HHS Public Access

Author manuscript

Alcohol Clin Exp Res (Hoboken). Author manuscript; available in PMC 2024 September 01.

Published in final edited form as:

Alcohol Clin Exp Res (Hoboken). 2023 September ; 47(9): 1713–1721. doi:10.1111/acer.15158.

The predictive validity of self-rated alcohol susceptibility to alcohol use in early adolescents in Latin America

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Abstract

Background: Measurement of substance use susceptibility was first conceived as part of the preparatory stage preceding youth smoking initiation and is defined as the lack of a firm commitment not to smoke in the future. Despite being a consistent and validated predictor of smoking initiation, little research has investigated whether susceptibility can predict alcohol use. This study aimed to assess the predictive validity of an adapted alcohol susceptibility measure among early adolescent students in Argentina and Mexico who had not previously consumed alcohol.

Methods: A school-based longitudinal study was conducted among first-year students in 33 secondary schools in Argentina and 57 in Mexico. The baseline sample included 1,504 never-drinker adolescents in Argentina and 5,264 in Mexico, of whom 1,055 and 3,540, respectively,

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Conflict of interest statement
The authors declare that they have no conflicts of interest.

completed a follow-up survey a year and a half later. Logistic regression with school as a random effect was used to estimate adjusted odds ratios for the transitions from never-drinker to ever-drinker, current drinker, and binge drinker.

Results: At baseline, 34% and 23.6% of adolescent never-users were susceptible to alcohol in Argentina and Mexico, respectively. After controlling for other known predictors of alcohol use initiation, alcohol susceptibility was positively associated with ever-drinking (OR = 3.23, 95% CI 2.38–4.36 in Argentina, OR = 1.73, 95% CI 1.43–2.10 in Mexico), current drinking (OR = 2.41, 95% CI 1.71–3.4 in Argentina, OR = 1.77, 95% CI 1.37–2.28 in Mexico), and binge drinking (OR = 2.27, 95% CI 1.78–2.91 in Argentina, OR = 1.89, 95% CI 1.32–1.99 in Mexico).

Conclusions: The adapted susceptibility measure for alcohol appears valid for identifying individuals or groups at risk of drinking initiation and problematic drinking among early adolescents in Argentina and Mexico.

Introduction

Early-onset alcohol use is a significant public health concern (Johnston et al., 2021). Early adolescent alcohol use has been associated with various negative outcomes, including unprotected sexual intercourse and pregnancy (Stueve et al., 2005), neurocognitive impairment (Zeigler et al., 2005), alcohol-related traffic accidents (Hingson et al., 2002), and long-term alcohol dependence and its associated problems (Palmer et al., 2009). Binge drinking, defined as consuming ≥5 drinks per occasion for males and ≥4 drinks for females, is the main cause of most of these adverse effects (Miller et al., 2007; Stolle, 2009).

In Argentina, according to the 2018 administration of the Global Student Health Survey (GSHS), 54.1% of students aged 13 to 17 had consumed alcohol in the past 30 days. Of those who had ever consumed alcohol, 28.5% reported binge drinking in the last 30 days and 65.7% started drinking before the age of 14 (Ministerio de Salud y Desarrollo Social, 2018). In Mexico, according to the 2016 National Survey on Drug, Alcohol and Tobacco Consumption,16.1% of adolescents aged 12 to 17 had consumed alcohol in the past 30 days, and among those who had ever consumed alcohol, 38.2% had reported binge drinking in the past year (Escobar et al., 2018). The development of public policies and other interventions to address these health risks would benefit from validated methods for identifying groups or individuals of young people at higher risk of initiating alcohol consumption and binge drinking.

The concept of cognitive susceptibility was first developed in the area of youth smoking, as part of the preparatory stage before initiation (Pierce et al., 1996). A 3-item susceptibility measure was created based on two domains: lack of a clear intention not to use in the future and lack of a clear resistance against peer influence. Non-smoker adolescents who answer “yes” to the question “Do you think that you will try a cigarette soon?” and anything but “definitely not” to the questions “Do you think you will be smoking cigarettes one year from now?” and “If one of your best friends were to offer you a cigarette, would you smoke it?” are classified as susceptible. The measure, using 3 or 2-items, is widely used due to its simplicity and proven validity for predicting smoking initiation in several regions

(Prokhorov et al., 2002), including Latin America, where individual items from this measure also have predictive validity (Morello et al., 2018).

This adolescent susceptibility measure has been adapted and validated for other tobacco-related products, such as e-cigarettes and hookah (Carey et al., 2018; Morello et al., 2018), and has even been used to predict sexual intercourse initiation (L'Engle et al., 2006). Although a preparatory stage is compatible with initiation of alcohol use among adolescents, to our knowledge, only one study has used this measurement approach to predict alcohol use. In a longitudinal study on alcohol marketing and alcohol initiation among US adolescents aged 10 to 14 years, McClure et al. (2009) found that the susceptibility measure was able to predict both later initiation of alcohol use and binge drinking. Other cross-sectional studies have used the alcohol susceptibility measure as an outcome, but not a predictor, of alcohol use in adolescents (Elder et al., 2000; Mejia et al., 2016; Unger et al., 2003; Critchlow et al., 2019). Other antecedents include a 13-item alcohol susceptibility measure covering four domains: expectancies about alcohol, future intentions to use alcohol, attitude toward alcohol use, and perceived peer norms for alcohol use (Ennett et al., 2013), but it only has been used among children under 10 years old, and its association with alcohol use initiation has not been studied. No studies of which we are aware have assessed the predictive validity of these susceptibility measures among adolescents from low- and middle-income countries.

The present study aimed to test the predictive validity of an adapted alcohol susceptibility measure in cohorts of early adolescent middle school students in Argentina and Mexico who had not consumed alcohol at baseline. We test whether cognitive susceptibility to alcohol use predicts different alcohol consumption outcomes (ever drinking, current drinking, and binge drinking) a year and half later, after adjusting for other predictors of alcohol use initiation. Validation of this measure could inform future research and public policy development to reduce youth alcohol use in Latin America and, potentially, in other Latino communities.

Materials and Methods

A school-based longitudinal study was carried out among first-year students in secondary schools from large Argentinian (Buenos Aires, Córdoba, and Tucumán) and Mexican (Mexico City, Guadalajara, and Monterrey) metropolitan areas. A sample of 18 public and 15 private secondary schools in Argentina was selected to capture a wide range of socioeconomic characteristics. In Mexico, 57 public schools were selected using a stratified, multi-stage random sampling scheme. A detailed description of the school selection in both countries has been published elsewhere (Mejia et al., 2016).

The aim of the survey was to assess predictors of adolescent substance use behaviors. The questionnaire included items used in surveys for adolescents previously implemented in Argentina, Mexico, and in the United States (Dal Cin et al., 2008; Thrasher et al., 2008). Items in English were translated and reviewed by Spanish speaking research staff, and the final survey instrument was pilot tested with students from both countries to ensure adequate understanding of questions, instructions, and confidentiality statements. The self-

administered questionnaires were completed in the classroom under the supervision of trained research staff.

A passive parental consent procedure was implemented, along with active assent for first year secondary school students before they completed a self-administered survey. A linking procedure was used to allow for follow-up while ensuring anonymity (Hanewinkel et al., n.d.). Study protocols were approved by NIH-certified human subjects research boards in Argentina (i.e., Centro de Educación Médica e Investigaciones Clínicas) and Mexico (Instituto Nacional de Salud Pública).

Baseline data collection took place between May and July 2014 in Argentina and February and March 2015 in Mexico, with the follow up survey between October and November 2015 in Argentina (mean between-wave interval=17.1 months; range=16 to 19.3 months) and between October and November 2016 in Mexico (mean between-wave interval=20.4 months; range=19.5 to 21.4 months). Overall, 3172 students in Argentina (participation rate 83%) and 7646 students in Mexico (participation rate 84%) completed the baseline survey. Of those, 1504 (47.4%) students in Argentina and 5264 (68.8%) in Mexico reported never having tried alcohol at baseline and were therefore eligible for inclusion. Of these 6768 baseline never drinkers, follow-up data were collected from 1055 (70.2%) Argentinean and 3540 (67.2%) Mexican students, comprising the analytical sample.

Assessment of Alcohol Susceptibility (Independent variable)

At baseline, students were asked two questions based on those developed for youth smoking: “Do you think you will drink alcohol during next year?” and “If one of your friends offered you an alcoholic beverage, would you drink it?” (possible answers: “Definitely not”, “Probably no”, “Probably yes”, “Definitely yes”). As is commonly done when characterizing tobacco use susceptibility (Pierce 1996), students were considered susceptible if they reported any answer other than “Definitely not” for both of these questions.

Assessment of Alcohol Consumption (Dependent Variables)

At follow-up, a respondent was classified as an “ever drinker” if he or she reported having ever drank (even a sip), and as a “current drinker” if he or she reported any number >0 to the question “During the past 30 days, on how many days did you drink alcohol?”. We assessed binge drinking by asking the maximum number of alcoholic drinks ever consumed in a single occasion, with responses coded separately for males and females (≥5 vs ≥4 drinks in a row, respectively).

Covariates

We adjusted for baseline characteristics that could be associated with susceptibility and youth substance use. Sociodemographic variables assessed included age (as continuous variable), gender (male or female), and highest educational attainment of either parent (≤12, >12 years of formal education). Any current drinking among the students’ five best friends was assessed and dichotomized (i.e., any friend vs none). We also adjusted for sensation seeking (4 items, alpha = 0.79 for Argentina and 0.82 for Mexico), using a shortened version questionnaire designed for large scale surveys (Sargent et al., 2010; Stephenson and Helme,

2006) that has predictive validity for smoking (Mejia et al., 2017) and alcohol initiation (Mejia et al., 2019). Parenting behavior was assessed using a parenting scale (Jackson et al., 1998; Peña et al., 2017), with three items to describe responsiveness (alpha=0.82 for Argentina and 0.81 for Mexico) and another three items for demandingness (alpha = 0.70 for Argentina and 0.80 for Mexico), measured separately for mothers and fathers and then averaged because they were positively correlated (Peña et al., 2017). Higher scores indicated more beneficial parenting styles.

Statistical analysis

All data analyses were conducted within the R statistical environment (R Core Team 2020). The association between baseline alcohol susceptibility and each alcohol use outcome at follow-up was estimated using multilevel logistic regressions, including a random intercept to adjust for non-independence of observations within schools. In order to better understand the association between each dimension of the susceptibility construct (i.e., intention to drink and peer influence) and alcohol use, we analyzed each susceptibility question separately, as well as the combined measure. To account for potential attrition bias, inverse probability weighting (IPW) was used in the final models (Weuve et al., 2012). All analyses were done separately for the Argentinian and Mexican samples.

Results

Table 1 shows the baseline characteristics of students who reported never drinking alcohol (not even a sip) at baseline, categorized based on whether they were lost to follow up or not, for each country. In both Mexico and Argentina students lost to follow-up had a higher sensation seeking index and were more likely to be older. In Mexico, students lost to follow-up had a lower parenting style index, were less likely to have parents with more than 12 years of education, more likely to have at least one drinker friend and present susceptibility to alcohol.

At follow up, 588 (60%) were ever drinkers, 239 (25%) were current drinkers, and 163 (17%) reported binge drinking in Argentina and 1704 (48.3%) were ever drinkers, 630 (17.9%) were current drinkers and 301 (8.5%) had reported binge drinking in Mexico. It should be noted that these categories are not mutually exclusive. For instance, the category of ever drinkers encompasses both current drinkers and binge drinkers, and it is possible for an adolescent to fall under both the categories of current and binge drinker simultaneously.

As shown in Table 2, after controlling for other baseline covariates, in Argentina, alcohol susceptibility was positively associated with ever drinking (OR = 3.23, 95% CI 2.38–4.36), current drinking (OR = 2.41, 95% CI 1.71–3.4) and binge drinking (OR = 2.27, 95% CI 1.78–2.91). In Mexico (Table 3), alcohol susceptibility was also positively associated with ever drinking (OR = 1.73, 95% CI 1.43–2.10), current drinking (OR = 1.77, 95% CI 1.37–2.28) and binge drinking (OR = 1.89, 95% CI 1.32–1.99). Considering the questions used to measure susceptibility separately, answering anything different from surely not to the question “Do you think you will drink Alcohol during next year?” was positively associated with all outcomes in both countries, while doing so to the question “If one of your friends offered you an alcoholic beverage, would you drink it?” was only significant in Mexico.

Figure 1 shows the positive association between alcohol susceptibility and the probability of alcohol consumption in each of the drinking outcomes in both countries.

Discussion

This study found that an alcohol susceptibility measure adapted from research on tobacco use prospectively predicts later alcohol use among early adolescents who had never tried alcohol in two different Latin-American countries. Our 2-item susceptibility measure predicted all considered alcohol consumption transitions (from never-drinkers to ever, current, and binge drinking) a year and half later, even after adjusting for other known predictors of alcohol use initiation. To our knowledge this is just the second study to show the predictive validity of alcohol susceptibility, expanding that limited evidence to include two Latin American countries. These findings are consistent with the aforementioned article by McClure et al (2009), who found that the 3-item susceptibility measure was predictor of the transition from never drinker to ever alcohol use and from never binge drinking to binge drinking at 8, 16 and 24 months later in US adolescents aged 10 to 14 years.

In both countries, the effect of susceptibility in predicting all alcohol use outcomes seems to be the most pronounced compared to other covariates, even surpassing other well-known risk factor for adolescent alcohol consumption, such as having at least one drinking friend (Patrick and Schulenberg, 2013). These results are similar to those of McClure et al (2009), who found that susceptibility effects were greater for predicting alcohol use than all other covariates, except age. Although both studies differ in the number of items used and the population studied, these results highlight the value of susceptibility as a predictor of different alcohol use outcomes in early adolescents from different contexts. Another strength of the susceptibility measure is its robustness as a strong predictor of drinking initiation and escalation.

When considering each item forming the susceptibility measure separately, that association between peer influence item and drinking outcomes in Argentina was lost in adjusted models, but not in Mexico. This does not appear to be due to the larger sample in Mexico than in Argentina, as the peer influence coefficients were also larger in Mexico. Elucidating why resistance to peer influence is important in the Mexican sample but not in the Argentinean sample requires further studies. There are no previous studies that have analyzed separately the predictive capacity of the different items of the susceptibility measure. We can speculate that this difference may be explained by varying states of alcohol consumption trajectories among early adolescents in Argentina and Mexico, but we cannot assert it with our sample design. However, it does not seem reasonable to conclude that the item about peer influence should be excluded from the measure in Argentina, since these results may reflect exclusively on this particular group. Evidence has been found about the differential effect of peers influence by age and levels of alcohol consumption in adolescents (Li et al., 2002).

This study has several limitations to consider. First, it is based on self-reported results, which may present a bias in what participants remember or are willing to declare. However, these self-reporting measures are widely used in the literature and are considered valid

(Smith et al., 1995). Second, the school sample was purposively selected in Argentina to involve a wide spectrum of socioeconomic levels, so the results there are not generalizable; however, the Mexican sample was randomly selected and representative of public schools in the three cities where data were collected. Nevertheless, results are generalizable only to those three cities, which were the largest in Mexico at the time of data collection. Third, we did not adjust our models by other well-established predictors of alcohol use initiation, such as family substance use, individual psychopathology, and educational factors (Stone et al., 2012). However, we have included the most commonly used covariates of adolescent alcohol consumption. Four, we included sips of alcohol in our assessment of alcohol consumption. Some authors have criticized incorporating sipping because it leads to much higher drinking prevalence estimates (Wadolowski et al., 2015) and because it isn't strongly associated with psychopathology underlying problem drinking (Kuntsche et al., 2016). However, we included sips because previous research has associated sipping with risk for drinking alcohol (Donovan & Molina, 2011, Jackson et al., 2015). Last, as we already mentioned, the study showed a large percentage of baseline survey drinking (particularly in Argentina). This greatly reduced this study's sample size and focused it on a group of late initiators of drinking behaviors. Future studies of drinking initiation could consider lower age groups.

Despite these limitations, we found a longitudinal, strong, and consistent association between the 2-item alcohol susceptibility measure and drinking outcomes in early adolescents across two Latin American countries. While further validation of these findings in other countries is necessary, our results strongly indicate that this measure can serve as a reliable predictor of later alcohol use in adolescents. Additionally, having a validated measure of susceptibility could be useful for cross-sectional research, which can be limited due to concerns about the temporality of associations between psychosocial risk factors and behaviors. Focusing on susceptibility as an outcome among never users can help to address concerns that engaging in the behavior caused the risk factor rather than vice versa (e.g., when studying the effects of advertising exposures, where attention or recall bias may be a concern).

Preventing or delaying the initiation of alcohol consumption, and particularly of binge drinking, is a vital public health task. If alcohol susceptibility can genuinely anticipate alcohol consumption among adolescents transitioning from never to drinking behaviors, the susceptibility measure may be used to identify individuals or groups at risk for problematic drinking. As a result, interventions can be initiated prior to the onset of issues, effectively preventing problem escalation. In summary, the alcohol susceptibility measure appears to be a valid tool for early identification and prevention of problematic alcohol use among youth in Latin America and beyond.

Acknowledgements

The authors would like to acknowledge the valuable collaboration of the teachers and students from the schools who participated in this study. Research reported in this publication was supported by the Fogarty International Center and the National Cancer Institute of the National Institutes of Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Funding statement:

This work was supported by U.S. Department of Health and Human Services, National Institutes of Health and Fogarty International Center (R01 TW009274 and R01 TW010652)

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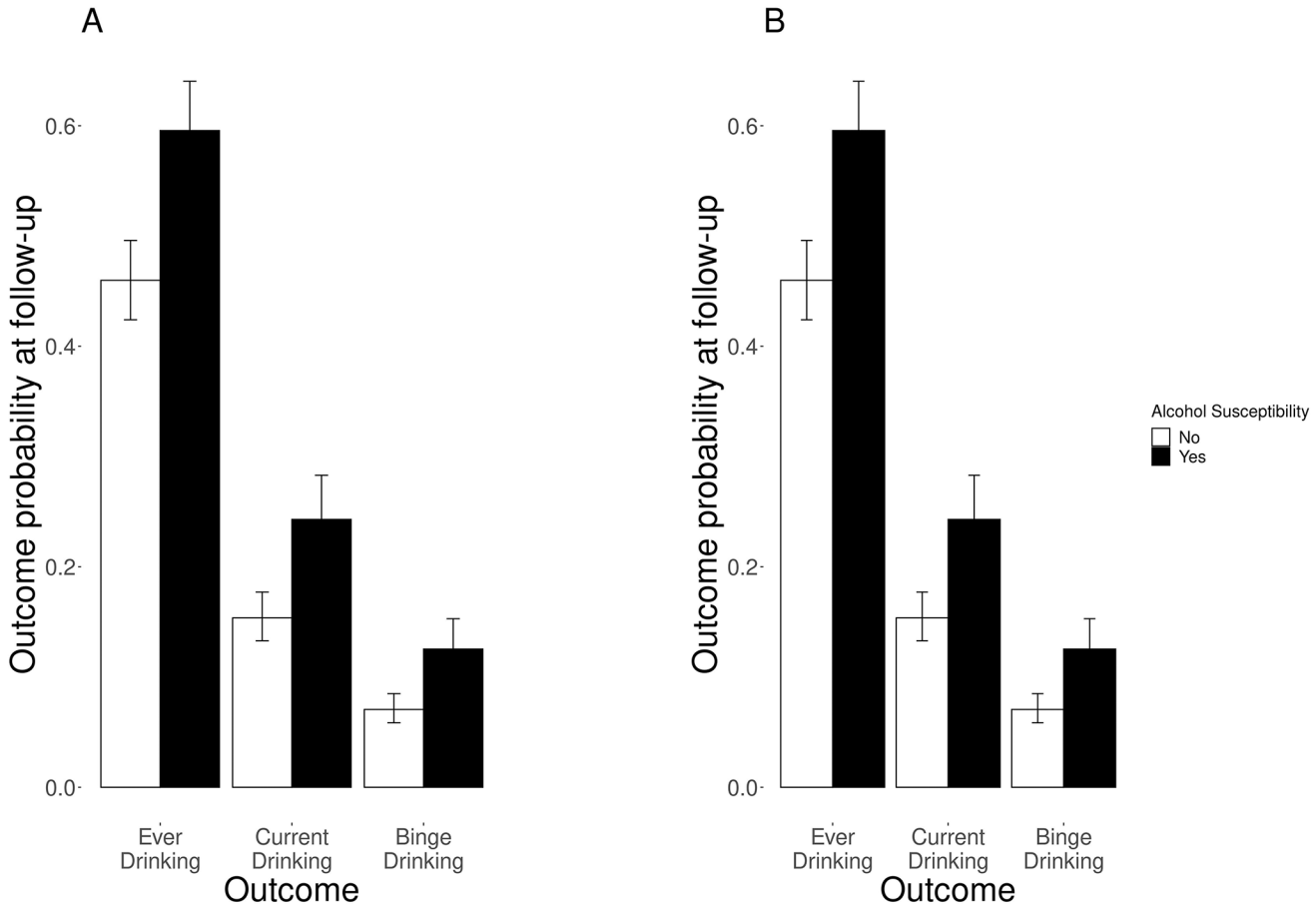

Figure 1.
Estimated probabilities of different outcomes at follow-up among never drinkers by alcohol susceptibility at baseline. A. Argentina, B. Mexico

Table 1.

Characteristics of students who were and were not successfully followed

	Argentina (n = 1504)			Mexico (n = 5264)		
Variable	**Not followed**	**Followed**	**p***	**Not followed**	**Followed**	**p***
n (%)	449 (30%)	1055 (70%)		1724 (33%)	3540 (67%)	
Personal variables						
Age, years, mean (SD)	12.82 (0.84)	12.56 (0.76)	< **0.01**	12.47 (0.63)	12.36 (0.54)	< **0.01**
Girl (%)	37.6%	46.9%	0.07	49.7%	52.0%	0.09
Parenting style, 1–5, mean (SD)	4.07 (0.77)	4.14 (0.67)	0,21	3.97 (0.85)	4.03 (0.84)	**0,01**
Sensation seeking, 1–5, mean (SD)	2.96 (1.02)	2.80 (1.00)	< **0.01**	2.72 (1.05)	2.53 (1.03)	< **0.01**
Parents with >12 years of education (%)	39.6%	47.1%	0.61	44.9%	51.7%	< **0.01**
At least one drinker friend (%)	34.3%	28.9%	0.24	22.0%	20.2%	0,08
Susceptibility						
Think will drink next year (Maybe not/maybe yes/ definitely yes)	30.3%	27.5%	0.30	21.8%	18.0%	< **0.01**
Will drink if best friend offers alcohol (Maybe not/maybe yes/definitely yes)	24.2%	22.7%	0.58	19.1%	15.5%	< **0.01**
Alcohol susceptibility (%)	38.1%	34.0%	0.15	28.5%	23.6%	< **0.01**
Alcohol use at follow up						
Ever drinkers (%)	-	60%		-	48.3%	
Current drinkers (%)	-	25%		-	17.9%	
Binge drinkers, n (%)	-	17%		-	8.5%	

*Bold values indicate p<0. 05

Table 2.

Logistic models for becoming alcohol users at follow up among never drinkers at baseline in Argentina [*]

	From never drinker to ever drinker					From never drinker to current drinker					From never drinker to binge drinker				
		(n= 973)					(n= 973)					(n= 973)			
Variable	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**
Alcohol susceptibility (both questions)															
No	54	1	1	-	-	20	1	1	-	-	14	1	1	-	-
Yes	82	**3.5(2.64–4.65)**	**3.23(2.38–4.36)**	-	-	42	**2.73(1.95–3.81)**	**2.41(1.71–3.4)**	-	-	30	**2.71(2.09–3.51)**	**2.27(1.78–2.91)**	-	-
Alcohol susceptibility (intention to drink next year)															
No	55	1	-	1	-	21	1	-	1	-	14	1	-	1	-
Yes	84	**4.13(2.77–6.16)**	-	**3.79(2.47–5.8)**	-	43	**2.58(1.84–3.61)**	-	**2.24(1.59–3.17)**	-	33	**3.1(2.41–3.98)**	-	**2.64(2.08–3.36)**	-
Alcohol susceptibility (peer influence)															
No	58	1	-	-	1	22	1	-	-	1	16	1	-	-	1
Yes	83	**3.32(2.28–4.85)**	-	-	1.24(0.66–2.33)	45	**2.74(1.85–4.04)**	-	-	1.46(0.82–2.58)	30	**2.17(1.48–3.18)**	-	-	0.88(0.44–1.73)
Personal variables															
Age		0.88(0.74–1.05)	**0.78(0.63–0.96)**	**0.78(0.65–0.94)**	**0.78(0.63–0.96)**		0.92(0.75–1.12)	0.82(0.66–1.03)	0.82(0.66–1.04)	0.82(0.66–1.03)		1.05(0.84–1.32)	0.93(0.72–1.2)	0.93(0.72–1.19)	0.93(0.72–1.2)
Gender															
Male	61	1	1			22	1	1	1	1	16	1	1	1	1
Female	66	1.23(0.91–1.66)	1.22(0.89–1.69)	1.23(0.88–1.71)	1.23(0.89–1.69)	33	**1.66(1.14–2.43)**	**1.68(1.1–2.56)**	**1.68(1.1–2.56)**	**1.68(1.11–2.56)**	23	1.36(0.95–1.93)	1.41(1–1.99)	**1.42(1–2.02)**	1.41(1–1.99)

	From never drinker to ever drinker					From never drinker to current drinker					From never drinker to binge drinker				
		(n= 973)					(n= 973)					(n= 973)			
Variable	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**
Parental style		0.88(0.7–1.1)	0.98(0.77–1.24)	0.96(0.76–1.21)	0.98(0.77–1.24)		0.9(0.72–1.12)	1.02(0.81–1.27)	1(0.8–1.24)	1.02(0.81–1.27)		**0.78(0.62–0.98)**	0.88(0.71–1.1)	0.87(0.7–1.09)	0.88(0.71–1.1)
Sensation seeking		**1.22(1.06–1.39)**	1.07(0.94–1.21)	1.09(0.96–1.24)	1.06(0.94–1.2)		**1.2(1.03–1.39)**	1.08(0.92–1.27)	1.11(0.95–1.3)	1.07(0.91–1.25)		**1.29(1.12–1.49)**	1.15(0.99–1.34)	1.16(1–1.35)	1.16(0.98–1.36)
Parent education															
Parents with <=12 years of education	62	1	1			28	1	1	1	1	21	1	1	1	1
Parents with >12 years of education	64	1.11(0.82–1.5)	1.07(0.78–1.48)	1.1(0.78–1.53)	1.07(0.78–1.48)	26	1.02(0.75–1.4)	1.01(0.73–1.41)	1.03(0.74–1.44)	1.03(0.74–1.42)	18	0.86(0.65–1.16)	0.88(0.63–1.23)	0.89(0.63–1.25)	0.87(0.62–1.23)
At least one drinker friend															
No	59	1	1	1	1	22	1	1	1	1	15	1	1	1	1
Yes	75	**2.03(1.53–2.68)**	**1.7(1.23–2.35)**	**1.69(1.22–2.34)**	**1.7(1.23–2.33)**	40	**2.32(1.76–3.05)**	**1.97(1.47–2.64)**	**2.01(1.49–2.7)**	**1.95(1.45–2.63)**	28	**2.13(1.63–2.78)**	**1.64(1.2–2.23)**	**1.6(1.16–2.21)**	**1.64(1.2–2.25)**

*All models included a random intercept for accounting school grouping. The adjusted models were adjusted for all predictor variables. As the independent variable, model 1 included alcohol susceptibility (both questions), model 2 only the question about intention to drink in the next year, and model 3, the question about the offer of alcohol by friends. Bold values indicate p<0. 05.

Table 3.

Logistic models for becoming alcohol users at follow up among never drinkers at baseline in Mexico *

	From never drinker to ever drinker					From never drinker to current drinker					From never drinker to binge drinker				
		(n=3128)					(n=3128)					(n=3128)			
Variable	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**
Alcohol susceptibility (both questions)															
No	44	1	1	-	-	15	1	1	-	-	7	1	1	-	-
Yes	61	**1.99(1.66–2.38)**	**1.73(1.43–2.1)**	-	-	27	**2.06(1.63–2.62)**	**1.77(1.37–2.28)**	-	-	14	**2.08(1.61–2.69)**	**1.89(1.43–2.49)**	-	-
Alcohol susceptibility (intention to drink next year)															
No	45	1	-	1	-	16	1	-	1	-	7	1	-	1	-
Yes	62	**2.06(1.7–2.5)**	-	**1.79(1.46–2.19)**	-	27	**1.96(1.54–2.5)**	-	**1.65(1.29–2.12)**	-	14	**1.97(1.47–2.63)**	-	**1.73(1.26–2.37)**	-
Alcohol susceptibility (peer influence)															
No	46	1	-	-	1	16	1	-	-	1	7	1	-	-	1
Yes	61	**1.81(1.46–2.23)**	-	-	**1.51(1.19–1.92)**	30	**2.15(1.67–2.78)**	-	-	**1.81(1.36–2.4)**	15	**2.03(1.44–2.87)**	-	-	**1.81(1.25–2.63)**
Personal variables															
Age		1.05(0.93–1.19)	1.02(0.9–1.16)	1.03(0.91–1.17)	1.02(0.9–1.16)		**1.22(1.07–1.41)**	**1.18(1.02–1.37)**	**1.19(1.03–1.38)**	**1.17(1.02–1.35)**		1.17(0.95–1.45)	1.14(0.92–1.42)	1.15(0.92–1.42)	1.13(0.91–1.41)
Gender															
Male	46	1	1	1	1	16	1	1	1	1	7	1	1	1	1
Female	50	**1.23(1.07–1.42)**	**1.31(1.13–1.52)**	**1.3(1.12–1.51)**	**1.31(1.13–1.52)**	20	**1.4(1.14–1.71)**	**1.48(1.2–1.81)**	**1.46(1.19–1.8)**	**1.48(1.2–1.82)**	10	**1.6(1.24–2.06)**	**1.66(1.28–2.15)**	**1.64(1.27–2.13)**	**1.66(1.28–2.15)**

Alcohol Clin Exp Res (Hoboken). Author manuscript; available in PMC 2024 September 01.

	From never drinker to ever drinker					From never drinker to current drinker					From never drinker to binge drinker				
		(n=3128)					(n=3128)					(n=3128)			
Variable	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**	**%**	**Model 0 unadjusted OR**	**Model 1 adjusted OR**	**Model 2 adjusted OR**	**Model 3 adjusted OR**
Parental style		**0.85(0.77–0.93)**	**0.91(0.83–1.01)**	0.91(0.83–1)	**0.9(0.82–0.99)**		**0.78(0.69–0.88)**	**0.84(0.73–0.96)**	**0.83(0.73–0.95)**	**0.84(0.73–0.95)**		**0.8(0.68–0.95)**	0.87(0.73–1.04)	0.86(0.72–1.03)	0.86(0.72–1.03)
Sensation seeking		**1.24(1.15–1.33)**	**1.18(1.1–1.28)**	**1.19(1.11–1.29)**	**1.2(1.11–1.29)**		**1.18(1.07–1.3)**	1.1(0.99–1.23)	**1.12(1.01–1.24)**	1.1(0.99–1.22)		1.12(0.99–1.27)	1.06(0.93–1.21)	1.08(0.94–1.23)	1.07(0.93–1.22)
Parent education															
Parents with <=12 years of education	50	1	1	1	1	21	1	1	1	1	10	1	1	1	1
Parents with >12 years of education	48	0.9(0.79–1.04)	0.95(0.82–1.1)	0.95(0.82–1.1)	0.94(0.81–1.09)	16	**0.73(0.6–0.88)**	**0.78(0.64–0.95)**	**0.78(0.64–0.95)**	**0.77(0.63–0.94)**	8	**0.7(0.54–0.9)**	**0.74(0.57–0.96)**	**0.75(0.58–0.97)**	**0.73(0.57–0.95)**
Ar least one drinker friend															
No	46	1	1	1	1	16	1	1	1	1	8	1	1	1	1
Yes	56	**1.47(1.23–1.76)**	**1.21(1–1.47)**	**1.24(1.02–1.49)**	**1.26(1.05–1.53)**	24	**1.65(1.34–2.04)**	**1.34(1.09–1.65)**	**1.39(1.12–1.72)**	**1.37(1.11–1.7)**	12	**1.44(1.07–1.93)**	1.16(0.87–1.55)	1.2(0.9–1.61)	1.2(0.9–1.59)

*All models included a random intercept for accounting school grouping. The adjusted models were adjusted for all predictor variables. As the independent variable, model 1 included alcohol susceptibility (both questions), model 2 only the question about intention to drink in the next year, and model 3, the question about the offer of alcohol by friends. Bold values indicate p<0. 05.