I Want to Live in "America": Acculturation and Nativity as Risk Factors for Metabolic Syndrome in a Mexican Origin Population in East Texas.

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Although we can easily identify the causal link between the adoption of negative health behaviors like smoking and subsequent disease in Mexican immigrants in the United States (Lee and Markides 1991), we continue to struggle with quantifying the effects of the actual process of acculturation on the salubrity (Hunt, Schneider, and Comer 2004). Language barriers make it difficult for Mexican immigrants to access healthcare or social programs that they may be eligible for (cite). In addition, Mexican immigrants enter into this country as "racial minorities" that creates physiological stress from discrimination (Finch, Hummer, Kolody and Vega 2001) and barriers to assimilation into the mainstream (Zhou 1997). It is the cumulative effects of these experiences that are also believed to affect the health of Mexican immigrants with longer time spent in the United States (Arcia, Skinner, Bailey, and Correa 2001).

Using biological markers; this study determines the effects of nativity, English language use and acculturation on the propensity to develop Metabolic Syndrome risk factors in the Mexican origin population living in East Texas. Using a theoretical framework of segmented assimilation (Zhou 1997) this study will address the following research objectives. First, do US born and immigrant Mexicans differ in there risk for Metabolic Syndrome? Second, is this effect conditioned by English language use or acculturation?

BACKGROUND

Traditional assimilation theory generally suggests that the process of adaptation to a host country is linear and with time immigrants will gradually loose their cultural ties to their place of origin and begin to take on the customs and traditions of their destination (Park 1928). However, Portes and Zhou (1993) state that the assimilation process for immigrants in the United States is segmented rather than linear and how close to the socially "desirable" non-Hispanic white upper and middle class norm an immigrant is able to become is contingent largely upon the human and social capital they possess. As a result, the pathway to assimilation can lead immigrants to three very different directs; full incorporation into the upper or middle class, integration into the underclass, or economic achieved adaptation without change to cultural tendencies. Furthermore, Warner and Strole (1945) assert that the assimilation process is conditioned by race, social class, and language of origin. Therefore, full assimilation into the dominant culture (upper or middle class white) is prevented by racial or ethnically ascribed characteristics, such as skin color or language spoken (Zhou 1997).

Latino immigrant assimilation is complex due to the variations that exist in migration experiences between the different ethnic groups. First, Cubans immigrants are more easily able to assimilate economically, while maintaining a strong sense of cultural affinity to their country of origin due to their well established ethnic enclave in Miami (Portes and Stepick 1997). Puerto Ricans are citizens of the United States but are often considered immigrants because of their cultural background and are overly represented in the underclass. Similarly, Mexicans immigrants, although not US citizens, are more likely to live in poverty and maintain a strong cultural connection to Mexico.

It is due to these patterns of social assimilation that make it so difficult to understand the general health and welfare of the Latino population. Health and mortality outcomes are highly segmented based on immigration status (Rogers, Hummer and Nam 2000; Singh and Siahpush 2002), race (Smith and Kington 1997; Pappa, Queen, Hadden and Fisher 1993), and socioeconomic status, yet interpretations of these tendencies are often based on the non-Hispanic white upper or middle class standard of the United States. Immigrants from Europe and Asia have health and mortality outcomes that most closely resemble their non-Hispanic white counterparts (Singh and Siahpush 2002), largely due to the higher economic status and level of education. Yet, the patterns of Latino health are less uniform than these other two groups. First, Cubans more closely resemble non-Hispanic whites than their other Latino counterparts (Vega and Amaro 1994; Cho, Frisbie, Hummer and Rogers 2004). Puerto Ricans are the most traditional of the underclass Latinos suffering from health conditions and mortality rates typical to their socioeconomic status (Vega and Amaro; Vega and Rambaut 1991; Franzini, Ribble and Keddie 2001; Cho, et al 2004). However Mexicans are over represented in the underclass, have health profiles typical to their status, but mortality outcomes similar to non-Hispanic whites (Hummer, Rogers, Nam, and LeClere 1999; Popkin and Udry 1998; Vega and Amaro 1994; Cho, et al 2004).

Since Mexican immigrants share the same language as other Latino groups, explicating this unusual pattern in Mexican immigrant health has focused on cultural behaviors or beliefs that are unique to this Latino group that are somehow protective from mortality. For example, because of strong ties to religious icons such as la virgin de Guadalupe, Mexican culture may be more likely to embrace good health behaviors such

as diet and at the same time condoning negative practices such as drinking or smoking. Moreover, due to strong family ties, Mexicans with illness may have greater support resources than other racial and ethnic groups.

This study sets out to determine the effects of assimilation (English language use) and acculturation (Preservation of Mexican Culture) on Metabolic Syndrome risk factors in US born and immigrant Mexicans living in the United States. We use English language as a measure of assimilation rather than acculturation we believe that language is the gateway to accessing the mainstream of the United States rather than to what extent an individual or group has taken on the customs and beliefs of the society as a whole. Furthermore, the Spanish and English languages are not specific to one culture or country, and therefore can not account exclusively for the culture of Mexico or the United States. Therefore, being fluent in English may affect the likelihood one graduates from high school which subsequently may determine socioeconomic status therefore affecting health. For our acculturation variable we use the preservation of Mexican culture, because of its specificity to Mexico and measure of actual cultural beliefs.

If there is a relationship between English language use, acculturation, and Metabolic Syndrome then we should expect significant difference between US born and immigrant Mexicans in four ways. First, we should observe an immigrant advantage. Second, we should observe a negative effect of English language use. Third, there should be a protective effect of preservation of Mexican culture. Finally, we should expect to see that English language use and preservation of Mexican culture as intervening variables for nativity differences.

METHODS

Data

Healthy City Assessment Project (HCAP) - Texas City, Texas. The preliminary data for this study comes from the Healthy City Assessment Project (HCAP) - Texas City, Texas. The purpose of the HCAP is to evaluate socio-biological patterns in a population under the stressful conditions of living in close proximity to a potential environment hazard (i.e. oil refinery). The benefit in using this data for this particular study is twofold. First, it samples every Hispanic household in Texas City, which is a city largely with a high population of individuals of Mexican descent. Second, it is one of the few studies that use blood samples and actual anthropometric measures in the context of environmental stress.

Study Design. The sample for the current research is a subsample of the larger, ongoing study on stress, coping, and health in Texas City. The sampling plan of the larger study included a target of approximately 1200 Mexican Americans aged 25-64, 400 Mexican Americans aged 65 and over, and 800 non-Hispanics. The research design involved a multistage probability sample. The first stage included the selection of three ethnic strata: Mexican Americans aged 25-64, Mexican Americans aged 65 and over, and non-Hispanics. The second stage involved the selection of Housing units (HUs) in each stratum. In this stage all Hispanic HUs and 1 in 8 non-Hispanic HUs were selected. The third stage included selecting one adult per household among Mexican Americans aged 25-64 and among non-Hispanics. All Mexican Americans aged 65 and over were selected. Baseline response rates in the main study were 75%. The institutional review board at University of Texas Medical Branch approved the study protocol, and informed consent was obtained from all participants.

Survey. Selected and consenting residents were interviewed at baseline in their home. The baseline survey instrument contains scales and items measuring a wide array of demographic, behavioral, social, and health indicators. For our outcome variable we use risk factors for Metabolic Syndrome. Metabolic syndrome is the presence of three or more risk factors that are associated with diabetes and heart disease. The risk factors for this syndrome include; obesity (Body Mass Index of 30 or greater), hypertension, insulin resistance (elevated glucose levels), and dyslipidemia (i.e. elevated LDL and triglycerides). We selected Metabolic Syndrome as our outcome because of the high prevalence of diabetes and heart disease among the Mexican origin population in the United States (cite). We believe by looking at the relationship between risk factors for diabetes and assimilation or acculturation we can begin to define how this relationship may lead to pathology.

The outcome measures for this study were selected based on criteria set by the World Health Organization (WHO) for Metabolic Syndrome (Otiniano, Balasubramanyam and Maldonado 2005). Obesity was determined to be a Body Mass Index (BMI) score of thirty or above calculated as a ratio subjects' actual height to their weight. Blood pressure was determined to be high if it exceeded a reading of 139 mm Hg over 89 mm Hg. Glucose was considered elevated if it was measured as 110 mg/dl or higher. Finally, triglycerides were considered above the normal limits at a reading of 150 mg/dl or above. If each of the final outcome variables were at or above the WHO cut-off limits they were assigned a values of "1", otherwise they were coded as "0".

For this study we use two scale based on the work of Hazuda and her colleagues to measure English language use and acculturation (Hazuda, Stern and Haffner 1988).

First, English Language Usage (ELU), refers to six items that address primary language spoken as an adult (e.g., at home, outside home, at family gatherings) and as a child (e.g., language spoken in home as a child) (range is 6-28, with higher scores reflecting greater usage of English, cronbach's alpha = .94). Second, acculturation was measured using the Preserving Mexican Culture (PMC) scale, which refers to 3 items asking about the importance of children knowing the history of Mexico, the customs of Mexico, and to celebrate Mexican holidays (range is 3-15, with higher scores reflecting less importance of preserving Mexican culture, cronbach's alpha = .75).

Descriptive statistics were generated to illustrate distributions and central tendencies of Metabolic Syndrome risk factors, assimilation, acculturation, and demographic characteristics. In addition, logistic regression models were run for each outcome variable separately. The first model estimates the predicted effects on the metabolic syndrome risk factors by nativity controlling for demographic characteristics. Model 2 two adjusts for English language use. Model 3 adjusts for acculturation without English language use. Finally, model 4 is the full saturated model.

RESULTS

Table 1 shows the prevalence of the Metabolic Syndrome risk factors by nativity. For all risk factors, US born Mexicans have a greater proportion who meets the criteria for the condition than their immigrant counterparts. In addition, US born are more likely to use English (mean = 21.1) and less likely to maintain the Mexican culture (mean = 5.5). Finally, immigrants have a lower average age (43.1 versus 47.3), level education (8.4 versus 11.5) and are more likely to be married (74.1 versus 56.1).

Table 2 demonstrates results for the logistic regression for each Metabolic Syndrome risk factor. First, in all four cases (hypertension, BMI, triglycerides, and glucose) there is an immigrant health advantage as demonstrated by the higher odds of all conditions for the US born. Second, preserving Mexican culture is only protective for triglycerides, although not significant. In fact, preserving Mexican culture is only significant for hypertension when adjusting for English language use and suggests that greater and not lower levels of acculturation may be protective (OR = .927, $p < .05$). Finally, English language use increases the odds of hypertension and obesity, but reduces the odd of high triglycerides and glucose, although not significant for any.

With respect to the intervening effects of English language use or acculturation, there are significant changes in the odds ratios for nativity for all four risk factors when including preserving Mexican culture and English language use (Table 2). Beginning with hypertension, US born are significantly more likely to have hypertension in model 1 (OR = 1.640, $p < .05$). This effect is increased by ten percent when including preserving Mexican culture to the model (model 3, OR = 1.740, $p < .05$). Yet in the adjusted model for English language use only (model 2 OR = 1.530) and in the model that adjusts for both English language use and preserving Mexican culture (model 4 OR =1.354) the effect of nativity is now insignificant. For obesity, including preservation of Mexican culture has little effect on the odds ratio in model 3, but in model 2 adjusting for English language use only and in the fully saturated model (model 4), the odds ratio for nativity is decreased by about 24 percent.

The two blood measures triglycerides and glucose follow different patterns than the two non-invasive measures. First, by adding preserving Mexican culture the odds

ratio for triglycerides is reduced by 9.2 percent (model 1 OR = 1.418, model 3 OR = 1.326). Including English language use in model 2 without preserving Mexican culture causes the odds for nativity to increase by 47.4 percent. In model 4 holding constant preserving Mexican culture and English language use, the odds are increased by 41.2 percent. Similarly, nativity does not significantly predict blood glucose level in the first model (OR = 1.481, $p > .05$), however, when including preservation of Mexican culture in model 3, the odds are increased by 10.1 percent. This odds ratio is increased even more by 55.8 percent for English language use alone in model 2 and 61.9 percent in model 4.

DISCUSSION

This paper, we use the theoretic framework of segmented assimilation, to determine in what ways nativity, assimilation (English language use) and acculturation (preserving Mexican culture) influence the propensity to develop risk factors for Metabolic Syndrome. We operated under the assumption that US born and immigrant Mexicans would differ in their propensity to have risk factors for Metabolic Syndrome and that English language use and acculturation will play an important role in this relationship. Furthermore, we postulated that assimilation (i.e. English language use) and acculturation (preserving Mexican culture) are different based on segmented assimilation theory (Zhou 1997) and therefore their effects on Metabolic Syndrome risk factors would differ.

First, the findings from this study are consistent with what we expected in that nativity is an important determinate in the incidence of Metabolic Syndrome risk factors in this sample of Mexicans living in Texas City. These findings are also consistent with numerous other studies that have compared immigrants to their US born counterparts

testing the healthy immigrant thesis (Singh and Siahpush 2001). The next step in our study was to explain these differences.

We used English language use as our measure of assimilation and preserving Mexican culture as acculturation in order to determine the individual and combined effects of the two processes on the relationship between nativity and risk factors for Metabolic Syndrome. Primary our purpose was to establish whether these effects are uniform or are there differences in how they relate to health. Our results suggest two things. First, the effect of assimilation (English language use) and acculturation (preservation of Mexican culture) operate in different ways in terms of the way they affect health. Second, the effects of nativity operate largely through English language use.

Beginning with English language use, the effect on nativity suggest that language use explains much of what is different between native born and immigrants in their propensity to develop risk factors for Metabolic Syndrome. However, these effects operate differently depending on the type of risk factor. For hypertension and obesity English language uses reduces the odds ratio for nativity significantly. Including English language use in the models for triglycerides and glucose causes the effects of nativity to be even greater so that at the same level of English use a native born Mexican will have greater odds of having either condition than an immigrant. In either case these results suggest that being assimilated to the United States in the form of language use is not necessarily an asset and most likely is suggestive of the negative effects of the segmented nature of this country by race and socioeconomic class (Zhou 1997). Being more assimilated on the one hand may open opportunities for employment or better navigation

of social and healthcare systems which may lead to better health. However, greater assimilation through language use may also create a greater level of exposure to discrimination (Finch, Hummer, Kolody and Vega 2001) or even negative health behaviors (Lee and Markides 1991) which then has an undesirable effect on risk factors of Metabolic Syndrome.

Individually, the preservation of Mexican culture does not have quite the same impact as English language use on nativity. With the exception of triglycerides, it inflates the odds ratio for the risk factors for Metabolic Syndrome. These effects do not suggest that having an affinity towards Mexican culture will protect either US born or immigrant Mexicans from illness, but rather suggests that if the native born preserve their ethnic heritage, this may put them at increase risk for disease. This effect is further demonstrated by the significant negative effect that was observed for hypertension. Less affinity towards Mexican culture, not greater, is significantly protective for the risk of hypertension.

Portes and Zhou (1993) state that the process of social assimilation is segmented based on race and socioeconomic status, among other things. The results from this study also suggest that the effects of this process on health also lack linearity the Mexican descent population in Texas City, Texas.. Furthermore, having an affinity to use one language over another does not equivocate holding the cultural values of Mexico in terms of effect on health. Furthermore, the negative effects of linguistic assimilation appear to supersede any positive effects of Mexican culture in terms of risks for Metabolic Syndrome. Ultimately, this study demonstrates that the relationship between culture,

language, and health is complex and in order to full appreciate this relationship, we may need to step back and take a look at the very basics.

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Table 1. Descriptive Statistics by Nativity

	Foreign Born Mexican	**US Born Mexican**
Health Conditions (n (%))		
Hypertension ≥ 140/90	39 (11.2)	147 (18.5)
BMI ≥ 30	145 (39.4)	435 (50.8)
Triglycerides ≥ 150	65 (38.2)	210 (44.0)
Glucose ≥ 110	38 (22.4)	142 (30.0)
Acculturation (means (±SD))		
English Language Usage (6 - 28)	10.6 (± 3.7)	21.1 (± 4.8)
Preserving Mexican Culture (3- 15)	4.3 (± 2.0)	5.5 (± 2.6)
Demographics		
Age (mean ± SD)	43.1 (± 14.1)	47.3 (± 15.1)
Sex (%)		
Male	166 (44.3)	369 (42.4)
Female	209 (55.7)	502 (57.6)
Level of Education (mean ± SD)	8.4 (± 3.7)	11.5 (± 2.9)
Married (%)	286 (74.1)	501 (56.1)
Income (mean ±)		

Table 2: Logistic Regression Results for Hypertension, Body Mass Index, Triglycerides, and Glucose by Nativity, Assimilation, and Acculturation

	Hypertension				Obesity			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Nativity (US Born = 1)	1.640*	1.53	1.740*	1.354	1.788***	1.555*	1.805***	1.559*
Demographics								
Age	1.000	1.002	1.002	1.004	.993	.994	.993	.994
Sex (Female = 1)	.472***	.473***	.475***	.476***	1.223†	1.228†	1.224†	1.229†
Married	.581	.576	.564	.556	.986	.982	.982	.975
Level of Education	.992	.988	.992	.987	.990	.987	.990	.986
Income	1.085*	1.078†	1.089*	1.081*	.989	.985	.989	.985
Acculturation/Assimilation								
Preservation of Mexican Culture (3- 15)			.936†	.927*			.991	.986
English Language Usage (6 - 28)		1.021		1.029		1.015		1.016
n	1121	1121	1121	1121	1203	1203	1203	1203
-2 LL	961.8	955.5	953.2	951.0	1642.3	1641.0	1642.2	1640.7

Results are reported in Odds Ratios. † p<.10, * p<.05, ** p<.01, ***p<.001

Table 2: Continued

	Triglycerides				Glucose			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Nativity (US Born = 1)	1.418†	1.892*	1.326	1.830*	1.481	2.039*	1.582†	2.100*
Demographics								
Age	1.001	.999	1.000	.998	1.032***	1.031***	1.034***	1.032***
Sex (Female = 1)	.565***	.565***	.562***	.561***	.627*	.627*	.633*	.632*
Married	1.149	1.153	1.172	1.181	.695	.701	.678	.687
Level of Education	.989	.996	.989	.997	.959	.968	.959	.967
Income	.948	.953	.947	.953	.934†	.939	.935†	.939
Acculturation/Assimilation								
Preservation of Mexican Culture (3- 15)			1.054	1.064†			.951	.958
English Language Usage (6 - 28)		.970†		.965†		.964†		.967
n	638	638	638	638	635	635	635	635
-2 LL	852.5	849.7	850.1	846.3	704.0	701.0	702.2	699.8

Results are reported in Odds Ratios. † p<.10, * p<.05, ** p<.01, ***p<.001