# COMPARING ACCULTURATION MODELS IN EVALUATING DIETARY HABITS AMONG LOW-INCOME HISPANIC WOMEN

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**Objectives:** Studies have demonstrated that Hispanic women in the United States who are more acculturated tend to consume fewer fruits and vegetables, and more fat, compared to less acculturated women. However, some studies have found an opposite trend. Such discrepancies could be caused by inconsistencies in the assessment of acculturation. The goal of the current study was to determine whether different methods of defining acculturation could identify dietary fat use practices among Hispanic women living in the United States.

**Design:** One hundred nineteen Hispanic women were recruited from adult education vocational rehabilitation classes, and completed questionnaires assessing dietary fat practices, acculturation, and demographic information.

**Results:** Years living in the United States was not associated with higher or lower fat use in this sample. A preference for speaking English at home was significantly associated with less consumption of beans and peas. Being born in the United States was significantly associated with greater consumption of convenience foods and chocolate candy. Being born in the United States and exhibiting a preference for English were significantly associated with greater consumption of convenience foods and salty snacks, as well as greater frequency of eating higher fat foods, overall.

**Conclusions:** The operational definition of acculturation significantly influences whether acculturation is associated with dietary fat practices in low-income Hispanic women. The discrepancies in the conclusions about dietary fat practices between these 4 methods demonstrate the need for a better understanding of cultural influences on dietary habits, as well as a consistent measure of acculturation in this field. (*Ethn Dis.* 2004;14:399–404).

**Key Words:** Acculturation, Dietary Habits, Nutrition, Hispanic Women

## INTRODUCTION

Previous research has demonstrated that Hispanic women who are more acculturated to the United States tend to have diets lower in fruits, vegetables, grains, and beans, and important nutrients such, as protein, calcium, vitamins A and C, and folic acid.[1,2] In addition, studies have found that as Hispanic women become more acculturated to the United States, their diets become higher in fat.[3,4] This process of adapting to the eating patterns of a host country has been termed "dietary acculturation."[5] However, other studies found a positive association between acculturation and healthy dietary habits.[5] Woodruff and colleagues[6] found that greater acculturation was associated with avoidance of high fat foods. Greater acculturation has also been linked to lower obesity rates among Hispanic women in the United States,[7] indicating that fat use may be decreasing with acculturation. Given that diets high in fats and low in nutrients are associated with increased risk of developing chronic diseases, such as diabetes, heart disease, and some forms of cancer,[8] and that Hispanics have higher risk for some of these diseases, it is important to resolve the discrepancies and identify the degree to which acculturation is related to dietary practices which are high in fat and low in consumption of fruits and vegetables.[5]

One possible reason for the discrepancy is inconsistencies in acculturation measurement. The various methods used to assess acculturation in previous dietary studies are listed in Table 1. The goal of the current study was to determine the ability of 4 acculturation measures to detect differences in food practices related to the consumption of dietary fat in a group of Hispanic women living in the United States, and to further ascertain whether the different measures yield different conclusions about the association between acculturation and dietary fat habits.

## METHODS

### Participants

One hundred-nineteen Hispanic women were recruited from adult-education vocational training classes in the San Francisco Bay Area. The federally funded Welfare-to-Work program supported vocational training (eg, medical assistant or computer technician training) for most of the women. The women were recruited to participate in a randomized, controlled trial of a physical activity intervention for low income, ethnically diverse women.[9–11] The intervention involved classroom education and follow-up counseling regarding exercise and dietary habits. The results presented in this study are from the baseline assessment of those participants who self-identified themselves as being Latino. Only women who spoke English were eligible to enroll in the vocational training classes from which recruitment for the randomized trial occurred. In addition, the women had to have sufficient fluency in English to complete study-related assessments, and to participate in classroom activities, both of which had written and verbal compo-

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nents. More than 97% of the women from the vocational job-training classes were eligible, based on their fluency in English.

In order to meet eligibility criteria, a participant had to be a woman between 18–65 years of age, free of diagnosed coronary heart disease and insulin-dependent diabetes mellitus, with no medical condition or disorder that would limit participation in light- to moderate-intensity physical activity. Questionnaires that were administered to participants were written at a 6th–8th grade reading level.

## Procedure

After participants attended an introductory session explaining the study, they were scheduled for baseline assessment, at which they provided informed consent. Assessments were conducted at the adult education site during the school day. Participants completed a battery of health and psychosocial questionnaires.

## Measures

### Sociodemographics

Participants were asked to provide their age, country of origin, ethnic identification, marital status, total years of formal education, household income, and language spoken at home.

### Dietary Fat Practices

The Eating Patterns Assessment Tool[12] is a previously validated measure

**Table 1. Methods used to measuring acculturation in dietary habits literature**

| Authors | Measure of Acculturation |
|---|---|
| Cantero, Richardson, Baezconde-Garbanati, Marks[3] | Language preference for speaking, reading, and writing |
| Dixon, Sundquist, Winkleby[15] | Country of birth and primary spoken language |
| Goslar, Macera, Castellanos, Hussey, Sy, Sharpe[16] | Language preference for speaking, reading and writing |
| Guendelman, Abrams[1] | Place of birth and parent place of birth |
| Hazuda, Haffner, Stern, Eifler[7] | Functional integration with mainstream society, value placed on preserving Mexican cultural origin, and attitude toward traditional family structure and sex-role organization |
| Otero-Sabogal, Sabogal, Perez-Stable, Hiatt[2] | Marin et al[14] Short Acculturation Scale for Hispanics (preference and use of language in general, in media, and in social relationships) |
| Polednak[17] | Which language the respondent spoke better, preferred to speak, read better, and wrote better |
| Sundquist, Winkleby[19] | Country of birth and primary language spoken |
| Winkleby, Albright, Howard-Pitney, Lin, Fortmann[4] | Language spoken at home |
| Woodruff, Zaslow, Candelaria, Elder[6] | Marin et al[14] Short Acculturation Scale for Hispanics |

of self-reported dietary fat use, measuring frequency of consumption of foods from high and low fat categories (Appendix 1). The scale has previously been validated for use with low SES populations.[12] Test-retest reliability for the EPAT was .91 for the high fat section, and .73 for low-fat (with visits scheduled a week apart). The authors examined concurrent validity with 4-day food records over 5 visits. Validity estimates ranged from .54 to .56. The EPAT is based on the eating pattern recommendations of the National Cholesterol Education Program's Adult Treatment Guidelines Panel.[13] For each item, participants circle one of 4 boxes that best described their consumption during the past week, ranging from less healthy to more healthy use. Items are scored on a scale of 1–4, such that healthier consumption is equal to higher point value (see Table 2 for values for each item). The EPAT consists of 21 items that fall into one of 2 categories: a tendency toward consumption of lower-fat fruit and vegetable alternatives (10 items), and a tendency toward high dietary fat consumption (10 items). An item asking about alcohol consumption was not included in the present study.

### Acculturation

Three socio-behavioral characteristics (years lived in the United States, language spoken at home, and country of birth) were used to create 4 models to capture degree of acculturation.[18] Model 1 determined acculturation based on years lived in United States, adjusting for age (ie, more years living in the United States represented higher acculturation). Model 2 used preferred language spoken at home (preference for English, Spanish, or either) as the marker for acculturation (speaking English at home represented higher acculturation). Model 3 categorized acculturation based on each respondent's place of birth (United States vs non-United States, with United States representing higher acculturation). Model 4 combined birthplace and language preference[12] to create 3 levels: 1) born outside of the United States; 2) born in the United States with Spanish language preference; and 3) born in the United States with English language preference (the latter representing the highest level of acculturation). These 4 methods for measuring level of acculturation are comparable to the ways acculturation was assessed in the studies listed in Table 1.

**Table 2. Differences in dietary components based on models for defining acculturation**

| | Acculturation Model | | | |
| Dietary Component | Model 1 â's & *P* Value | Model 2 â's & *P* Value | Model 3 â's & *P* Value | Model 4 â's & *P* Value |
|---|---|---|---|---|
| *Total of higher fat foods* | .14, *P*=.38 | −.16, *P*=.18 | −.34, *P*=.00 | .32*, *P*=.00 |
| Convenience foods | .16, *P*=.32 | .19, *P*=.05 | .39†, *P*=.00 | .35*,*P*=.00 |
| Processed or untrimmed red meats | .24, *P*=.14 | −.06, *P*=.55 | −.24, *P*=.01 | −.17, *P*=.02 |
| Poultry skin | .05, *P*=.75 | −.18, *P*=.07 | −.15, *P*=.12 | −.21, *P*=.07 |
| Eggs | .00, *P*=.95 | .02, *P*=.81 | .01, *P*=.89 | .00, *P*=.98 |
| Whole or 2% milk, regular yogurt | .03, *P*=.26 | −.18, *P*=.23 | .06, *P*=.49 | .06 *P*=.78 |
| Cheeses | −.18, *P*=.59 | −.06, *P*=.50 | −.23, *P*=.02 | −.19, *P*=.06 |
| Fats and oils used in cooking or at the table | .08, *P*=.91 | −.09, *P*=.33 | −.27, *P*=.00 | −.25, *P*=.02 |
| Visible fats and oils | .01, *P*=.38 | .03, *P*=.38 | −.27, *P*=.38 | −.25, *P*=.38 |
| Baked goods | .01, *P*=.26 | .03, *P*=.33 | −.16, *P*=.51 | −.05, *P*=.76 |
| Salty snacks | −.08, *P*=.04 | −.23, *P*=.02 | .39†, *P*=.00 | .39*. *P*=.00 |
| Chocolate candy | .33, *P*=.16 | −.27, *P*=.00 | .25†, *P*=.01 | −31, *P*=.00 |
| *Total of low fat foods* | .10, *P*=.51 | .13, *P*=.19 | .08, *P*=.40 | .10, *P*=.55 |
| Trimmed red meats | −.26, *P*=.11 | .09, *P*=.77 | .01, *P*=.87 | .03, *P*=.92 |
| Poultry and fish/seafood | .06, *P*=.67 | −0.6, *P*=.31 | .13, *P*=.17 | .09, *P*=.31 |
| Dairy foods | .07, *P*=.63 | .10, *P*=.04 | .00, *P*=.98 | −0.6, *P*=.38 |
| Low-fat cheeses | −.07, *P*=.67 | .09, *P*=.36 | −.02, *P*=.80 | .00, *P*=.79 |
| Beans and peas | −.07, *P*=.64 | .32*, *P*=.00 | .15, *P*=.11 | .23, *P*=.02 |
| Preparation method for meats, fish, and poultry | .06, *P*=.69 | .03, *P*=.72 | .14, *P*=.15 | .12, *P*=.36 |
| Preparation methods for baked goods | .10, *P*=.50 | .20, *P*=.31 | .02, *P*=.76 | .06, *P*=.10 |
| Breads and other starchy foods | −.13, *P*=.40 | −.14, *P*=.15 | −.11, *P*=.26 | −.13, *P*=.39 |
| Fruits and vegetables | −.03, *P*=.84 | −.07, *P*=.44 | −.08, *P*=.39 | .00, *P*=.14 |

* *P*<.01 for overall model; † *P*<.001 for overall model.
Model 1=years in US (more years=more acculturation).
Model 2=English as preferred language=most acculturated.
Model 3=born in the United States=most acculturated.
Model 4=English as preferred language + born in the United States=most acculturated.

## Statistical Methods

To assess the role of acculturation in the dietary habits of the sample, we used a series of multiple regressions to examine the relationships between 20 EPAT dietary components and each of the 4 acculturation models. This method allowed us to examine the relationship between acculturation and individual dietary practices, in order to assess whether the relationship was uniform or varied across dietary areas. We also ran these analyses using the total high fat foods and total ok-foods score as the dependent variable. We ran correlations with age, years of education, and income level as potential covariates of both acculturation and dietary practice. Only age was a significant confounder and was, therefore, included as a covariate in all analyses. Because these analyses involved multiple statistical tests, which increased the risk of Type 1 error,

we adopted an alpha level of .01 for all analyses.

## RESULTS

The average age of the women was 32 years (SD=10.14, range=18 to 67), with an average of 10 years of formal education (SD=2.52, range=4 to 16). Thirty-seven percent of the sample had earned either a high school diploma or a GED. Thirty-two percent had a total household income of less than $10,000, 62% had a total household income less than $30,000, 34% were married or living with a partner, and 23% were separated or divorced. The average number of children in the household was 2 (SD=1.5, range=0 to 7). Almost half of the women (48.7%) were born in the United States, 41.2% were born in Mexico, 8.4% were born in Central or

South America, and 2% listed "other" as their place of birth. The average years lived in the United States was 22.71 (SD=11.93, range=2 to 54). Forty percent of the women preferred speaking Spanish and English equally, 30.3% preferred English, and 29.4% preferred Spanish.

Results for acculturation and diet are listed in Table 2. In Model 1, the number of years lived in the United States was not significantly associated with differences in dietary patterns. In Model 2, results indicated that higher acculturation, defined by preference for speaking English at home, was significantly associated with less consumption of beans and peas. In Model 3, higher acculturation, defined as being born in the United States, was significantly associated with greater consumption of convenience foods and chocolate candy. In Model 4, the model that combined

country of birth and English language preference found that higher acculturation was significantly associated with greater consumption of convenience foods and salty snacks, and also with greater use of behavior involving high fat foods overall.

## DISCUSSION

These results demonstrate that the operational definition of acculturation significantly influences whether or not acculturation is associated with dietary habits in low-income Hispanic women. Years lived in the United States was not associated with better or worse dietary fat practices in this sample. Language preference and birthplace appeared to have more discriminatory ability. Many of the methods used to assess acculturation in previous literature use language preference as all or part of their definition of acculturation. However in this study, language preference alone discriminated fewer dietary differences than did birthplace, and birthplace and language preference combined. Birthplace alone (Model 3) and the 3-level variable combining birthplace and language preference (Model 4) appeared to be the most discriminatory, although not completely consistent with each other. The discrepancy between these 2 models further demonstrates the need for a consistent measure of acculturation in this field. Marin et al[14] have stated the need for a more uniform method of measuring acculturation, but as yet, no single method has been adopted.

The limitations of this study include a relatively small sample size and a specified segment of the population of low-income Hispanic women (ie, those in vocational training programs, all with some level of fluency in English). Also, although the EPAT has been previously validated with low SES populations,[12] we are not aware of studies where it has been validated specifically with Hispanic populations. Future studies are needed

> *However in this study, language preference alone discriminated fewer dietary differences than did birthplace, and birthplace and language preference combined.*

to further explore the most effective methods through which to operationalize the measurement of acculturation in more diverse or generalizable samples of low-income ethnic minority women.

In our sample, greater acculturation was associated with greater use of high fat foods (more consumption of convenience foods and snacks, fewer beans), indicating that these women may not have time to pursue healthier dietary habits, or may not have access to information regarding how to practice healthier eating. Other literature has found a greater apparent concern about fat consumption in relation to greater acculturation, although it is not clear whether fat intake was lower in more, as compared to less, acculturated women.[5,6] Poverty may play a role in this discrepancy in that these women may have a desire to eat less fat but are constrained by expense or lack of time. The relationship between acculturation and dietary habits appears more complex than previously understood. The apparent effort to reduce fat intake found in some of the literature may mean that greater acculturation might positively carry greater exposure to mainstream messages about healthful nutrition practices, and could cause greater awareness of public health campaigns aimed at improving nutritional choices (eg, the national "5 a day" campaign). A necessary future step in this line of research is to better understand the barriers to healthy

eating habits faced by low-income Hispanic women.

The concept of "acculturation" and its relationship to exposure or adaptation to American nutritional habits can be examined in multiple ways, each with relative advantages and disadvantages. As the assessment of acculturation becomes better refined and more widely accepted within the research community, it is expected that the true linkages between acculturation and nutritional choices will emerge in a more consistent manner.[5] Hopefully, the results of a more precise assessment will identify methods of maximizing the healthful options available within each culture's nutritional foundations.

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**Appendix 1. EPAT Items and Portion Sizes**

| High Fat Foods | | OK Foods | |
|---|---|---|---|
| **Dietary Component** | **Serving Size** | **Dietary Component** | **Serving Size** |
| Convenience Foods (≥7 servings/week – ≤1 serving/week or never eat) | Fast food sandwich - 1 sandwich; All canned, packaged, or frozen dinners (except diet types), 1/4 med pizza, 1 cup, or 1 avg. pot pie | Trimmed red meats (≤1 or ≤10 servings/wk - 6–7 servings/wk) | Low-fat lunch meats - 2 slices; Pork, beef, lamb, veal w/o visible fat - 1 med. slice or chop; Extra lean hamburger - 1/4 lb patty |
| Processed or untrimmed red meats (≥6 servings/week - <1 serving/week) | Bacon - 4 slices; Bologna, lunch meat - 2 slices; Hot dog, breakfast sausage - 1 avg.; Bratwurst - link; Hamburger - 1/4 lb patty; Beef, pork, lamb, veal - 1 med. slice with visible fat | Poultry and fish/seafood (≤1 or ≤10 servings/wk - 7–9 servings/wk) | Chicken, turkey - 1 med slice, 1 avg. piece, 1/2 cup diced; Turkey lunch meat - 2 slices; Fish fillet - 1 med.; Tuna - 1/2 cup or 1/2 can; Crab - 1/2 cup or 2 legs |
| Poultry skin (Always eat with skin - always without skin or never eat) | | Dairy foods (≥4 servings/wk - ≤1 servings/wk) | Ice milk - 1/2 cup; Soft-serve or frozen yogurt - 1 scoop |
| Eggs (other than those used in baking) (≥6 servings/week - <2 servings/week or egg whites only) | 1 whole egg | Low-fat cheeses (≤1 or ≥7 servings/wk - 5–6 servings/wk) | Mozzarella, diet, or light cheeses - 1 slice; Cottage cheese or ricotta - 1/2 cup |
| Whole or 2% milk, regular yogurt (≥7 servings/week - <1 servings/week) | 1 cup | Beans and peas (≤1 servings/wk - ≥6 servings/wk) | 1/2 cup cooked |
| Cheeses (≥5 servings/week - never eat) | Cheddar, colby, swiss, monterey jack, American can or processed - 1 ounce slice; Cream cheese, blue cheese - 2 tablespoons | Preparation method for meats, fish, and poultry (Always prepared w/fat or commercial breading - always prepared w/o) | Fried, cooked with fat. |
| Types of fats and oils used in cooking or at the table (Always use butter, lard, cream - always use margarine and salad dressing or never use fats or oils) | Butter, lard, cream | Preparation methods for baked goods (Usually eat commercially prepared - usually eat homemade) | |
| Amount of visible fats and oils (≥6 servings/day - ≤3 servings/day) | Butter, margarine, lard - 1 pat; Oils - 1 teaspoon; Salad dressing - 1 tablespoon; Cream - 1 tablespoon; Peanut butter - 1 tablespoon; Nuts, seeds - 1 tablespoon | Breads and other starchy foods (≤1 servings/day - ≥6 servings/day) | Bread - 1 slice; Dinner roll, bagel - one avg; Cereal - 1 cup; Rice, noodles, pasta - 1/2 cup |
| Baked goods (>7 servings/week - ≤2 servings/week) | Donuts, sweet rolls, muffins, cakes, coffee cakes - 1 avg. piece; Pie - 1 avg. wedge; Granola bar - 1 bar; Granola cereals - 1/2 cup; Pancakes - 2 avg.; Waffles, French toast - 2 avg. | Fruits and vegetables ≥5 servings/day - ≥6 servings/day | |
| Salty snacks (≥7 servings/week - rarely or never eat) | Snack crackers or chips - 12 pieces; French fries - 1 small order | | |
| Chocolate candy (≥3 servings/week - rarely or never eat) | 2 oz. Or avg. candy bar | | |