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## Drinking and Driving among Immigrant and US-born Hispanic Young Adults: Results from a longitudinal and nationally representative study

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### Abstract

**Objective**—To evaluate the risk factors associated with the initiation of driving under the influence (DUI) among Hispanics in a longitudinal and nationally-representative sample of adolescents and young adults. Specifically, this study tests the effect of demographic variables, individual-level risk factors, and eco-processes (e.g., peer drug use, parental involvement) during adolescence on DUI among Hispanic young adults.

**Methods**—Data were derived from 1,734 Hispanic adolescents surveyed for the National Longitudinal Study of Adolescent Health (Add Health). Survey logistic regression procedures were used to examine the effects of nativity status on DUI initiation, to evaluate the independent effect of each risk factor (demographic, individual-level, and eco-processes), and to identify whether and to what extent these factors are associated with the initiation of DUI.

**Results**—The overall prevalence of DUI initiation was 18.3%. Differences were observed in the rates of DUI initiation by nativity status: first-generation immigrants reported the lowest rates of DUI initiation (15.4%) when compared with second-generation US-born Hispanic youth (17.4%) and third-generation and beyond US-born Hispanic youth (21.5%). US-born Hispanic youth were also more likely to report higher frequency of alcohol use ( $t=3.46, p=.001$ ) and marijuana use ( $t=2.34, p=.021$ ) compared to immigrant adolescents. After adjusting for a number of risk factors, men (OR=2.86), marijuana users (OR=1.98), and those who reported feeling safe in their neighborhoods (OR=2.02) were at an increased risk DUI initiation.

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**Conflict of Interest:** All authors declare that they have no conflicts of interests.

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**Conclusions**—Findings provide support for the “immigrant paradox”: immigrant youth reported lower rates of DUI initiation and other high-risk behaviors when compared with US-born Hispanic youth.

### Keywords

Drinking; Drunk; Driving; Impaired; Hispanic; Alcohol

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## 1.1 Introduction

In the United States, driving under the influence (DUI) of alcohol is a major public health problem. On average, someone is killed in an alcohol-impaired driving crash every 45 minutes, and in 2008 (latest figures available), DUI fatalities accounted for 32% of all traffic deaths (National Highway Traffic Safety Administration, 2009). Across all racial/ethnic groups, motor vehicle crashes are the leading cause of death for persons ages 4 to 34 (National Highway Traffic Safety Administration, 2006). Hispanics, however, are over-represented in DUI deaths (National Highway Traffic Safety Administration, 2006; Roudsari, Ramisetty-Mikler, & Rodriguez, 2009). This health disparity is especially alarming given that Hispanics represent the largest and fastest growing minority population in the United States; and by 2050, it is projected that Hispanics will comprise nearly 30% of the U.S. population (U.S. Census Bureau, 2008). Due to the growing population of Hispanic youth, reducing behavioral health risks (such as impaired driving), is of considerable public health importance.

When compared to White and African-American drivers, Hispanics are at increased risk of alcohol-impaired driving (Shults, Kresnow, & Lee, 2009; R.B. Voas, Wells, Lestina, Williams, & Greene, 1998; Walker, Treno, Grube, & Light, 2003). Hispanic adolescents viewed DUI as less hazardous (Ginsburg, et al., 2008) and were nearly twice as likely to ride with drivers who had been drinking compared to Whites (Walker, et al., 2003). Moreover, Hispanic drivers tended to report higher rates of legal alcohol intoxication, speeding, and invalid driver's licenses (Harper, Marine, Garrett, Lezotte, & Lowenstein, 2000). Overall, Hispanics reported believing that a larger number of drinks would be necessary to affect their driving ability when compared with other ethnic groups (Bergdahl, 2007; Caetano & Clark, 2000).

Efforts to understand the prevalence and etiology of DUI among Hispanics are challenged by the heterogeneity within the Hispanic population. US-born Hispanics are approximately three times more likely to drink and drive than Hispanics who were born in other countries but live in the United States (Caetano & Clark, 2000). Several studies have shown that US-born Hispanics report more encounters with the police when driving, increased alcohol abuse and dependence, and higher rates of DUI than their immigrant counterparts (Caetano & Clark, 2000; Caetano, Ramisetty-Mikler, & Rodriguez, 2008b). Previous studies are also consistent with a growing body of literature describing the “immigrant paradox” (W. A. Vega, Rodriguez, & Gruskin, 2009), or the tendency for foreign-born Hispanics, who would be expected to show poorer signs of health due to immigration and lifestyle disruptions, to report more favorable health indicators than US-born Hispanics. Potential explanations for the “immigrant paradox” include the deterioration of cultural and Hispanic family values, attitudes, and behaviors (G. Prado, Szapocznik, Schwartz, Maldonado-Molina, & Pantin, 2008; Schwartz, Unger, Zamboanga, & Szapocznik, 2010; Szapocznik, Prado, Burlew, Williams, & Santisteban, 2007), and increased exposure to substances in the United States than in the immigrant host country (William A. Vega, Gil, & Kolody, 2002). Another explanation for the “immigrant paradox” holds that ecological determinants such as school,

peer, and family processes may operate differently for US-born and foreign-born youth (G. Prado, et al., 2009; G. J. Prado, et al., 2009; W. A. Vega, et al., 2009).

Studies have also shown differences in rates of DUI by country of origin. For instance, Mexican Americans have the second highest alcohol-related fatality rate (after Native Americans) among all four types of road users: drivers, passengers, pedestrians, and cyclists (R. B. Voas, Tippetts, & Fisher, 2000). Mexican-American men also have reported higher driving while intoxicated (DWI) arrests than any other ethnic/racial groups (R. B. Voas, et al., 2000). When compared to whites, Mexican Americans were also more likely to consider DUI less problematic and were more likely to believe that they would not be arrested for DUI (Cherpitel & Tam, 2000). In a recent study, Caetano et al. (2008a) found that Mexican Americans and South Americans, men, young drivers, those with less than high school education, those with higher income and higher alcohol consumption were more likely to report DUI and had more DUI arrests (Caetano, Ramisetty-Mikler, & Rodriguez, 2008a).

With the exception of the Hispanic American Baseline Alcohol Study (HABLAS) study (Caetano, Ramisetty-Mikler, et al., 2008a, 2008b; Caetano, Ramisetty-Mikler, Wallisch, McGrath, & Spence, 2008; Caetano, Vaeth, Ramisetty-Mikler, & Rodriguez, 2009), no studies to our knowledge have used a nationally representative sample of Hispanic youth to examine factors associated with risk of DUI. Furthermore, studies conducted to examine the “immigrant paradox” have sampled from specific regions within the United States because different segments of the Hispanic population have settled in different parts of the country (Paez & Suae, 2002). Thus, using a nationally representative sample of Hispanics to examine the risk factors associated with DUI might help explain why US-born Hispanics report higher rates of DUI compared to their immigrant Hispanic counterparts.

### The current study

The current study is a significant contribution to literature because it uses a longitudinal and nationally-representative sample of Hispanic adolescents and young adults to investigate DUI initiation among Hispanics by nativity status and country of origin. Specifically, the current study examines the role of demographic variables (e.g., gender, nativity status, country of origin) on DUI and uses longitudinal data to examine the effects of ecological processes (e.g., parent, peers, and school) on DUI initiation, after controlling for the individual-level risk factors (e.g., drug use and other related behaviors).

We addressed two research questions: (1) Are there any differences in the prevalence of DUI among Hispanic youth by nativity status? and (2) What risk factors are associated with DUI initiation? We organized the risk and protective factors into three levels: demographics, ecological processes, and individual-level risk factors. Demographic factors include gender, age, generation status (1<sup>st</sup> generation immigrant, 2<sup>nd</sup> generation US-born, and 3<sup>rd</sup> and beyond generation US-born), and country of origin. Ecological factors include parental involvement, school connectedness, and peer drug use; and individual-level factors include drug use, delinquency, and other related risk factors.

Several general theoretical frameworks provide support for the study of risk factors associated with DUI behaviors. Expanding on social learning theory (Akers, 1985), the problem-behavior theory (Jessor, 1991; Jessor, Van Den Boss, Vanderryn, Costa, & Turbin, 1995) provided a framework to the study of risk factors associated with adolescent problem behaviors (alcohol and illicit drug use, delinquency, drunk-driving), health-related behaviors (e.g., unhealthy eating, tobacco use) and school behaviors (e.g., truancy, dropout, drug use at school). In addition, Hawkins and colleagues provided a framework to identify conditions that increase or decrease the probability of children and adolescents manifesting behavioral problems (Hawkins, Catalano, & Miller, 1992). Szapocznik and colleagues also proposed an

eco-developmental model of risk and protection for understanding contextual factors within various domains for children and adolescents: family, peer, school and neighborhood (G. Prado, et al., 2009; G. J. Prado, et al., 2009; Szapocznik & Coatsworth, 1999). Thus, reviews of these theories suggest that it is important to account for various contextual factors, including individual, family, peer, neighborhood, and cultural influences on DUI in order to more completely understand DUI etiology. To our knowledge, this is the first study to investigate the effects of risk factors during adolescence on the initiation of DUI among Hispanic young adults using nationally representative, longitudinal data.

## 2.1 Methods

### 2.1.1 Research design

Analyses were performed using the National Longitudinal Study of Adolescent Health dataset (Add Health), a longitudinal school-based survey of health-related behaviors among adolescents beginning in grades 7-12 and continuing into adulthood. The Add Health study was designed to explore the causes of various health-related behaviors, emphasizing social and contextual influences. Wave I included students interviewed between April and December 1995, Wave II included the same subjects interviewed between April and August 1996, and Wave III data included participants interviewed between August 2001 and April 2002.

### 2.1.2 Participants

The current study includes 1,734 Hispanic youth (50.6% men and 49.4% women) who were present at Wave I, had a valid sampling weight at Wave III (Chantala & Tabor, 1999), and self-identified as Hispanic or Latino. Participants were 15.6 years old at Wave I (sd=1.6). The majority of the sample was US-born (63%; compared with 37% of immigrant youth). Consistent with national prevalence of Hispanics in the United States (U.S. Census Bureau, 2006, 2008), the majority of the sample was Mexican/Chicano/Mexican Americans (58%), followed by Puerto Ricans (11%), Central Americans (12%), Cuban Americans (5%), and other Hispanic adolescents (13%). No significant differences were observed by nativity status in the proportion of Mexican American, Cuban Americans, or other Hispanic adolescents. However, a larger proportion of Puerto Ricans were US-born and a larger proportion of Central Americans were immigrants (Table 1).

### 2.1.3 Measures

**2.1.3.1 Demographics**—Youth included in the current study answered “yes” to the question, “Are you of Hispanic or Latino origin?”

**Gender:** Both genders were included and women were coded as the reference group. Regardless of race and ethnicity, disparities by gender are evident in the rates of DUI and related mortality in that men are at greatest risk compared to women (Bergdahl, 2007).

**Age:** Age was included as covariate because older individuals are more likely to engage in DUI than younger adolescents (Treno, Grube, & Martin, 2003). Age was calculated from the recorded month and year of birth.

**Nativity:** Nativity status was categorized into three groups: 1<sup>st</sup> generation immigrant, 2<sup>nd</sup> generation US-born, and 3<sup>rd</sup> and beyond generation US-born. Two items were used to create these categories: “Was your [biological mother or father] born in the United States?” and “Were you born in the United States?” Youth who responded they were not born in the United States were coded as “1<sup>st</sup> generation immigrants”. Those who responded they were born in the US and at least one of their parents was foreign-born were coded as “2<sup>nd</sup>

generation US-born”; and those who responded that both their parents were born in the US were coded as “3<sup>rd</sup> and beyond generation US-born”. Because previous research has found differences in the prevalence of DUI by nativity status (Caetano & Clark, 2000; Caetano & McGrath, 2005), the analyses examined differences in DUI between immigrants and US-born Hispanic youth.

**Country of origin:** Youth were asked, “What is your Hispanic or Latino background?” and were coded as “Mexican/Mexican American/Chicano”, Cuban American, Puerto Rican, Central American, or “other Hispanic”. Youth who responded to multiple categories (e.g., Cuban-Mexican American) were included in the “Other Hispanic” group.

**2.1.3.2 Eco- processes**—Ecological processes included language preference, peer involvement with drug use, neighborhood safety, parental involvement and school connectedness.

**Language preference:** Language preference was measured using a single item, “What language is usually spoken in your home?” The responses were dichotomized into “Spanish” and “other languages”. Language preference was included because it has been identified a proxy of level of acculturation (Caetano, Ramisetty-Mikler, Wallisch, et al., 2008) and previous studies have identified this measure as a factor associated with reduced behavioral problems during adolescence (Allen, et al., 2009; Schwartz, et al., 2010).

**Peer drug use:** Peer involvement with alcohol and marijuana was assessed with two items. Peer alcohol use was measured using one item: “Of your three best friends, how many drink alcohol at least once a month?” Similarly, respondents were asked, “Of your three best friends, how many use marijuana at least once a month?” Responses ranged from 0 to 3; 0= “No friends”, 1 = “One Friend”, 2= “ Two Friends”, and 3= “Three Friends”. Peer drug use was included as a covariate because there is a strong evidence of the role of peer drug use during adolescence on behavioral outcomes (Dishion, Nelson, & Bullock, 2004; G. Prado, et al., 2009).

**Safe Neighborhood:** Neighborhood safety was measured using one item, “Do you usually feel safe in your neighborhood?” This measure was included as a proxy of neighborhood context; evidence suggests that behavioral outcomes are often associated with neighborhood characteristics (Liu, Probst, Harun, Bennett, & Torres, 2009; Theall KP, et al., 2009).

**Parental involvement:** The 20-item parent-adolescent activities subscale (Cronbach's alpha = 0.74) evaluates the extent of parental involvement in various activities with the adolescent during the four weeks prior to assessment. The activities listed include going shopping, playing a sport, and attending a religious service or church-related event. Each item is rated on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree”.

**School connectedness:** School connectedness was assessed using six items to assess whether adolescents feel they are connected or bonded to their school and to their teachers, whether adolescents feel safe at school, and whether adolescents feel that their teachers are treating them fairly. Adolescents responded on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree” or “not at all” to “very much”. Cronbach's alpha for this scale is 0.77. This measure was included because there is evidence that school connectedness operates as a protective factor for drug use among Hispanics adolescents (Pantín, Schwartz, Sullivan, Prado, & Szapocznik, 2004; G. Prado, et al., 2009; G. J. Prado, et al., 2009).

### 2.1.3.3 Individual-level

**Alcohol use:** Alcohol use was measured using one item: “During the past 12 months, on how many days did you drink alcohol?”. Responses ranged from 0= “never” to 7= “every day or almost every day”. A measure of problematic alcohol use (e.g., whether the adolescent has been intoxicated at school) was also included. Drunk at school was measured with one item: “Have you ever been drunk at school?”. The responses were coded 0= “no” and 1= “yes”.

**Marijuana use:** Marijuana use was measured using the item, “During your life, how many times have you used marijuana?”. Responses were categorized into “users” and “non-users”.

**Other drug use:** Other drug use was created using the self-reported number of times the respondent used cocaine, inhalants, or other drugs in their lifetime. If any of these drugs were used, respondents were categorized as “users”.

**Leave home:** Desire to leave home was measured using the following item: “How much do you feel that you want to leave home?”. Responses ranged between 0 to 2: Respondents who reported “very much” or “quite a bit” were categorized as “High desire” and were coded as “2”, adolescents who responded “somewhat” were coded as “1”, and others were categorized as “0”.

**Group fights:** Group fighting, a strong indicator of gang membership, was measured using the following item: “In the past 12 months, how often did you take part in a fight where a group of your friends was against another group?”. Responses included 0= “Never”, 1= “1 or 2 times”, and 2= “3 or 4 times”, and 3= “5 or more times”.

**Other driving-related measures:** Three items were used to measure risk factors, which may be associated with DUI. Miles driven (e.g., “About how many miles do you drive each week?”) was included as a measure of exposure and access to private transportation. Whether youth had a driver's license was measured using one item, “Do you have a valid driver's license (not a driver's permit)?”. A measure of seatbelt use was also included because there is evidence that youth who use seatbelts are at lower risk for other risky behaviors (Romano, Tippetts, Blackman, & Voas, 2005; Shults, et al., 2009). This was measured using one item: “How often do you wear a seatbelt when you are riding in or driving a car?”. This item ranged from 0 to 4, including “0=Never”, “1=Rarely”, “2=Sometimes”, “3=Most of the time”, and “4=Always”.

**2.1.3.4 Dependent variable: DUI Initiation—**At Wave I (1995), adolescents responded to the question: “Have you ever driven while drunk?” Responses were coded 0= “no” and 1= “yes”. At a follow-up interview, participants were asked, “Since June 1995, have you driven while drunk?” Responses to these questions were coded 0= “no” and 1= “yes”. Participants who responded, “yes” to the alcohol use question at follow-up (i.e., “Since June 1995, have you had a drink of beer, wine, or a liquor more than two or three times? Do not include sips or tastes from someone else's drink.”), were asked about DUI. If respondents reported no use of alcohol, the DUI item was not applicable to the interview and coded as “No DUI” for the purposes of the current study.

### 2.1.4 Analytical Strategy

In accordance with the sampling design, weights from the sample most recently collected (Wave III) were incorporated (Chantala & Tabor, 1999). As recommended by Add Health (Chantala & Tabor, 1999), observations with missing sampling weights at Wave III were not included. Survey logistic regression analyses were conducted using STATA 11.0

(StataCorp, 2009). The surveylogit procedure allows the estimation of logistic regression for survey data and incorporates weights by specifying the stratification variables, the primary sampling unit (i.e., the cluster that was sampled in the first sampling stage), and accounting for post-stratification of underrepresented groups in the population.

We conducted the analyses in three steps. First, we used survey logistic regression to evaluate the bivariate relations between each risk factor and DUI. Second, we examined the effects of nativity status on DUI initiation using survey logistic regression. Third, we examined six models (Models A-F) to test the effect of each set of predictors on the dependent variable. Model A examined the effect of nativity status (i.e. immigrant vs. US-born) on DUI initiation, and Model B examined the effect of generational status (i.e., 2<sup>nd</sup> generation US-born and 3<sup>rd</sup>+ generation US-born; compared to 1<sup>st</sup> generation immigrants as the reference group) on initiation. Model C estimated the effects of generational status after including other demographic variables (e.g., age, gender, country of origin) to evaluate whether demographic characteristics account for the disparities in DUI by nativity status. Model D examined the effect of eco-processes (e.g., peer drug use, parental involvement, school connectedness) on DUI, and Model E examined the effects of individual risk factors (e.g., drug use, drunk at school, group fight, seatbelt use). Finally, Model F examined the independent effect of each risk factor (demographic, eco-processes, and individual-level -- all in one model) to determine which factors are most strongly associated with the initiation of DUI.

### 3.1 Results

#### 3.1.1 Differences in Risk Factors by Nativity Status

There were significant differences observed among several risk factors by nativity status. Overall, US-born Hispanic youth engaged in more risky behaviors when compared with immigrant youth. For instance, when compared to immigrant adolescents, US-born Hispanic youth were more likely to report higher frequency of alcohol use ( $t=3.46, p=0.001$ ), marijuana use ( $t=2.34, p=0.021$ ), and reported having a larger number of peers who use alcohol ( $t=2.01, p=0.047$ ) and marijuana ( $t=2.89, p=0.005$ ). In contrast, immigrant youth reported increased school connectedness ( $t=-3.04, p=0.003$ ) when compared with US-born Hispanic adolescents. Differences in risk and protective factors are detailed in Table 1.

#### 3.2.1 DUI Initiation

The prevalence of DUI initiation was 18.3%, and significant differences were observed by nativity status ( $p=0.05$ ). Specifically, 1<sup>st</sup> generation immigrant young adults reported lower DUI initiation (15.4%) when compared with 2<sup>nd</sup> generation (17.4%) and 3<sup>rd</sup> generation and beyond (21.5%). Figure 1 shows a graphical representation of DUI initiation by nativity and generational status.

Among immigrant Hispanic youth, men (OR=4.11), Mexican Americans (OR=2.09), those who reported having a greater number of peers who have used alcohol and marijuana (OR=1.60 and 1.89, respectively), used alcohol more frequently (OR=1.57), were marijuana users (3.78), those who reported use of other drugs (OR=7.66), adolescents who engaged in group fights (OR=1.83), and drove more miles (OR=1.42) were more likely to report DUI (see Table 2). Among US-born Hispanic youth, there were no significant differences in DUI by country of origin. Men (OR=2.33), youth who reported having peers who have used marijuana (OR=1.20), were frequent alcohol (OR=1.15) and marijuana users (OR=2.53), have used other drugs (OR=2.31), reported being drunk at school (OR=2.29), desired to leave home (OR=1.41), had engaged in group fights (OR=1.53) and drove more miles (OR=1.33) were more likely to report DUI (see Table 2).

Significant differences were also observed in rates of DUI initiation by nativity status. For instance, both generations of US-born Hispanic youth were at increased risk for DUI behaviors (OR=1.38) when compared with immigrant youth (Model A; Table 3). Specifically, 3<sup>rd</sup> generation and beyond US-born Hispanic adults were at an increased risk for DUI behaviors (OR=1.51) when compared with immigrants (Model B; Table 3). After adjusting for several demographic variables (e.g. gender, age, country of origin), men (OR=2.75) and youth who were 3<sup>rd</sup> generation and beyond (OR=1.74) were at an increased risk for DUI behaviors (Model C; Table 3).

Eco-processes (e.g., peer drug use, language preference at home, neighborhood safety) accounted for differences in DUI initiation by nativity status. Specifically, no significant differences in DUI initiation by nativity status were observed after estimating the effects of eco-processes. Men (OR=2.84), adolescents whose friends used marijuana (OR=1.26) and those who felt safe in their neighborhood (OR=2.04) were at increased risk for DUI initiation (Model D; Table 3). Language preference (specifically, speaking Spanish at home) was associated with reduced risk (OR=0.51) of DUI behaviors. Individual-level risk factors also explained differences in the prevalence of DUI by nativity status (Model E; Table 3). Specifically, after adjusting for several risk factors, men (OR=2.71) and marijuana users (OR=2.14) were at an increased risk for DUI behaviors.

In the final model (Model F; Table 3), after adjusting for nativity status, demographic characteristics, eco-processes, and other individual-level risk factors, men (OR=2.86), marijuana users (OR=1.98), and those who reported feeling safe in their neighborhoods (OR=2.02) were at an increased risk DUI initiation. Figure 2 shows the rates of DUI initiation by nativity and generational status between marijuana users and those who were not marijuana users. Rates of DUI behaviors were higher among marijuana users when compared with non-marijuana users, regardless of nativity and generational status.

## 4.1 Discussion

The purpose of the current study was to examine the effects of demographics, individual and eco-processes (e.g., drug use, peer drug use involvement, and school connectedness) on initiation of DUI behaviors between US-born and immigrant Hispanic young adults. Findings suggest that 2<sup>nd</sup> generation US-born Hispanic youth and 3<sup>rd</sup> generation and beyond US-born Hispanic youth were more likely to engage in DUI when compared to immigrant Hispanic youth, even after accounting for demographic variables. Findings also suggest that US-born Hispanic youth engaged in more risky behaviors when compared with immigrant Hispanic youth. As expected, the “immigrant paradox” emerged in the present study, as immigrant Hispanic young adults were significantly less likely to report DUI initiation when compared to US-born Hispanic young adults. This is consistent with previous studies suggesting that the prevalence of DUI is higher among US-born Hispanics. Our findings are also consistent with Caetano et. al.'s (2008) argument that this finding “contradicts the common perception that foreign-born Hispanics are more likely to engage in DUI because of their lack of knowledge about DUI laws in the United States” (Caetano, Ramisetty-Mikler, et al., 2008a).

In addition to differences in DUI behaviors by nativity status, eco-processes (such as peer drug use) were associated with DUI. We found that US-born Hispanic youth were more likely to associate with peers who use marijuana when compared with immigrant counterparts. The finding that peer substance use was directly related to DUI is consistent with much of the existing literature on non-Hispanic white youth and Hispanic youth (Beck, et al., 2008; Caetano & Raspberry, 2001; Grube & Voas, 1996). Additionally, these findings provide support for the hypothesis that cultural processes operate differently for immigrant



and US born Hispanic youth, resulting in higher levels of risky behavior (in this case, DUI) among US-born adolescents.

Unexpectedly, we found that perceived neighborhood safety was associated with increased risk for DUI initiation. One might hypothesize that those who reported feeling safe in their neighborhood had a higher social capital (e.g., were of higher SES and living in neighborhoods with access to alcohol and cars). This finding provide support for Caetano and colleagues conclusion that “US-born Hispanics are less socially disadvantaged than immigrants and most probably have more access to cars, have more disposable income to buy alcohol, and are less intimidated by contact with the police” (Caetano, Ramisetty-Mikler, et al., 2008a). Future studies should examine the role of social capital, education, SES, social networks and other neighborhood characteristics on the risk or protective effect of DUI. Such studies can provide support for previous studies by Caetano and colleagues who found a positive association between education, income, and alcohol consumption (Caetano, Ramisetty-Mikler, et al., 2008a).

In addition to the role of eco-processes, individual-level risk factors, such as gender and drug use were also associated with an increased risk for DUI. Regardless of nativity, men reported a higher prevalence of DUI, providing further support of gender differences in the rates of DUI (Nyaronga, Greenfield, & McDaniel, 2009; O'Malley & Johnston, 2007). After controlling for gender differences, marijuana use was another factor associated with an increased risk of DUI. Marijuana users were two times more likely to report initiation of DUI as young adults. This finding highlights the relevance of investigating a constellation of factors associated with impaired driving (in addition to alcohol use). Impaired driving, often associated with blood alcohol concentration (BAC) levels above .08, may interact with other substances (e.g., marijuana) and contribute to drug-impaired driving.

The current study has several limitations that are worth noting. First, it uses a self-report measure of DUI and does not permit examination of DUI frequency. Second, the self-report survey design may also result in some misclassification among Hispanics born in of Puerto Rico, as the instrument does not clearly delineate whether these individuals should identify as U.S. born or Immigrant. Third, the current study is limited in its ability to assess behavioral and cultural attitudes related to the acceptance or rejection DUI. Fourth, data on DUI behaviors were collected between 2001 and 2002. In the past decade, the prevalence of alcohol use has declined among all adolescents (including Hispanics) (Johnston, O'Malley, Bachman, & Schulenberg, 2009). However, Hispanics account for the greatest proportion of alcohol-impaired driver deaths among all age groups (Roudsari, et al., 2009). Fifth, the patterns of drug use may also have changed in the past decade, with drugs such as ecstasy, prescription medications, and methamphetamines becoming popular in recent years (Johnston, et al., 2009). Therefore, the current study might underestimate the effects of other drugs and their association with DUI. Finally, in the past decade, there has been massive migration from Latin America to the US, and this cohort of newer immigrants may not necessarily be reflective of the older immigrants. More recent cohorts of nationally representative Hispanic samples (with data on family, school, and peer processes), however, are not available.

Despite its limitations, the current study has several strengths. First, it uses a nationally representative and longitudinal study to examine DUI among Hispanics, while taking into account nativity status, country of origin, and other relevant demographic variables. Second, it allows for the evaluation of the effects of risk factors at multiple levels of influence (including demographic, eco-processes, and individual-level) during adolescence on the risk of DUI behaviors among Hispanic young adults. Future studies should investigate the mechanisms and processes underlying gender differences in drinking and driving behaviors

among Hispanic men and women. More importantly, future studies should examine how to develop intervention programs to change attitudes that promote risk-taking behaviors such as drinking and driving. Policies to deter DUI should be emphasized to encourage prevention of risky driving.

Structural and policy interventions (such as increasing alcohol taxes) may also be beneficial in reducing the prevalence of DUI behaviors by reducing alcohol access and availability. Findings also suggest that 3<sup>rd</sup> generation and beyond Hispanics may be in greater need of intervention given that the incidence of DUI are higher in this population than in 1<sup>st</sup> or 2<sup>nd</sup> generation Hispanic youth. Future research should seek to determine whether different interventions are needed for these different Hispanic subgroups.

The current study has important implications for the criminal justice system and its response to drinking and driving among Hispanic populations. Considering that Hispanics tend to be disproportionately heavy drinkers (particularly men) which subsequently increases their probability of engaging in risk-taking behaviors such as DUI (Ferguson, Burns, Fiorentino, Williams, & Garcia, 2002), in-prison and community treatment programs should be accessible to those who demonstrate alcohol misuse or abuse to reduce their likelihood of initiating or continuing DUI. There has been evidence to suggest that such intervention programs aimed at young minorities can be effective (Wells-Parker & Williams, 2002).

In conclusion, the current study examined the effects of risk and protective factors on DUI behaviors among Hispanic young adults. Examination of several risk factors highlights gender differences in the rates of DUI in that men reported higher rates of DUI when compared with women, regardless of nativity. Findings emphasize the role of marijuana use on the prevalence of DUI among Hispanic young adults, and the need to develop intervention and policies targeting impaired driving. Overall, the current study provides support for the role of eco-processes during adolescence, such as peer drug use involvement and neighborhood context, in addition to individual-level risk factors to explain DUI among Hispanic young adults.

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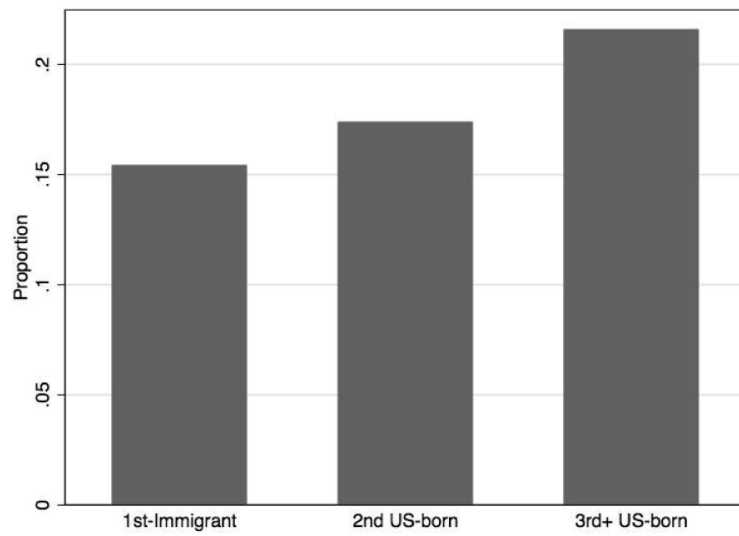
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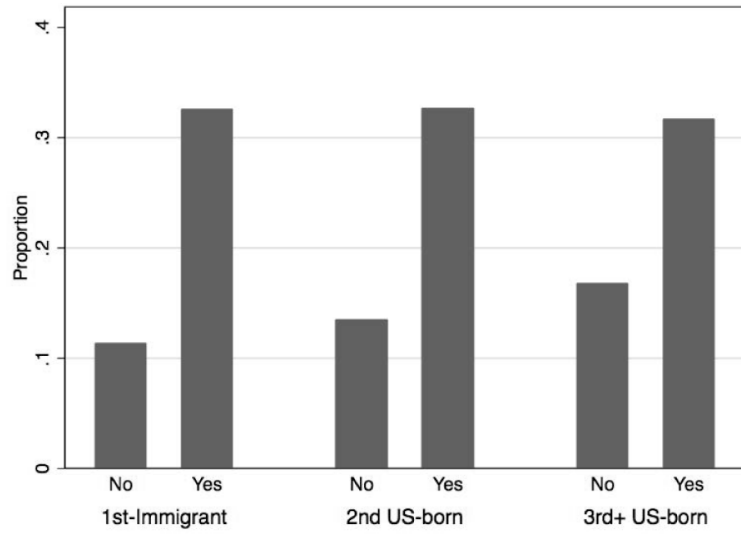
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**Figure 1. DUI initiation among Hispanic young adults by nativity and generational status, Add Health Study**



**Figure 2. DUI initiation among Hispanic young adults by marijuana use and nativity status, Add Health Study**

**Table 1**  
**Description of demographics, risk factors, and DUI among Hispanic adolescents (age 15), by nativity status**

	Total		Immigrant		US-born		F	p
	Mean	sd	Proportion	sd	Proportion	sd		
Men	1734	.50	.189	.311	0	1	-0.49	.623
Mexican <sup>1</sup>	1734	.583	.205	.379	0	1	1.19	.238
Cuban <sup>1</sup>	1734	.050	.016	.033	0	1	0.36	.719
Puerto Rican <sup>1</sup>	1734	.114	.026	.092*	0	1	3.19	<.001
Central American <sup>1</sup>	1734	.123	.076*	.047	0	1	-2.73	.007
Other <sup>1</sup>	1734	.130	.050	.080	0	1	-0.27	.788
1 <sup>st</sup> generation Immigrant	1732	--	.370	--	0	1	--	--
2 <sup>nd</sup> generation US-born	1732	--	--	.195	0	1	--	--
3 <sup>rd</sup> + generation US-born	1732	--	--	.435	0	1	--	--
Spanish at home	1711	.412	.235*	.179	0	1	52.51	<.001
Ever drive drunk	1730	.043	.011	.032	0	1	1.63	.107

	Mean (sd)	Mean (sd)	t	p
Age	1734 15.11 (.225)	15.47* (.277)	14.90 (.209)	11 20 -3.11 .002
Alcohol use <sup>2</sup>	1728 1.52 (.094)	1.22 (.113)	1.69* (.116)	0 7 3.46 .001
Marijuana use	1710 .275 (.025)	.215 (.033)	.310* (.030)	0 1 2.34 .021
Other drugs	1709 .080 (.011)	.065 (.015)	.089 (.014)	0 1 1.34 .184
Drunk at school	1730 .059 (.010)	.049 (.013)	.066 (.013)	0 1 1.12 .266
Leave home <sup>2</sup>	1705 .442 (.031)	.411 (.034)	.461 (.040)	0 2 1.05 .294
Group Fight <sup>2</sup>	1715 .358 (.020)	.304 (.023)	.389 (.032)	0 2 1.71 .090
Parental involvement <sup>3</sup>	1728 5.59 (.163)	5.50 (.230)	5.64 (.212)	0 19 0.45 .651
Peer alcohol use <sup>22</sup>	1692 1.00 (.067)	.889 (.078)	1.07* (.080)	0 3 2.01 .047
Peer marijuana use <sup>2</sup>	1696 .613 (.055)	.496 (.061)	0.68* (.062)	0 3 2.89 .005
School connectedness <sup>3</sup>	1699 21.64 (.201)	22.15* (.286)	21.35 (.203)	6 33 -3.04 .003
Safe Neighborhood	1715 .835 (.015)	.822 (.024)	.842 (.015)	0 1 0.81 .419



		<i>Mean (sd)</i>	<i>Mean (sd)</i>	<i>t</i>	<i>p</i>
Seatbelt use <sup>3</sup>	1734	3.08 (.073)	3.15 (.089)	3.04 (.091)	0 4 -0.93 .355
Miles driven <sup>2</sup>	1731	1.17 (.074)	1.10 (.093)	1.21 (.077)	0 4 1.43 .156
Valid driver's license	1734	.140 (.020)	.147 (.027)	.136 (.023)	0 1 -0.37 .709

<sup>1</sup> Each group was compared to all other groups as the reference group.

<sup>2</sup> Higher values represent more risk.

<sup>3</sup> Higher values represent less risk.

**Table 2**  
**Bivariate relation between risk factors during adolescence on DUI behaviors among young adults, by nativity status**

	Immigrant		US-born	
	OR	s.e.	OR	s.e
<i>Demographics</i>				
Men	4.11**	1.80	2.33**	0.57
Age	0.99	0.82	1.13	0.09
Mexican <sup>l</sup>	2.09*	0.59	1.14	0.28
Cuban <sup>l</sup>	1.17	0.82	1.29	0.52
Puerto Rican <sup>l</sup>	.877	0.48	.586	0.20
Central American <sup>l</sup>	.492	0.17	1.57	0.54
Other <sup>l</sup>	.632	0.39	1.16	0.41
<i>Eco-processes</i>				
Peer alcohol use	1.60***	0.20	1.12	0.10
Peer marijuana use	1.89***	0.23	1.20*	0.10
Parent Involvement	.968	0.04	.967	.039
Spanish at home	.574	0.22	.462	0.15
School connectedness	.938 <sup>+</sup>	0.04	.939 <sup>+</sup>	0.04
Safe Neighborhood	2.64 <sup>+</sup>	1.51	1.78 <sup>+</sup>	0.59
<i>Risk factors</i>				
Alcohol use	1.57***	0.17	1.15*	0.08
Marijuana use	3.78**	1.47	2.53***	0.64
Other drugs	7.66***	4.01	2.31*	0.96
Drunk at school	1.97	1.51	2.29*	0.96
Leave home	.853	0.19	1.41*	0.21
Group Fight	1.83*	0.46	1.53**	0.22
Seatbelt use	.912	0.10	1.07	0.10
Miles driven	1.42**	0.16	1.33**	0.12
Valid driver's license	1.57 <sup>+</sup>	0.66	1.79 <sup>+</sup>	0.62

<sup>+</sup> p<.10,

\* p<.05,

\*\* <.01,

\*\*\* p<.001

<sup>l</sup> Each group was compared to all other groups as the reference group.

**Table 3**  
**Effects of risk factors during adolescence on DUI behaviors by nativity status**

<i>Model</i>	A	B	C	D	E	F
<i>N=</i>	1661 <sup>^</sup>	1659	1659	1552	1604	1527 <sup>^^</sup>
<i>US-born</i> <sup>2</sup>	1.38*					
1 <sup>st</sup> generation Immigrant	--	--	--	--	--	--
2 <sup>nd</sup> generation US-born <sup>1</sup>		1.15	1.20	1.35	1.09	1.24
3 <sup>rd</sup> + generation US-born <sup>1</sup>		1.51*	1.74*	1.17	1.31	1.09
<i>Demographics</i>						
Men		2.75**	2.84**	2.71**	2.86**	2.86**
Age		1.07	1.08	.97	1.03	1.03
Mexican		1.18	1.28	1.30	1.46	1.46
Cuban		1.51	1.67	1.87	1.96	1.96
Puerto Rican		0.47 <sup>+</sup>	0.50 <sup>+</sup>	0.53 <sup>+</sup>	0.57	0.57
Central American		0.97	1.23	1.12	1.35	1.35
Other		--	--	--	--	--
<i>Eco-processes</i>						
Peer alcohol use			1.15			1.00
Peer marijuana use			1.26*			1.05
Parental involvement			0.99			1.00
Spanish at home			0.51*			.618 <sup>+</sup>
School connectedness			1.00			1.01
Safe Neighborhood			2.04*			2.02*
<i>Risk factors</i>						
Alcohol use					1.06	1.07
Marijuana use					2.14*	1.98*
Other drugs					1.78	1.94
Drunk at school					.909	.834
Leave home					1.18	1.23

<i>Model</i>	A	B	C	D	E	F
N=	1661 <sup>^</sup>	1659	1659	1552	1604	1527 <sup>^^</sup>
Group Fight					1.26	1.25
Seatbelt use					1.02	1.02
Miles driven					1.07	1.05
Valid driver's license					1.16	1.12

<sup>+</sup> p<0.10,

<sup>\*</sup> p<0.05,

<sup>\*\*</sup> p<0.01,

<sup>\*\*\*</sup> p<0.001

<sup>I</sup> Immigrant youth (reference group).

<sup>^</sup> n=1661 responded to the ever drink and drive question at Wave III, which represents 96% of the eligible sample at Wave I.

<sup>^^</sup> n=134 cases were excluded from the final model because of missingness in at least one covariate.

Note: Numbers reported are odds-ratios.