

Drinking Patterns and Victimization among Male and Female Students in Mexico

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Abstract — Aims: The purpose of this study is to estimate the prevalence of alcohol use and alcohol-related consequences, identify drinking profiles using latent profile analysis (LPA), and investigate associations between profiles and violent victimization among young people in Mexico. **Methods:** LPA identified profiles of drinking behavior in a survey of entering first year university students. Multinomial and logistic regression examined associations between drinking patterns, socio-demographic variables and violent victimization. **Results:** The LPA identified five profiles of behaviors and consequences among the 22,224 current, former and never drinkers: Non/Infrequent-No Consequences, Occasional-Few Consequences, Regular-Some Consequences, Heavy-Many Consequences and Excessive-Many Consequences drinkers. The Occasional-Few Consequences profile comprised the largest, and the Excessive-Many Consequences profile the smallest, group of drinkers. Multinomial regression showed males and older students more likely to be Heavy or Excessive-Many Consequences drinkers. Living alone was associated with higher odds, and higher maternal education with lower odds, of being a Non/Infrequent-No Consequences drinker. Heavier drinking profiles were more likely to experience violent victimization adverse consequences. Logistic regression showed male and female Heavy and Excessive-Many Consequences drinkers had the highest odds, and Non/Infrequent drinkers the lowest odds, of experiencing any victimization. **Conclusion:** Findings suggest changes in male and female drinking behavior and a continuation of the established pattern of infrequent but high consumption among Mexican youths. Both male and female Heavy and Excessive-Many Consequences drinkers were at elevated risk for experiencing victimization. Identifying cultural gender norms about drinking including drinker expectations and drinking context that contribute to these patterns can inform prevention efforts.

INTRODUCTION

Studies of alcohol use among young people worldwide show heavy episodic drinking and increased alcohol use frequently associated with harmful consequences including a higher risk of accidents (Perkins, 2002), injuries (Hingson and Zha, 2009; Rehm *et al.*, 2010), fights (Hingson *et al.*, 2009; Cleveland *et al.*, 2012), adverse sexual events (Connor *et al.*, 2013) and problems with authorities (Reboussin *et al.*, 2006). All these studies suggest the risk of these outcomes peaks at the age at which periodic or high-risk drinking is greatest (National Institute of Alcohol Abuse and Alcoholism, 2006).

In Mexico, men traditionally consumed alcohol more frequently and more heavily than women but since the 1990s this difference has become less prominent among young people. Over the 10-year period 1988–1998, the age of drinking onset decreased and heavier drinking increased among males aged 18–29 indicating that Mexican men experience their heaviest drinking at increasingly younger ages. Drinking among women and adolescent females has also increased significantly as have the proportions of females with abuse or dependence (Medina-Mora, 2007). A recent national household survey examining alcohol and drug use found fewer than 1% of the general population drank daily but over half (53.6%) of young adults aged 18–35 consumed 5+ drinks on a single occasion in the past year, and among 12–17 year olds 42.9% ever used alcohol with 31.8% of males and 28.1% of females drinking in the past year (Health Ministry, 2012). Although the frequency of drinking was 20% greater among adult men

than adult women, this difference was only 6% between males and females aged 12–17 (Health Ministry, 2012) suggesting continued increase in use among female adolescents. Four cross-sectional surveys of entering first year university students in Mexico City conducted from 2005 to 2008 also show a pattern of heavy episodic drinking among youths with both consumption of large quantities in a single occasion and increasingly frequent use (Díaz-Martínez *et al.*, 2008, 2012; Solís-Torres *et al.*, 2012; Strunin *et al.*, 2013a). In 2005 75% of male and 66% of female students reported past year drinking (Díaz-Martínez *et al.*, 2008), in 2007 26.9% drank 4+ drinks on a single occasion (Solís-Torres *et al.*, 2012) and in 2008 a majority (86.3%) were ever drinkers with more males (35.2%) than females (23.7%) drinking 2+ times per month and more males (31.1%) than females (20.4%) reporting hazardous and harmful (Alcohol Use Disorders Identification Test, AUDIT, score of 6+) levels of drinking (Strunin *et al.*, 2013a). All these studies of alcohol use among young people from different socioeconomic backgrounds in Mexico suggest changes in traditional gender patterns of alcohol use. Identifying factors that contribute to gender differences can inform prevention and intervention efforts and, potentially, explain more universal risk and protective factors contributing to gender differences among Mexican American young people.

The present study is from a project investigating patterns of alcohol use including risk and protective factors among students entering first year university in Mexico City. The project used a mixed method approach in two phases. In Phase 1 ethnographic interviews exploring the influence of the Mexican

drinking culture were conducted with students identified from an ongoing general health survey conducted prior to the start of the academic year (Strunin *et al.*, 2013b). In Phase 2, an alcohol survey supplement to the general health survey was administered to incoming first year students to assess prevalence and correlates of alcohol use. This paper focuses on data from Phase 2. The purpose of this study is to: (a) estimate the prevalence of alcohol use and alcohol-related consequences by examining quantity, frequency, frequency of 5+ drinks and alcohol-related consequences, (b) use latent profile analysis (LPA) to identify 'drinking profiles' based on drinking behavior and alcohol-related consequences, and then to examine associations between socio-demographic characteristics and these drinking profiles, and (c) investigate the associations between the drinking profiles and violent victimization among a population of Mexican youths aged 17–20. Alcohol is the most widely used substance in Mexico and emergency room data show a strong association between episodic and frequently heavy patterns of drinking and violence related injury (Borges *et al.*, 2005; Cherpitel *et al.*, 2012). Violent crime rates in Mexico are among the highest in Latin America (ICESI, 2011). In a recent national survey of the general Mexican population, 55.3% of males and 44.7% of females aged 18–19 years reported violent victimization including being injured, robbed and sexual assault (ICESI, 2011). Studies in Mexico also indicate males and females experience different forms of assault. Males are more likely to be threatened with a weapon and physically assaulted, and females more likely to be sexually assaulted (Norris *et al.*, 2003; ICSI, 2011). Males are also more likely to ever experience violence, be a victim of recurrent violence, or be a victim of violence during adolescence (Baker *et al.*, 2005). We hypothesized that among drinking groups based on quantity and frequency of drinking and alcohol-related consequences: (a) groups with heavier drinking profiles are more likely to experience violent victimization, (b) males with heavier drinking profiles are more likely to experience physical assault and (c) females with heavier drinking profiles are more likely to experience sexual assault. This is the first study to examine drinking profiles among Mexican youths and their associations with violent victimization. Past studies of alcohol use among Mexican young people use single measures to assess alcohol use but other research suggests that individuals' multi-dimensional patterns of use can be identified using multivariate person-centered methods that study associations among characteristics of alcohol use (Auerbach and Collins, 2006; Reboussin *et al.*, 2006; Cleveland *et al.*, 2012; Varvil-Weld *et al.*, 2013). LPA is one such person-centered method used to identify underlying subgroups from a set of observed variables (Varvil-Weld *et al.*, 2013).

METHODS

Procedure

The study design is a cross-sectional survey of entering first year students at a large public university in Mexico City conducted during registration prior to the beginning of the school year. During the registration period the university Medical Services routinely administers a general health survey to all entering students. In 2012, an alcohol survey supplement to the general health survey was administered to collect more detailed information about alcohol use. The alcohol survey

supplement questions were developed from the Phase 1 ethnographic interviews. The study was approved by the university IRB for the PI in the USA and the IRB in Mexico City.

Sample

In 2012, 29,677 (80.0%) of 37,077 students enrolled in nine campuses of the university in the Mexico City metropolitan area completed the surveys. Of those who completed the surveys 13% had missing data on age and 3.5% had missing or inconsistent data on drinking status.

Measures

The alcohol supplement survey included questions about frequency and quantity of alcohol use and alcohol-related consequences in the past year. The general health survey queried frequency of drinking 5+ in a single occasion, violent victimization and socio-demographics.

Alcohol consumption

Questions assessed alcohol consumption using frequency of drinking 'once a month or less', 'two to four times a month', 'two to three times a week', 'four or more times a week', 'every day', 'I used to drink but I don't drink anymore', 'I never drink'; quantity on a typical drinking day in the past month: 0–29 drinks; and frequency of drinking 5+ drinks in a single occasion 'never in the past year', 'at least once in the past year', 'once in the past month', 'two to three times in the past month', 'one or more times in the past week'. Students were shown a chart with picture equivalents for a single drink of different types of alcoholic beverages to assist with calculation of quantity of alcohol consumed; for example a 330 ml bottle or can of beer equaled one drink. Students were categorized as never drinkers if they never consumed alcoholic drinks and ever drinkers if they reported past or current drinking. Current drinkers drank once a month or less, 2–4 times a month, 2+ times a week, every day.

Alcohol-related consequences

Alcohol-related consequences were assessed asking which of the following problems happened in the past 12 months: 'you got into trouble with your parents because you drank', 'you got into a sexual situation after drinking that you later regretted', 'you had problems with friends because of the way you drank', 'you got into a physical fight with a friend or stranger because you had drunk'.

Violent victimization

Outcome measures included ever being a victim of the following situations: 'threatened with a weapon (knife, gun, sticks, ice pick, etc.)', 'hit, insulted, threatened or humiliated by someone in your family, a friend, or partner', 'injured in a fight or assault', 'forced to have sexual contact or sexual relations'.

Socio-demographic measures

Students provided information on age; sex; parental education of 'secondary school or less', 'high school or technical degree', 'undergraduate degree or more', and living situation with 'mother', 'father', 'siblings or step siblings', 'other family', 'non family', 'alone', 'with a partner'.

Analysis

Sample characteristics and drinking behaviors were stratified by sex. In Mexico the legal drinking age is 18 and we assessed differences between underage 17 year olds and of age 18–20 year olds. Drinking behaviors were categorized and described through percentages and means. Chi-square tests and Wilcoxon rank sum tests were used to compare males and females on socio-demographic characteristics and drinking behaviors.

LPA was used to identify subgroups of individuals with similar patterns of drinking behaviors and consequences among the sample using seven variables: categorical variables for frequency of drinking and frequency of heavy drinking, a measurement variable for number of drinks consumed on a typical drinking day, and four indicator variables for alcohol-related consequences. LPA was conducted using Mplus 7.11 (Muthén and Muthén, 1998). Successive LPA models were fit to the data, starting with a model including only one profile and increasing up to six profiles. To determine the optimal number of profiles the fit of each model was examined through the Bayesian information criteria (BIC) (Schwartz, 1978), the sample-size adjusted Bayesian information criteria (SSABIC) (Sclove, 1987) and the Lo-Mendell-Rubin adjusted likelihood ratio test (LMR) (Lo *et al.*, 2001). For both the BIC and SSABIC lower values indicate better fit; for the LMR a significant result indicates that the model is a better fit than the model with one fewer profile. Entropy values were also used to determine the model with the optimal LPA solution. Entropy values range from 0 to 1; values closer to 1 indicate better separation of the profiles (Ramaswamy *et al.*, 1993). In addition to these measures of fit and quality, interpretability of the resulting latent profile structure was also considered in selecting the optimal number of profiles.

Multinomial regression examined socio-demographic characteristics as predictors of drinking profile. This analysis was conducted using the R3STEP method in Mplus which adjusts for the measurement error stemming from assigning individuals to the most likely latent profile (Asparouhov and Muthén, 2013).

The most likely latent profile was saved for further analysis of the association between drinking profile (as a predictor) and violent victimization outcomes. Four separate logistic regression models (one for each violent victimization outcome) were fit with drinking profile as the main independent variable. A concern of this approach is that it fails to account for misclassification (Lanza and Rhoades, 2013). To address this issue we conducted secondary analyses using multiple imputation to generate imputed profile membership based on each subject's probabilities of profile membership. These analyses were conducted via logistic regression and PROC MIANALYZE in SAS 9.3 (SAS Institute, Inc., Cary, NC, USA) and associations described by odds ratios and 95% confidence intervals.

The surveys were administered during orientation at 21 schools and departments at the nine university campuses. All analyses accounted for clustering by school or department. In MPlus this adjustment was accomplished through the Mixture Complex feature. In SAS, generalized estimating equations (GEE) logistic regression was used with an independence working correlation and empirical standard errors reported.

RESULTS

Socio-demographics

Of the sample 22,224 (74.9%) were aged 17–20 of whom 14,663 (66.0%) reported current drinking, 1727 (7.8%)

reported being a former drinker and 5834 (26.3%) reported never drinking alcohol. Almost 60% (57.6%) of the sample were 18 years old and over half (55.6%) were female. More students (37.6%) had a father than mother (27.1%) with an undergraduate or higher degree. Over 95% of both males and females lived with one or both parents or other family members and twice as many males (1.6%) as females (0.6%) lived alone (Table 1).

Alcohol use and alcohol-related consequences

Of the sample 66.0% were current drinkers and 26.3% were never drinkers. Significantly more males than females were current drinkers (68.0 vs. 64.4%) and significantly more females than males were never drinkers (27.3 vs. 24.9%) (Table 1). An analysis of age and drinking status (ever and current) showed a steady increase in drinking with increase in age with 68% of 17 year olds, 72% of 18 year olds, 79% of 19 year olds and 81% of 20 year olds reporting being ever drinkers. There were no gender differences by age.

Males were significantly more likely than females to drink both frequently and heavily. Over twice as many males as females drank 2+ times per week and more males than females drank 5+ drinks in a single occasion at least once in the past year. Males were also significantly more likely than females to report problems with friends, a sexual situation they later regretted or having a physical fight with a friend or stranger because they drank. Both males and females reported trouble with parents because of drinking more than any other alcohol-related consequence (Table 1).

Latent drinking profiles

LPA identified five distinct profiles of alcohol use and alcohol-related consequences based on frequency of drinking, quantity on a typical drinking day, frequency of drinking 5+ drinks and alcohol-related consequences reported in the past 12 months. Our choice of the five profile solution was based on a significant improvement in fit of five vs. four profiles and better interpretability for the five vs. six profile solution (Table 2). Estimated probabilities of profile membership are estimated for the five profiles which we label Non/Infrequent-No Consequences, Occasional-Few Consequences, Regular-Some Consequences, Heavy-Many Consequences and Excessive-Many Consequences drinkers (Table 3). This approach may lead to different findings compared with studies that define drinking groups through absolute cutoffs on specific drinking variables because it identifies subgroups of students with similar profiles across a set of variables. For example, while all of those classified as Excessive-Many Consequences drinkers reported drinking 5+ in the past year, 23% reported drinking 5+ only once in the past month, and 10% only once in the past year. However, all of these students reported having at least 14 drinks on a typical drinking day, and 52% reported at least one alcohol-related consequence. Similarly, 55% of Regular-Some Consequences drinkers reported drinking 5+ at least once in the past month (compared with 85% of Heavy-Many Consequences); but all these students reported seven or fewer drinks on a typical drinking day and low occurrence of alcohol-related consequences.

The majority of Profile 1, Non/Infrequent-No Consequences drinkers, never drank and did not report any alcohol-related consequences.

Table 1. Socio-demographics, alcohol use and alcohol-related consequences

	Overall (N = 22,224)		Male (N = 9860)		Female (N = 12,364)		χ^2 (df)
	N	%	N	%	N	%	
Socio-demographics							
Age ^a							178.70 (3)
17	2698	(12.1)	1080	(11.0)	1618	(13.1)	
18	12,811	(57.6)	5389	(54.7)	7422	(60.0)	
19	4746	(21.4)	2298	(23.3)	2448	(19.8)	
20	1969	(8.9)	1093	(11.1)	876	(7.1)	
Living situation ^a							104.47 (3)
One or both parent(s)	19,606	(92.1)	8451	(90.1)	11,155	(93.6)	
Other family (no parents)	1088	(5.1)	571	(6.1)	517	(4.3)	
Non-family/partner	384	(1.8)	213	(2.3)	171	(1.4)	
Alone	217	(1.0)	145	(1.6)	72	(0.6)	
Maternal education ^a							47.32 (2)
Secondary school or less	6795	(32.9)	2912	(32.1)	3883	(33.5)	
High school/technical degree	8267	(40.0)	3483	(38.4)	4784	(41.3)	
Undergraduate degree or more	5608	(27.1)	2678	(29.5)	2930	(25.3)	
Paternal education ^a							54.39 (2)
Secondary school or less	5886	(29.6)	2440	(27.9)	3446	(30.9)	
High school/technical degree	6545	(32.9)	2781	(31.8)	3764	(33.8)	
Undergraduate degree or more	7475	(37.6)	3535	(40.4)	3940	(35.3)	
Alcohol use							
Frequency of use ^a							33.8 (2)
Never drinkers	5834	(26.3)	2456	(24.9)	3378	(27.3)	
Former drinkers	1727	(7.8)	699	(7.1)	1028	(8.3)	
Current drinkers	14,663	(66.0)	6705	(68.0)	7958	(64.4)	
Frequency of any drinking ^a							335.62 (4)
I never drink	5834	(26.3)	2456	(24.9)	3378	(27.3)	
I used to drink but do not drink anymore	1727	(7.8)	699	(7.1)	1028	(8.3)	
Once a month or less	8922	(40.2)	3599	(36.5)	5323	(43.1)	
2–4 times a month	5201	(23.4)	2750	(27.9)	2451	(19.8)	
2+ times a week	540	(2.4)	356	(3.6)	187	(1.5)	
Number of drinks on a typical drinking day in past month ^a							664.85 (7)
Did not drink in the past month ^c	9928	(44.7)	4044	(41.0)	5884	(47.6)	
1	2222	(10.0)	816	(8.3)	1406	(11.4)	
2	2588	(11.7)	1006	(10.2)	1582	(12.8)	
3	2057	(9.26)	881	(8.9)	1176	(9.5)	
4	1542	(6.9)	751	(7.6)	791	(6.4)	
5	1272	(5.7)	653	(6.6)	619	(5.0)	
6–10	1995	(9.0)	1253	(12.7)	742	(6.0)	
11+	620	(2.8)	456	(4.6)	164	(1.3)	
Mean (SD) ^{d,e}	2.3	(3.4)	2.9	(4.0)	1.8	(2.7)	
Frequency of 5+ drinks in a single occasion ^a							517.67 (4)
Never in past year	10,806	(48.8)	4117	(41.8)	6689	(54.3)	
At least once in past year	6420	(29.0)	2929	(29.8)	3491	(28.3)	
Once in past month	2951	(13.3)	1564	(15.9)	1387	(11.3)	
2–3 times in past month	1711	(7.7)	1045	(10.6)	666	(5.4)	
1+ times in past week	278	(1.3)	187	(1.9)	91	(0.7)	
Alcohol-related consequences							
In the past 12 months, which of the following consequences happened to you? (responded 'yes')							
You got into trouble with your parents because you drank ^b	3440	(15.5)	1609	(16.3)	1831	(14.8)	9.55 (1)
You got into a sexual situation you later regretted because you had been drinking ^a	559	(2.5)	332	(3.4)	227	(1.8)	52.45 (1)
You had problems with friends because of the way you drink ^a	577	(2.6)	344	(3.5)	233	(1.9)	55.83 (1)
You got into a physical fight with a friend or stranger(s) because you had drunk ^a	381	(1.7)	322	(3.3)	59	(0.5)	253.15 (1)

^aDifferences between males and females significant at $P < 0.0001$.

^bDifferences between males and females significant at $P < 0.01$

^cStudents not drinking in past month were coded as 0.

^d $W = 117,966,177.5$, $Z = 18.55$, $P < 0.0001$.

^eMeans presented include students not drinking in past month coded as 0; among students who drank in the past month the mean number of drinks was 4.2 (SE 3.6); among males 5.0 (SE 4.1) and among females 3.5 (SE 2.9), $W = 40148491.5$, $Z = 22.60$, Differences between males and females significant at $P < 0.0001$.

The largest group of drinkers, 40.1% of the total sample, was Profile 2, Occasional-Few Consequences drinkers. This group had a low prevalence of frequency, quantity and heavy drinking and reported trouble with their parents because of drinking more than any other alcohol-related consequence.

Profile 3, Regular-Some Consequences drinkers, were characterized by a pattern of drinking 2–4 times a month, averaging 4.2 drinks on a typical drinking day and over 33% drank 5+ drinks once in the past month. Although almost 30% of Regular-Some Consequences drinkers reported trouble with

Table 2. Fit indices for the latent profile analysis

Profiles	Free parameters	AIC ^a	BIC ^b	SSABIC ^c	LMR-A ^d	P-value	Entropy
2	28	241329.161	241553.411	241464.428	24132.830	0.0008	0.842
3	42	227721.048	228057.423	227923.949	13539.488	0.0117	0.873
4	56	218688.328	219136.828	218958.862	8996.516	0.0017	0.917
5	70	211385.572	211946.197	211723.739	7278.811	0.0023	0.895
6	84	208052.890	208725.640	208458.691	3336.868	0.1896	0.904

^aAkaike information criterion.

^bBayesian information criterion.

^cSample-size adjusted Bayesian information criterion.

^dLo-Mendell-Rubin adjusted likelihood ratio test.

Table 3. Frequency and quantity of alcohol use and related consequences by latent profile

	Profile 1 (Non/Infrequent-No Consequences)		Profile 2 (Occasional-Few Consequences)		Profile 3 (Regular-Some Consequences)		Profile 4 (Heavy-Many Consequences)		Profile 5 (Excessive-Many Consequences)	
Total, <i>N</i> (%)	6676	(30.0)	8913	(40.1)	4771	(21.5)	1448	(6.5)	420	(1.9)
Frequency of any drinking										
Estimated probabilities (SE)										
I never drink	84.6	(2.2)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
I used to drink but don't drink anymore	9.4	(0.6)	11.9	(0.6)	0.8	(0.2)	1.2	(0.3)	1.7	(0.8)
Once a month or less	6.0	(2.0)	74.3	(1.1)	36.8	(1.8)	21.0	(1.5)	13.6	(1.3)
2–4 times a month	0	(0.0)	13.5	(1.3)	57.3	(1.4)	66.1	(1.3)	63.5	(2.7)
2+ times a week	0	(0.0)	0.3	(0.1)	5.1	(0.6)	11.8	(1.3)	21.2	(2.2)
Number of drinks on a typical drinking day in past month	0.03	(0.01)	1.14	(0.06)	4.22	(0.08)	9.27	(0.08)	17.67	(0.15)
Estimated mean (SE)										
Frequency of 5+ drinks in a single occasion										
Estimated probabilities (SE)										
Never in past year	96.9	(0.3)	46.6	(1.2)	4.1	(1.0)	0	(0.0)	0	(0.0)
At least once in past year	2.6	(0.2)	46.5	(1.5)	41.1	(1.5)	14.9	(1.5)	10.7	(1.1)
Once in past month	0.4	(0.1)	5.9	(0.4)	36.3	(1.4)	36.8	(1.3)	23.3	(2.3)
2–3 times in past month	0.1	(0.1)	1.0	(0.1)	16.6	(0.9)	40.6	(2.0)	49.8	(3.1)
1+ times in past week	0	(0.0)	0	(0.0)	1.9	(0.3)	7.7	(0.8)	16.2	(1.8)
In the past 12 months, which of the following consequences happened to you? (responded 'yes')										
Estimated probabilities (SE)										
You got into trouble with your parents because you drank	0	(0.0)	15.8	(1.2)	28.4	(1.4)	36.5	(1.3)	39.7	(2.4)
You got into a sexual situation you later regretted because you had been drinking	0	(0.0)	1.9	(0.2)	4.5	(0.4)	9.3	(0.7)	9.3	(2.0)
You had problems with friends because of the way you drink	0	(0.0)	3.1	(0.4)	4.0	(0.2)	6.1	(0.4)	6.7	(1.2)
You got into a physical fight with a friend or stranger(s) because you had drunk	0	(0.0)	1.2	(0.2)	2.7	(0.3)	6.8	(0.4)	12.4	(1.2)

parents because of drinking they had low incidence of other alcohol-related consequences.

Profile 4, Heavy-Many Consequences drinkers, included 6.5% of the total sample, drank 2–4 times a month and had heavy consumption. Heavy-Many Consequences drinkers averaged 9.3 drinks on a typical drinking day and almost half drank 5+ drinks in a single occasion 2+ times in the past month. Heavy-Many Consequences drinkers reported higher incidence of alcohol-related consequences.

Profile 5, Excessive-Many Consequences drinkers, comprised the smallest group of drinkers (1.9%) but had the highest prevalence of frequency, quantity and heavy drinking. Most Excessive-Many Consequences drinkers drank 2–4 times per month, two-thirds drank 5+ drinks in a single occasion 2+ times in the past month and they averaged 17.7 drinks on a typical drinking day. Although Excessive-Many Consequences

drinkers were as likely as Heavy drinkers to report alcohol-related consequences, they had almost twice as many physical fights because of drinking.

Associations between socio-demographic characteristics and drinking profiles

A multinomial regression model was used to examine associations between socio-demographic variables (independent variables) and drinking profile (dependent variable). This analysis treated Occasional-Few Consequences drinkers as the reference group and controlled for the other variables in Table 4. Factors associated with higher odds of being a Heavy or Excessive-Many Consequences drinker included being male and older. Living alone was associated with increased odds of being a Non/Infrequent-No Consequences drinker, and higher

Table 4. Associations between socio-demographic variables and drinking profiles

	Non/Infrequent-No Consequences ^a		Regular-Some Consequences ^a		Heavy-Many Consequences ^a		Excessive-Many Consequences ^a	
	OR ^b	95% CI	OR ^b	95% CI	OR ^b	95% CI	OR ^b	95% CI
Sex								
Female	1.00		1.00		1.00		1.00	
Male	1.17	(1.09, 1.25)	1.59	(1.49, 1.70)	3.36	(2.95, 3.82)	4.62	(3.49, 6.12)
Age								
17	1.17	(1.03, 1.34)	0.86	(0.75, 0.99)	0.97	(0.77, 1.22)	0.78	(0.54, 1.12)
18	1.00		1.00		1.00		1.00	
19	0.21	(0.19, 0.23)	1.27	(1.17, 1.38)	1.52	(1.23, 1.89)	1.50	(1.21, 1.86)
20	0.15	(0.13, 0.17)	1.47	(1.28, 1.68)	1.80	(1.46, 2.23)	2.38	(1.76, 3.22)
Living situation								
One or both parent(s)	1.00		1.00		1.00		1.00	
Other family (not parents)	1.10	(0.95, 1.28)	1.13	(0.94, 1.35)	0.84	(0.63, 1.12)	1.47	(0.88, 2.46)
Non-family/partner	1.11	(0.82, 1.49)	0.96	(0.76, 1.20)	0.65	(0.35, 1.20)	0.27	(0.08, 0.97)
Alone	2.01	(1.50, 2.69)	1.37	(0.90, 2.09)	1.17	(0.74, 1.85)	1.92	(0.78, 4.69)
Maternal education								
Secondary school or less	1.00		1.00		1.00		1.00	
High school/technical degree	0.84	(0.77, 0.91)	1.01	(0.88, 1.16)	0.96	(0.79, 1.17)	0.72	(0.54, 1.96)
Undergraduate degree or more	0.81	(0.74, 0.89)	0.99	(0.86, 1.14)	0.85	(0.69, 1.04)	0.61	(0.40, 0.92)
Paternal education								
Secondary school or less	1.00		1.00		1.00		1.00	
High school/technical degree	0.93	(0.84, 1.03)	1.72	(1.51, 1.95)	1.06	(0.87, 1.30)	1.29	(1.01, 1.66)
Undergraduate degree or more	0.94	(0.85, 1.03)	1.12	(0.99, 1.27)	1.01	(0.79, 1.28)	1.26	(0.83, 1.92)

OR, odds ratio; CI, confidence interval.

^aOccasional/Few Consequences drinkers used as reference.

^bAdjusted for all variables included in the table.

maternal education was associated with lower odds of being a Non/Infrequent-No Consequences drinker (Table 4).

Associations between drinking profiles and violent victimization

Logistic regression models examined associations between drinking profile (independent variable) and violent victimization variables (dependent variables). These analyses treated Occasional-Few Consequences drinkers as the reference group controlling for age, sex, parental education and living situation (Table 5). Excessive-Many Consequences drinkers had the highest odds and Non/Infrequent-No Consequences drinkers the lowest odds of reporting any violent victimization. Female Heavy and Excessive-Many Consequences drinkers had higher odds than males of being hit, insulted, threatened or humiliated. Male and female Excessive-Many Consequences drinkers had three times the odds, and Heavy-Many Consequences drinkers twice the odds, of being injured in a fight or assault. Male and female Excessive-Many Consequences drinkers had over three times the odds, and females the highest odds, of being forced to have sexual contact or sexual relations.

DISCUSSION

This is the first study to examine profiles among Mexican young people that predict membership in drinking subgroups experiencing alcohol-related consequences and associations with violent victimization.

The study found five distinct drinking profiles of which Occasional-Few Consequences drinkers comprised the largest profile and Excessive-Many Consequences drinkers the smallest profile. Drinking profile was associated with socio-

demographic variables of age, parental education and living situation. Older students were more likely to be Heavy or Excessive-Many Consequences drinkers. Students whose parents had higher education were less likely to be Non/Infrequent-No Consequences drinkers and, although almost all students lived with their parents, those living alone were significantly more likely to be Non/Infrequent-No Consequences drinkers. In our Phase 1 qualitative study, the few students not living at home initiated or increased drinking after beginning university. However, the interviews were conducted 6–9 months after the start of the school year and the survey may be administered too early in the academic year to show any change in drinking due to living situation (Strunin *et al.*, 2014). Other research at the same university found higher parental education associated with harmful and hazardous drinking but only among female students (Díaz-Martínez *et al.*, 2008) which differs from our findings. Studies in the USA indicate differences in drinking behavior and living situation among white, Hispanic/Latino and other students. Students living with parents during the first year of college drank less than students living on or off campus (Fromme *et al.*, 2008), and although there was an association between living away from parents and heavy drinking among white students but not Hispanic or other racial/ethnic groups (Paschall *et al.*, 2005), Latino college students living away from parents had higher peak and weekly drinking (Varvil-Weld *et al.*, 2014).

Parental influences on alcohol use among young people in Mexico including whether parental restrictions/supervision play an important role in students' drinking behaviors, and whether students in families with higher parental education have different communication about alcohol (Elder *et al.*, 2000), different family relations (Wilkinson *et al.*, 2011), or drink for different reasons (Raffaelli *et al.*, 2007) are questions for future study.

Table 5. Odds of experiencing violent victimization by latent profile membership

Profile	Threatened with a weapon (yes vs. no)		Hit, insulted, threatened or humiliated (yes vs. no)		Injured in a fight/assault (yes vs. no)		Forced to have sexual contact/sexual relations (yes vs. no)	
	OR (95% CI)	χ^2 (df)	OR (95% CI)	χ^2 (df)	OR (95% CI)	χ^2 (df)	OR (95% CI)	χ^2 (df)
Overall ^a								
Non/Infrequent-No Consequences	0.80 (0.74, 0.87)	113.41 (4)	0.90 (0.81, 0.99)	135.53 (4)	0.72 (0.64, 0.81)	405.98 (4)	0.72 (0.59, 0.88)	72.48 (4)
Occasional-Few Consequences	1.00		1.00		1.00		1.00	
Regular-Some Consequences	1.21 (1.09, 1.36)		1.12 (1.02, 1.23)		1.58 (1.44, 1.75)		1.06 (0.83, 1.37)	
Heavy-Many Consequences	1.50 (1.32, 1.71)		1.32 (1.16, 1.50)		2.18 (1.89, 2.52)		1.72 (1.15, 2.56)	
Excessive-Many Consequences	2.01 (1.49, 2.71)		1.80 (1.47, 2.22)		3.53 (2.95, 4.23)		3.30 (1.85, 5.91)	
Male ^b								
Non/Infrequent-No Consequences	0.85 (0.76, 0.95)	68.84 (4)	1.02 (0.92, 1.14)	19.95 (4)	0.73 (0.63, 0.86)	267.21 (4)	0.70 (0.36, 1.36)	16.77 (4)
Occasional-Few Consequences	1.00		1.00		1.00		1.00	
Regular-Some Consequences	1.36 (1.14, 1.63)		0.98 (0.83, 1.16)		1.62 (1.44, 1.81)		0.96 (0.54, 1.70)	
Heavy-Many Consequences	1.57 (1.37, 1.80)		1.19 (1.00, 1.42)		2.16 (1.83, 2.56)		1.57 (0.86, 2.89)	
Excessive-Many Consequences	2.13 (1.49, 3.05)		1.58 (1.23, 2.04)		3.63 (2.94, 4.49)		3.18 (1.24, 8.16)	
Female ^b								
Non/Infrequent-No Consequences	0.75 (0.69, 0.81)	83.96 (4)	0.79 (0.68, 0.92)	122.77 (4)	0.69 (0.57, 0.83)	237.81 (4)	0.72 (0.57, 0.92)	41.53 (4)
Occasional-Few Consequences	1.00		1.00		1.00		1.00	
Regular-Some Consequences	1.07 (0.99, 1.17)		1.28 (1.14, 1.43)		1.52 (1.31, 1.77)		1.09 (0.82, 1.45)	
Heavy-Many Consequences	1.45 (1.16, 1.80)		1.60 (1.31, 1.96)		2.32 (1.84, 2.93)		1.81 (1.11, 2.96)	
Excessive-Many Consequences	1.89 (1.20, 2.97)		2.64 (1.82, 3.83)		3.23 (2.23, 4.67)		3.37 (1.64, 6.93)	

OR, odds ratio; CI, confidence interval.

^aAdjusted for age, sex, mother's education, father's education, living situation.

^bAdjusted for age, mother's education, father's education, living situation.

Our finding of a consumption pattern of infrequent alcohol use but occasional high intake among Occasional-Few Consequences drinkers is similar to other findings in Mexico which indicate that infrequent use with occasionally high intake is the most common drinking pattern in Mexico (Medina-Mora *et al.*, 2000; Medina-Mora, 2007; Cherpitel *et al.*, 2012; Health Ministry, 2012; Benjet *et al.*, 2014). However, the Heavy and Excessive-Many Consequences profile drinkers in our study are clearly deviating from this pattern. Considering their weekly and monthly consumption, almost half of Heavy and almost two-thirds of Excessive-Many Consequences drinkers consumed 5+ drinks in a single occasion 2+ times a month. Our findings from the Phase 1 qualitative study show similarly that heavy and excessive drinkers were breaking with traditional norms of drinking (Strunin *et al.*, 2013b). Other research also indicates heavy drinkers breaking with a cultural tradition of moderate drinking (Strunin *et al.*, 2010). Although males in our study were significantly more likely than females to be Heavy and Excessive-Many Consequences drinkers, comparable proportions of males and females drank 5+ drinks on a single occasion confirming substantial increases in alcohol use among Mexican female youths. In our study Heavy and Excessive-Many Consequences drinkers appear to be challenging or breaking with cultural norms and whether other risk factors differ among these groups need further study. Research shows that compared with males, females drink less often (Rahav *et al.*, 2006; Bond *et al.*, 2010), less heavily (Rahav *et al.*, 2006), and are more likely to abstain or stop drinking (Wilsnack *et al.*, 2009); however, male drinking patterns influence gender differences even when male and female drinking (Roberts, 2012) and drunkenness (Kuntsche *et al.*, 2011) are highly correlated. Future research about male and female youths and traditional patterns of alcohol use would fill an important gap in the literature about drinking among young people in Mexico.

As hypothesized, groups with heavier drinking profiles were more likely to experience adverse consequences of violent victimization. Our logistic regression models show an increased risk of violent victimization among Heavy and Excessive-Many Consequences drinkers and there were gender differences. Compared with Occasional-Few Consequences drinkers, both male and female Heavy and Excessive-Many Consequences drinkers had the highest odds, and Non/Infrequent-No Consequences drinkers the lowest odds, of experiencing any victimization. However, Regular-Some Consequences, Heavy and Excessive-Many Consequences female drinkers had higher odds than males of being hit, insulted, threatened or humiliated, and Heavy and Excessive-Many Consequences female drinkers had higher odds than males of being forced to have sexual contact or sexual relations. Although our findings concerning sexual victimization should be interpreted with caution because of the small number of these events, the reporting may be conservative and should not be minimized. Researchers have argued that self-administered surveys are the best method for collecting information on sexual violence among young people (Krebs, 2014), but it is likely underreported by young people because of general underreporting of traumatic and socially undesirable events (Callahan *et al.*, 2003). A recent study of sexual abuse in Mexico recommends interventions designed from a gender perspective. The authors propose that youths underreport sexual abuse in surveys because of stigma, shame and fear which are related to the Mexican social construction of sex and sexuality (Frias and Erviti, 2014).

In addition to frequency, amount of alcohol consumed and drinker characteristics, the influences of drinker expectations (Martens *et al.*, 2006), and the drinking context and situation (Forsyth and Lennox, 2010) have been found to be important in the drinking-violence connection and should be considered in future studies. The contributions of cultural factors are also

unknown and research is needed about changes in cultural gender norms about drinking in order to inform prevention efforts.

This investigation of drinking patterns and victimization among young people in the Mexican context can help clarify key factors associated with alcohol use among Mexican young people, and also, potentially, inform future work among Mexican American young people. The Hispanic population is the largest ethnic minority population in the USA, with 39.1% under the age of 21 (U.S. Census Bureau, 2011) and projected to comprise over 25% of the US population by 2050 (U.S. Census Bureau, 2005). In 2010, over 10% of the US population and 65.1% of Hispanics identified as Mexican (Ennis *et al.*, 2011). There are often contradictory findings in alcohol studies of youths in the USA which suggest different patterns of drinking among racial and ethnic subgroups. Some indicate Hispanic youths drink less than white youths and more than Black youths (Johnston *et al.*, 2013; Substance Abuse and Mental Health Services Administration, 2013) while others that Hispanic youths have similar rates to White youths (Swendsen *et al.*, 2012). Importantly when the data is not aggregated across Hispanic subgroups findings show different patterns and trends among youths from different ethnic subgroups indicating socio-cultural differences (Delva *et al.*, 2005; Wahl and Eitle, 2010). The physical and mental health of the growing Mexican American population is of great importance to both the USA and Mexico (Cesarman-Maus, 2003; Borges *et al.*, 2007) and researchers have recommended further investigation of cultural variables to inform prevention and intervention for different ethnic groups of Latino youths (Alegria *et al.*, 2006; Zamboanga *et al.*, 2006; Strunin *et al.*, 2007).

There are a number of limitations to the study. The results are from a large, comprehensive sample of young people completing a survey as they transition into their first year of university with very high participation rates and analysis utilizes person centered latent variables modeling, but the alcohol use of these students may differ from students entering private universities or from young people not attending university. However, findings from a study of private and public university students (Mora-Ríos and Natera, 2001) and of non-university Mexican youths in the same age group as participants in this study (Medina-Mora *et al.*, 2000; Latimer *et al.*, 2004; Marsiglia *et al.*, 2009) report similar prevalence of ever drinkers suggesting that our findings are similar to Mexican youths of the same age group. For the analysis of drinking profiles students were classified based on their most likely drinking profile and concern has been raised about potential misclassification with this statistical approach (Lanza and Rhoades, 2013). In this study the LPA had entropy of 0.90, and 94% of students had a 70% or higher probability of profile membership. In addition, to account for potential misclassification bias, we imputed five replicates of the data set with profile membership based on profile probabilities. Multiple imputation techniques averaged results across imputations. Findings of the multiple imputation analysis agreed closely with the analysis based on the most likely profile, with all statements of significance agreeing between the two approaches. Another limitation of the study are the narrow violent victimization measures and the lumping together of multiple types of victimization. We did not have the ability to examine specific types of physical assault or verbal

aggression. However, all these issues had a very low rate of reporting in our population.

Identifying factors that contribute to cultural and gender differences can inform alcohol prevention and intervention efforts in this population and, potentially, elucidate more universal risk and protective factors contributing to differences among Mexican American young people. These factors can also help in the broader goal of developing the most effective programs and policies to reduce alcohol-related health and social problems in Mexico, the USA, and other countries.

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