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The Relationship Between Spanish Language Use and Substance Use Behaviors Among Latino Youth: A Social Network Approach

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Abstract

Purpose—Greater acculturation is associated with higher rates of substance use among Latino adolescents, but the reasons are poorly understood. One potential explanation is that social networks change with acculturation, leading to decreased protection and increased risk. Our objective was to identify Spanish language-sensitive individual and social network attributes associated with substance use in Latino adolescents.

Methods—Latino eighth-grade students in a Los Angeles public middle school completed a computerized, self-administered survey about tobacco, alcohol, drug use, and parental monitoring; and description of 30 social network members. Regression analyses were used to estimate the independent associations of network-level Spanish language use and other factors with a substance use behavior scale. Mediation analysis identified Spanish language-sensitive attributes.

Results—Network-level Spanish language use was associated with a substance use scale in bivariate but not multivariate models. Protective Spanish language-sensitive attributes included greater numbers of extended family members in the network, less substance use among network members, and greater perceived parental monitoring. Risky Spanish language-insensitive attributes include more high school aged network members.

Conclusions—These results suggest that parental monitoring and some characteristics of social networks account for the relationship between Spanish language use and substance use among Latino adolescents. Clinic- or community-based interventions that enhance protective characteristics of social networks in Latino adolescents may be effective.

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Keywords

Latinos; Adolescents; Acculturation; Substance use

Approximately 40% of Latinos, one of the fastest growing racial/ethnic groups in the United States, are foreign born [1]. Many Latino adolescents, therefore, are immigrants or children of immigrants [2] and so will likely experience acculturation. Greater acculturation is associated with increased participation in substance use in this population [3–8], but the underlying mechanisms to explain the association are poorly understood. A better understanding of amenable acculturation-sensitive individual and social network attributes may help adolescent health providers seeking to prevent substance use in Latino youth.

Acculturation is the process whereby immigrants and their descendants adopt the behaviors, beliefs, and values of the host culture while adapting those belonging to their culture of origin [9,10]. Current theories suggest that most people experience biculturalism, with individuals ranging from full acceptance to rejection of the dominant culture, and from full retention to rejection of their culture of origin [11]. Results from research assessing the relationship between acculturation and substance use are variable and depend on many factors: how acculturation is measured (unidimensional measures such as language vs. multidimensional scales), and which population characteristics (age, gender, subpopulation, etc.), and outcomes are considered [11].

In the case of substance use in Latino adolescents, despite these definitional challenges increased acculturation has been consistently associated with worsening behavior across a variety of operationalizations of the concept. Many studies have found substance use to be associated with acculturation when measured by generational status (immigrant vs. U.S.-born) [3–5], preferred language (Spanish vs. English) [6–8,12], and preferred media (Spanish vs. English language) [7]. However, there is a lack of understanding regarding what underlying factors explain the greater prevalence of substance use with increased acculturation. Recent reports have suggested a public health goal of promoting the maintenance of healthy behaviors among the less acculturated [11], but such programs may not be successful unless acculturation-sensitive risk and protective factors are better understood.

Social network analysis (SNA), which has been used to study adolescent gun carrying [13], smoking [14,15], and bullying [16], aims to understand behavior by describing the social ties individuals have with each other [17]. SNA can potentially contribute to our understanding of the complex relationship between acculturation and adolescent substance use in two ways. First, it may enhance language-based measures of acculturation. Language use accounts for a substantial portion of the variance in many acculturation measures [18]. Most Latino adolescents are immersed in English-dominant institutions such as schools, and primarily speak English (85% of children who speak Spanish at home speak English “very well” or “well”) [19]; thus, they may choose which language they use with more acculturated peers and family members. Measures that assess language in a limited number of settings are therefore unlikely to capture the complexity of language use for bicultural adolescents. SNA, which measures respondents’ language use with multiple individuals they

identify as important in their lives, can provide a more complete assessment of language preferences.

Next, SNA may be useful because language preference likely predicts different types of social contacts, and exposure to the risky or protective norms, values, and behaviors that are associated with those particular relationships. For example, one cultural characteristic often associated with traditional Latino values is familism (belief in the importance of family unity, and close proximity with extended family members [20]), which has been shown to protect Latino adolescents against substance use [7]. However, in two longitudinal studies, increased acculturation led to decreased familism and increased alcohol use [4,21]. Although direct assessment of extended family involvement in the lives of adolescents is not frequently performed, loss of family orientation likely results in decreased extended family support, which has been found protective against substance use in Latino adults [22]. Conversely, Latino adolescents may become more peer-oriented as they gain English language fluency [8], leading to increased exposure to substance users, especially if peers are more highly acculturated. Therefore, the composition of Latino adolescents' networks may identify social factors that explain the relationship between acculturation and substance use.

Therefore, we designed a study using SNA to identify acculturation-sensitive sociocultural factors (e.g., country of birth, parental monitoring, and network characteristics) associated with substance use for Latino adolescents. First, we asked which individual and social network attributes were associated with respondents' participation in tobacco, alcohol, inhalant, and drug use. Because we were interested in assessing overall contributors to the relationship between acculturation and substance use, and because similar risk and protective factors often predict multiple behaviors [23], we chose to utilize a substance use scale for this exploratory study. We hypothesized that acculturation-sensitive sociocultural factors would mediate the relationship between Spanish language use and substance use behaviors. These factors may be targets for public health interventions designed to maintain healthy behaviors among less acculturated Latinos.

Methods

The study was approved by the institutional review boards at the University of California, Los Angeles, and the Los Angeles Unified School District.

Design, setting, and subjects

For this exploratory, cross-sectional study, which occurred between April and September 2004 at a Los Angeles middle school, we sought at least 238 (of approximately 1,300) eighth-grade Latino participants so as to have 80% power with a two-sided test to detect correlations of .25 or greater in absolute value among those participants at a significance level of .05. They were given parental consent forms in their classrooms. Parents provided active informed consent, and students provided assent. Participants received a \$25 gift certificate. When compared to the district as a whole, students at the participating school were more likely to be Latino and socioeconomically disadvantaged, and to have somewhat

lower academic performance on California Department of Education composite scores of standardized tests [24].

A total of 296 students enrolled in and completed the study. Eighteen were excluded for incomplete network data. Teens were asked to identify themselves as one of the following: Asian, Black or African American (not Hispanic or Latino), Hispanic or Latino/a, Native Hawaiian or Pacific Islander, Native American or Alaskan native, or white or Caucasian (not Hispanic or Latino). Due to software limitations, students were only able to select one race/ethnicity. The present analysis was restricted to the 258 (93%) who identified as Latino.

Procedures

Participants completed a computer-assisted-self-interview using *Egonet* software [25], designed to collect social network data. The survey was conducted at the school after classes, and took an average of 90 minutes to complete. Trained bilingual research assistants provided the survey in English or Spanish, provided a short lesson in use of the computer, assured privacy, and supervised survey administration. The survey was translated to Spanish by an experienced translator, and then reviewed by two additional translators for accuracy; discrepancies were resolved by committee [26]. The survey covered demographics, substance use behaviors (focusing on those most prevalent in middle-school populations), and other health and social indicators. Previous research has shown that average social networks are quite large [27] and that even acquaintances may be influential [28]. Therefore, respondents listed the first names of “30 people important in your life,” and answered a series of questions about each of those people.

Measures

Outcome variable: substance use scale—Survey items were modified from other sources [29,30]. A common preface was used for all substance use questions: “Some teens your age, but not all teens, use alcohol, tobacco, and drugs. During your life, how many times have you tried ...,” followed by “a cigarette, even one or two puffs,” “one full drink of alcohol (a can of beer, glass or wine, wine cooler, or shot of liquor),” “marijuana (pot, weed, or hash),” “inhalants (things you sniff, huff, or breathe to get high such as glue, paint, aerosol sprays, gasoline, or poppers),” or “any illegal drugs (such as PCP, downers, or other pills not prescribed by a doctor).” Response categories were “0 times,” “1 time,” “2–3 times,” or “4 or more times.”

We created a summary scale for substance use that gave each component item equal significance, was transformed to have a normal distribution, and was standardized to mean zero standard deviation one for ease of interpretation. The scale had a Cronbach’s α coefficient of 0.81, suggesting a high degree of internal consistency.

Individual characteristics—Respondents reported their gender and age. They identified the country in which they were born from a list. Perceived parental monitoring was measured with a six-item scale (e.g., “I tell my parent(s) who I am going to be with before I go out”) with five-point Likert response options (from “never” to “always”). The parental monitoring score was calculated as the mean of individual item z-scores, and then

restandardized to a mean of zero and standard deviation of one. It has been shown to have high internal consistency [31].

Social network characteristics—Respondents were asked a series of questions about each of the 30 social network members they identified. (1) “To which group does this person belong?” Response categories were “immediate family (parents/guardian, brothers, sisters),” “extended family (grandparents, aunts, uncles, cousins, etc.),” “friends or someone you know about your age,” or “adult other than family.” (2) “How old is this person?” Response categories were: “middle school age or younger,” “high school age,” or “an adult older than high school.” (3) “What is this person’s gender?” (male/female). (4) “What is this person’s race/ethnicity?” Response options were the same categorizations used to assess respondent race/ethnicity, and were collapsed into Latino and non-Latino. (5) Finally, respondents were asked questions about network members’ substance use including “Does this person smoke cigarettes?” “Does this person drink alcohol?” and “Does this person use drugs?” For the three substances, we calculated the percentage of each response category (“yes,” “no,” and “I don’t know”) in the network, then collapsed across substances to obtain the mean number of substances used, not used, or not known about in a member of the network (out of a maximum of three—alcohol, cigarettes, and drugs).

Contextual variables intended to measure how influential the network member was on the respondent were assessed through six questions. Social support was measured using a previously validated scale [31] asking “How helpful is this person in talking about personal problems,” “How much does this person help you when you need money or other things,” and “How much do you have fun with this person?” Response categories were “not at all,” “somewhat,” and “a great deal.” Overall closeness was assessed by the question, “How close are you to this person,” Response categories were “very close,” “somewhat close,” and “not close at all.” Geographic closeness to the respondent was asked and response categories were “in your neighborhood,” “somewhere in Los Angeles,” “in another city in the United States,” and “in another country.” Finally, frequency of contact was asked by “How often do you see this person or talk to them on the phone?” Response categories were “almost every day,” “at least once a week,” “once a month,” and “less than once a month.”

When averaged at the respondent level, the resulting network variables are measured continuously on a 0%–100% scale, and must sum to 100% across response categories. These percentages were converted to proportions between 0 and 1 for regression analyses.

Network-level Spanish language use—Respondents were asked the language they speak with each network member. Response options were “mostly English,” “about half English half Spanish,” “mostly Spanish,” or “some other language.” Because the four mutually exclusive language categories were inherently strongly correlated, we used a preliminary model to determine a parsimonious (one degree of freedom) parameterization of this variable. Of the four language categories, the proportion of network members with whom the respondent spoke mostly Spanish (hereafter referred to as Spanish language use) most strongly predicted our outcome was therefore chosen as our measure of acculturation. The other language categories added little to the predictive power of this one measure.

Data analysis

All analyses used SAS software (Version 9.1) [32]. Because item missingness rates were low (<5% for each variable), we imputed missing values using a standard “hot-deck” strategy, stratifying on gender [33].

Univariate descriptive statistics were calculated for all individual and network outcomes. Simple (bivariate) linear regression was used to screen potential predictors of substance use behavior outcome from a set of individual and network characteristics. An overall F -test of the five contextual variables found no significant evidence that these variables predicted substance use ($p = .34$). Therefore, to retain a parsimonious number of predictors relative to observations, we did not include these variables in the reported multivariate models. Three multivariate models created to assess the relationship between respondent characteristics, network characteristics, Spanish language use, and substance use included: (1) language use and respondent characteristics, (2) respondent characteristics and network characteristics, (3) language use, respondent characteristics and network characteristics. To identify the mediators of the relationship between Spanish language use and substance use, we created a series of simple (bivariate) linear regressions to predict Spanish language use from other individual and network characteristics and utilized the Sobel test to determine characteristics that mediated the relationship between Spanish language use and respondent substance use.

Results

Description of the sample and substance use behaviors

The majority of respondents (91%) were 13–14 years old (Table 1). Sixteen percent were immigrants. Most of respondents’ parents were immigrants, largely from Mexico (60%), Central America (19%), or both (one parent from each, 11%). The most frequent substance used was alcohol (44%), followed by cigarettes (27%), marijuana (16%), inhalants (15%), and other drugs (7%).

Social network characteristics

Table 2 describes the characteristics of the adolescents’ social networks. On average, networks had an approximately even number of males and females (51%). Just over half (55%) were middle-school age or younger, followed by older than high-school age and high-school age. The majority were Latino. Respondents spoke mostly Spanish with 18% of network members, and mostly English with 49% of network members. The average network consisted of 49% peers, followed by extended family, immediate family, and adults other than family. Respondents reported knowing that 8% of network members used cigarettes, 14% alcohol, and 8% drugs.

Individual and network characteristics associated with substance use behavior

Because substance use behaviors are standardized, coefficients in Table 3 can be interpreted as effect sizes in standard deviations. For network measures expressed as proportions, these are the effect sizes associated with a change from 0% to 100% (0 to 1).

In the simple model including demographic variables (Table 3, Model 1), only Spanish language use was significantly associated with substance use, and was protective. When demographic variables and potential mediators were considered without Spanish language use (Table 3, Model 2) parental monitoring had a significant protective association, and the percentage of extended family and adult other than family network members approached significance as protective. Factors associated with significantly increased risk were higher percentages of network members who were high-school age or substance users. Once Spanish language use and all demographic variables and potential mediators were included in a final multivariate model (Table 3, Model 3), Spanish language use was no longer significantly associated with substance use. The effects of parental monitoring, network members who were high-school age, or substance users, and the marginal effects of the percentage of extended family and adult other than family members persisted.

Individual and network characteristics associated with mostly Spanish language use

The first columns in Table 4 show the bivariate relationship between Spanish language use and potential mediators. Individual and network characteristics related to increased Spanish language use were: greater parental monitoring, a higher percentage of extended family members versus peers and adults versus those middle-school age or younger in the network. Spanish language use was also associated with fewer non-Latinos, and less network drug use.

Evidence for mediation

The Sobel Test for mediation (Table 4) found that the association between Spanish language use and substance use was mediated by one individual (parental monitoring) and two network (extended family and substance users in the networks) characteristics ($p < .05$ for each). The percentage of extended family member in the network approached significance as individual predictor of substance use, but achieved significance here when both assessment of the relationship between extended family and Spanish language use as well as extended family and substance use were considered jointly.

Discussion

We found that network level Spanish language use by Latino adolescents, was associated with less substance use. However, when parental monitoring and social network characteristics (i.e., the percentage of extended family members and substance users in the network) were controlled for, the association was no longer significant. In formal mediation analysis, these factors were found to account for the relationship between Spanish language use and adolescent substance use. In addition, a higher percentage of high-school aged network members was associated with a higher likelihood of substance use, independent of Spanish language use. These findings suggest that language use is related to whom adolescents interact with and how they interact, and identify potentially important targets for interventions designed to prevent or lower Latino adolescents' substance use.

Study findings speak to the challenging process that immigrant families undergo as parents and teens adapt to life in the United States and to the developmental changes of adolescence.

One difficulty these families experience is the undermining of parental authority that occurs when adolescents develop English skills and cultural understanding faster than their parents do. Differential acculturation has been found to lead to family stress and less use of effective parenting practices—including parental monitoring—resulting in increased adolescent substance use [34]. One mechanism that may explain the protective effect of extended family members in the lives of Latino adolescents is that they may in effect decrease the acculturation differential by reinforcing parents' values and language choice [35]. Furthermore, consistent with theories of social networks, extended family may help define meaningful social roles and establish the coherent and consistent sense of identity that is important for adolescent development [36], and protective against substance use [37]. Extended family may also be influential through the reinforcement of protective norms, or provision of material resources or information. For example, extended family has been identified as a safe source for information about sexuality, although communication around substance use has not been evaluated [38]. Future research on Latino and other populations could investigate whether interventions may be designed to enhance the role of either extended family members, or in their absence, other supportive social network members.

This study also contributes knowledge about parental monitoring in Latino populations. High levels of parental monitoring have been shown to be protective across a range of behaviors and populations [31,39]; however, an association with language use has not been previously demonstrated. Parental monitoring may be taught or reinforced [31,40], so it is a practical target for interventions that seek to promote the maintenance of protective behaviors in less acculturated populations. Results of this study indicate that monitoring may be a particularly important prevention strategy as youth become bilingual, given the greater exposure to substance users noted in less Spanish-dominated networks.

In terms of magnitude, one of the strongest risk factors in our model was the percentage of the network that was high-school aged. There is some literature that points to specific risks for teens socializing with older youth (e.g., increased risk for pregnancy in girls with older boyfriends [41]), but more research is needed to understand why some teens seek out these interactions. If validated in future studies, information regarding the risk of involvement with high-school age teens may be important anticipatory guidance for parents of younger adolescents.

This study has limitations. The results come from a single school in Los Angeles with a low-income, predominantly Mexican and Central American student body, so results may not apply to all Latino adolescents. Although the ethnic and gender composition of study participants was similar to the overall student body, and the prevalence rates of substance use were comparable to those found in representative studies such as Monitoring the Future [42], available data did not permit us to confirm whether study participants differed in any systematic way from nonrespondents. The study is cross-sectional, raising questions about the direction of influence of networks on behavior. Additionally, despite the fact that network-level Spanish language use was associated with substance use in a similar manner to other commonly used measures, it has not been previously tested. Finally, due to confidentiality concerns, we could not ask for identities of network members and so were unable to adjust for those common to multiple networks. Consequently, slightly overlapping

networks may result in imperfect independence and a small understatement of standard errors.

Despite these limitations, this study, utilizing social network analysis, provides a clearer understanding of how language use is related to substance use among the large and growing population of Latino youth. The results suggest that providers should discuss with Latino parents the importance of monitoring, including knowing the ages of their children's friends, and reinforce the important role of extended family. Future research should determine whether strengthening protective factors in adolescent social networks reduces risky behaviors as acculturation progresses. Such work could offer an important intervention strategy to ensure the long-term health of Latino youth.

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Table 1

Characteristics of respondents

Characteristic	N	%
Total sample (n)	258	
Gender		
Female	146	57
Age		
12 years old	21	8
13 years old	160	62
14 years old	76	29
15 years old	1	<1
Recipients of free lunch program ^a		89
Immigrant	42	16
Parents' countries/regions of birth		
Mexico for both	155	60
Central America for both	48	19
Mexico and Central America	29	11
U.S. and Latin America	12	5
U.S. for both	9	3
Other ^b	5	2
Lifetime behaviors		
Alcohol use	114	44
Cigarette use	69	27
Marijuana use	40	16
Inhalant use	39	15
Other drug use	17	7

^aFor school total by school district report.

^bIncludes four cases with both parents both from South America and one case with parents from Puerto Rico and Mexico.

Table 2

Mean percentage of network by each network characteristic

Characteristic	M Percentage ^a	SD Percentage
Female network members	51	19
Age of network member		
Middle school age or younger	55	21
High school	15	13
Adult older than high school	30	18
Non-Latino race/ethnicity of network member	11	15
Language use with respondent		
Mostly English	49	3
Half English half Spanish	31	25
Mostly Spanish	18	18
Other language	1	6
Relationship to respondent		
Friend or peer	49	26
Extended Family	26	21
Immediate Family	18	17
Adult other than family	7	11
Perceived by respondent to smoke cigarettes ^b	8	12
Perceived by respondent to use alcohol ^b	14	17
Perceived by respondent to use drugs ^b	8	14

Notes: M = mean, SD = standard deviation.

^aThe percentage of network members in each variable category was first calculated for each respondent, then averaged across all respondents.^bCompared to perceived nonuse or use unknown.

Relationship between respondent and network characteristics, Spanish language use in network, and substance use: multivariate regression analyses

Table 3

Characteristics (N = 258)	Model 1		Model 2		Model 3	
	Coeff	p-value	Coeff	p-value	Coeff	p-value
Mostly Spanish language use	−0.74	.039			0.19	.657
Respondent characteristics						
Gender female	0.03	.805	−0.01	.937	0.00	.989
Age (years)	−0.14	.181	−0.10	.274	−0.10	.275
Immigrant	0.04	.812	0.10	.509	0.08	.602
Parental monitoring ^a			−0.32	<.001	−0.32	<.001
Network characteristics ^b						
Gender of network member						
Female			−0.05	.900	−0.08	.832
Male			(0)		(0)	
Relationship to respondent						
Immediate family			−0.51	.123	−0.50	.125
Extended family			−0.65	.072	−0.69	.064
Adult other than family			−1.48	.057	−1.47	.058
Peer			(0)		(0)	
Age of network member						
Adult			0.42	.375	0.33	.523
High school			1.49	.002	1.47	.003
Middle school or younger			(0)		(0)	
Race-ethnicity of network member						
Non-Latino			−0.27	.548	−0.23	.613
Network member substance use ^c						
Perceived use			1.77	<.001	1.77	<.001

^aMean zero, standard deviation one.

^bExpressed as proportion of network members (0–1).

^cAveraged across three substances; compared to perceived nonuse or unknown use.

Table 4

Sobel test for mediation of Spanish language effect on substance use

N = 258	<u>Test of bivariate association between mediator and Spanish language use</u>		<u>Sobel test of mediation</u>	
	<i>T</i> -value	<i>p</i> -value	<i>Z</i> -value	<i>p</i> -value
Respondent characteristics				
Parental monitoring ^a	3.33	<.001	−2.86	.002
Network characteristics ^b				
Gender of network member				
Female	1.87	.060	−0.21	.417
Relationship to respondent				
Immediate family	−0.97	.333	0.82	.794
Extended family	10.36	<.001	−1.83	.034
Adult other than family	1.55	.122	−1.20	.115
Peer				
Age of network member				
Adult	11.27	<.001	0.64	.739
High school	−0.60	.547	−0.59	.278
Middle school or younger				
Race–ethnicity of network member				
Non-Latino	−2.39	.017	0.49	.688
Network member substance use ^c				
Perceived use	−2.44	.016	−2.15	.016

^aMean zero, standard deviation one.^bExpressed as proportion of network members (0–1).^cAveraged across three substances; compared to perceived nonuse or unknown use.