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Prevalence and Correlates of Arrests or Stops for Drunk Driving on Both Sides of the U.S.-Mexico Border

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Abstract

Risk for driving under the influence of alcohol (DUI) may be higher in U.S. and Mexican border cities as compared to non-border cities in each country. We examine rates and correlates of self-reported DUI arrests or stops on both sides of the border, based on a large-scale survey of 4,796 Mexicans and Mexican Americans in border and non-border cities of Texas and two states in Mexico. Findings varied by site and country, and did not consistently show higher rates on the border. DUI prevention efforts should take into account the heterogeneity of local conditions and needs.

1. Introduction

Driving under the influence of alcohol (DUI) is a major public health concern in both the United States and Mexico. In the U.S., alcohol-related fatalities accounted for about one-third of all traffic fatalities in 2013 (NHTSA, 2014) and drivers just above the legal limit of blood alcohol concentration (i.e. at a BAC of .08-.12) are 5-30 times more likely to crash than sober drivers (Compton & Berning, 2015). On average, about 1.3 million Americans have been arrested yearly between 2009 and 2014 for driving under the influence (FBI, 2012), and this is likely just a small percentage of those who actually drive impaired (Voas & Fischer, 2001; Caetano et al., 2013). For its part, Mexico ranks among the top ten countries in the world for traffic fatalities (Bonello, 2012), and it is estimated that 23% to 44% of them are related to alcohol consumption (World Health Organization, 2013; Secretaría de Salud, 2014).

Summarizing evidence from a variety of sources, Romano et al. (2010) report that arrest and crash data in the U.S. tend to show an overrepresentation of Hispanics in impaired driving

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events, while national survey data show lower rates or no difference for Hispanics, as compared to non-Hispanic whites (see also Caetano et al., 2008, 2013). Among individuals stopped for drunk driving, Hispanic drivers have consumed more drinks and have higher BAC levels than whites (Braver, 2003; Caetano & Raspberry, 2001). Some studies have also found Hispanics less likely to consider DUI to be a safety problem, less likely to believe they will be arrested, and more likely to think a larger number of drinks would be necessary to affect their driving ability (Bergdahl, 2007; Caetano & Clark, 2000; Cherpitel & Tam, 2000).

The U.S. border region with Mexico, an area home to almost 4 million Hispanics (primarily Mexican Americans), is at potentially high risk for DUI arrests or stops as compared to non-border areas, due to the presence of factors such as higher rates of binge drinking and drug and alcohol problems, particularly among younger people (Borges et al., 2015; Caetano et al., 2012, 2013a; Cherpitel et al., 2015; Wallisch & Spence, 2006; Zemore et al., in press); more permissive attitudes and norms for risky drinking (Lange et al., 2002; Voas et al., 2002; Valdez, 1993; Zemore et al., in press); lower expectation of getting caught (Híjar et al., 1998, 2012); less understanding of U.S. laws, due to low English proficiency or recent immigration (Ferguson et al., 2002; Fiorentino et al., 2007); easy availability and low cost of alcohol just across the border (Lange & Voas, 2000; Lange et al., 2002); high frequency of bar attendance (NHTSA, 1995; Mills et al., 2012, 2014); excessive alcohol advertising (Power, 1998); illicit drug trafficking and easy availability of prescription drugs on the Mexican side (Valdez & Sifaneck, 1997); and potentially higher policing activity associated with drug trafficking and immigration enforcement (Associated Press, 2016). Additionally, the relatively high rates of poverty and unemployment, and low educational levels may also contribute to risk for substance-related problems, including DUI (Romano et al., 2006; Braver, 2003).

Despite these risk factors, there is no clear evidence that DUI is elevated on the border. Crash statistics (TXDOT, 2015) show that similar proportions of the Texas border (.09%) and total state population (.10%) were involved in an alcohol-related crash in 2013. Mills et al. (2014) found no difference in drinking and driving norms and attitudes between border and non-border young adults, and the only study to date that has rigorously compared self-reported DUI events among adults on and off the border (Caetano et al., 2013) found no association between border residence and likelihood of either impaired driving or DUI arrest. However, studies among high school and college students have reported higher rates of drinking and driving among border students compared to students statewide or nationwide, and noted that this phenomenon was strongly associated with crossing the border to drink (McKinnon et al., 2003, 2004; Maxwell & Wallisch, 1999).

The Mexican side of the border may also have particular characteristics that increase the likelihood of drunk driving compared to Mexican non-border areas. For example, some studies have found higher rates of drug use and alcohol problems in the border area compared to the interior, although others have not (Borges et al., 2015). Moreover, the Mexican northern states are relatively affluent compared to other parts of Mexico (Lara & Peña, n.d.; INEGI, 2015), with higher car ownership than elsewhere in Mexico (Rhoda & Burton, 2010; INEGI, 2015), which may elevate exposure to the risk of driving drunk

(although it may also suggest better roads, safer cars or more disposable income for taxi rides). However, Mexican state-level data relating to DUI reduction policies, enforcement of driving laws and the percentage of traffic accidents involving alcohol do not show a consistent pattern of differences between the six border states and the rest of the country (Secretaría de Salud, 2014, Figure 8, Figure 9, Table 1 and Table 2).

While the U.S. and Mexico, although neighbors, have many national differences in culture, economies, and policies, the 'borderlands' has been called a 'third country', a transnational region, characterized by frequent border crossings and family, cultural and economic interactions that may make the two countries' border regions more similar to each other in some respects than each is to the interiors of their respective countries (Martinez, 1994; Miller, 2000). Moreover, a relatively high proportion of border residents in the U.S. were born in Mexico (MPI, 2016) and a high proportion of Mexican residents have U.S. migration experience, either personally or in their families (Borges et al., 2016). Therefore, there is some reason to believe that behaviors and norms related to alcohol-impaired driving could show similarities across the border, as well as similarities in border/non-border differences within each country.

The present study compares rates of self-reported arrests or stops for DUI in two border locations and one non-border location in Texas and in the Mexican states of Tamaulipas and Nuevo Leon. Our work is informed by theory (e.g. Valdez, 1993; Rhodes et al., 2005) suggesting potential roles for border-related factors such as cultural permissiveness, the drug trade, crime, poverty, and social norms in predicting substance use and problems (see Zemore et al., in press, for more details on this theoretical framework). Our underlying research questions are: 'Is the border unique (does it differ from the non-border)?'; 'Is the border homogeneous (are border sites similar to each other within and between the two countries)?'; and 'Does the border differ from the non-border in the same way in both countries?' Given the potential risk factors discussed above, we expect that rates of DUI arrest/stop will be higher on the border than the non-border and expect that, because of shared culture, similar DUI laws, and fluidity of population movement across the border, DUI rates and related norms will look similar in 'sister cities' (contiguous metropolitan areas separated only by the Rio Grande).

Our sampling sites were selected to limit heterogeneity in the geographic, cultural and sociopolitical factors that might affect alcohol use and problems, so initially we did not expect much variation *between* the two border sites in each country. However, early studies using these same data (Cherpitel et al., 2015; Zemore et al., in press) revealed some variation in rates of alcohol use disorders and other factors, so we look at the border sites individually.

We also test the hypothesis that higher rates of DUI arrest/stop on the border will be tempered by other factors that may be independently related to DUI, including demographic characteristics, perceived norms, cultural factors (exposure to U.S. culture), and substance use. While evidence for the influence of these explanatory factors on DUI is somewhat mixed, we anticipate that DUI arrests/stops will be higher among men (Caetano & Clark, 2000; Caetano et al., 2013), young drivers (Caetano et al., 2008a; Moulton et al., 2010), those with lower educational levels (Caetano et al., 2008a, 2013; Romano et al., 2006), those

who believe more drinks are acceptable before driving (Ferguson et al., 2002; Moulton et al., 2010), those who are less likely to believe they would be caught if driving drunk (Moulton et al., 2010), and those with risky alcohol or drug use (Caetano & Clark, 2000; Caetano & McGrath, 2005; Caetano et al., 2013; Compton & Berning, 2015). The expected effect on DUI of birthplace, for U.S. residents, and U.S. migration experience, for Mexican residents, is not clear, given mixed findings in other literature (Caetano & McGrath, 2005; Caetano et al., 2008a, 2013; Borges et al., 2016). Overall, we expect that controlling for these correlates will reduce any border/non-border difference found in the prevalence of DUI arrests/stops.

2. Methods

2.1. Sampling and Weighting

Data come from the 2011-2012 U.S.-Mexico Study on Alcohol and Related Conditions (UMSARC), the first large-scale survey of alcohol and drug use conducted simultaneously in sister-city pairs (i.e. contiguous metropolitan areas) on both sides of the U.S.-Mexico border, and in a comparison non-border city on each side. Household face-to-face interviews of about 45 minutes were conducted in English or Spanish with Mexican-origin adults aged 18-65 by the Public Policy Institute at Texas A&M University on the U.S. side and the National Institute of Psychiatry on the Mexican side. A multistage area-probability sampling design with stratification by city was used to select census block groups and randomly select respondents within them.

On the U.S. side, the sample consisted of Mexican-origin respondents from the Texas border metropolitan areas of Laredo (Webb County: N=751) and Brownsville-McAllen (Cameron/Hidalgo Counties: N=814), and the non-border metropolitan area of San Antonio (Bexar county: N=771). Together, the U.S. samples reflected a combined cooperation rate of 84% (53.1% response rate). Parallel sampling was carried out in Mexico on respondents living in the border metropolitan areas of Nuevo Laredo (N=828) and Matamoros-Reynosa (N=821) (state of Tamaulipas) and in the non-border metropolitan area of Monterrey (state of Nuevo Leon: N=811), reflecting a combined cooperation rate of 71.4% (63.3% response rate). Cooperation rates include in the denominator only households in which an eligible respondent was confirmed to reside, while response rates include in the denominator all households estimated to contain eligible respondents (AAPOR, 2011).The border sites sampled are among the largest U.S-Mexico border sister-city pairs, with high proportions (on the U.S. side) of Mexican-origin individuals, and each lies within 150-250 miles of a large comparable non-border city, connected by a major transportation corridor. More details of the UMSARC sampling, fieldwork and instrument can be found in Cherpitel et al. (2015) and Zemore et al. (in press).

2.2. Measures

DUI Arrests/Stops: The primary outcome of interest was DUI arrests/stops, as assessed by the following question: Were you arrested or stopped by the police because of drunk driving or drunk behavior more than once? When was the last time you were arrested or stopped [last 12 months/more than a year ago/DK]? Subsequently, we refer to this variable as ‘DUI arrests/stops’, recognizing both that not all stops led to formal arrest, and that inclusion of

the term ‘drunk behavior’ may lead to an overestimate of arrests/stops for drunk driving per se. Only individuals who had ever used alcohol were asked this question, so the analysis sample was limited to lifetime drinkers.

Drinking and driving beliefs and norms: Two other variables related to DUI were assessed: perceived likelihood of getting caught (As far as you know, how likely or unlikely is it that you would get stopped by the police if you drove a car, truck or motorcycle while intoxicated [very likely, somewhat likely, somewhat unlikely, very unlikely])? and perceived drinking and driving norms of respondent’s family or friends (If you were planning to drive, what is the greatest amount that important people in your life would feel it is OK for you to drink [No drinking at all, 1-2 drinks, 3-4 drinks, 5 or more drinks])? We refer to this latter variable as ‘perceived norms’, reminding the reader that they relate to respondents’ important others and not necessarily to norms of the larger community.

Border residence: The main explanatory variable of interest was border residence vs non-border residence in each country. On the U.S. side, the border sites are Laredo and the combined Brownsville-McAllen metropolitan area (henceforth referred to as “the Valley”, as the area is commonly known); the non-border comparison site is San Antonio. On the Mexican side, the border locations comprise Nuevo Laredo and the combined Matamoros-Reynosa metropolitan area, and the non-border site is Monterrey. We examine the border sites individually in our analyses.

Other Predictors of DUI Arrests/Stops

Demographic Characteristics: *Gender* (male vs female), *Age* (30+ vs 18-29), and *Education* (high school diploma/GED or greater vs less than high school completion).

Substance Use

Hazardous alcohol use: 5+ drinks for men or 4+ drinks for women on a single occasion at least monthly in the past year (sometimes referred to as binge drinking).

Past-year alcohol use disorder (AUD): Our measure of DSM-5 Alcohol Use Disorder (AUD) was based on questions assessing the 11 diagnostic criteria of AUD in the Diagnostic and Statistical Manual, 5th revision (American Psychiatric Association, 2013), using an adaptation of the Alcohol Section of the Composite International Diagnostic Interview (CIDI) (World Health Organization,1993). DSM-5 collapses the alcohol abuse and dependence criteria into a single, unidimensional construct, with a score of ≥2 considered positive for AUD (Hasin et al., 2013). The CIDI questions have a long history of use in studies conducted with Mexicans in Mexico and Mexican Americans in the U.S. and have shown good reliability and validity (Alegría et al., 2007; Demyttenaere et al., 2004; Medina-Mora et al., 2005; Vega et al., 1998).

Past-year drug use: Use of any illicit drug, or non-medical use of prescription drugs. We include this measure because drugged driving may also increase the risk of a stop or arrest.

Cultural Factors (Exposure to U.S. culture)

Foreign born (U.S. residents only): Born abroad vs born in the U.S. (All but two respondents who had been born abroad stated they were born in Mexico).

Migration experience (Mexico residents only): Personal or family migration experience to the U.S. vs no such experience (Borges et al., 2016).

2.3. Analyses

Data from each site were weighted to reflect the multistage clustered sampling design and then adjusted to match census marginal distributions of education and the combined gender by age distribution (see Cherpitel et al., 2015 for further details of the survey methodology).

Cross-tabulations present the percentage arrested or stopped for lifetime and past-year DUI, as well as the percentage endorsing the two drinking and driving beliefs and norms. Differences between each border site and the non-border comparison site are tested within each country using Rao-Scott chi-square tests of significance. Multivariate logistic regression analyses test the hypothesis that any border/non-border differences found in DUI arrests/stops will be explained by demographic and other factors. To adjust for design effects inherent in multistage clustered sampling, SAS survey commands were used for model parameter estimation and significance tests. This technique generally results in a more conservative estimate of the significance of differences as compared to statistics assuming random samples. Because of the relatively small numbers of individuals reporting past-year arrests/stops, the multivariate analysis examines predictors of lifetime arrests/stops only.

3. Results

3.1. Prevalence of self-reported arrests/stops for DUI

3.1.1. United States—Focusing first on results for the United States, Table 1 shows that the percentage who reported having ever been arrested or stopped for DUI was significantly higher for residents of both border sites (13% in Laredo and almost 14% in the Valley) than for those living in non-border San Antonio (9%). The difference in the percentage arrested or stopped in the past year was even more striking, with almost 6% of Laredo respondents and 3% of Valley respondents, compared to less than 1% of San Antonio respondents, reporting arrests/stops.

Table 1 also shows differences in the percentage who endorsed the beliefs and perceived norms for drinking and driving. Residents of the Valley were less likely than either residents of the other border site or non-border residents to say their ‘important others’ felt it was acceptable to drink if planning to drive. However, Valley residents were also less likely than residents of the other two sites to believe they would be caught if driving drunk.

3.1.2. Mexico—In Mexico, unlike in the United States, the border did not show consistent differences from the non-border. The border site of Matamoros-Reynosa had a lower prevalence of lifetime arrests/stops (5%) than either the other border site (9.6%) or the non-border site (8.6%). On the other hand, the border site of Nuevo Laredo had a higher prevalence of past-year arrests/stops (4%) than either of the other two sites (1% for each).

DUI beliefs and perceived norms also showed different patterns from those observed in the U.S. Residents in both border sites were more likely to think the important people in their lives would consider it acceptable to consume several drinks before driving, as compared to residents of the non-border site of Monterrey. Nuevo Laredans were less likely than residents of the other border and non-border sites to think they would be caught if driving drunk.

3.1.3. Comparing Sister Cities—In addition to the questions of whether border/non-border patterns were similar in each country, the data allow a comparison of sister cities, those metropolitan areas that straddle the Rio Grande. The sister-city pairs are Laredo and Nuevo Laredo, and the Valley and Matamoros-Reynosa area. The prevalence of DUI arrests/stops was similar in Laredo (13%) and its counterpart, Nuevo Laredo (10%, ns), but DUI arrests/stops were more than double in the Valley (14%) as compared to its counterpart Matamoros-Reynosa (5%, $p<.001$). Residents of Laredo and Nuevo Laredo also shared a similar perceived norm for the acceptability of consuming 3 or more drinks before driving, while that norm differed in the other city pair (higher acceptability on the Mexican side). For the perceived probability of being caught, however, the sister-city similarity was reversed, with a large difference between Laredo (higher) and Nuevo Laredo, but an equal perception in the other sister-city pair.

The non-border comparison cities of San Antonio and Monterrey are not contiguous, but share the characteristic of being the closest large city within about 200 miles of their respective borders. The prevalence of DUI arrests/stops was similar in San Antonio and Monterrey, at about 9% in each city. San Antonians were, however, more likely than residents of Monterrey to have important others who considered drinking before driving acceptable and more likely to believe they would be caught if doing so.

These findings reveal both similarities and differences between sister cities on both sides of the border. Rates of DUI arrest/stop in Mexico and the U.S. were similar in two of the city pairs but different in the third city pair. Beliefs about the likelihood of being caught if driving under the influence and perceived norms about the acceptability of drinking before driving were similar in one city pair but different in two city pairs.

3.2. Factors predicting DUI arrests/stops

Table 2 shows the distribution across the border and non-border sites of factors expected to be associated with DUI arrests/stops. On the U.S. side, the prevalence of both AUD and drug use was higher in Laredo compared to the other sites. In both U.S. border sites (as compared to the non-border site), a higher proportion of individuals were born abroad (Mexico). On the Mexican side, border residents were less likely than non-border residents to be high school graduates. Residents of Matamoros-Reynosa were less likely to engage in hazardous alcohol use or to have an AUD, as compared to the other sites; however, residents of Nuevo Laredo were more likely to be drug users. In Mexico, border residents in both sites were more likely than residents of Monterrey to have migration experience.

Tables 3 (United States) and 4 (Mexico) show the results of logistic regression analysis testing the hypothesis that the border/non-border differences in lifetime DUI arrest/stop rates

shown in Table 1 would be explained by other factors associated with DUI arrests/stops. The results are discussed separately by country.

3.2.1. United States—After controlling for the other predictive variables, the odds of DUI arrest/stop on the border as compared to the non-border became weaker and non-significant in Laredo but remained robustly higher in the Valley. The factors that uniquely appear to explain the reduction in odds in Laredo are the higher rates of alcohol use disorder and drug use there. That is, when all predictive factors together except AUD or drug use were included in the model, Laredo still showed a significantly higher odds of arrest/stop than in the non-border city; however, once either AUD *or* drug use was included (with or without the other factors), the difference between Laredo and the non-border disappeared. In the Valley, on the other hand, none of the included factors accounted for the higher odds of arrest/stop as compared to the non-border and, in fact, the odds ratio was slightly strengthened by inclusion of the other factors.

In addition to testing the hypothesis of the border/non-border difference, it is of interest to assess the independent contribution of other factors to predicting DUI arrests/stops. In the U.S., factors associated with higher likelihood of arrests/stops, in addition to AUD and drug use, included male gender, age 30+, hazardous alcohol use, expectation of being caught, and perceived acceptability of 3+ drinks before driving, while factors that reduced the likelihood of arrest/stop were high school completion and being born in Mexico.

3.2.2. Mexico—In Mexico, only one border site (Matamoros-Reynosa) had had significantly different arrest/stop prevalence from the non-border site, and that difference disappeared after controlling for the other predictors. As had been the case in the U.S., the factor that appeared most explanatory of the border/non-border difference was the lower rate of alcohol use disorder in the border site where DUI was lower; when that variable alone was included in the model, the difference disappeared. Other factors that predicted DUI arrests/stops in Mexico were male gender, age 30+, and drug use. Unlike in the U.S., the beliefs and perceived norms variables were not significant predictors. Having migration experience to the U.S. was marginally associated with DUI arrests/stops (p=.06).

4. Discussion

This study was the first, to our knowledge, to report the comparative prevalence and correlates of self-reported DUI arrests/stops in border and non-border areas on both sides of the U.S./Mexico border. While the U.S. border presented some environmental and cultural risk factors potentially conducive to higher DUI, a previous border study (Caetano et al., 2013) had found that rates were no different on or off the border, so our expectations of higher DUI were tempered. Similarly, on the Mexican side, although the border had some risk factors, data related to DUI policy, enforcement, and crashes did not paint a consistent picture distinguishing the border from elsewhere, so our hypothesis that the Mexican border would also show higher DUI was proffered tentatively.

Given these mixed expectations, it is perhaps not surprising that we found mixed support for the hypotheses that DUI arrest/stop rates would be higher on the border, that border sites

would be similar to each other, and that sister cities across the border would also share similarities. On the U.S. side, both border sites did show higher rates of lifetime and past-year DUI arrest/stop than the non-border, while in Mexico, one border site showed lower rates of lifetime arrest/stop, while the other border site showed higher rates of past-year arrest/stop. Sister cities Laredo and Nuevo Laredo shared a similar prevalence of arrests/stops, as did the two non-border cities of San Antonio and Monterrey, while the other sister-city pair (Matamoros-Reynosa and the Valley) had dissimilar prevalence rates. The covariates examined, particularly AUD, explained much of the border/non-border difference for Laredo vs San Antonio and Matamoros-Reynosa vs Monterrey, but not for the Valley vs San Antonio. Thus hypotheses concerning the border may need to be more nuanced and take account of location-specific factors (at perhaps the county or even municipal level), rather than treating the border as a homogeneous region.

We can only speculate on the reasons why the Valley looks different from Laredo in showing a persisting high rate of arrests/stops even after the covariates were controlled. Do Valley residents have more driving exposure? While data show similar rates of car ownership across the three U.S. sites (Governing Magazine, 2016), it could be that Valley residents take more or longer trips, or that driving there is somehow more hazardous (due to traffic or road conditions). Do Valley respondents cross the border more often to drink than Laredans do? Our data do show that Valley residents were more likely to have crossed the border in the past year (43%) as compared to Laredo residents (35%), although the percentage citing “to drink” as a reason for crossing was the same in both sites (5%). While crossing the border to drink has been found to be significantly associated with heavy drinking (Cherpitel et al., 2015a) and the potential to drive under the influence (Lange and Voas, 2000), adding ‘crossed the border’ to the multivariate analysis of DUI prevalence did not yield a significant predictor or change the results. Is policing perhaps more rigorous in the Valley? Since both Laredo and the Valley are important points of entry from Mexico, surveillance for drug trafficking and human smuggling is undoubtedly high in both places; yet, it is possible that driving laws (or profiling) are enforced differently. However, Zemore et al. (in press), using the UMSARC data, noted that Valley residents perceived lower law enforcement as compared to residents of Laredo or San Antonio, which would argue against the interpretation that DUI is simply more likely to be punished in the Valley. Finally, although not likely, it is possible that for some reason respondents in the Valley simply have a different propensity to report sensitive behavior than those in Laredo. However, interviewers did not note any significant difference in the veracity of reporting between the two sites. In the quest to understand and mitigate factors contributing to drunk driving, it would be important for future research to investigate factors beyond those controlled for here that might help explain the relatively higher DUI arrest/stop rates in the Valley, as well as extending the research to additional border sites.

Beyond their use as covariates in the model testing border/non-border differences, it is of interest to consider the other risk and protective factors for DUI arrests/stops in their own right. In the U.S., believing a high number of drinks before driving to be acceptable (at least to one’s important others) was, not unexpectedly, associated with a higher likelihood of arrest/stop. Other literature has suggested that Mexican Americans tend to overestimate the number of drinks it takes to make them unsafe drivers (Ferguson et al., 2002; Moulton et al.,

2010). On the other hand, in our study, believing oneself likely to be apprehended if drinking and driving also predicted a higher likelihood of arrest/stop. While such a belief is usually considered a deterrent, it is possible that the direction of causality runs the other way, with individuals who had previously been arrested or stopped more likely to expect it in the future. The cross-sectional nature of this survey does not allow us to rule out that possibility.

Being born abroad was associated with a lower likelihood of arrest/stop among U.S. residents. There are reasons to have expected the opposite, including possibly lower enforcement of driving laws in Mexico (Híjar et al., 2012), less social disapproval in Mexico for driving drunk (Bonello, 2012; Caetano & McGrath, 2005), or a lack of understanding of U.S. drinking and driving laws (Ferguson et al., 2002; Fiorentino et al., 2007). Other studies have shown mixed findings about whether rates of DUI for immigrants are lower (Caetano & Clark, 2000; Caetano & McGrath, 2005) or similar to those of the U.S.-born (Caetano et al., 2008a, 2013). Immigrants who are undocumented may especially try to drive less often or more cautiously to avoid law enforcement (Arce & Sherrets, 2004; Romano et al., 2016). It is also possible that immigrants simply underreport DUI events as compared to native-born Mexican Americans (Bond & Cherpitel, 2004). In our study, over 90% of the respondents born abroad had been in the United States for more than five years (average 20 years), so they were presumably not naïve to U.S. driving laws or community norms. Educational level (high school diploma or greater) was also associated with lower DUI prevalence. Education may represent better English proficiency or understanding of driving laws or some other factor, such as the likelihood of possessing a safer car.

On the Mexican side, fewer factors were associated with DUI arrests/stops. As in the U.S., being male, older, and having an AUD or using drugs were associated with higher likelihood of arrest/stop, and a high school or greater education was associated with lower likelihood of arrest/stop. Unlike in the U.S., beliefs and perceived norms about drinking and driving were not related to arrests/stops. For Mexicans, having immigration experience to the U.S. was marginally positively related to DUI. Other research has shown that exposure to U.S. culture is associated with higher likelihood of alcohol and drug use disorders (Borges et al., 2016) and with desire for treatment (Wallisch et al., 2016), both of which may in turn be related to DUI, as a cause or a consequence. Additionally, in some cases, having a DUI conviction in the U.S. may be associated with deportation back to Mexico (Dominguez Villegas & Rietig, 2015). If the likelihood of DUI arrest/stop is higher in the U.S. than in Mexico, Mexican residents with migration experience would have more exposure to risk. In order to parse out these possible explanations, it would be important to know whether the DUI arrests/stops occurred while the migrant was in the U.S. or after return to Mexico.

While we do not know the comparative probability of being stopped or arrested for DUI in Mexico as compared to the U.S., driving with a BAC limit over .08 is illegal in both countries. Drinking age is lower in Mexico (18) than in Texas (21), and some younger U.S. residents take advantage of this to drink in Mexico (Lange & Voas, 2000). (Yet, in our study, 18 to 21-year-olds reported lower rates of DUI arrest/stop than did those over 21.) In 2003, the first random breath-testing program started in Mexico City, with almost 250,000 evaluations during 2013, and currently about 100 municipalities in the country have such programs. In our study, the state of Nuevo Leon (Monterrey) had such programs, while the

state of Tamaulipas (both Mexican border sites) did not (Secretaría de Salud, 2014). However, only about 1/3 of drivers believe they would be caught if driving drunk (Pérez-Núñez et al., 2014), and compliance with DUI laws in Mexico is considered to be poor by a regional evaluation (Híjar et al., 2012). Nevertheless, when DUI programs are implemented and enforcement is in place, results have been shown to be similar to those of such programs implemented elsewhere (Gómez-García et al., 2014).

Our measure of DUI arrests/stops is different from those used in several other DUI studies, so it is not possible to directly compare our findings to others. Yet it is of some value to place our prevalence estimates in the broad context of what we know about DUI prevalence from other studies. For example, aggregated data from the 2006-2009 National Surveys on Drug Use and Health show that 13.9% of Texas adults and 13.2% of U.S. adults self-reported driving under the influence of alcohol in the past year (SAMHSA, 2012). Caetano et al.'s (2013) rigorous study of DUI across the entire U.S. side of the border reported past-year rates of driving under the influence at 16% for border males and 11% for non-border males (a non-significant difference). While our study did not assess DUI not resulting in an arrest or stop, it is well-known that the percentage who drive under the influence is considerably higher than the percentage ever stopped or arrested for it (Beitel et al., 2000), so our past-year stop/arrest rates of 4% to 9% for border males suggest that the percentage who had ever driven under the influence would likely be considerably higher. (For example, 45% of men on and off the border in our study admitted to having had 'times in your life when you were often under the influence of alcohol in situations where you could get hurt, for example when riding a bicycle, driving, operating a machine, or anything else?').

The 1995 National Survey of Drinking and Driving Attitudes and Behavior (Zador et al., 2000), which asked explicitly about past-year 'stops' by police for suspicion of drinking and driving, found rates of 3.6% for Hispanics (6.4% for Hispanic males), which is not dissimilar to those of our study. Finally, a survey of substance use on the Texas/Mexico border conducted in 2003 (Wallisch & Spence, 2006), which asked respondents in the Valley and El Paso whether they had ever "gotten in trouble with the law" for driving while intoxicated, found a lifetime prevalence of 14%, which is consistent with the lifetime rate of 13-14% for the border sites in our present study. Again, as noted above, each of these studies employed different questions, as well as different timeframes and different comparison sites, so these comparisons should be viewed as providing general context only. Taken as a whole, however, they suggest that our prevalence rates are likely "in the ballpark" of those of other studies.

4.1. Strengths and limitations

A major strength of this study is the survey design that allowed comparison of six sites across two countries using an identical sampling strategy, questionnaire and timeframe. As is generally true of cross-sectional surveys, however, it was not possible to take into account the time order of events, such as whether beliefs and norms or behaviors may have changed over time in response to being stopped or arrested.

The question about stop or arrest for drunk driving has both a potential strength (asking whether this has happened "more than once", which may identify habitual offenders,

although it would lead to an underestimate of prevalence rates for *any* arrest/stop), and a weakness, in that it includes the possibility of arrest or stop for "drunk behavior", which may include such things as loitering, rowdiness or fights because of intoxication and thus overestimate drunk driving per se. Texas arrest data (Texas Department of Public Safety, 2016) show an approximately equal number of arrests for 'driving under the influence' and arrests for 'drunkenness', so the prevalence of arrests/stops found in our study could be as much as twice as high as that of DUI alone, if a significant proportion of respondents have been stopped for non driving-related drunk behavior. The fact that we cannot distinguish arrests from stops is also a limitation when comparing our findings to those of other studies. Nevertheless, our question is robust for the purposes of comparing border and non-border sites within our study and for comparing 'stop' rates with those studies that have reported them.

Another potential limitation to understanding variation in DUI arrests/stops across the study sites is the fact that we cannot discern from our data where the arrests/stops occurred. Mexican border residents may be more likely than interior residents to drive on the U.S. side and be stopped there for DUI, and the fact that arrests/stops were marginally higher for Mexicans with migration experience lends credence to this possibility. We also do not know whether there is a difference among the sites in car ownership or driving exposure, although data suggest that, within each country, car ownership is similar in the Texas counties and Mexican states included in our study (Governing Magazine, 2016; INEGI, 2016). Finally, our focus on two sister-city pairs within a single state on each side of the border precludes any generalization to the entire border. Given the differences found even between border locations within a state, it is plausible that other border locations would provide different data.

4.2. Implications and future directions

Despite these limitations, the findings presented here are important because they provide new data on variation in DUI arrest/stop prevalence and DUI-related beliefs and norms among border sites that might be expected to be comparable, both across and within countries. They suggest that particular border sites may have relatively elevated risk for DUI, which could help target prevention efforts to where they are needed most. They also suggest that addressing AUD may be necessary – although not sufficient in all cases – to reducing DUI.

The association between alcohol use disorder and DUI arrest/stop is a crucial one although they are not completely 'multicollinear'. Approximately three-quarters of the individuals in our study who had an AUD were never stopped or arrested for DUI, and conversely less than half of those stopped or arrested had an AUD. Nevertheless, AUD was a strong predictor of arrest/stop and one that seemed to explain the border/non-border differential in at least some sites. Drug use was an additional strong predictor of impaired driving. While educational efforts aimed at deterring driving after binge drinking can be effective and easier to implement, it would also be important to address the problems of AUD and drug use by increasing the availability, accessibility of and desire for substance abuse treatment on the border (Wallisch et al., 2016).

An additional issue on the U.S. side of the border is the use in some communities of Spanish as a primary or only language (in our study, for example, 35% of the U.S. respondents chose to be interviewed in Spanish). Therefore, it would be important, in efforts to reduce DUI in U.S. border areas, to disseminate knowledge of DUI prevention and laws through Spanish-language materials and approaches (e.g. Spanish-language television, radio, fotonovelas and peer outreach – see GHSA, 2009). Development of awareness and prevention materials should also take into account the fact that DUI arrests/stops are more likely among individuals who have not completed high school and be written at an easily comprehensible level.

Finally, this study suggests that “the border” is not necessarily a homogeneous area, either across or within the two countries. Not only do sister cities show sometimes quite different patterns of DUI arrests/stops and beliefs/norms – which suggests that the two countries’ political, cultural, environmental and other differences are more influential than geographical proximity – but even within each country’s border area, the two sites examined were in some cases more different from each other than they were from their non-border counterpart. Previous analyses of the UMSARC have also documented differences in drinking and related factors between the two U.S. border sites (Cherpitel et al., 2015; Zemore et al., in press). While there is much literature painting the border as a distinct cultural environment, shaped not only by within-country but also by across-country interactions, when it comes to driving under the influence, and alcohol and drug problems generally, we must endeavor to understand the variations as much as the similarities in order to focus prevention efforts on local conditions and needs.

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Table 1

U.S.-Mexico Study on Alcohol and Related Conditions (UMSARC) Percentage ever arrested or stopped because of drunk driving, and percentage endorsing drinking and driving beliefs and norms[1]: *Among lifetime alcohol users; data are weighted*

	Non-Border	Border Site 1	Border Site 2
United States	San Antonio N=641	Laredo N=637	Brownsville-McAllen ("Valley") N=606
Ever stopped/arrested	9.0	13.2*	13.7**
Stopped/arrested in past year	*0.5*	*5.7****	*3.1****
Somewhat or very likely to get caught	81.8	79.4	67.5**
Most to drink			
0 drinks	77.1	72.7	90.7***
1-2 drinks	18.1	20.9	7.7
3 or more drinks	4.7	6.4	1.6
Mexico	Monterrey N=478	Nuevo Laredo N=487	Matamoros-Reynosa N=546
Ever stopped/arrested	8.6	9.6	5.0*
Stopped/arrested in past year	*1.0*	*4.3**	*0.9*
Somewhat or very likely to get caught	57.8	39.1***	62.9
Most to drink			
0 drinks	92.2	85.7**	85.0*
1-2 drinks	6.0	9.2	10.2
3 or more drinks	1.7	5.2	4.7

* p<.05 for difference between border site and San Antonio or Monterrey (non-border)

** p<.01 for difference between border site and San Antonio or Monterrey (non-border)

*** p<.001 for difference between border site and San Antonio or Monterrey (non-border)

[1] Questions were: Were you arrested or stopped by the police because of drunk driving or drunk behavior more than once? As far as you know, how likely or unlikely is it that you would get stopped by the police if you drove a car, truck or motorcycle while intoxicated? and If you were planning to drive, what is the greatest amount that important people in your life would feel it is OK for you to drink?

Table 2

U.S.-Mexico Study on Alcohol and Related Conditions (UMSARC) Demographic characteristics, substance use, beliefs/norms and cultural factors predicting lifetime arrests/stops for DUI – Bivariate Associations
Among lifetime alcohol users; data are weighted

	Non-Border	Border Site 1	Border Site 2
United States	San Antonio N=641	Laredo N=637	Brownsville-McAllen (“Valley”) N=606
Demographics			
Sex (male)	54.6	52.9	54.0
Age (30+ vs 18-29)	69.1	68.6	71.6
Education (HS+ vs <HS)[1]	67.8	65.7	68.8
Substance Use (12 month)			
Hazardous alcohol use	24.4	28.1	21.3
Alcohol use disorder	17.8	25.6***	18.2
Drug use	19.9	36.4***	19.2
Beliefs and Perceived Norms			
Likely to get caught	81.8	79.4	67.5**
Most to drink 3+	4.7	6.4	1.6*
Cultural			
Foreign born	24.5	31.2*	36.9***
Mexico	Monterrey N=478	Nuevo Laredo N=487	Matamoros-Reynosa N=546
Demographics			
Sex (male)	63.2	62.9	63.2
Age (30+ vs 18-29)	69.5	66.8	66.2
Education (HS+ vs <HS)[1]	40.4	29.0*	29.0*
Substance Use (12 month)			
Hazardous alcohol use	15.5	13.5	3.0***
Alcohol use disorder	16.3	14.8	6.1***
Drug use	4.6	10.4**	5.6
Beliefs and Perceived Norms			
Likely to get caught	57.8	39.1***	62.9
Most to drink 3+	1.7	5.2**	4.7*
Cultural			
Migration experience	6.4	17.9***	13.7**

*p<.05 for difference between border site and non-border site

**p<01

***p<001

[1]Education is coded as high school diploma/GED or greater (HS+) vs less than high school completion (<HS)

Table 3

U.S.-Mexico Study on Alcohol and Related Conditions (UMSARC) Multivariate predictors of lifetime arrests/stops for DUI - United States Among lifetime alcohol users (N=1868); data are weighted

	OR	CI	p-value
Bivariate			
Border Residence			
Laredo [vs San Antonio]	1.51	1.13-2.15	.01**
Valley [vs San Antonio]	1.60	1.24-2.43	.00**
Multivariate			
Demographics			
Border Residence			
Laredo [vs San Antonio]	1.31	0.93-1.85	.12
Valley [vs San Antonio]	1.96	1.33-2.91	.00***
Sex (male)	4.12	2.88-5.89	<.0001***
Age (30+ vs 18-29)	1.50	1.10-2.04	.01**
Education (HS+ vs <HS)[1]	0.45	0.32-0.61	<.0001***
Substance Use (12 month)			
Hazardous alcohol use	1.48	1.03-2.14	.03*
Alcohol use disorder	2.31	1.66-3.21	<.0001***
Drug use	1.32	0.98-1.77	.07
Beliefs and Perceived Norms			
Likely to get caught	1.40	1.02-1.94	.04*
Most to drink 3+	2.64	1.62-4.29	<.000***
Cultural			
Foreign born	0.67	0.47-0.96	.03*
N for dependent variable (ever arrested/stopped)	*235*		

*p<05

**p<01

***p<001

[1]Education is coded as high school diploma/GED or greater (HS+) vs less than high school completion (<HS)

Table 4

U.S.-Mexico Study on Alcohol and Related Conditions (UMSARC) Multivariate predictors of lifetime arrests/stops for DUI - Mexico Among lifetime alcohol users (N=1474); data are weighted

	OR	CI	p-value
Bivariate			
Border Residence			
Nuevo Laredo [vs Monterrey]	1.22	0.73-1.74	.39
Mata/Rey [vs Monterrey]	0.58	0.33-0.93	.04*
Multivariate			
Demographics			
Border Residence			
Nuevo Laredo [vs Monterrey]	1.07	0.65-1.75	.79
Mata/Rey [vs Monterrey]	0.71	0.42-1.22	.22
Sex (male)	11.13	4.31-28.72	<.0001***
Age (30+ vs 18-29)	1.88	1.29-2.73	.00**
Education (HS+ vs <HS)[1]	0.58	0.37-0.92	.02*
Substance Use (12 month)			
Hazardous alcohol use	1.20	0.66-2.16	.55
Alcohol use disorder	5.15	3.32-8.00	<.0001***
Drug use	2.53	1.53-4.20	.00***
Beliefs and Perceived Norms			
Likely to get caught	1.18	0.77-1.81	.44
Most to drink 3+	1.05	0.33-3.34	.93
Cultural			
Migration experience	1.65	0.97-2.79	.06
N for dependent variable (ever arrested/stopped)	*117*		

*p<05

**p<01

***p<001

[1]Education is coded as high school diploma/GED or greater (HS+) vs less than high school completion (<HS)