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The Multiple Dimensions of Immigrant Acculturation and Obesity among Mexican-Americans

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The health literature for U.S. Latinos has generally found that greater acculturation (i.e., greater social and cultural integration) is associated with worse health or health-related behaviors (Lara et al. 2005). However, in the case of obesity, the findings for U.S. Latinos more broadly and migrants of Mexican origin in particular has been mixed. Some have found a positive association between acculturation and obesity (Barcenas et al. 2007; Bowie et al. 2007; Sundquist and Winkleby 2000), others have found no association (Gordon-Larson et al. 2003; Wingo et al. 2009), and still others have found a negative association (Hazuda et al. 1991).

Identification of a link between acculturation and obesity requires a clear definition of the native-born population of reference (i.e., to whom the population of interest is acculturating). Distinct U.S.-born subpopulations vary in their odds of being obese with large racial and ethnic differences particularly between white and black females (Barrington et al. 2009). Although the term acculturation broadly defines a process by which individuals adopt attitudes, values, customs, beliefs, and behaviors of another culture (Abraído-Lanza et al. 2006), the meaning of these changes in terms of obesity clearly depends on the referent population. To account for these potentially distinct acculturative pathways, we compare 1st and 2nd generation Mexican-Americans to three U.S.-born ethnic groups – 3rd+ generation whites, 3rd+ generation blacks and 3rd+ generation Latinos.

There are two advantages to our focus on 1st and 2nd generation Mexican-American population. The first is based on the relative size of the Mexican population in the US, with the majority of U.S. Latinos originating in Mexico – approximately 64% in 2006 (ACS 2006). Nearly a third of the total number of first generation immigrants in the U.S. (Martin and Midgley 2006) or an estimated 11.4 million (Passel 2006) were born in Mexico. In Los Angeles

County, which is the focus of our study, Latinos, the majority of whom are of Mexican-origin, made up nearly half of the total population (ACS 2006).

The second advantage of using a single country of origin rests on a fundamental assumption underlying research on immigrant acculturation and health, namely that the context of origin is distinct from the context of destination. Recently, the prevalence of adult obesity in Mexico reached levels similar to that in the U.S., particularly for women (WHO 2009). Similarly high levels are not found in other Latin American countries (WHO 2009). This convergence between Mexico and the U.S. has been rapid, with a more than doubling of the proportion obese since the late 1980s (Rivera et al. 2002). This somewhat unique, national-level pattern of obesity requires the consideration of Mexico as a distinct context of origin.

Data:

The Los Angeles Family and Neighborhood Survey (L.A.FANS) provides detailed information on acculturation (social and linguistic) of immigrants and health behaviors associated with obesity, along with measurement of height and weight. L.A.FANS is a longitudinal study of approximately 3,000 households in a stratified probability sample of 65 neighborhoods (census tracts) in Los Angeles County. The survey oversamples poor neighborhoods and households with children (Sastry et al. 2006). In wave 2 (2006-08), panel respondents from wave 1 who were still living within Los Angeles County were re-interviewed and a sample of new entrants was added. Respondents in Wave 2 were asked to report their height and weight and were also measured. L.A.FANS was reviewed and approved by the Institutional Review Boards of the University of California, Los Angeles, RAND, and RTI International. All adult and adolescent respondents provided informed consent.

Models:

First, we define multiple dimensions of acculturation, accounting for distinct pathways of language usage and socialization. Second, we measure the association between these multiple dimensions of acculturation and two health behaviors related to obesity - diet and exercise. Third, we consider the direct relationship between acculturation and obesity, assessing the degree to which diet and exercise explain the association. Our analysis compares the risk of obesity for 1st and 2nd generation Mexican-origin U.S. residents to U.S.-born (3rd+ generation) whites, blacks and Latinos. Descriptive statistics of the variables used in the analysis are found in tables 1 and 2.

Preliminary Findings:

Acculturation, Diet and Exercise

Table 3 reports the estimated coefficients from Poisson regression models of the outcome diet and exercise on immigrant generation, social and linguistic acculturation. Results indicate that 1st and 2nd generation Mexican-Americans report significantly more episodes of vigorous exercise than 3rd+ generation Whites, but only for household exercise (column 2). This suggests that distinguishing household and non-household exercise is important, which has been hypothesized in other work (Crespo 2001). Overall, 1st and 2nd generation Mexican-Americans report significantly less healthy dietary behaviors relative to 3rd+ generation whites. Relative to 3rd+ generation whites, 2nd generation Mexican-Americans consume significantly fewer servings of vegetables and significantly more servings of fast food. Of note, 1st generation Mexican-Americans report a somewhat healthier dietary profile, with the only significant association pertaining to fewer servings of vegetables.

Acculturation, Diet, Exercise and Obesity

In table 4 reports the odds ratios from a logistic regression model of the outcome obesity on immigrant generation, social and linguistic acculturation. In brief, the introduction of measures of diet (fruit, vegetables, soda and fast food) and exercise (household and non-household) does not substantially reduce the magnitude of the estimated odds ratios for 1st and 2nd generation Mexican-Americans (column 1 vs. column 3 and 4). The estimated odds ratios for 1st and 2nd generation Mexican-Americans in column 5, which includes both the measures of social and linguistic acculturation and diet and exercise, are very similar to the estimates in the model that only included controls for the acculturation measures (column 2). The implication is that social interactions with non-co-ethnics explain some of the relationship between generation and obesity, but that our measures of diet and exercise provide limited additional explanatory power.

Next Steps:

The next step will be to estimate multi-level models for the Poisson models (table 3), which consider the outcomes of diet and exercise, and the logistic models (table 4), which consider the outcome of obesity. A multi-level approach will take into account the sampling design of L.A.FANS, namely the inclusion of multiple adults in a given household and in a neighborhood/census tract. These models will provide correct estimates of standard errors as well as a clearer picture of the importance of unobserved characteristics described by measures of intra-household or intra-neighborhood clustering of obesity.

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Table 1: Descriptive Statistics of Acculturation Measures and Core Demographic Characteristics of the Sample

	Mean or %	Std. Dev.	Min.	Max.
Generation				
1st Generation - Mexican-American	42.5%			
2nd Generation - Mexican-American	16.8%			
3rd+ Generation - White	20.9%			
3rd+ Generation - Black	10.9%			
3rd+ Generation - Latino	8.9%			
Social Acculturation (Standardized)	0	1	-1.13	2.98
Linguistic Acculturation Score (Standardized)	0	1	-1.54	1.05
Language Spoken with Friends	0	1	-1.39	1.03
Language Spoken and Read Often	0	1	-1.49	1.03
Language Read Better	0	1	-1.57	1.01
Language Spoken Better	0	1	-1.55	1.05
Sex				
Female	65.6%			
Male	34.4%			
Age	37.87	13.76	16	92
Education				
< High School	34.1%			
High School	18.7%			
> High School	47.2%			
n	1,419			

Source: L.A.FANS-2

Table 2: Descriptive Statistics of Diet, Exercise, Obesity and BMI

	Mean or %	Std. Dev.	Min.	Max.
Diet (Servings in Previous Day)				
Fruit	1.72	1.26	0	6
[0-2]	75.5%			
3+	24.5%			
Vegetable	1.51	1.22	0	6
[0-2]	80.8%			
3+	19.2%			
Soda	1.00	1.49	0	12
[0-2]	89.1%			
3+	10.9%			
Fast Food	0.38	0.69	0	5
0	70.2%			
1+	29.8%			
Vigorous Exercise (Episodes in Previous Week)				
Non-Household	1.84	2.22	0	7
Household	1.53	2.06	0	7
Body Mass Index (BMI)	29.69	6.73	16	61
Not Obese	59.0%			
Obese	41.0%			
n	1,419			

Source: L.A.FANS-2

Table 3: Estimated Coefficients of a Poisson Regression Model of Diet and Exercise on Acculturation

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of Episodes in Previous Week of…		Number of Servings in Previous Day of…			
	Vigorous Non-Household Exercise	Vigorous Household Exercise	Fruit	Vegetables	Soda	Fast Food
	β (std. error)	β (std. error)	β (std. error)	β (std. error)	β (std. error)	β (std. error)
Generation (ref.=3rd+ Generation - White)						
1st Generation - Mexican-American	-0.0246	0.450*	-0.0155	-0.281**	0.0202	0.340
	(0.150)	(0.195)	(0.095)	(0.100)	(0.189)	(0.222)
2nd Generation - Mexican-American	-0.0426	0.367*	-0.130	-0.411***	0.262	0.521**
	(0.110)	(0.167)	(0.081)	(0.083)	(0.178)	(0.185)
3rd+ Generation - Black	-0.370**	0.361*	-0.400***	-0.290***	0.516**	0.705***
	(0.127)	(0.155)	(0.090)	(0.079)	(0.171)	(0.171)
3rd+ Generation - Latino	-0.0487	0.206	-0.161	-0.314***	0.389*	0.636***
	(0.115)	(0.184)	(0.083)	(0.079)	(0.162)	(0.173)
Social Acculturation	0.0480	-0.0260	-0.0222	-0.0208	0.0216	0.0254
	(0.035)	(0.042)	(0.023)	(0.023)	(0.041)	(0.067)
Linguistic Accultulturation Score	0.0439	-0.154	-0.0688	-0.0893	-0.00838	0.248*
	(0.079)	(0.088)	(0.044)	(0.047)	(0.081)	(0.099)
Log-Psuedolikelihood	-3087	-2772	-2228	-2146	-2042	-1096
n	1,419	1,419	1,419	1,419	1,419	1,419

*p<0.05 , **p<0.01 ,***p<0.001
Source: L.A.FANS-2

Note: All models include controls for sex, age, age squared, and education. All models use robust standard errors to account for clustering within households. The measure of social acculturation is scaled such that lower values reflect respondents who socialize primarily with co-ethnics, values in the middle reflect respondents who socialize with non-co-ethnics and co-ethnics, and higher values reflect respondents who socializing primarily with non-co-ethnics. The linguistic acculturation score is scaled such that lower values reflect respondents who primarily speak a language other than English, values in the middle reflect respondents who speak English and another language, and higher values reflect respondents who primarily speak English.

Table 4: Odds Ratios of Logistic Regression Models of Obesity on Acculturation, Diet and Exercise

	(1) Obese Odds Ratio (std. error)	(2)	(3)	(4)	(5)
Generation (ref.=3rd+ Generation - White)					
1st Generation - Mexican-American	1.596*	1.317	1.650**	1.548*	1.286
	(0.299)	(0.430)	(0.306)	(0.292)	(0.420)
2nd Generation - Mexican-American	2.142***	1.932**	2.069***	2.100***	1.814*
	(0.468)	(0.493)	(0.456)	(0.463)	(0.476)
3rd+ Generation - Black	2.589***	2.509***	2.395***	2.476***	2.244***
	(0.539)	(0.521)	(0.512)	(0.521)	(0.482)
3rd+ Generation - Latino	2.305***	2.158***	2.143***	2.291***	2.004**
	(0.501)	(0.470)	(0.474)	(0.499)	(0.445)
Social Acculturation		1.189**			1.193**
		(0.073)			(0.074)
Linguistic Acculturation Score		0.851			0.839
		(0.122)			(0.123)
Diet	NO	NO	YES	NO	YES
Exercise	NO	NO	NO	YES	YES
Psuedo R-Squared	0.042	0.046	0.045	0.045	0.052
n	1,419	1,419	1,419	1,419	1,419

*p<0.05 , **p<0.01 ,***p<0.001
Source: L.A.FANS-2

Note: All models include controls for sex, age, age squared, and education. All models use robust standard errors to account for clustering within households.