence. Children were classified as (1) foreign-born with less than 5 years of U.S. residence, (2) foreign-born with 5 or more years of U.S. residence, (3) U.S.-born with a foreign-born householder or (4) U.S.-born with a U.S. born householder. Adults were classified as foreign-born with (1) 0–4, (2) 5–9, or (3) 10 or more years of U.S. residence, or as (4) U.S.-born.

We estimated *diet quality* using the 2010 Healthy Eating Index (HEI-2010), which can be produced using code provided by the National Cancer Institute <http://riskfactor.cancer.gov/tools/hei/tools.html>. It is a scale ranging from 1 to 100 indicating the degree to which reported food intake conformed to Center for Nutrition Policy and Promotion (CNPP) guidelines.

All multivariate models controlled for *age*, *sex* (female=1), and *educational attainment* (for adults or householders of children: <high school, high school, some college, college+), share of total grams of daily food consumed at home, and whether the dietary recall occurred on a Saturday or Sunday (weekend=1). Multivariate models predicting HEI-2010 also controlled for the proportion of food (grams) consumed as snacks and whether the respondent ate breakfast and lunch.

Data analysis

All analyses were conducted in Stata 12.0. We multiply imputed missing values separately for children and adults, using all analytic variables as predictors. We averaged empirical

results across ten imputation samples and accounted for random variation across samples to calculate standard errors. We also adjusted estimates to account for the clustered and stratified NHANES sample design

We first described the sample (Table 1). We next validated FSI as a measure of dietary acculturation by estimating how consumption of American, Hispanic and Asian foods varied by FSI terciles (Table 2). The remaining analyses illustrated FSI's versatility for exploring the pace and contexts of dietary acculturation. We evaluated FSI's relationship to generational status/duration of U.S. residency and other sociodemographic factors using OLS regression models (Table 3), and showed how FSI can assess the nutrition impacts of dietary acculturation, by estimating multivariate models predicting the relationship between FSI and healthy eating (Table 4).

We conducted eight separate sets of analyses for Hispanic, non-Hispanic white, non-Hispanic black, and other children and adults. The NHANES does not identify Asians separately from other racial/ethnic group. We suspect that a large share in the "other" group is Asian because 65% of those who do not identify as non-Hispanic white, non-Hispanic black or Hispanic are Asian. This rises to 92 % among the foreign-born (authors' calculation).

RESULTS

Table 1 describes characteristics of our sample. The mean value of FSI was 49.4 for children and 48.0 for adults. HEI-2010 was 42.1 for children and 47.6 for adults. Nearly 60 % of children and adults consumed soda, and 22.0 % of children and 10.6 % of adults ate pizza. Roughly a third of children and adults consumed Hispanic food and about 1 in 6 consumed Asian food. For both children and adults, about two-thirds of food was consumed at home. Average values for other study variables followed expected sociodemographic patterns.

Results in Table 2 suggest that FSI estimates dietary acculturation well. It was related to consuming American foods for all groups. For example, among Hispanic children and adults in the lowest food similarity tercile, 15.7 and 25.4 % drank soda, respectively. This increased across FSI categories, exceeding 90 % among both children and adults in the highest tercile. FSI was also related to less Hispanic food consumption among Hispanics, and less Asian food consumption among other race individuals. This illustrates FSI's flexibility: it can tap diet similarity with U.S.-born persons across racial/ethnic groups with different culinary traditions.

Results in Table 3 demonstrate FSI's capacity to identify the factors associated with dietary acculturation. Generational status/duration of U.S. residence was associated with FSI for all race/ethnic groups among children (Panel A) and adults (Panel B). The only exceptions were foreign-born black children with 5 or more years of U.S. residence and foreign-born black adults with 5–9 years of U.S. residence, whose FSI scores were not significantly different from their U.S.-born counterparts, possibly due to low sample sizes.

Additionally, dietary acculturation may occur most quickly for Hispanics. As indicated by the "a" superscript, Hispanic foreign-born children with 5 or more years of U.S. residence

and foreign-born adults with 10 or more years of U.S. residence had significantly higher FSI scores than those with less than 5 years of U.S. residence. There were no significant differences *among* the foreign-born for the other race/ethnic groups. Instead, the greatest differences were between the U.S.-born and all others.

Surprisingly, FSI was not consistently associated with where people eat, when their diets were assessed, or with educational attainment. However, females had significantly less acculturated diets than males among nearly every group. Results about gender were similar when the sample excluded the U.S. born (not shown).

Table 4 shows that FSI also predicts how dietary acculturation is related to diet quality. FSI was consistently associated with HEI-2010. For example, among Hispanic children, a percentile increase in FSI was associated with a reduction in HEI-2010 of about a tenth of a point. This association was significant and similar in magnitude across all race/ethnic groups among children and adults; supplemental analyses yielded nearly identical results when the U.S. born were dropped from the sample. Supplemental analyses also showed that the relationship between FSI and HEI tended to be flatter at lower levels of FSI and more strongly negative at higher levels.

Finally, we tested the sensitivity of FSI to different specifications. We constructed alternative FSI scores by modifying the detail of the U.S.D.A. food codes, which contain 8 digits, but can be truncated to broader categories. For example, all fluid unsweetened cow's milk codes share the same first 4 digits (1111), but 5 digits are required to distinguish non-fat (11113), low-fat (11112), and whole milk (11114). We estimated FSI with 4, 5, and 6 digit food codes. We also estimated FSI using alternative metrics to rank foods and weight rank scores: *grams*, *calories*, and the *number of times* the food was consumed during the day of the dietary recall.¹ Table 5 shows for children and adults of all race/ethnic groups how generational status is associated with each FSI variation net of confounders, and how the FSI variations predict HEI-2010 net of confounders. The association between generation/duration and FSI was stronger when more detailed food categories were used, and when food was measured in grams or number of times consumed. Beyond this, results were remarkably consistent across the FSI variations, signifying FSI's robustness.

DISCUSSION

In this study, we introduced the FSI, a new measure of dietary acculturation that compares respondent's dietary patterns with empirically-established dietary patterns among same-aged US-born peers. We demonstrated the validity and versatility of this measure for children and adults across multiple racial/ethnic groups.

We showed that FSI has face validity across 9 alternative specifications. It was positively associated with consuming American foods, negatively associated with ethnic foods, and positively associated with time and generations in the U.S. Additionally, FSI can be used to

¹In additional sensitivity tests, we substituted the rank score ($r_{j,a}$) in equation 1 with indicators of how frequently, the U.S. born consumed food j ($f_{j,a}$) and the proportion of food (grams) in category j consumed by the U.S. born ($p_{j,a}$). We also tested raw versus percentiled FSI scores. Results were consistent across these specifications, but are not reported here due to space constraints.

identify group variations in dietary acculturation. For example, males tended to have more acculturated diets than females, and dietary acculturation appeared to occur more quickly within the first generation among Hispanics than other groups, though our cross-sectional data prevent us from drawing conclusions about temporal change. Finally, FSI can assess healthful eating impacts of dietary acculturation. Consistent with prior research (2, 4, 5, 13), it was associated with worse diet quality.

The FSI has the potential to advance dietary acculturation research. Unlike previous research that measures dietary acculturation within a single national-origin immigrant group, the FSI enables researchers to compare individual's diets with U.S.-born peers and to develop consistent comparisons within and across different race/ethnic, age, and national origin groups. We found substantial differences in dietary acculturation by nativity and generational status, consistent with prior research (6, 12, 13). Our study extends this research by quantifying these group differences and by being the first to show how processes compare across groups of children and adults.

The FSI does not measure diet quality. Instead, it examines how similar individual's diets are to a typical American diet thus allowing researchers to empirically assess the importance of dietary acculturation for a host of health related outcomes. In this study, we demonstrated its link to a validated indicator of diet quality. Future research can use the FSI to better understand many other implications of dietary acculturation for health outcomes such as obesity, hypertension, and diabetes or for health outcomes in different contexts. For example, future research could use the FSI to examine what kinds of neighborhood contexts may protect immigrants from dietary acculturation or from negative outcomes associated with it.

The FSI has limitations, some of which are the result of the data available to construct it. It is based on self-reported NHANES dietary recall data, which has been evaluated for validity, effectiveness and accuracy (15, 16, 18), but some people, including men and individuals who eat more, have difficulty documenting what and how much they eat (19). Another limitation is that the FSI globally assesses dietary acculturation. It cannot provide insight about which foods drive food (dis)similarities. Future research could develop subscales, using the Healthy Eating Index subscales as a model. Finally, Americans and their diets are heterogeneous, yet the FSI gauges the similarity of individual's diets to the diets of *all* same-aged U.S. born. Future research could select different reference groups to compare food similarity, such as African Americans, highly educated U.S.-born individuals, or individuals living in the same region or state. Despite limitations, FSI is a new and flexible dietary acculturation measure that can push research on this topic forward in important and innovative ways.

ACKNOWLEDGEMENTS

This research was supported by grants from the National Institutes of Health (R24 HD041025 and P01 HD062498). The authors thank Molly Martin and Claire Altman for helpful comments on earlier drafts of this paper.

REFERENCES

1. Antecol H, Bedard K. Unhealthy Assimilation: Why Do Immigrants Converge to American Health Status Levels? *Demography*. 2006; 43(2):337–360. [PubMed: 16889132]
2. Satia-Abouta J, Patterson RE, Neuhouser ML, Elder J. Dietary Acculturation: Applications to nutrition research and dietetics. *Journal of the American Dietetic Association*. 2002; 102:1105–1118. [PubMed: 12171455]
3. Lin H, Bermudez OI, Tucker KL. Dietary Patterns of Hispanic Elders are Associated with Acculturation and Obesity. *The Journal of nutrition*. 2003:3651–3657. [PubMed: 14608089]
4. Oster A, Yung J. Dietary acculturation, obesity, and diabetes among Chinese immigrants in New York City. *Diabetes care*. 2010; 33:e109. [PubMed: 20668145]
5. Wong SS, Dixon LB, Gilbride JA, Kwan TW, Stein RA. Measures of Acculturation are Associated with Cardiovascular Disease Risk Factors, Dietary Intakes, and Physical Activity in Older Chinese Americans in New York City. *Journal of Immigrant and Minority Health*. 2013:1–9. [PubMed: 22307545]
6. Ayala GX, Baquero B, Klinger S. A systematic review of the relationship between acculturation and diet among Latinos in the United States: implications for future research. *Journal of the American Dietetic Association*. 2008; 108:1330–1344. [PubMed: 18656573]
7. Carrera PM, Gao X, Tucker KL. A study of dietary patterns in the Mexican-American population and their association with obesity. *Journal of the American Dietetic Association*. 2007; 107:1735–1742. [PubMed: 17904933]
8. Liu A, Berhane Z, Tseng M. Improved dietary variety and adequacy but lower dietary moderation with acculturation in Chinese women in the United States. *Journal of the American Dietetic Association*. 2010; 110:457–462. [PubMed: 20184998]
9. Edmonds VM. The nutritional patterns of recently immigrated Honduran women. *Journal of transcultural nursing : official journal of the Transcultural Nursing Society / Transcultural Nursing Society*. 2005; 16:226–235. [PubMed: 15980050]
10. Akresh IR. Dietary assimilation and health among Hispanic immigrants to the United States. *Journal of Health and Social Behavior*. 2007; 48(4):404–417. [PubMed: 18198687]
11. Dixon LB, Sundquist J, Winkleby M. Differences in energy, nutrient, and food intakes in a US sample of Mexican-American women and men: findings from the Third National Health and Nutrition Examination Survey, 1988–1994. *American journal of epidemiology*. 2000; 152:548–557. [PubMed: 10997545]
12. Duffey KJ, Gordon-Larsen P, Ayala GX, Popkin BM. Birthplace is associated with more adverse dietary profiles for US-born than for foreign-born Latino adults. *The Journal of Nutrition*. 2008; 138:2428–2435. [PubMed: 19022968]
13. Batis C, Hernandez-Barrera L, Barquera S, Rivera JA, Popkin BM. Food Acculturation Drives Dietary Differences among Mexicans, Mexican Americans, and Non-Hispanic Whites. *The Journal of Nutrition*. 2011; 141(10):1–9. [PubMed: 21106929]
14. Moshfegh AJ, Rhodes DG, Baer DJ, Murayi T, Clemens JC, Rumpler WV, et al. The US Department of Agriculture Automated Multiple-Pass Method reduces bias in the collection of energy intakes. *The American Journal of Clinical Nutrition*. 2008; 88(2):324–332. [PubMed: 18689367]
15. Conway JM, Ingwersen LA, Vinyard BT, Moshfegh AJ. Effectiveness of the US Department of Agriculture 5-step multiple-pass method in assessing food intake in obese and nonobese women. *The American Journal of Clinical Nutrition*. 2003; 77(5):1171–1178. [PubMed: 12716668]
16. Blanton CA, Moshfegh AJ, Baer DJ, Kretsch MJ. The USDA Automated Multiple-Pass Method accurately estimates group total energy and nutrient intake. *The Journal of Nutrition*. 2006; 136(10):2594–2599. [PubMed: 16988132]
17. Birch LL. Development of food preferences. *Annual review of nutrition*. 1999; 19(1):41–62.
18. Moshfegh AJ, Rhodes DG, Baer DJ, Murayi T, Clemens JC, Rumpler WV, et al. The US Department of Agriculture Automated Multiple-Pass Method reduces bias in the collection of energy intakes. *The American Journal of Clinical Nutrition*. 2008; 88(2):324–332. [PubMed: 18689367]

19. Jonnalagadda SS, et al. Accuracy of energy intake data estimated by a multiplepass, 24-hour dietary recall technique. *Journal of the American Dietetic Association*. 2000; 100(3):303–311. [PubMed: 10719403]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 1

Weighted means or percentages for all analytic variables (standard deviations for continuous variables in parentheses), NHANE5 1999/00-2009/10

Variable	Children aged 5–19	Adults aged 20–84
Food similarity index (mean)	49.4 (29.6)	48.0 (29.4)
Healthy Eating Index-2010 (mean)	42.1 (12.0)	47.6 (14.3)
<u>Percentage who consumed:</u>		
Soda	56.7	56.9
Pizza	22.1	10.6
"Hispanic" food	32.7	30.9
"Asian" food	15.6	17.6
Breakfast	80.3	84.6
Lunch	82.0	76.1
<u>Generation/Duration of U.S. residence</u>		
Children's Generational Status (percentage)		
Foreign-born, 0–4 years in U.S.	2.7	
Foreign-born, 5+ years in U.S.	4.1	
U.S.-born, Foreign-born householder	12.3	
U.S.-born, U.S.-born Householder	80.9	
Adult's Nativity/Duration of Residence (percentage)		
Foreign-born, 0–4 years in U.S.		5.0
Foreign-born, 5–9 years in U.S.		3.6
Foreign-born, 10+ years in U.S.		6.0
U.S.-born		85.4
<u>Other Variables</u>		
Proportion of food consumed at home	0.64 (0.32)	0.67 (0.32)
Day of Dietary Recall (percentage on weekend)	28.6	28.6
Proportion of food consumed as a snack	0.32 (0.23)	0.36 (0.25)
Race/Ethnicity (Percentage)		
Hispanic	18.0	12.4
NH-White	60.9	71.1
NH-Black	14.6	11.3
Other	6.5	5.2
Age (Percentage)		
5–9	31.3	
10–14	36.2	
15–19	32.5	
20–29		20.1
30–39		19.9
40–49		20.6
50–59		17.6
60–69		12.5

Variable	Children aged 5–19	Adults aged 20–84
70+		9.3
Educational Attainment ^a (percentage)		
Less than High School	7.2	6.0
High School	14.3	12.8
Some College	25.4	25.1
Completed College	53.1	56.1
Female (percentage)	49.3	51.7
N	18349	27365

Abbreviations: NHANES, National Health and Nutrition Examination Survey

^aFor children, this refers to the householder's educational attainment.

Table 2
Percentage consumed selected foods by Food Similarity Index, NHANES 1999/00-2009/10

FSI category:	Children aged 5–19				Adults aged 20–84			
	Low Food Similarity		Medium		Low Food Similarity		Medium	
	0–32	33–66	67–100	High Food Similarity	0–32	33–66	67–100	High Food Similarity
Hispanics								
Soda	15.7	71.4	93.4	25.4	80.1	93.7		
Pizza	13.5	22.5	27.8	5.7	10.4	12.8		
"Hispanic" food	61.5	60.5	51.9	74.7	72.0	58.9		
"Asian" food	19.7	15.9	11.9	18.3	16.5	13.3		
N	2257	2542	2133	3349	2417	1686		
NH-Whites								
Soda	15.0	61.6	90.2	18.9	60.6	85.2		
Pizza	14.6	22.4	29.8	8.7	11.1	14.4		
"Hispanic" food	26.9	29.5	24.2	24.5	26.8	24.5		
"Asian" food	16.4	13.7	8.0	18.6	17.1	10.4		
N	1410	1753	1976	3905	4607	4785		
NH-Blacks								
Soda	10.3	62.8	95.2	17.6	75.6	94.3		
Pizza	17.2	26.0	23.8	5.0	8.3	8.6		
"Hispanic" food	28.7	30.3	24.6	24.9	25.9	25.0		
"Asian" food	20.9	18.5	15.7	21.1	18.3	16.4		
N	2310	1727	1368	2578	1620	1303		
Others								
Soda	13.5	65.0	91.2	16.0	65.8	90.3		
Pizza	15.6	19.1	25.7	6.4	7.6	17.1		
"Hispanic" food	25.1	28.6	27.8	24.6	26.0	26.8		
"Asian" food	56.1	31.3	20.2	65.9	49.7	22.8		
N	304	317	252	561	319	235		

Abbreviations: FSI, food similarity index; NHANES, National Health and Nutrition Examination Survey

Table 3
OLS regression models predicting Food Similarity Index (FSI), NHANES 1999/00-2009/10

	Hispanic	NH-White	NH-Black	Other
Panel A. Children Aged 5–19				
Generational Status (Ref = U.S. born with U.S.-born Householder)				
Foreign-born, 0–4 years in U.S.	–19.5 ***	–17.6 ***	–17.8 ***	–17.4 **
Foreign-born, 5+ years in U.S.	–10.5 ^a ***	–15.8 ***	–5.9	–17.2 **
U.S.-born, Foreign-born householder	–7.4 ^a ***	–13.8 ***	–12.2 ***	–21.4 ***
Proportion of food consumed at home	–8.7 ***	–1.3	–1.9	–8.4 +
Day of Dietary Recall (Weekend = 1)	–0.6	–2.1 *	–3.1 *	0.3
Age (Ref=15–19)				
5–9	–3.0 *	–0.2	–2.7 *	–3.0
10–14	–1.2	0.3	–2.5 +	2.9
Householder's Educational Attainment (Ref = <High School)				
High School	1.2	–2.4	5.7 *	4.4
Some College	0.1	–2.9	7.7 *	1.6
Completed College	–0.6	–6.2	7.1 *	–0.6
Gender (Female=1)	–4.4 ***	–6.9 ***	–1.7 +	–1.8
Intercept	57.8 ***	63.3 ***	46.0 ***	58.7 ***
N	6,932	5,139	5,405	873
Panel B. Adults Aged 20–84				
Generational Status (Ref = U.S. born)				
Foreign-born, 0–4 years in U.S.	–17.9 ***	–13.8 **	–13.3 ***	–26.3 ***
Foreign-born, 5–9 years in U.S.	–16.6 ***	–15.7 ***	–8.7 +	–29.3 ***
Foreign-born, 10+ years in U.S.	–11.5 ^a ***	–6.9 ***	–14.4 ***	–23.1 ***
Proportion of food consumed at home	–2.4	–1.0	1.3	2.5
Day of Dietary Recall (Weekend = 1)	–0.6	–0.4	–2.0 +	–2.8
Age (Ref=20–29)				
30–39	–6.9 ***	–3.5 **	–5.3 **	2.2
40–49	–3.7 +	0.1	–3.1 *	5.0

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

	Hispanic	NH-White	NH-Black	Other
50–59	–6.2 **	–2.9 **	–3.6 *	1.9
60–69	–3.5 +	0.7	–0.2	2.6
70+	–6.2 **	–4.9 ***	–2.1	–0.1
Educational Attainment (Ref = <HS)				
High School	2.9 *	4.2 +	2.8	2.5
Some College	0.2	1.6	6.0 *	–3.7
Completed College	0.1	–5.9 **	3.3	–5.3
Gender (Female=1)	–5.4 ***	–5.0 ***	–2.9 **	–0.9
Intercept	56.2 ***	59.0 ***	45.5 ***	54.7 ***
N	7,452	13,297	5,501	1,115

p<.001;

**
p<.01;

*
p<.01;

+
p<.10 (significance of difference from reference group)

^a Significantly different from foreign-born with 0–4 years in U.S. (p<.05)

Table 4
OLS regression models predicting the Healthy Eating Index (HEI-2010), NHANES 1999/00-2009/10

	Hispanic	NH-White	NH-Black	Other
<u>Panel A. Children Aged 5–19</u>				
Food Similarity Index	–0.09 ***	–0.11 ***	–0.09 ***	–0.12 ***
Generational Status (Ref = U.S. born with U.S.-born Householder)				
Foreign-born, 0–4 years in U.S.	2.19 *	5.96 **	4.63 **	1.40
Foreign-born, 5+ years in U.S.	2.56 ***	1.24 ^a	0.84 ^a	–0.25
U.S.-born, Foreign-born householder	2.27 ***	1.48 ^a	3.91 **	1.37
Intercept	38.14 ***	35.68 ***	39.69 ***	40.60 ***
N	6,932	5,139	5,405	873
<u>Panel B. Adults Aged 20–84</u>				
Food Similarity Index	–0.09 ***	–0.11 ***	–0.08 ***	–0.13 ***
Generational Status (Ref = U.S. born)				
Foreign-born, 0–4 years in U.S.	3.32 ***	3.10 *	8.67 ***	3.10 *
Foreign-born, 5–9 years in U.S.	4.32 ***	3.81 *	7.74 ***	2.22
Foreign-born, 10+ years in U.S.	2.78 ***	3.49 **	7.76 ***	0.88
Intercept	38.21 ***	31.29 ***	33.50 ***	34.87 ***
N	7,452	13,297	5,501	1,115

Abbreviations: NHANES, National Health and Nutrition Examination Survey

p<.001;

**
p<.01;

*
p<.01;

+
p<.10 (significance of difference from reference group)

All models control for age, educational attainment, gender, breakfast, lunch, snacking, share of food consumed at home, and day of recall.

^aSignificantly different from foreign-born with 0–4 years in U.S. (p<.05)

Table 5

Abbreviations: DV, Dependent Variable; IV, Independent Variable; FSI, Food Similarity Index; HEI-2010, Healthy Eating Index 2010

^b Coefficients from Table 4; DV = HEL-2010; IV = FSL, generation, education, age, gender, share of food consumed at home, day of recall, lunch, dinner, and snacking.