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Latino Immigrants' Biological Parents' Histories Of Substance Use Problems In Their Country Of Origin Predict Their Pre- And Post-Immigration Alcohol Use Problems

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Abstract

Background—No studies to date have assessed whether recent young adult (ages 18–34) Latino immigrants' biological parents' histories of substance use problems (BPHSUP) in their country of origin predict their alcohol use problems at pre- and post-immigration to the United States (U.S.).

Methods—BPHSUP in their country of origin was assessed via interviews conducted by bilingual Latino researchers with recent Latino immigrants primarily from Cuba, Central and South America recruited through respondent driven sampling at the time of their immigration to southeastern U.S. Three-waves of data were collected to document Latino immigrants' severity of alcohol use problems at pre-immigration and two annual post-immigration follow-up assessments. BPHSUP +/- status was used as a predictor of Latinos' (N=452; 45.8% female, 54.2% male) Alcohol Use Disorders Identification Test (AUDIT) scores at pre- and post-immigration with age, education and income as covariates as well as odds ratios for AUDIT classifications of hazardous use, harmful use and dependence.

Results—BPHSUP+ status predicted Latino immigrants' higher AUDIT scores pre- and post-immigration by gender ($p < .01$) compared to Latino immigrants of BPHSUP- status controlling for age, education and income. BPHSUP+ status predicted odds ratios of 3.45 and 2.91 for alcohol dependence AUDIT classification for men and women respectively (T3).

Conclusions—This study documents that BPHSUP +/- status in their country of origin predict their young adult Latino offspring's severity of alcohol use problems pre-and post-immigration.

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AUTHOR CONTRIBUTIONS

Dr. Blackson wrote the manuscript, Dr. De La Rosa designed the study and contributed to the manuscript, Dr. Sanchez prepared the data set and Dr. Li contributed the statistical analyses.

These results may inform (1) community-based health care providers to screen recent young adult Latino immigrants for their BPHSUP+/- status and severity of alcohol use problems to redirect trajectories away from alcohol use disorders toward more normative post-immigration outcomes through culturally relevant prevention services and (2) future research advantages of differential susceptibility theory. Implications for future research and the need for replication studies in other geographic regions of the U.S. are discussed.

INTRODUCTION

Surprisingly, no studies to date have assessed the effect of Latino immigrants' biological parents' histories of substance use problems (BPHSUP) in their country of origin on their early adult (ages 18–34) alcohol use problems pre- and post-immigration to the U.S. Yet, it is well-documented that heritability liability estimates range between 48–66% for alcohol dependence.^{1,2} Albeit biological parents' histories of substance use problems is not sufficiently specific to heritability estimates for alcohol dependence *per se*, it is of heuristic value to consider their effect on recent adult Latino immigrants' alcohol use problems which may presage their progression to post-immigration development of alcohol use disorders.^{3,4}

Moreover, only a few studies have addressed recent adult Latino immigrants' patterns of alcohol use pre- and post-immigration to the U.S.⁵ or, made comparisons between their alcohol use pre- and post-immigration to national aggregate data on foreign born immigrants living in the U.S. for more than 5-years or among U.S. born Latinos.^{6–8} Specifically, one study⁸ found that regular, binge and heavy drinking rates during pre-immigration among recent Latino immigrants were similar to alcohol consumption rates of U.S. born Latinos and at higher levels than foreign-born Latino immigrants living in the U.S. for at least 5-years.

Given that recent Latino immigrants have differences and similarities in acculturation issues, individual differences in liabilities and resiliencies to adversity, and longitudinally have shown post-immigration trajectories to both good and poor outcomes within and between genders,⁹ documenting the effect of biological parents' histories of substance use problems on their pre- and post-immigrant severity of alcohol use problems is a logical first step to inform etiological pathways on trajectories to development of alcohol use disorders post-immigration. For example, future research may show that acculturative stress mediates or moderates the relationship between recent Latino immigrants' biological parents' histories of substance use problems and their subsequent development of alcohol use disorders post-immigration. Therefore, we address the lacuna of data on the effect of Latino biological parents' histories of substance use problems in their country of origin on recent young adult Latino immigrants' alcohol use problems at pre- and post-immigration to the U.S. Specifically, we expect biological parents' histories of substance use problems in their country of origin to predict recent Latino immigrants' pre- and post-immigration severity of alcohol use problems among young adult Latino men and women.

METHODS

Participants and procedure

Data were obtained at baseline (T1) within one-year of immigration and two annual follow-up assessments (T2 and T3 respectively) from participants in the study on the sociocultural determinants of liability and resiliency to good (e.g., healthy lifestyles) and poor (e.g., substance abuse, HIV/AIDs) post-immigration outcomes. A major southeastern university Institutional Review Board approved the study which was conducted by an NIH-funded national Latino research center. Written informed consent was obtained from each participant. Also, a NIH certificate of confidentiality was issued to protect participants' confidentiality. Extensive details on inclusionary and exclusionary criteria, sampling methods, representative sample considerations and limitations, community-based bilingual Latino research staff training, Latino community resources, protocol development and pilot testing in English and Spanish versions of questionnaires and interviews along with their translations forward and backwards from English to Spanish, participant recruitment and longitudinal retention procedures are presented elsewhere.¹⁰

Briefly, recent young adult Latino immigrants were recruited through respondent-driven sampling (RDS)¹¹ which is a well-known strategy to recruit participants from hidden or difficult to reach populations (e.g., immigrants with documentation issues).¹² Each recruited participant (seed) was asked to refer three individuals in their social network who met the eligibility criteria (Latino immigrated to the U.S. within the past year between the ages of 18–34 with intentions of staying and consents to be interviewed). This procedure was followed for seven legs for each seed after which a new seed would begin so as to avoid skewing the respondent sample. Seeds were recruited through announcements posted at community-based agencies providing services to refugees, asylum seekers, and other documented and undocumented Latino immigrants in southeastern U.S. Additionally, information was distributed at Latino community health fairs and neighborhood locales (e.g., parks). Announcements were also posted at Latino centers and electronic bulletin boards (e.g., employment websites).

Sample description

Recent adult Latino immigrants (N=452; 45.8% female of which 82.6% were documented and 17.4% were undocumented and, 54.2% male of which 80.4% were documented and 19.6% were undocumented) with complete data across 3-waves were included in the longitudinal analyses. Baseline ages (T1) were 18 to 34 years (*M*, *SD* =27.3, 5.1 for females and 26.5, 4.9 for males respectively). Participants were from Cuba (43.6%, n=197), Colombia (19.5%, n=88), Honduras (12.2%, n=55), Nicaragua (8.2%, n=37), Guatemala (2.9%, n=13), Peru (2.9%, n=13), Venezuela (2.4%, n=11), Argentina (2.0%, n=9), Dominican Republic (1.5%, n=7), Mexico (1.3%, n=6) and El Salvador (1.1%, n=5) with less than 1% (n=11) from Bolivia, Chile, Costa Rica, Ecuador, Panama and Uruguay which reflects the evolving Latino population growth in southeastern U.S.¹⁰ In comparison to the present study sample described above, available data for the country of origin distributions among the Latino immigrant population of the southeastern U.S. county where the study was conducted consists of 52.7% Cuban, 16.8% South American, 13.1 % Central American, and

3.6% other Caribbean.¹³ In that regard, it is noteworthy that Cuban, South and Central American immigrants have been largely understudied albeit they are representative of the US Latino population growth in the southeastern U.S.¹⁴

Measures

Demographics and biological parents' histories of substance use problems (BPHSUP+/- status)

Socio-demographic instruments and measures are well-described elsewhere.^{5,8,10} Participants reported at T1 whether one or both biological parents had presence or absence of a history of substance use problems (e.g., personal, legal, work, marital, family, financial, social, community problems related to substance use/abuse) in their country of origin on the family history of substance use questionnaire. Specifically, biological parents' history of substance use problems was assessed via an interview format conducted by a bilingual Latino interviewer with the following instructions given to participants: "Sometimes people have problems because of their drinking or drug use. These might be health problems such as cirrhosis of the liver, trouble with the law such as DUI or arrests or incarcerations related to drinking or drug use, family problems such as separation or divorce due to alcohol or drug use, money problems such as falling into debt due to spending needed finances on alcohol or drugs, or any other personal problems related to alcohol or drug use. I'd like to ask you whether your birth parents (biological father and biological mother) have had problems with their health, with the law, or difficulties at school or at work or other personal problems because of their drinking or use of other drugs ...in your country of origin." "Your birth father? Yes or No; Your birth mother? Yes or No."

Then, a dichotomous BPHSUP+/- status variable was created: If either one or both biological parents had a history of substance use problems in their country of origin per participant's report, BPHSUP+ =1 and, if neither biological parent had any such history, BPHSUP- =0. Among Latino women, 15% of their biological fathers and 4.8% of their biological mothers had histories of substance use problems in their country of origin. Among Latino men, 19.2% of their biological fathers and 1.6% of their biological mothers had histories of substance use problems in their country of origin. Those percentages of Latino immigrants' biological parents with histories of substance use problems in their country of origin are approximately equivalent to the 16.6 % prevalence rate of alcohol use problems among adult U.S. citizens.¹⁵ Gender was coded 1=male and 0=female.

Alcohol use problems—Alcohol Use Identification Test (AUDIT)¹⁶ Interview version was administered to participants at T1, T2 and T3 to document their alcohol use problems in the past 90-days *employing timeline follow back procedures*.¹⁷ T1 AUDIT scores documented Latino immigrants' self-reports on their alcohol use problems *90-days prior to* their immigration to the U.S. T2 and T3 AUDIT scores documented Latino immigrants' alcohol use problems post-immigration for the 90-days prior to each annual post-immigration follow-up assessment. The AUDIT has sensitivities and specificities comparable to those of other self-report screening measures, including the Spanish translated AUDIT with documented reliability and validity among Latin Americans.¹⁸ In addition, dichotomous AUDIT classifications of harmful use, hazardous use and dependence were derived according to standard procedures.¹⁶ Domains and item content of the AUDIT

Interview version were: hazardous use (frequency of drinking alcohol, typical quantity alcohol use and frequency of heavy drinking); harmful use (guilt after drinking alcohol, blackouts after alcohol use, alcohol-related injuries and others concerned about drinking); and, dependence (impaired control over drinking symptoms, increased salience of drinking and morning drinking).

Analyses—Between-group (BPHSUP+/- status) differences on socio-demographics were computed via t-test with results presented in Table 1. ANCOVAs were computed by gender with between BPHSUP+/- status as the fixed factor with age, education and income as covariates at pre-immigration (T1) and at two annual follow-ups (T2 and T3). SPSS¹⁹ computed results are summarized in Table 2. Odds ratios for AUDIT classifications (hazardous use, harmful use, dependence) by BPHSUP +/- status for Latino men and women are presented in Table 3.

RESULTS

Sociodemographics

Educational attainment at baseline (self-reports on education and income one-year prior to immigration conducted by interview) by gender (female/male) was: 25.6/14.7% had college degrees, 37.7/32.2% had some college, 25.6/31.4% had a high school or equivalent degree, and 11.1/21.6% had not completed high school. Mean annual income one-year prior to immigration by gender (female/male) was: \$4,961/4,676 USD. Post-immigration length of time in the U.S. was equivalent among participants at all 3-waves.

Latino immigrant men of BPHSUP+ status had statistically significantly lower levels of education from pre- through post-immigration compared to men of BPHSUP- status as shown in Table 1. There were no significant differences in incomes across 3-time points between Latino men of BPHSUP +/- status. Among Latino immigrant women of BPHSUP +/- status, no significant differences were observed for education levels or income levels from pre- to post-immigration (T1, T2 and T3 respectively) as depicted in Table 1.

AUDIT Scores

Participants' total AUDIT scores ranged from T1=0–34; T2=0–25; and, T3=0–25. Higher scores indicate greater severity of alcohol use problems. More specifically, BPHSUP+ status predicted recent young adult Latino immigrants' higher AUDIT scores pre- and post-immigration across 3-time points for both genders compared to those of BPHSUP - status as shown in Table 2. While some of the covariates were significant revealing gender specific effects, their simultaneous entry did not alter the strong effect of BPHSUP+ status on their higher AUDIT scores across 3-time points. The smaller n for T2 was attributed to suboptimal participant payments (\$30), which was ameliorated (\$60) at T3.¹⁰ No imputed values for missing data were used at T2 (T1 and T3 had no imputed values either) since these preliminary results address a core liability feature of alcohol use disorders among Latino immigrants: biological parents' histories of substance use problems in their country of origin.

Given the salience of BPHSUP +/- status in predicting predict Latino immigrants' severity of alcohol use problems across 3-time points, we computed odds ratios to predict AUDIT classifications of hazardous use, harmful use and dependence at T3 by BPHSUP +/- status. As shown in Table 3, young Latino immigrant men of BPHSUP+ status were 3.45 ($p=.001$) times more likely to be in the alcohol dependence classification compared to Latino men of BPHSUP-status. Similarly, young Latino women of BPHSUP+ status were 2.91 times ($p=.042$) more likely to be in the alcohol dependence classification compared to Latino women of BPHSUP- status. Overall, all of the odds ratios for respective AUDIT classifications were statistically significant for Latino immigrants of BPHSUP+ status compared to those of BPHSUP- status across genders as summarized in Table 3 except for hazardous use among men which reflects the lowest level of alcohol use problems.

DISCUSSION

To the best of our knowledge, this is the first longitudinal study of recent young adult Latino immigrants (ages 18–34) which documents that biological parents' histories of substance use problems (BPHSUP+ status) in their country of origin prior to immigration predict their severity of alcohol use problems consistently by gender from pre- to post-immigration during their acculturation to the U.S. Although the obtained results are not surprising, it has been a long overlooked heritability liability among recent Latino immigrants as it pertains to their risk to develop post-immigration alcohol use disorders. Thus, these findings are important for several reasons: (1) they inform and reinforce the need for prevention program development²⁰ for community-based health care providers to screen recent Latino immigrants for their biological parents' histories of substance use problems in their country of origin as well as their current severity of alcohol use problems to potentially redirect Latino immigrants on trajectories to alcohol use disorders³ toward healthy post-immigration outcomes and (2) the results provide fertile data for future research with this cohort to inform innovative theory development as it pertains to differential susceptibility theory.²¹

Whilst a thorough discussion on differential susceptibility theory²¹ is beyond the scope of this report, it is an innovative theoretical perspective which may explain, in part, Latino immigrants' post-immigration trajectories to various outcomes.⁹ In that context, a differential susceptibility hypothesis infers a 'for better' or 'for worse' outcome scenario for those at greatest risk for adversity.^{21–23} That is, Latinos at a heightened heritability risk (BPHSUP+ status) for post-immigration development of alcohol use disorders would be expected to have 'better' post-immigration outcomes than their low risk (BPHSUP- status) counterparts when they experience high levels of a favorable post-immigration factor (e.g., educational opportunities and mentorships) and much 'worse' post-immigration outcomes (e.g., development of alcohol use disorders) than their low risk counterparts (BPHSUP- status) when they experience a like-kind unfavorable factor (e.g., thwarted post-immigration educational opportunities and no mentorships) when all else is equivalent between groups.

As such, the relevance of differential susceptibility theory to our sample of recent Latino immigrants is evident in the results summarized in Table 2. For example, the magnitude of *SDs* in AUDIT scores within BPHSUP+ status across genders indicate that some Latino immigrants may be on trajectories to alcohol use disorder outcomes and some are not.

Likewise, among Latino immigrants at low risk for alcohol use disorders per BPHSUP– status, their AUDIT score *SDs* suggest similar divergent trajectories. This point is underscored by the results summarized in Table 3 which shows that both Latino men and women of BPHSUP+ and BPHSUP– status reach a threshold of alcohol dependence according to the AUDIT classification system. That said, it is crystal clear that both Latino men and women of BPHSUP+ status have statistically significantly higher odds ratios for dependence classification compared to Latino men and women of BPHSUP– status (OR=3.45 and 2.91 respectively). Hence, in presence of equivalent favorable (or unfavorable) socio-cultural determinants of liability and resiliency at post-immigration, differential susceptibility theory can be tested to determine if those at heightened risk per heritability liability associated with their BPHSUP+ status have better outcomes than their low risk counterparts when high levels of an attenuating moderating factor is equally experienced by Latino immigrants of both BPHSUP+ and BPHSUP– status.^{21–23}

Future research with this cohort or others may also elucidate a range of moderating and mediating factors which account for, in part or whole, the relationship between BPHSUP+/- status and both good (e.g., healthy lifestyle) and poor (e.g., SUDs, HIV/AIDs) post-immigration outcomes. In that regard, the serotonin transporter gene polymorphism²⁴ tri-allelic 5-HTTLPR (ss, sl or ll) associated with stress reactivity (heightened stress reactivity when one or both alleles are s-short and reduced stress reactivity when both alleles are ll-long) may predict the magnitude of acculturative stress recent Latino immigrants experience as they acculturate to the U.S. which, in turn, may mediate or moderate the effects of BPHSUP+ status on development of post-immigration alcohol use disorders. Such analyses should take into account advances in regression techniques which allow for detection of gene-environment interactions in context of differential susceptibility theory.²³ Doing so may illuminate why some immigrants at highest risk per heritability liability (e.g., 5-HTTLPR ss allele;^{24–26} BPHSUP+ status²⁷) have the most favorable outcomes while others do not. Moreover, such findings may provide a basis for future research to inform the development of culturally relevant prevention initiatives and clinical interventions²⁰ which take into account effects of heritability liabilities (e.g., BPHSUP + status) and contextual risk factors (e.g., acculturative stress) on trajectories to alcohol use disorders among recent Latino immigrants to promote healthier post-immigration outcomes.

Limitations

Inexplicably, no studies to date have assessed the effect of Latino intergenerational biological family histories of substance use problems in their country of origin on recent young adult Latino immigrants' severity of alcohol use problems pre- and post-immigration to the U.S. Thus, these findings require replication by longitudinal studies conducted in other areas of the U.S. which take into account intergenerational biological family histories of substance use problems in their countries of origin on recent Latino immigrants' alcohol use problems during their post-immigration acculturation to the U.S. That would be in contrast to cross-national studies which do not focus on or document intergenerational biological family histories of substance use problems on recent immigrants' alcohol use problems from pre- to post-immigration and thus, are non-informative on that issue.^{6–7, 28–29} Furthermore, our sample is not intended to reflect Latino immigrant or migrant populations

in southwestern U.S. which are predominantly Mexican-American. Rather, as previously stated, this sample represents the emerging young adult Latino immigrant population growth in southeastern U.S. which is predominantly immigrants from Cuba, Central and South America. In addition, respondent driven sampling may yield a biased sample that is not representative of the indicated population of Latino immigrants. However, studies^{10–12} have shown that respondent driven sampling is an appropriate recruitment strategy especially as pertains to the current political climate regarding documented and undocumented Latino immigrants in the U.S.

The implications for heritability liabilities and gene-environment interactions in context of differential susceptibility theory²¹ should be considered for their heuristic value since we did not test specific genetic effects via genotyping our sample. Also, Latino immigrants' reports on their biological parents' histories of substance use problems may be biased but no more so than self-reports on other health issues (e.g., parents' histories of colon cancer and breast cancer) which have been shown to be reliable and valid.^{30–32} Other studies have demonstrated that adult offspring's self-reports on their parents' histories of substance abuse are valid and reliable as well.^{27,33} Moreover, the BPHSUP+/- status effect was strong and consistent across time and gender. Furthermore, it is highly unlikely that recent Latino immigrants would over state their biological parents' histories of substance use problems in their country of origin: under-reporting would be more likely. However, our well-educated, bilingual Latino interviewers, who themselves are first generation immigrants from Cuba, Central and South America, have the cultural sensibilities to elicit sensitive information from Latino participants who immigrated primarily from Cuba, Central and South America.¹⁰ Finally, recent young adult Latino immigrants (ages 18–34) are engaged in the 21st century with Facebook and Twitter accounts, smartphones and awareness of celebrities, athletes and politicians with substance use problems. Hence, the 'taboo-shameful' inhibitory issues of disclosing family histories of substance use problems noteworthy in the 20th century among Latinos have largely evaporated with the ubiquitous social media of the 21st century.

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Socio-demographic differences between recent Latino immigrants of BPHSUP+ and BPHSUP- status on education levels and incomes in USD at pre-immigration (T1) and post-immigration (T2 and T3)

TABLE 1

GENDER	BPHSUP+ status				BPHSUP- status				t	p=
	M	SD	(SE)		M	SD	(SE)			
Men	Education T1	1.88	0.98	(0.14)	2.56	1.00	(0.07)	-4.24	<.001	
	Income T1	5,510.10	7,943.09	(1,146.49)	4,792.78	12,454.63	(887.36)	0.50	.622	
	Education T2	2.27	0.98	(0.18)	2.77	0.98	(0.08)	-2.54	.012	
	Income T2	12,333.33	7,040.93	(1,285.49)	15,518.80	16,125.36	(1,353.21)	-1.06	.291	
	Education T3	2.04	0.82	(0.12)	2.56	0.97	(0.07)	-3.76	<.001	
	Income T3	21,100.50	7,171.65	(1,035.14)	21,577.15	9,732.98	(693.45)	-0.38	.703	
Women	Education T1	2.64	1.13	(0.19)	2.86	1.01	(0.08)	-1.17	.243	
	Income T1	5,366.33	9,160.70	(1,526.78)	5,321.53	9,554.79	(732.82)	0.03	.979	
	Education T2	2.76	1.12	(0.21)	2.70	0.92	(0.08)	0.29	.771	
	Income T2	13,500.00	9,689.91	(1,799.37)	13,640.36	10,999.32	(895.11)	-0.06	.949	
	Education T3	2.78	1.04	(0.17)	2.75	0.90	(0.07)	0.17	.863	
	Income T3	14,525.00	9,131.75	(1,521.96)	18,084.32	11,909.76	(910.76)	-1.69	.092	

Note. Education levels: 1=less than high school (HS); 2=HS diploma; 3=some college/training post-HS; 4=bachelor's degree; 5=graduate/professional studies.

TABLE 2

Gender specific ANCOVAs predicting AUDIT scores by BPHSUP+/- status with age, education and income as covariates for T1, T2 and T3 (N=452)

GENDER*					Predictors	F	df	p =
Men's AUDIT Scores T1					Fixed Factor			
BPHSUP+ (n=48)					BPHSUP+/- status	19.40	1, 244	<.001
<i>M</i>	<i>95% CI</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>95% CI</i>	<i>SD</i>		
11.54	(9.35, 12.92)	7.90	.91	6.55	(5.79, 7.51)	5.64		
(Observed AUDIT scores presented)					Age	3.40	1, 244	.066
<i>F</i> =8.26, <i>df</i> =4, 240, <i>p</i> <.001					Education T1	3.49	1, 244	.063
					Income T1	0.88	1, 244	.349
Men's AUDIT Scores T2					Fixed Factor			
BPHSUP+ (n=30)					BPHSUP+/- status	8.36	1, 171	.004
<i>M</i>	<i>95% CI</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>95% CI</i>	<i>SD</i>		
7.93	(5.99, 9.26)	5.56	.83	4.91	(4.24, 5.72)	4.27		
(Observed AUDIT scores presented)					Age	1.79	1, 171	.183
<i>F</i> =4.62, <i>df</i> =4, 167, <i>p</i> <.001					Education T2	4.05	1, 171	.046
					Income T2	0.34	1, 171	.560
Men's AUDIT Scores T3					Fixed Factor			
BPHSUP+ (n=48)					BPHSUP+/- status	17.60	1, 244	<.001
<i>M</i>	<i>95% CI</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>95% CI</i>	<i>SD</i>		
7.60	(6.31, 8.90)	5.47	.66	4.48	(3.84, 5.12)	4.32		
(Observed AUDIT scores presented)					Age	0.99	1, 244	.320
<i>F</i> =6.85, <i>df</i> =4, 240, <i>p</i> <.001					Education T3	0.02	1, 244	.881
					Income T3	8.24	1, 244	.004
Women's AUDIT Scores T1					Fixed Factor			
BPHSUP+ (n=36)					BPHSUP+/- status	34.22	1, 205	<.001
<i>M</i>	<i>95% CI</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>95% CI</i>	<i>SD</i>		
7.28	(6.01, 8.91)	6.84	.74	2.76	(2.06, 3.39)	4.00		
(Observed AUDIT scores presented)					Age	4.00	1, 205	.047
<i>#F</i> =13.92, <i>df</i> =4, 201, <i>p</i> <.001					Education T1	3.83	1, 205	.052
<i>#1</i> -person had missing income T1					Income T1	12.77	1, 205	>.001
Women's AUDIT Scores T2					Fixed Factor			
BPHSUP+ (n=29)					BPHSUP+/- status	13.84	1, 179	<.001
<i>M</i>	<i>95% CI</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>95% CI</i>	<i>SD</i>		
5.90	(4.24, 7.55)	5.82	.79	2.79	(2.09, 3.45)	4.08		
(Observed AUDIT scores presented)					Age	3.16	1, 179	.077

GENDER*				Predictors	F	df	p =
(Observed AUDIT scores presented)				Education T2	2.72	1, 179	.101
<i>F</i> = 7.20, <i>df</i> = 4, 175, <i>p</i> < .001				Income T2	8.39	1, 179	.004
Women's AUDIT Scores T3				Fixed Factor			
BPHSUP+ (n = 36)				BPHSUP+/- status	10.01	1, 206	.002
				Covariates			
<i>M</i>	<i>95% CI</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>95% CI</i>	<i>SD</i>	<i>SE</i>
4.72	(3.49, 5.95)	4.65	.62	2.61	(2.05, 3.17)	3.52	.29
(Observed AUDIT scores presented)				Age	0.62	1, 206	.432
				Education T3	4.34	1, 206	.039
<i>F</i> = 3.77, <i>df</i> = 4, 202, <i>p</i> < .006				Income T3	0.38	1, 206	.538

Note.

* Rerun ANCOVAs combining genders yield the same results for men's and women's AUDIT scores with main effect of BPHSUP+/- status as shown above. As expected, a gender specific effect is significant (*p* < .001) with men having higher AUDIT scores across all 3-waves but all covariates become non-significant except for men's income at T1 (which is not significant in Table 1 as shown above). Thus, disaggregating the analyses by gender may be more informative longitudinally to ensure salient socio-demographics are not overlooked in predicting outcomes by gender.

TABLE 3

Latinos' BPHSUP +/- status (N=452) by gender predicting odds ratios for AUDIT classifications at T3

	GENDER by AUDIT Classification	BPHSUP+		BPHSUP-		X ²	p=	OR	95% CI
		n	%	n	%				
Men	Dependence	14/48	29.2	21/197	10.7	10.80	.001	3.45	(1.60, 7.45)
	Harmful use	9/48	18.8	17/197	8.6	4.17	.041	2.44	(1.02, 5.89)
	Hazardous use	33/48	68.8	122/197	61.9	0.77	.379	2.63	(1.20, 5.79)
Women	Dependence	6/36	16.7	11/171	6.4	4.13	.042	2.91	(1.00, 8.47)
	Harmful use	8/36	22.2	12/171	7.0	7.88	.005	3.79	(1.42, 10.09)
	Hazardous use	26/36	72.2	85/171	49.7	6.06	.014	1.35	(0.69, 2.66)