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## **Drinking Initiation and Problematic Drinking Among Latino Adolescents: Explanations of the Immigrant Paradox**

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# Drinking Initiation and Problematic Drinking Among Latino Adolescents: Explanations of the Immigrant Paradox

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Studies indicate that U.S.-born Latino teens exhibit higher rates of alcohol use compared with their foreign-born counterparts. Different hypotheses have been advanced to explain the mechanisms underlying this immigrant paradox, including the erosion of protective cultural factors across generations and increased exposure to risky peer environments in the United States. The present study examined whether the immigrant paradox applies to drinking initiation and problematic drinking among Latino adolescents, and tested whether generational differences in family protective factors and peer risk factors might explain the immigrant paradox. A nationally representative sample of Latino teens ( $N = 2,482$ ) of Cuban, Mexican, and Puerto Rican origin from 3 immigrant generations (21% first generation, 33% second generation, and 46% third and later generations) was obtained from the National Longitudinal Study of Adolescent Health. Logistic and negative binomial regression models indicated that early drinking initiation and problematic alcohol use were more prevalent among later-generation youth, supporting the immigrant paradox. Erosion of family closeness and increased association with substance-using peers mediated the relationship between generation and alcohol use patterns in this sample. Results provide support for culturally sensitive interventions that target peer perceptions of substance use and bolster protective family values among Latino adolescents.

*Keywords:* adolescents, Latino/Hispanic, immigrant paradox, alcohol use patterns

Alcohol continues to be the most abused substance among adolescents in the United States. By twelfth grade, 72% of adolescents report having consumed alcohol, 55% report

having been drunk, and 25% report binge drinking in the past 2 weeks (Johnston, O'Malley, Bachman, & Schulenberg, 2010b). The public health impact of teen drinking is highlighted by the array of alcohol-related problems reported by young drinkers, such as interpersonal problems, impaired school and work performance, risky sexual behaviors, and drunk driving (Brown et al., 2008; National Institute on Alcohol Abuse & Alcoholism, 2006; Office of the Surgeon General, 2007; Windle & Windle, 2006).

Latino adolescents exhibit the second highest rates of alcohol use, closely following non-Hispanic White teens (Johnston, O'Malley, Bachman, & Schulenberg, 2010a). One of the most consistent factors associated with drinking patterns among Latino teens is nativity. U.S.-born Latino adolescents report higher levels of alcohol use compared with their first-generation immigrant counterparts (Gil, Wagner, & Vega, 2000; Guilamo-Ramos, Jaccard, Johansson, & Turrissi, 2004; Vega & Gil, 1998). Indeed, nativity-based disparities are apparent across many health outcomes, including substance abuse and mental disorders (Alegria et al., 2008). However, immigrants are often exposed to stress or trauma before and during the migration process, commonly settle in impoverished neighborhoods, and confront greater language barriers compared with their U.S.-born counterparts (Guarnaccia & Lopez, 1998; Pumariega, Rothe, & Pumariega, 2005). The advantaged health status of first-generation Latinos has come to be known as the "immigrant paradox" (Markides & Coreil, 1986; Vega & Sribney, 2011).

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Although the mechanisms underlying the immigrant paradox are not well understood, the literature has advanced different hypotheses. Proposed explanations include acculturation stress theory, assimilation theory, the healthy immigrant hypothesis, erosion of cultural values, and increased exposure to risky environments. The acculturative stress framework posits that the strain resulting from the challenges that Latino youth encounter as they adapt to the host culture generates stressful situations that elicit substance use as a maladaptive stress management response (Gil et al., 2000). Assimilation theory proposes that as Latino teens assimilate to mainstream culture, their drinking patterns will change to reflect the norms of the host culture (Caetano & Clark, 2003). The healthy immigrant effect explains that healthier people are more likely to successfully immigrate to the United States (Crimmins, Soldo, Kim, & Alley, 2005) and may appear healthier than their U.S.-born counterparts.

Some suggest that erosion of protective features of the culture of origin accounts for increased risk across generations (Barrera, Gonzales, Lopez, & Fernandez, 2004; Mogro-Wilson, 2008). For example, parenting practices and relationships among Latino families are organized by values highlighting the centrality of family integrity. *Familismo* is a dynamic construct often defined as a normative set of values endorsed by Latinos that encompasses several facets. These include a sense of obligation to provide instrumental support to the family, an edict that family expectations should guide behavior, and an implicit sense that emotional support must be cultivated within the family (Germán, Gonzales, & Dumka, 2009; Sabogal, Marin, Otero-Sabogal, Vanoss Marin, & Perez-Stable, 1987). Orientation toward traditional family values has been found to be protective against externalizing behaviors (Germán et al., 2009; Gonzales et al., 2008), including alcohol and drug use (Castro, Stein, & Bentler, 2009; Gil et al., 2000). However, *familismo* decreases across generations as Latino teens acculturate, and this decline appears related to increased alcohol use (Gil et al., 2000). As family values change across generations, so, too, may parenting practices. Parental monitoring of adolescents decreases with acculturation among Latino parents (Driscoll, Russell, & Crockett, 2008; Mogro-Wilson, 2008), and decreased monitoring is associated with increased alcohol use among Latino adolescents (Driscoll et al., 2008; Mogro-Wilson, 2008). Thus, the erosion of protective family practices involving closeness and monitoring may explain generational differences in drinking among Latino youth.

Another explanation for the immigrant paradox is that U.S.-born Latino adolescents are disproportionately exposed to environmental conditions that predispose risk, such as substance-using peers (Gil et al., 2000; Lopez et al., 2009; Prado et al., 2009). During adolescence, peer networks become central as teens begin to seek individuation (Brown et al., 2008). Teens are more likely to engage in risky behaviors, including alcohol use, if they associate with deviant peers (Barrera et al., 2004; Brown et al., 2008). It is plausible that immigrant teen social networks present less peer risk than those of U.S.-born Latino youth. Immigrant Latino adolescents are more likely to affiliate with other immigrant youth because of school placements organized by English proficiency (Carhill, Suárez-Orozco, & Paez, 2008) and preferences for Spanish-speaking peers (Carhill et al., 2008). Immigrant and Spanish-speaking Latino youth are less likely to use alcohol (Marsiglia & Waller, 2002). Conversely, U.S.-born Latino teens are

more likely to have English-speaking U.S.-born peers who report greater use of alcohol and drugs (Allen et al., 2008). Thus, deviant or substance using peer networks may represent a social risk factor explaining an immigrant paradox in teen drinking.

The first aim of this study was to examine whether the immigrant paradox was present in Latino teens' drinking initiation and problematic drinking using a nationally representative sample of Latino teens. Because most studies evaluating the immigrant paradox have examined nativity, contrasting U.S.-born with foreign-born Latinos, little is known about how drinking patterns among third- and later-generation Latino youth compared with second- and first-generation adolescents. To that end, we examined differences among three generations of Latino youth.

The second aim of this study was to examine the contribution of two hypothesized mechanisms proposed to explain the immigrant paradox, namely, erosion of cultural family practices and increased exposure to risky behaviors. First, the cultural erosion hypothesis was examined using two relevant protective factors, namely, parental monitoring and family closeness, as putative mediators. Second, we examined the role of exposure to risky peer environments using an index of association with substance-using peers as a putative mediator. We predicted that immigrant youth may be less likely than later-generation youth to initiate drinking and experience alcohol-related problems because they benefit from more family closeness, parental monitoring, and prosocial peer networks.

## Method

### Sample and Procedure

The National Longitudinal Study of Adolescent Health (Add Health) is a nationally representative study of health and risk behavior among U.S. adolescents in Grades 7 through 12 (Harris et al., 2008). Add Health utilized a multistage and stratified sampling frame that included all high schools in the United States. A random sample of 80 high schools and their major middle-school feeders were selected for participation. Students completed a self-administered questionnaire during the period 1994 to 1995. A core sample of 12,105 adolescents was selected to participate in home interviews conducted between April and December of 1995. A resident parent, usually the mother, also completed an interview (Harris et al., 2008).

### Study Sample

This study used a subsample of Add Health Wave I participants who identified as Latino or Hispanic ( $N = 2,482$ ); of Mexican (62%), Cuban (18%), and Puerto Rican (20%) origin; who spoke English (53%) or Spanish (47%); and who indicated whether or not they had consumed alcohol in their lifetime. All items were selected from the adolescent interview unless otherwise noted.

### Measures

**Generational status.** Immigrant generation was determined using parent and adolescent responses regarding their respective country of birth. Adolescents who reported being foreign-born were classified as first generation. Teens who reported being

U.S.-born and whose parent reported being foreign-born were categorized as second generation. Adolescents who reported being U.S.-born and whose parent reported being also U.S.-born were classified as third and later generation.

**National origin.** All participants indicated that they were of Latino or Hispanic origin. In addition, to be included in the current study, adolescents self-identified as Mexican/Mexican American/Chicano, Cuban/Cuban American, or Puerto Rican.

**Language use at home.** Adolescents indicated the usual language spoken at home by choosing English or Spanish.

**Parental alcohol use.** Parents were asked to indicate how often in the past year they had a drink on a 6-point scale ranging from *never* (1) to *nearly every day* (6).

**Family socioeconomic status.** Parents were asked to indicate their level of educational attainment (less than high school, high school or equivalent, some college, or college graduate and beyond). Parents also reported their annual family income (less than \$14,999, \$15,000 to \$29,999, \$30,000 to \$44,999, \$45,000 to \$59,999, and \$60,000 or above).

**Family structure.** Based on teen reports on multiple items regarding household composition, family structure was coded into one of five categories (two biological parents, at least one non-birth parent identified as a parent figure [step, adoptive, grandfather, etc.], single parent, and other [foster home, no identified parent figures, etc.]).

**Initiation of drinking.** Adolescents indicated whether or not they had ever had a drink of beer, wine, or liquor more than two or three times in their life. The item directed teens to exclude a sip or a taste of someone else's drink.

**Problematic alcohol use.** For those reporting alcohol initiation, the frequency of alcohol-related problems in the past year was assessed by asking adolescents how many times, as a result of drinking, they "got into trouble with their parents," "had problems at school or with their schoolwork," "had problems with friends," "had problems with someone they were dating," "did something they later regretted," "were hung over," "were sick to their stomach or threw up," "got into a sexual situation they later regretted," and "got into a physical fight." Responses ranged on a 5-point scale from *0 times* to *5 or more times* in the past year, and were summed for a maximum total of 45 points ( $\alpha = .85$ ).

**Perceived family closeness.** Teens were asked, "How much do you feel that . . ." "your parents care about you," "people in your family understand you," "you and your family have fun together," and "your family pays attention to you"? Answers ranged from *not at all* (1) to *very much* (5), for a possible total score of 20 points. Higher scores indicated greater family closeness ( $\alpha = .76$ ).

**Perceived parental monitoring.** Adolescents were asked, "Do your parents let you make your own decisions about . . ." "the time you must be home on weekend nights," "the people you hang around with," "what you wear," "how much TV you watch," "which TV programs you watch," "what time you go to bed on week nights," "what you eat"? Answers were dichotomous for a possible summed total score of seven points. Higher scores indicated greater degree parental monitoring ( $\alpha = .65$ ).

**Association with substance-using peers.** Adolescents were asked, "Of your best friends, how many . . ." "drink alcohol at least once a month," "smoke a cigarette at least once a day," and "use marijuana at least once a month"? Answers ranged from 0 to 3, for

a total summed score of 9 points. Higher scores indicated greater association with substance-using peers ( $\alpha = .76$ ).

## Missing Data

Missing data ranged from 0% to 32%, depending on the variable, with a mean of 6.21% across all study variables. Items obtained from the parent questionnaire, including family income and parental education, contained the highest percentage of missing data (18% and 32%, respectively). Listwise deletion procedures are not recommended, as this approach may yield biased results; therefore, multiple imputation (MI) was used to estimate missing data values (Rubin, 1987). Missing values were imputed by the command *ice* (imputation by chained equations; Royston, 2009) in Stata 10 (StataCorp, 2009) using equation models that combined relevant predictors in the data set previously identified using the command *pred\_eq* (Medeiros, 2007). Twenty imputed data sets were created that were then combined using the command *mim* to generate estimates (Carlin, Galati, & Royston, 2008). MI is commonly used because it yields estimates averaged over the imputed data sets that reflect unbiased parameters and standard errors that take into account the uncertainty of using imputed missing values (Graham, Allison, & Gilreath, 2007).

## Analytic Strategy

First, the relationships between immigrant generation and drinking initiation and problematic alcohol use were examined to establish if the immigrant paradox was prevalent in each of these outcomes. Second, the mediating role of family closeness and parental monitoring, and association with substance-using peers, were tested in separate models to examine if each hypothesized mediator explained generational differences in each drinking outcome. Third, a multimediation model, including all proposed mediators, was conducted to ascertain if each hypothesis explained generational differences in the examined drinking outcomes over and above the others included in the model. Tests of mediation were conducted following the Baron and Kenny (1986) approach. Significance of mediation effects was determined using Sobel tests (Sobel, 1982). All models controlled for adolescents' gender, age, national origin, language used at home, parental alcohol use, family structure, and family socioeconomic status.

Logistic regressions were used to examine the direct and indirect effect of generation on likelihood of drinking initiation during adolescence. Numbers of alcohol-related problems were examined among youth who had started to drink ( $n = 1,537$ ). Because the variance of this count variable is greater than its mean, negative binomial regression models were used. The alphas obtained in every negative binomial regression conducted were significantly greater than zero, indicating that negative binomial models provided better estimates than would have regular Poisson models. Ordinary least squares regressions were used to examine generational differences in the proposed mediators, all of which are continuous variables. All analyses used the appropriate survey weights to correct for design and sampling effects, as not doing so may yield biased parameter estimates (Chantala & Tabor, 1999). Add Health selected high schools with replacements from the Quality of Education Database as the basis for a stratified cluster sampling (Tourangeau & Shin, 1999) and adjusted individual

weights for oversampling. Adolescents for whom weights were missing were excluded from analysis, as recommended by Chantala and Tabor (1999).

## Results

### Sample Characteristics

Table 1 describes the sample used in this study. Twenty-one percent of the adolescents were first-generation immigrants, 33% were second-generation immigrants, and 46% were third-generation immigrants. Participants' age ranged from 11 to 21 years ( $M = 15.9$ ,  $SD = 1.7$ ) and 49% were female. Fifty-three percent were living with both biological parents, 48% of parents had not completed high school, and 59% reported a family gross income of \$29,000 or less.

### Generation and Drinking Initiation

As shown in Table 2, likelihood of alcohol initiation during adolescence increased with generation,  $F(2, 1000) = 18.58$ ,  $p < .001$ . Second-generation teens were 2.77 times more likely and third-generation teens were 3.38 times more likely than first-generation teens to have started drinking. There was no significant difference in drinking initiation between the second and third generations. Age significantly predicted alcohol initiation in the expected direction,  $t(125) = 8.31$ ,  $p < .001$ .

### Mediational Analyses for Drinking Initiation

Table 2 shows the results of mediational analyses for drinking initiation.

**Erosion of cultural values hypothesis.** Parental monitoring decreased across generations,  $F(2, 1000) = 3.49$ ,  $p < .05$ , but was not significantly related to initiation and thus was not a mediator. Family closeness decreased across generations,  $F(2, 1000) = 3.43$ ,  $p < .05$ , and significantly predicted initiation,  $t(125.6) = -4.36$ ,  $p < .001$ . The effect of generation on initiation was attenuated after parental monitoring and family closeness were added to the model,  $F(2, 1000) = 14.67$ ,  $p < .001$ . Partial mediation was confirmed using the Sobel test when comparing lifetime alcohol use between second and first generations,  $Z = 1.96$ ,  $p < .05$ , and between third- and first-generation teens,  $Z = 2.06$ ,  $p < .05$ .

**Exposure to risky peer environment.** Association with substance-using peers increased across generations,  $F(2, 1000) = 14.77$ ,  $p < .001$ , and significantly predicted initiation,  $t(124.2) = 10.89$ ,  $p < .001$ . The effect of generation on initiation was attenuated but remained significant after accounting for substance-using peers,  $F(2, 979.8) = 7.23$ ,  $p < .001$ . Sobel tests determined that the effect of generation on drinking initiation was partially mediated by association with substance-using peers (second vs. first,  $Z = 3.49$ ,  $p < .05$ ; third vs. first,  $Z = 4.84$ ,  $p < .05$ ).

**Multimediation.** The effect of generation on lifetime alcohol use was attenuated but remained significant after introducing all mediators in the model,  $F(2, 1000) = 6.37$ ,  $p < .05$ . Only family

Table 1  
Sociodemographic Characteristics by Immigrant Generation Based on Weighted Analyses, Wave I Longitudinal Study of Adolescent Health

	Overall	First generation	Second generation	Third and later generation
Total	$N = 2,482$	21%	33%	46%
Gender				
Female	49%	50%	49%	47%
Male	51%	50%	50%	53%
Age (years)	$M = 15.9$ , $SD = .24$	$M = 16.4$ , $SD = .31$	$M = 16.1$ , $SD = .29$	$M = 15.9$ , $SD = .24$
National origin				
Mexican	62%	52%	74%	77%
Cuban	18%	39%	12%	3%
Puerto Rican	20%	9%	14%	20%
Language use				
English	53%	15%	64%	90%
Spanish	47%	85%	36%	10%
Family composition				
Two birth parents	53%	52%	61%	47%
At least one step-parent	33%	32%	29%	39%
Single parent	12%	13%	8%	13%
Other	2%	3%	2%	1%
Family socioeconomic status				
Parent education				
No High School	48%	68%	64%	30%
High school or equivalent	24%	16%	19%	31%
Some college	20%	12%	14%	27%
College degree and beyond	8%	4%	3%	12%
Family income (thousand dollars)	$M = 33.7$ , $SD = 1.5$	$M = 25.9$ , $SD = 2.4$	$M = 29.7$ , $SD = 2.34$	$M = 39.2$ , $SD = 2.3$
Less than \$14,999	31%	44%	33%	23%
\$15,000–\$29,999	28%	28%	33%	25%
\$30,000–\$44,999	17%	10%	17%	20%
\$45,000–\$59,000	10%	8%	8%	13%
\$60,000 and above	14%	10%	9%	19%

Table 2

Weighted Odds Ratios (OR) for Each Mediation Model Predicting Drinking Initiation Among Latino Adolescents of Different Immigrant Generations, Wave I Longitudinal Study of Adolescent Health

	OR (SE)			
	Model 1	Model 2	Model 3	Model 4
Immigrant generation				
Second generation <sup>a</sup>	2.77 (.51)**	2.65 (.51)**	2.35 (.50)**	2.31 (.51)**
Third and later generation <sup>a</sup>	3.38 (.70)**	3.11 (.66)**	2.53 (.66)**	2.42 (.63)**
Perceived parental monitoring	—	1.04 (.07)	—	1.04 (.05)
Perceived family closeness	—	0.89 (.03)**	—	0.93 (.03)*
Association with substance-using peers	—	—	1.42 (.05)**	1.41 (.05)**
Sex				
Males <sup>b</sup>	1.29 (.2)	1.38 (.20)*	1.21 (.17)	1.27 (.17)
Age	1.39 (.06)**	1.34 (.06)**	1.29 (.05)**	1.26 (.05)**
Preferred language at home				
English <sup>c</sup>	1.07 (.20)	1.12 (.20)	1.04 (.20)	1.06 (.20)
National origin				
Cuban <sup>d</sup>	0.79 (.17)	0.78 (.13)	0.92 (.18)	0.90 (.16)
Puerto Rican <sup>d</sup>	0.63 (.13)	0.61 (.13)*	0.66 (.12)	0.64 (.12)
Parental alcohol use	1.05 (.07)	1.04 (.07)	1.06 (.08)	1.06 (.08)
Family structure				
At least one step parent <sup>e</sup>	1.26 (.20)	1.13 (.19)	1.05 (.18)	1.00 (.17)
Single parent <sup>e</sup>	1.35 (.29)	1.29 (.28)	1.12 (.26)	1.09 (.25)
Other <sup>e</sup>	1.08 (.43)	0.97 (.38)	0.75 (.36)	0.70 (.33)
Family socioeconomic status				
Parental education				
High school or equivalent <sup>f</sup>	1.29 (.28)	1.30 (.28)	1.12 (.24)	1.23 (.25)
Some college <sup>f</sup>	1.29 (.28)	1.24 (.28)	1.24 (.28)	1.21 (.28)
College graduate and beyond <sup>f</sup>	1.55 (.64)	1.51 (.48)	1.29 (.45)	1.27 (.44)
Family income				
\$15,000–\$29,999 <sup>g</sup>	1.22 (.25)	1.27 (.27)	1.39 (.31)	1.42 (.32)
\$30,000–\$44,999 <sup>g</sup>	1.00 (.24)	0.99 (.25)	1.05 (.29)	1.04 (.29)
\$45,000–\$59,000 <sup>g</sup>	0.92 (.29)	0.92 (.29)	0.98 (.32)	0.98 (.32)
\$60,000 and above <sup>g</sup>	1.03 (.27)	1.05 (.29)	1.13 (.32)	1.14 (.34)

Note. The lettered footnotes indicate the comparison group for each predictor in the models.

<sup>a</sup> First generation. <sup>b</sup> Females. <sup>c</sup> Spanish. <sup>d</sup> Mexican. <sup>e</sup> Two biological parents. <sup>f</sup> No high school. <sup>g</sup> Less than \$14,999.

\*  $p < .05$ . \*\*  $p < .001$ .

closeness,  $t(125.5) = -2.47$ ,  $p < .05$ , and association with substance-using peers,  $t(124.4) = 9.79$ ,  $p < .001$ , significantly predicted lifetime use. Sobel tests indicated that family closeness was not a significant mediator. However, association with substance-using peers partially mediated the relationship between generation and lifetime use (second vs. first,  $Z = 3.47$ ,  $p < .05$ ; third vs. first  $Z = 4.76$ ,  $p < .05$ ).

### Generation and Problematic Alcohol Use

As shown in Table 3, among the subsample of youth who had initiated drinking, generation significantly predicted number of alcohol-related problems,  $F(2, 1000) = 5.32$ ,  $p < .001$ . Third-generation youth reported a rate of alcohol related problems 1.84 times greater than first-generation teens,  $t(113.1) = 3.18$ ,  $p < .001$ , and 1.48 times greater than second-generation adolescents,  $t(110.4) = 1.98$ ,  $p < .05$ . There were no differences in problematic use between first- and second-generation teens,  $t(123.1) = 1.06$ ,  $p > .05$ . Age was also related to increased rates of problematic alcohol use in the expected direction,  $t(124.8) = 3.11$ ,  $p < .05$ .

### Mediational Analyses for Problematic Alcohol Use

Table 3 shows the results of mediational analyses for problematic alcohol use.

**Erosion of cultural values hypothesis.** There were no generational differences in parental monitoring among drinkers and, as such, it was ruled out as a mediator. Family closeness decreased across generations,  $F(2, 1000) = 4.90$ ,  $p < .01$ , and significantly predicted the number of teen alcohol-related problems,  $t(122.5) = -4.77$ ,  $p < .001$ . The effect of generation on alcohol-related problems was reduced but remained significant after accounting for monitoring and closeness,  $F(2, 1000) = 3.32$ ,  $p < .05$ . Sobel tests determined that family closeness partially mediated the effect of immigrant generation on problematic alcohol use when comparing first- to third-generation adolescents,  $Z = 3.98$ ,  $p < .05$ .

**Exposure to risky peer environment.** Association with substance-using peers increased across generations among adolescent drinkers,  $F(2, 1000) = 4.99$ ,  $p > .05$ . Association with substance-using peers significantly predicted problematic alcohol use,  $t(118.3) = 9.95$ ,  $p < .001$ . The effect of generation on problematic alcohol use was not significant when association with substance-using peers was introduced in the model,  $F(2, 1000) = 2.51$ ,  $p < .001$ . The effect of generation on problematic alcohol use was fully mediated by substance-using peers (third vs. first,  $Z = 3.02$ ,  $p < .05$ ; third vs. second,  $Z = 2.23$ ,  $p < .05$ ).

**Multimediation.** Generation was not significantly related to problematic alcohol use after introducing all mediators in the model,  $F(2, 1000) = 1.93$ ,  $p > .05$ . Family closeness,  $t(123.7) =$

Table 3

Weighted Incidence Rate Ratios (IRR) for Each Mediation Model Predicting Problematic Alcohol Use Among Latino Adolescents of Different Immigrant Generations, Wave I Longitudinal Study of Adolescent Health

	IRR (SE)			
	Model 1	Model 2	Model 3	Model 4
Immigrant generation				
Second generation <sup>a</sup>	1.23 (.25)	1.02 (.22)	1.22 (.26)	1.06 (.24)
Third and later generation <sup>a</sup>	1.84 (.35)**	1.53 (.30)*	1.63 (.36)	1.43 (.31)
Perceived parental monitoring	—	1.03 (.03)	—	1.03 (.03)
Perceived family closeness	—	0.89 (.02)**	—	0.90 (.02)**
Association with substance-using peers	—	—	1.24 (.03)**	1.24 (.02)**
Sex				
Males <sup>b</sup>	0.95 (.12)	1.04 (.13)	0.87 (.10)	0.95 (.11)
Age	1.16 (.06)**	1.14 (.05)*	1.12 (.05)*	1.10 (.05)*
Preferred language at home				
English <sup>c</sup>	.97 (.17)	1.02 (.17)	0.92 (.17)	0.94 (.17)
National origin				
Cuban <sup>d</sup>	0.68 (.18)	0.66 (.17)	0.67 (.16)	0.68 (.17)
Puerto Rican <sup>d</sup>	0.72 (.15)	0.75 (.15)	0.66 (.12)*	0.68 (.13)
Parental alcohol use	.97 (.07)	.944 (.06)	1.01 (.07)	0.98 (.06)
Family structure				
At least one step parent <sup>e</sup>	1.08 (.19)	1.07 (.18)	1.04 (.17)	1.01 (.16)
Single parent <sup>e</sup>	1.27 (.29)	1.39 (.35)	1.23 (.26)	1.28 (.29)
Other <sup>e</sup>	1.53 (.31)	1.50 (.38)	1.58 (.39)	1.46 (.40)
Family SES				
Parental education				
High school or equivalent <sup>f</sup>	1.05 (.20)	1.09 (.21)	0.92 (.17)	0.96 (.18)
Some college <sup>f</sup>	0.84 (.15)	0.81 (.15)	0.74 (.15)	0.72 (.14)
College graduate and beyond <sup>f</sup>	1.01 (.24)	1.02 (.25)	0.78 (.20)	0.80 (.20)
Family income				
\$15,000–\$29,999 <sup>g</sup>	0.82 (.15)	0.92 (.15)	0.85 (.17)	0.92 (.17)
\$30,000–\$44,999 <sup>g</sup>	0.74 (.17)	0.80 (.18)	0.76 (.19)	0.80 (.20)
\$45,000–\$59,000 <sup>g</sup>	0.78 (.17)	0.83 (.18)	0.88 (.20)	0.93 (.20)
\$60,000 and above <sup>g</sup>	0.89 (.30)	0.92 (.23)	0.97 (.26)	0.99 (.26)

Note. The lettered footnotes indicate the comparison group for each predictor in the models.

<sup>a</sup> First generation. <sup>b</sup> Females. <sup>c</sup> Spanish. <sup>d</sup> Mexican. <sup>e</sup> Two biological parents. <sup>f</sup> No high school. <sup>g</sup> Less than \$14,999.

\*  $p < .05$ . \*\*  $p < .001$ .

–4.33,  $p < .001$ , and association with substance-using peers,  $t(118.6) = 10.50$ ,  $p < .001$ , significantly predicted problematic alcohol use. Family closeness fully mediated the effect of generation on problematic alcohol use when comparing third- with first-generation teens,  $Z = 289$ ,  $p < .05$ . Association with substance-using peers fully mediated the effect of generation on problematic alcohol use (third vs. first,  $Z = 3.16$ ,  $p < .05$ ; third vs. second,  $Z = 2.29$ ,  $p < .05$ ).

## Discussion

The first aim of this study was to examine the prevalence of the immigrant paradox in drinking initiation and problematic alcohol use among Latino adolescents of three immigrant generations. Variants of the immigrant paradox in these drinking patterns were identified. Consistent with previous studies, U.S.-born teens (second and third and later generations) were more likely to initiate drinking compared with immigrant adolescents (Gil et al., 2000; Guilamo-Ramos et al., 2004; Vega & Gil, 1998). However, teens whose parents are U.S.-born (third and later generations) were more likely to experience alcohol-related problems than adolescents whose parents were foreign-born (first and second generations). These findings suggest that nativity and immigrant generation are associated differently with varying drinking outcomes, and the results highlight the importance of

assessing generation in addition to nativity when studying alcohol use among Latino teens in the United States. Relying solely on nativity may obscure important similarities and differences among generations of Latino teens. It is possible that assessing only nativity may miss sociocultural processes potentially encompassed by generation, such as acculturation status, enculturation status, or divergent cultural values.

The second aim of the study was to test the contributions of the erosion of cultural values hypothesis and the exposure to risky peer environment hypothesis in explaining generational differences in these drinking patterns. There was support for the hypothesis that the immigrant paradox is partly due to differences in family functioning across generations. Specifically, differences in family closeness across generations, but not parental monitoring, played an important role in explaining generational differences in drinking patterns. It is important to note that the indicator of parental monitoring used had low reliability and may not have captured the ways that parents in this sample exercise parental monitoring. The often-taxing work demands that disadvantaged Latino immigrant parents have to juggle may interfere with their ability to be present in their homes to closely supervise the activities of their offspring, and, as a result, this measure may not be the best indicator of care-giving quality or protective parenting practices.

The negative association of family closeness with alcohol use is consistent with the concept that *familismo* is protective against deviant behaviors (Castro et al., 2009; Gil et al., 2000; Gonzales et al., 2008). Nonetheless, differences in family closeness did not systematically explain the generational increases in drinking outcomes. Parents of first-generation teens are foreign-born and likely promote *familismo* more so than parents of third-generation teens who are U.S.-born. Consistently, the greater likelihood of drinking initiation and problematic drinking of third- compared with first-generation teens was partially explained by the generational decline in family closeness. However, decreases in family closeness between the first and second generations did not explain their differences in drinking initiation. Immigrant parents of first- and second-generation youth may support *familismo* in similar ways, and the increase in drinking initiation between these generations may be better explained by extrafamilial factors such as affiliation with substance-using peers. Similarly, the higher rates of problematic drinking of third- and later- compared with second-generation teens were not explained by differences in family closeness. Although the erosion of family closeness across generations indeed impacts teen alcohol outcomes, it does not fully account for the immigrant paradox in drinking patterns.

Findings support the hypothesis that increased exposure to risky peer environments, through association with substance-using peers, partly explicates the immigrant paradox in drinking among Latino youth. Consistent with other studies (Brown et al., 2008; Lopez et al., 2009; Windle, 2000), adolescents of later generations reported associating with more substance-using peers, and this was related, in turn, to higher likelihood of drinking initiation and problematic alcohol use. However, the effect of association with substance-using peers differed by outcome. Increased association with substance-using peers partially explained the generational increases in drinking initiation. Once adolescents started drinking, risk exposure had a stronger effect such that association with substance-using peers fully mediated the relationship between generation and problematic drinking.

The purported mediators were simultaneously tested as explanations of the generational differences in drinking. Affiliation with substance-using peers was the strongest, albeit partial, explanation of increased drinking initiation among later generations. This robust effect of generation on drinking initiation underlines the importance of continuing to investigate this relationship to inform prevention efforts for Latino adolescents. Similarly, increased association with substance-using peers and decreased family closeness simultaneously explained the significant increase in problematic drinking of third- compared with first-generation teens. These results are consistent with other studies that have found that orientation toward family values buffers the effect of associating with substance-using peers (Germán et al., 2009; Prado et al., 2009). However this study suggests that the protective role of family closeness may be particularly important for first-generation teens in preventing problematic drinking (Wagner, 2003), even after accounting for the strong effects of associating with substance-using peers. It is important to consider that the centrality of family and peer networks changes during adolescence and that the value ascribed to each may differ across generations. It is possible that the comparative advantages of the second and third generations over the first generation, such as speaking English and being U.S. citizens, may decrease the importance that family

closeness plays in their development. For these later generations, a better point of intervention might be peer-focused. For first-generation teens, on the other hand, maintaining family closeness may be more adaptive as they enter a new culture and face the adaptation challenges together.

The results from this investigation should be taken with caution due to several limitations. Other plausible explanations for the immigrant paradox were not examined. For instance, greater perceived discrimination associated with nativity and longer residence in the United States (Cook, Alegria, Lin, & Guo, 2009; Córdova & Cervantes, 2010) may also account for the increase in alcohol problems in later-generation Latino youth (Pérez, Fortuna, & Alegria, 2008). Thus, although the putative mediators tested in this study are important, these factors may combine with other risk mechanisms to explain the immigrant paradox.

As a cross-sectional study, it is not possible to determine causality or infer directionality of influence with certainty. For example, the association between family closeness and drinking may signify that teens who drink are more likely to become estranged from their families. Similarly, the directionality of association with substance-using peers may be reversed, such that teens who drink are more likely to select friends who drink. Furthermore, family closeness only approximates one facet of *familismo* and does not include the other two factors identified by Sabogal and colleagues (1987), namely, sense of obligation to provide support to the family and following family expectations of behaviors. Despite that Sabogal and colleagues (1987) used a diverse sample of Latino individuals of Central American, Cuban, and Mexican origin, it is possible that Latino subgroups may differ in how they interpret and endorse different facets of *familismo* as a construct. Future studies would benefit from specific instruments that directly measure this cultural construct.

The sample size of our study allowed us to examine only the influence of generation for three major Latino subpopulations of Cuban, Mexican, and Puerto Rican origin. However, our analyses do not speak to possible differences in risk patterns among Latino subgroups. The systematic advantages and disparities between Latinos of Mexican, Puerto Rican, and Cuban origin in language proficiency, migration status, and socioeconomic status may modify how the immigrant paradox in drinking patterns manifests among each group. Moreover, our findings may not be applicable to other Latino populations in the United States. Future studies would benefit from the use of prospective designs with samples that include other Latino subgroups. Limitations notwithstanding, this study represents an important first step toward testing a theory-driven model of alcohol use initiation and alcohol problems in Latino youth.

In sum, drinking initiation and problematic alcohol use among Latino adolescents, as well as the contribution of the tested explanations, differed across generations. This study highlights the importance of assessing beyond the dichotomous indicator of nativity and considering the effect of immigrant generation when studying alcohol use among Latino teens. Further, the results indicate that multiple factors influence alcohol use patterns among Latino adolescents and operate in tandem to explain the immigrant paradox. Findings suggest that effective preventions to delay drinking initiation among Latino teens should target perceptions of peer alcohol and drug use. These results also offer support to culturally sensitive interventions geared at Latino adolescents that



bolster family closeness and strengthen perception of family support (Pantin et al., 2009), which may help reduce problematic alcohol use through the transition to adulthood.

## References

- Alegria, M., Canino, G., Shrout, P. E., Woo, M., Duan, N., Vila, D., . . . Meng, X. L. (2008). Prevalence of mental illness in immigrant and non-immigrant U.S. Latino groups. *The American Journal of Psychiatry*, *165*, 359–369. doi:10.1176/appi.ajp.2007.07040704
- Allen, M. L., Elliot, M. N., Fuligni, A. J., Morales, L. S., Hambarsoomian, K., & Schuster, M. A. (2008). The relationship between Spanish language use and substance use behaviors among Latino youth: A social network approach. *Journal of Adolescent Health*, *43*, 372–379. doi:10.1016/j.jadohealth.2008.02.016
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182. doi:10.1037/0022-3514.51.6.1173
- Barrera, M., Gonzales, N., Lopez, V., & Fernandez, A. (2004). Problem behaviors of Chicana/o and Latina/o adolescents: An analysis of prevalence, risk, and protective factors. In L. M. Velasquez, M. Arellano, & B. W. McNeill (Eds.), *The handbook of Chicana/o psychology and mental health* (pp. 83–109). Mahwah, NJ: Lawrence Erlbaum.
- Brown, S. A., McGue, M., Maggs, J., Shulenberg, J., Hingson, R., Swartzwelder, S., . . . Murphy, S. (2008). A developmental perspective on alcohol and youths 16 to 20 years of age. *Pediatrics*, *121*, S290–S310.
- Caetano, R., & Clark, C. L. (2003). Acculturation, alcohol consumption, smoking, and drug use among Hispanics. In K. M. Chun, P. Organista, & G. Marin (Eds.), *Acculturation: Advances in Theory, Measurement, and Applied Research* (pp. 223–239). Washington DC: American Psychological Association.
- Carhill, A., Suárez-Orozco, C., & Paez, M. (2008). Explaining English language proficiency among adolescent immigrant students. *American Educational Research Journal*, *45*, 1155–1179. doi:10.3102/0002831208321443
- Carlin, J. B., Galati, J. C., & Royston, P. (2008). A new framework for managing and analyzing multiply imputed data in Stata. *The Stata Journal*, *8*, 49–67.
- Castro, F. G., Stein, J. A., & Bentler, P. (2009). Ethnic pride, traditional family values, and acculturation in early cigarette and alcohol use among Latino adolescents. *The Journal of Primary Prevention*, *30*, 265–292. doi:10.1007/s10935-009-0174-z
- Chantala, K., & Tabor, J. (1999). *Strategies to perform a design-based analysis using the Add Health data*. Chapel Hill, NC: University of North Carolina, Carolina Population Center.
- Cook, B., Alegria, M., Lin, J., & Guo, J. (2009). Pathway and correlates connecting Latinos' mental health with exposure to the United States. *American Journal of Public Health*, *99*, 2247–2254. doi:10.2105/AJPH.2008.137091
- Córdova, D., & Cervantes, R. (2010). Intergroup and within-group perceived discrimination among U.S.-born and foreign-born Latino youth. *Hispanic Journal of Behavioral Sciences*, *32*, 259–274. doi:10.1177/0739986310362371
- Crimmins, E. M., Soldo, B. J., Kim, J. K., & Alley, D. E. (2005). Using anthropometric indicators for Mexicans in the United States and Mexico to understand the selection of migrants and the "Hispanic paradox". *Social Biology*, *52*, 164–177.
- Driscoll, A. K., Russell, S. T., & Crockett, L. J. (2008). Parenting styles and youth well-being across immigrant generations. *Journal of Family Issues*, *29*, 185–209. doi:10.1177/0192513X07307843
- Germán, M., Gonzales, N., & Dumka, L. E. (2009). Familism values as a protective factor for Mexican-origin adolescents exposed to deviant peers. *The Journal of Early Adolescence*, *29*, 16–42. doi:10.1177/0272431608324475
- Gil, A. G., Wagner, E. F., & Vega, W. A. (2000). Acculturation, familism, and alcohol use among Latino adolescent males: Longitudinal relations. *Journal of Community Psychology*, *28*, 443–458. doi:10.1002/1520-6629(200007)28:4<443::AID-JCOP6>3.0.CO;2-A
- Gonzales, N. A., Germán, M., Kim, Y. S., George, P., Fabrett, F. C., Millsap, R., & Dumka, L. E. (2008). Mexican American adolescents' cultural orientation, externalizing behavior, and academic engagement: The role of traditional cultural values. *American Journal of Community Psychology*, *41*, 151–164.
- Graham, J. W., Allison, O., & Gilreath, T. (2007). How many imputations are really needed? Some practical clarifications of multiple imputation theory. *Prevention Science*, *8*, 206–213. doi:10.1007/s11121-007-0070-9
- Guarnaccia, P. J., & Lopez, S. R. (1998). The mental health and adjustment of immigrant and refugee children. *Child and Adolescent Psychiatric Clinics of North America*, *7*, 537–553.
- Guilamo-Ramos, V., Jaccard, J., Johansson, M., & Turrissi, R. (2004). Binge drinking among Latino youth: Role of acculturation-related variables. *Psychology of Addictive Behaviors*, *18*, 135–142. doi:10.1037/0893-164X.18.2.135
- Harris, K. M., Halpern, C. T., Entzel, P., Tabor, J., Bearman, P. S., & Udry, J. R. (2008). The national longitudinal study of adolescent health: Research design. Retrieved from <http://www.cpc.unc.edu/projects/addhealth/design>
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2010a). Demographic subgroup trends for various licit and illicit drugs, 1975–2009. *Monitoring the Future Occasional Paper No. 73*. Ann Arbor, MI: Institute for Social Research.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2010b). *Monitoring the future national results on adolescent drug use: Overview of key findings, 2009*. Bethesda, MD: National Institute on Drug Use.
- Lopez, B., Wang, W., Schwartz, S. J., Prado, G., Huang, S., Brown, C. H., . . . Szapocznik, J. (2009). School, family, and peer factors and their association with substance use in Hispanic adolescents. *The Journal of Primary Prevention*, *30*, 622–641.
- Markides, K. S., & Coreil, J. (1986). The health of Hispanics in the Southwestern United States: An epidemiologic paradox. *Public Health Reports*, *101*, 253–265.
- Marsiglia, F., & Waller, M. (2002). Language preference and drug use among Southwestern Mexican American middle school students. *Children and Schools*, *24*, 145–158. doi:10.1093/cs/24.3.145
- Medeiros, R. A. (2007). *An algorithm for creating models for imputation using the MICE approach: An application in Stata*. Paper presented at the West Coast Stata Users Group Meeting, Marina del Rey, CA.
- Mogro-Wilson, C. (2008). The influence of parental warmth and control on Latino adolescent alcohol use. *Hispanic Journal of Behavioral Sciences*, *30*, 89–105. doi:10.1177/0739986307310881
- National Institute on Alcohol Abuse and Alcoholism. (2006). *Underage drinking*. Rockville, MD: U.S. Department of Health and Human Services.
- Office of the Surgeon General. (2007). *The Surgeon General's call to action to prevent and reduce underage drinking*. Washington, DC: Department of Health and Human Services.
- Pantin, H., Prado, G., Lopez, B., Huang, S., Tapia, M. I., Schwartz, S. J., . . . Branchini, J. (2009). A randomized controlled trial of Familias Unidas for Hispanic adolescents with behavior problems. *Psychosomatic Medicine*, *71*, 987–995. doi:10.1097/PSY.0b013e3181bb2913
- Pérez, D. J., Fortuna, L., & Alegria, M. (2008). Prevalence and correlates of everyday discrimination among U.S. Latinos. *Journal of Community Psychology*, *36*, 421–433. doi:10.1002/jcop.20221

- Prado, G., Huang, S., Schwartz, S. J., Maldonado-Molina, M., Bandiera, F. C., de la Rosa, M., & Pantin, H. (2009). What accounts for differences in substance use among U. S.-born and immigrant Hispanic adolescents? Results from a longitudinal prospective cohort study. *Journal of Adolescent Health, 45*, 118–125. doi:10.1016/j.jadohealth.2008.12.011
- Pumariega, A. J., Rothe, E., & Pumariega, J. B. (2005). Mental health of immigrants and refugees. *Community Mental Health Journal, 41*, 581–597. doi:10.1007/s10597-005-6363-1
- Royston, P. (2009). Multiple imputation of missing values: Further update of ice, with an emphasis on categorical variables. *The Stata Journal, 9*, 466–477.
- Rubin, D. B. (1987). *Multiple imputation for nonresponse in sample surveys*. New York, NY: Wiley.
- Sabogal, F., Marin, G., Otero-Sabogal, R., Vanoss Marin, B., & Perez-Stable, E. (1987). Hispanic familism and acculturation: What changes and what doesn't? *Hispanic Journal of Behavioral Sciences, 9*, 397–412. doi:10.1177/07399863870094003
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological Methodology* (pp. 290–312). Washington, DC: American Sociological Association.
- StataCorp. (2009). *Stata statistical software: Release 10*. College Station, TX: StataCorp.
- Tourangeau, R., & Shin, H. C. (1999). *National longitudinal study of adolescent health: Grand sample weights*. Chapel Hill, NC: University of North Carolina, Carolina Population Center.
- Vega, W. A., & Gil, A. G. (1998). *Drug use and ethnicity in early adolescence*. New York, NY: Plenum Press.
- Vega, W. A., & Sribney, W. (2011). Understanding the Hispanic health paradox through a multi-generation lens: A focus on behaviour disorders. In G. Carlo, L. J. Crockett, & M. A. Carranza (Eds.), *Health disparities in youth and families: Research and applications* (pp. 151–168). New York, NY: Springer.
- Wagner, E. F. (2003). Conceptualizing alcohol treatment research for Hispanic/Latino adolescents. *Alcoholism: Clinical and Experimental Research, 27*, 1349–1352. doi:10.1097/01.ALC.0000080201.46747.D5
- Windle, M. (2000). Parental, sibling, and peer influences on adolescent substance use and alcohol problems. *Applied Developmental Science, 4*, 98–110. doi:10.1207/S1532480XADS0402\_5
- Windle, M., & Windle, R. C. (2006). Alcohol consumption and its consequences among adolescents and young adults. In M. Galanter (Ed.), *Alcohol problems in adolescents and young adults: Epidemiology, neurobiology, prevention, and treatment* (pp. 67–83). New York, NY: Springer.

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