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## Socioenvironmental Risk Factors for Adolescent Marijuana Use in a United States-Mexico Border Community

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### Abstract

**Purpose:** We examined how socioenvironmental risk factors unique to the United States-Mexico border, defined as border community and immigration stress, normalization of drug trafficking, and perceived disordered neighborhood stress, contribute to tobacco, alcohol, and marijuana use among adolescents residing there.

**Design:** Cross-sectional design.

**Setting:** The study was conducted at a high school on the United States-Mexico border.

**Subjects:** A sample of 445 primarily Hispanic students (ages 14–18).

**Measure:** Perceived Disordered Neighborhood Stress Scale, Border Community and Immigration Stress Scale, and Normalization of Drug Trafficking Scale.

**Analysis:** Logistic regression assessed the association between the socioenvironmental risk factors and past 30-day tobacco, alcohol, and marijuana use.

**Results:** Participants with higher border community and immigration stress scores were significantly more likely to have used tobacco (adjusted odds ratio [aOR] = 1.41,  $P < .01$ ) and alcohol (aOR = 1.31,  $P < .01$ ) in the past 30 days. Perceived disordered neighborhood stress also was associated with past 30-day alcohol use (aOR = 1.46,  $P < .00$ ). The normalization of drug trafficking was associated with past 30-day marijuana use (aOR = 1.45,  $P < .05$ ).

**Conclusions:** Public health practitioners, educational institutions, and policy makers should consider the economic and normative environment of the United States-Mexico border for future substance use prevention and risk reduction efforts targeting border adolescents.

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Keywords

adolescents; age specific; specific populations; substance use; United States-Mexico border; racial minority groups; underserved populations; specific populations; school; specific settings; psychometric analysis; research methods

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## Background

Evidence suggests that environmental factors contribute to drug availability and substance experimentation among youth.<sup>1</sup> Further, regional availability of substances and social trends influence the prevalence of specific substance use disorders.<sup>2</sup> A “risk environment” approach emphasizes how environments intersect with and shape substance use among adolescents.<sup>3</sup> Rhodes and colleagues define *risk environment* as the physical, social, economic, and policy spaces in which a variety of factors interact to increase the chances of drug-related harm.<sup>3</sup> Our study calls attention to the importance of the risk environment of the United States-Mexico border, including socioeconomic status, border security and immigration enforcement, and the normalization of drug trafficking, as they may contribute to substance use among youth living on the United States-Mexico border.

The United States-Mexico border is composed of the 44 US counties that have most of their population within the 100-km limit of the United States-Mexico border.<sup>4</sup> Estimates suggest that the border region population in 2015 was over 15.3 million people and roughly half identified as Hispanic or Latino.<sup>5</sup> Hispanic adolescents, who are part of the most rapidly growing ethnic group in the United States,<sup>5</sup> are more likely to engage in substance use when compared to adolescents from all other ethnic groups.<sup>6,7</sup> Evidence suggests that Hispanic adolescents living on the border experience higher rates of substance use-related problems compared to nonborder Hispanic adolescents in the United States.<sup>8,9</sup> For adolescents living on the United States-Mexico border, the risk of substance use may be exacerbated by unique border-bound socioenvironmental risk factors.

## Socioenvironmental Risk Factors of Adolescent Substance Use on the United States-Mexico Border

**Border community and immigration stress.**—Adolescents living on the border may be subjected to border-bound stressors including border militarization, perceived ethnic discrimination, and acculturative stress, which have been shown to pose health risks to Hispanic border residents.<sup>10–19</sup> Perceived ethnic discrimination also has been associated with larger amounts and higher frequency of substance use, prosubstance use attitudes, and peer approval of substance use among Hispanic adolescents.<sup>20</sup>

**Normalization of drug trafficking.**—Adolescents living on the United States-Mexico border may have increased access to substances due to their proximity to the border, nearby drug trafficking, and the frequent interactions and movement of people crossing the border.<sup>21</sup> Normalization of drug trafficking is defined as the keen awareness of the nature of drug trafficking, including the intergenerational nature of the drug trade and the active presence of drug cartels in the community that may normalize drug trafficking and, more distally, the use

of illicit substances.<sup>22</sup> This awareness exemplifies a disproportionately high exposure to drug trade-related activity, likely due to the border as a major point of entry for illicit substances, which may cause desensitization to the drug trade and substance use among border adolescents.<sup>22</sup>

**Perceived disordered neighborhood stress.**—Compared to nonborder communities, border residents are disproportionately exposed to poverty and high unemployment.<sup>10–15</sup> Struggling local economy and social disorganization, including disordered neighborhood environments (eg, graffiti, broken windows, property damage), negative neighborhood perceptions, and drug-related indicators (eg, neighborhood drug selling or substance use) influences behavioral health and risk taking (eg, substance use) among adolescents.<sup>23–25</sup> In border communities in particular, findings suggest that adolescents may perceive a sense of hopelessness in their community with regard to the poor economy, dilapidated buildings, broken windows, and graffiti, which may put them at higher risk for substance use because it limits how they envision their future career opportunities and how their community is sustained and maintained.<sup>22</sup>

## Current Study

Hypotheses for the current study were based on findings from a previous qualitative study conducted in the same rural border community. The research team and a local adolescent health coalition engaged in Youth Participatory Action Research using Photovoice to examine the perceived environmental factors that influence substance use among adolescents living at the border.<sup>22</sup> We used Photovoice findings to develop a composite survey, titled the Border Adolescent Substance Use Survey (BASUS), which consists of existing validated instruments and newly created measures to examine the border-bound factors that influence substance use among adolescents.

Building on this previous work, the present study quantitatively examined the associations between 3 hypothesized socioenvironmental risk factors, including (1) border community and immigration stress, (2) normalization of drug trafficking, (3) perceived disordered neighborhood stress—and past 30-day tobacco, alcohol, and marijuana use among adolescents living on the United States-Mexico border. We hypothesized that participants with greater exposure to these socioenvironmental risk factors also would report increased substance use. We expect that this hypothesized association between exposure and substance use will not be accounted for by sociodemographic factors like age, gender, socioeconomic status, and family structure.

## Methods

### Participants and Recruitment

Participants were recruited from a local high school and included males and females ages 14 to 18 years who were able to write and read in English and/or Spanish. To ensure stratification by age and grade level, students were recruited from freshman prealgebra, sophomore geometry, junior algebra I, and senior algebra II classes. Students must have lived in the city in which the school was located or the sister city on the Mexico side for the

last 12 months. Individuals with missing data (>50% of the survey incomplete) were removed from the analysis. Participants provided informed written assent and received informed written consent from a legally authorized representative prior to participating in this study. Participants included their student identification numbers on their consent forms, which was later linked to their survey. One week prior to the survey, students were informed both written and verbally in class that because the study may involve participants who are not US citizens or who may have experience with illicit activities, the lead author obtained a Certificate of Confidentiality from the National Institutes of Health and that the researchers could use this certificate to legally refuse to disclose information that may identify participants in any legal proceedings. Further, due to the sensitive nature of some of the questions, students were assured that all their information would be deidentified, locked in a safe place, and that only aggregate data would be shared with school officials and the community. The lead author also informed the students that she was not affiliated with the school.

### Survey Procedure

The BASUS was delivered during math class at the school computer lab. The lead author administered the BASUS to each group (25–30 students) in 2 adjacent computer labs for 50-minute intervals during 6 periods per day for 2 consecutive days. The students were only in the lab to complete the survey. The students without consent/assent documentation used the computers while other students took the survey. The lead author described the purpose of the study, the sensitive nature of the questions therein, as well as the confidential nature of data collection, and provided students with ample opportunity to ask questions. Students had the option to complete the BASUS in Spanish or English. A Spanish version was developed using a back-translation method.<sup>26</sup> The students received a tiny URL to access the BASUS. The BASUS was administered online using the *Research Electronic Data Capture* platform. Completion took between 20 and 40 minutes per class. As an incentive to participate, BASUS participants received 10 student dollars (to be used in the high school's student store) for submission of the parental consent and participant assent and 5 student dollars for completion of the BASUS. Their student identification numbers were used to link their consents and survey completion confirmation in order to receive their incentive. All identifying information was later replaced with a unique code and destroyed. This study received human subject's approval from the University of Arizona Human Subject' Protection Program (approval #1708726591R001).

### Measures

Demographics included age, gender, and race/ethnicity. Other relevant sociodemographic information collected included country of residence, mother's education (as a proxy for socioeconomic status [SES]), and family structure (ie, whether participants lived with both parents, single parent, or other family).<sup>27</sup> The BASUS also measured 30-day tobacco, alcohol, and marijuana use.

**Border community and immigration stress**—Border community and immigration stress was assessed using a modified Border Community and Immigration Stress Scale (BCISS).<sup>22</sup> Participants answered 10 questions on a Likert Scale (1 = not stressed at all, 5 =

very stressed) about stress related to perceived racial/ethnic discrimination and border militarization and law enforcement in their community. Self-reported scores are summed and can range from 1 to 50. Larger sum scores indicate greater border community and immigration stress. This scale is reliable with this sample (Cronbach  $\alpha = 0.68$ ). Similar reliability results were seen with an urban border community (Cronbach  $\alpha = 0.91$ ) and a rural farmworker border community (Cronbach  $\alpha = 0.88$ ). The results of these studies suggest particularly high physical and mental health burdens tied to the experience of stressors in the US border region. These studies were conducted with adults. Thus, the present study adds to these findings by exploring the association between border stressors and substance use in an adolescent border population.<sup>22</sup>

BASUS investigators created 6 items to measure the *normalization of drug trafficking* based on the formative qualitative work conducted in partnership with the youth coalition.<sup>22</sup> Items addressed community norms related to drug trafficking including exposure to music that glorifies trafficking and substance use, whether participants had been encouraged to sell, store, or transport drugs, and perceived normalization of adolescents selling, storing, or transporting drugs. Participants answered on a Likert scale (1 = strongly disagree to 4 = strongly agree). When the items were represented by presence/intensity, the scale showed internal consistency (Cronbach  $\alpha = 0.66$ ) and had a range of 1 to 24. Larger sum scores indicate greater normalization of drug trafficking. It had not been tested prior to this study.

**Perceived disordered neighborhood stress**—Perceived disordered neighborhood stress was measured using the Perceived Disordered Neighborhood Stress scale.<sup>28</sup> Participants answered 15 questions on a Likert scale (1 = strongly disagree, 4 = strongly agree) about neighborhood environment, graffiti, community trust, and alcohol and drug activity. Self-reported scores are summed and can range from 1 to 60. Larger sum scores indicate greater perceived disordered neighborhood stress. This scale is reliable and has high external validity.<sup>28</sup> This scale was internally consistent with this sample (Cronbach  $\alpha = 0.87$ ).

### Statistical Analysis

Prevalence estimates were computed for 30-day tobacco, alcohol, and marijuana use, and correlation analyses were used to examine the bivariate relationships among the variables. Independent sample *t* tests determined group-based mean differences between tobacco, alcohol, and marijuana users, respectively, versus nonusers on each of the explanatory variables. Pairwise correlations between all continuous explanatory variables and past 30-day tobacco, alcohol, and marijuana use to assess intercorrelation.

We then formed an adjusted logistic regression model (model 1) accounting for (1) border community and immigration stress, (2) normalization of drug trafficking, and (3) perceived disordered neighborhood stress as covariates according to previous univariate analysis findings. Accordingly, all predictors were standardized prior to entry in the models to avoid problems associated with multicollinearity. We then formed a second model (model 2) with all previously mentioned correlates and adjusted for sociodemographic factors (age, gender, SES, and family structure). These correlates were selected based on their use in previous

research on adolescents and substance use.<sup>29,30</sup> Odds ratios and 95% confidence intervals were calculated. Graphical summaries were used to assess linearity of the covariates with the scale scores and all assumptions of logistic regression analysis were assessed.

## Results

### Participants

There were 597 students invited to participate. Of the 597 consent forms distributed, 505 were returned. A total of 35 participants consented but were absent the day of the survey, and another 7 completed the BASUS but were removed because they were older than 18 years. A total of 18 participants completed less than 50% of the survey and were removed from the analysis. There were no differences between the demographics in the total sample versus those who did not complete the BASUS. Only 8.9% (n = 40) of the participants chose the Spanish version of the BASUS.

As illustrated in Table 1, a total of 445 students completed the BASUS, with a response rate of 75%. Mean age of participants was 17 and were 57% female. Nearly all participants lived in the United States (92.5%) and identified as Hispanic (98.4). More than half of participants lived with both parents (55.1%). The population that completed the survey was representative of the entire school with regard to overall demographics.

### Differences Between Users and Nonusers

Of all BASUS participants, 13% had used tobacco, 33.9% had used alcohol, and 11.6% had used marijuana in the past 30 days. All users had increased mean border community and immigration scores (tobacco: 18.53 [standard deviation, SD = 4.79]; alcohol: 17.75 [SD = 4.93]; and marijuana: 18.48 [SD = 5.46]) compared to *nonusers* (tobacco: 16.61 [SD = 4.78]; alcohol: 16.31 [SD = 4.67]; Marijuana: 16.65 [SD = 4.69]).

Mean scores for normalization of drug trafficking were 10.66 (SD = 2.63) for tobacco users compared to 10.24 (SD = 2.37) among nonusers; 10.45 (SD = 2.38) for alcohol users compared to 10.21 (SD = 2.42) among nonusers; and 11.17 (SD = 2.56) for marijuana users compared to 10.18 (SD = 2.37) among nonusers.

Mean perceived disordered neighborhood stress was 30.52 (SD = 6.60) for tobacco users compared to 29.53 (SD = 6.33) in nonusers; 31.40 (SD = 7.05) for alcohol users compared to 28.76 (SD = 5.79) in nonusers; and 32.5 (SD = 5.74) for marijuana users compared to 29.28 (SD = 6.36) in nonusers.

### Regression Models

**Tobacco.**—As illustrated in Table 2, model 1 findings suggest that participants who used tobacco in the past 30 days were significantly more likely than nonusers to have higher border community and immigration stress (adjusted odds ratio [aOR] = 1.41,  $P < .01$ ), which remained significant (aOR = 1.43,  $P < .01$ ) even after adjusting for sociodemographic characteristics, age (aOR = 1.41,  $P < .01$ ), gender (ie, male identifying; aOR = .55,  $P < .05$ ), and country of residence (ie, living in the United States; aOR = 2.62,  $P < .05$ ).

**Alcohol.**—Unadjusted findings suggest that participants who used alcohol in the past 30 days were significantly more likely than nonusers to have higher border community and immigration stress (aOR = 1.31,  $P < .01$ ) and had higher perceived disordered neighborhood stress (aOR = 1.46,  $P < .00$ ). Adjusted findings show that border community and immigration stress (aOR = 1.34,  $P < .01$ ) and perceived disordered neighborhood stress (aOR = 1.32,  $P < .05$ ) remained significant. Age (aOR = 1.24,  $P < .01$ ), country of residence (ie, living in the United States) (aOR = 5.02,  $P < .00$ ), and SES (eg, had a mother with lower educational attainment; aOR = .82,  $P < .05$ ) also predicted alcohol use in the past 30 days (Table 3).

**Marijuana.**—Unadjusted findings suggest that participants who used marijuana in the past 30 days were significantly more likely than nonusers to perceive that drug trafficking is normal in their community (aOR = 1.45,  $P < .05$ ) and had higher perceived disordered neighborhood stress (aOR = 1.47,  $P < .01$ ). In adjusted findings, normalization of drug trafficking remained significant (aOR = 1.45,  $P < .05$ ). Age (aOR = 1.33,  $p < .05$ ), family structure (ie, did not live with both parents; aOR = .56,  $P < .05$ ), and SES (eg, had a mother with lower educational attainment; aOR = .84,  $P < .05$ ) also predicted marijuana use in the past 30 days (Table 4).

## Discussion

This study examined the association between border community and immigration stress, normalization of drug trafficking, and perceived disordered neighborhood stress on past 30-day tobacco, alcohol, and marijuana use, respectively, among adolescents residing on the United States-Mexico border. Importantly, our findings suggest that exposure to drug trafficking may not only desensitize border adolescents to substance use, as suggested by our formative qualitative work<sup>22</sup> but may also play a role in whether or not they are current marijuana users. Our findings help triangulate formative work which found that border adolescents perceived a disproportionately high exposure to drug trade-related activity.<sup>22</sup> They attributed this to a struggling local economy, which is compounded by a long-standing and pervasive presence of drug trafficking desensitizing adolescents to the harms of substance use and increase access to illicit substances.<sup>22</sup> Previous research in parallel communities suggested that substance use was significantly related to the perception that illicit substances were easy to obtain as well as perceptions of high substance use in the respondent's neighborhood.<sup>15</sup> Prevention initiatives in border communities where drug trafficking is present (and potentially normalized) should consider the detrimental effects that this exposure has on adolescent health behaviors.

Disordered neighborhood environments are known to influence behavioral health and risk taking (eg, substance use) among adolescents.<sup>23–25</sup> Nevertheless, this study is one of very few studies to identify these phenomena in the United States-Mexico border region. Our findings also support the team's formative qualitative research with border adolescents, in which participants perceived that the poor economy, dilapidated buildings, broken windows and graffiti put youth in their community at higher risk for substance use because it limits how they envision their future career opportunities.<sup>22</sup> The troubled economic state in rural border communities coupled with the normalization of the drug trade may expose border

adolescents to multiple and compounded socioenvironmental risk factors for substance use. A possible solution is to create or promote existing youth programs with an emphasis on vocational and career training opportunities. Such a program may provide border adolescents with both an alternative to drug trafficking as an economic necessity and improve the economic state of their community.<sup>31</sup>

The examination of the influence of border-bound risk factors on adolescent substance misuse confirmed previous border research that found that perceived ethnic discrimination and border militarization, defined as “the saturation of and pervasive encounters with immigration officials including local police enacting immigration and border enforcement policy with military style tactics and weapons” have been shown to pose health risks to Hispanic border residents.<sup>17,18</sup> In the past decades, immigrant communities, and border communities in particular, have experienced a proliferation of anti-immigrant policies (eg, Arizona State Bill 1070) that restrict access to basic social determinants of health and subject communities to militarization.<sup>18</sup> More research is needed to better understand how the stress associated with living in a militarized border community influences adolescent substance misuse.

### Strengths and Limitations

The large sample size of Hispanic participants along with the wide age-range and inclusion of both male and female adolescents are a few of the strengths of this study. These findings provide valuable epidemiological data about the patterns of adolescent tobacco, alcohol, and marijuana use on the United States-Mexico border. The lead author who collected the data was not affiliated with the school, which may have decreased social desirability bias. Some limitations of our study are its cross-sectional nature and use of self-report measures. The proportion of participants who self-reported tobacco, alcohol, and marijuana use was small, which limits statistical power to assess differences across groups. Finally, our sample was limited to one rural border community, which limits the generalizability of the findings.

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### References

1. Trad PV. Developmental vicissitudes that promote drug abuse in adolescents. *Am J Drug Alcohol Abuse*. 1994;20(4):459–481. [PubMed: 7832180]



2. Buchholz KK. Nosology and epidemiology of addictive disorders and their comorbidity. *Psychiatr Clin North Am.* 1999;22(2): 221–240. [PubMed: 10385930]
3. Rhodes T, Lilly R, Fernández C, et al. Risk factors associated with drug use: the importance of ‘risk environment’. *Drugs: Edu, Prev Pol.* 2003;10(4):303–329.
4. U.S.-Mexico Border Health Commission. Health disparities and the U.S.-Méxicoborder: Challenges and opportunities 2010. Accessed May 3, 2018. <https://www.ruralhealthinfo.org/assets/1076-3987/health-disparities-united-states-mexico-border-challenges-andopportunities.pdf>.
5. United States Environmental Protection Agency, & Secretaria de Medio Ambiente y Recursos Naturales. Border 20:20- U.S. Mexico environmental program: State of the border region indicators interim report 2016. Accessed May 3, 2018. [https://www.epa.gov/sites/production/files/2017-01/documents/state\\_of\\_the\\_border\\_region\\_2016\\_122216.pdf](https://www.epa.gov/sites/production/files/2017-01/documents/state_of_the_border_region_2016_122216.pdf).
6. Johnston LD, O’Malley PM, Bachman JG, Schulenberg JE. Monitoring the Future. National Survey Results on Drug Use, 1975– 2009. Vol. 2: College Students and Adults Ages 19–50 Bethesda, MD: National Institute on Drug Abuse; 2010. NIH Publication 10–7585.
7. Partnership for Drug Free Kids. The partnership attitude tracking study. 2013. Accessed March 15, 2018. <https://drugfree.org/wp-content/uploads/2014/07/PATS-2013-FULL-REPORT.Pdf>.
8. Almodovar A, Tomaka J, Thompson S, McKinnon S, O’Rourke K. Risk and protective factors among high school students on the US/Mexico border. *Am J Health Behav.* 2006; 30(6):745–752. [PubMed: 17096630]
9. McKinnon SA, O’rourke KM, Thompson SE, Berumen JH. Alcohol use and abuse by adolescents: the impact of living in a border community. *J Adolesc Health.* 2004;34(1):88–93. [PubMed: 14706410]
10. Caetano R, Ramisetty-Mikler S, Wallisch LS, McGrath C, Spence RT. Acculturation, drinking, and alcohol abuse and dependence among Hispanics in the Texas–Mexico border. *Alcohol Clin Exp Res.* 2008;32(2):314–321. [PubMed: 18162071]
11. Caetano R, Mills B, Vaeth PAC. Alcohol consumption and binge drinking among US–Mexico border and non-border Mexican Americans. *Alcohol Clin Exp Res.* 2012;36(4):677–685. [PubMed: 22017228]
12. Caetano R, Vaeth PAC, Mills BA, Rodriguez LA. Alcohol abuse and dependence among US–Mexico border and non-border Mexican Americans. *Alcohol Clin Exp Res.* 2013;37(5): 847–853. [PubMed: 23278433]
13. Reingle JM, Caetano R, Mills BA, Vaeth PAC. The Role of immigration age on alcohol and drug use among border and non-border Mexican Americans. *Alcohol Clin Exp Res.* 2014; 38(7):2080–2086. [PubMed: 24846850]
14. Lange JE, Voas RB, Johnson MB. South of the border: a legal haven for underage drinking. *Addiction.* 2002;97(9):1195–1203. [PubMed: 12199835]
15. Wallisch LS, Spence RT. Alcohol and drug use, abuse, and dependence in urban areas and colonias of the Texas-Mexico border. *Hisp JBehav Sci.* 2006;28(2):286–307.
16. Borges G, Zemore S, Orozco R, et al. Co-occurrence of alcohol, drug use, DSM-5 alcohol use disorder, and symptoms of drug use disorder on both sides of the US–Mexico border. *Alcohol Clin Exp Res.* 2015;39(4):679–687. [PubMed: 25833029]
17. Carvajal SC, Rosales C, Rubio-Goldsmith R, et al. The border community and immigration stress scale: a preliminary examination of a community responsive measure in two southwest samples. *J Immigr Minor Health.* 2013;15(2):427–436. [PubMed: 22430894]
18. Sabo S, Shaw S, Ingram M, et al. Everyday violence, structural racism and mistreatment at the US–Mexico border. *Soc Sci Med.* 2014;109:66–74. [PubMed: 24705336]
19. Viruell-Fuentes EA, Miranda PY, Abdulrahim S. More than culture: structural racism, intersectionality theory, and immigrant health. *Soc Sci Med.* 2012;75(12):2099–2106. [PubMed: 22386617]
20. Kulis S, Marsiglia FF, Nieri T. Perceived ethnic discrimination versus acculturation stress: Influences on substance use among Latino youth in the Southwest. *J Health Soc Behav.* 2009;50(4): 443–459. [PubMed: 20099450]
21. Lee E, Wilson CE, Lara-Valencia F, de la Parra CA, Van Schoik R, Patron-Soberano K. The State of the Border Report: A Comprehensive Analysis of the US-Mexico Border. 2013. Border

- Research partnership. Accessed April 20, 2018. [https://www.wilsoncenter.org/sites/default/files/mexico\\_state\\_of\\_border\\_0.pdf](https://www.wilsoncenter.org/sites/default/files/mexico_state_of_border_0.pdf).
22. Valdez ES, Korchmaros J, Sabo S, Garcia DO, Carvajal S, Stevens S. How the U.S.-Mexico border influences adolescent substance use: Youth participatory action research using photovoice. *International Journal of Drug Policy*. 2019;73:146–155. [PubMed: 31353247]
  23. Aneshensel CS, Sucoff CA. The neighborhood context of adolescent mental health. *J Health Soc Behav*. 1996;37(4): 293–310. [PubMed: 8997886]
  24. Milam AJ, Furr-Holden CD, Whitaker D, Smart M, Leaf P, Cooley-Strickland M. Neighborhood environment and internalizing problems in African American children. *Community Ment Health J*. 2012;48(1):39–44. [PubMed: 21234683]
  25. Furr-Holden C, Smart MJ, Pokorni JL, et al. The NifETy method for environmental assessment of neighborhood-level indicators of violence, alcohol, and other drug exposure. *Prev Sci*. 2008;9(4): 245–255. [PubMed: 18931911]
  26. Rogler L The meaning of culturally sensitive research in mental health. *Am J Psychiatry*. 1989;146(3):296–303. [PubMed: 2919686]
  27. Lien N, Friestad C, Klepp KI. Adolescents' proxy reports of parents' socioeconomic status: How valid are they? *J Epidemiol Community Health*. 2001;55(10):731–737. [PubMed: 11553657]
  28. Ross CE, Mirowsky J. Disorder and decay: The concept and measurement of perceived neighborhood disorder. *Urban Aff Rev*. 1999;34(3):412–432.
  29. Flewelling RL, Bauman KE. Family structure as a predictor of initial substance use and sexual intercourse in early adolescence. *J Marriage Fam*. 1990;52(1):171–181.
  30. Barrett AE, Turner RJ. Family structure and substance use problems in adolescence and early adulthood: examining explanations for the relationship. *Addiction*. 2006;101(1):109–120. [PubMed: 16393197]
  31. Ferguson KM. Implementing a social enterprise intervention with homeless, street-living youths in Los Angeles. *Soc Work*. 2007; 52(2):103–112. [PubMed: 17580772]

### **So What? (Implications for Health Promotion Practitioners and Researchers)**

Previous literature explores patterns of alcohol use and associated risk factors for adolescents living on the United States-Mexico border.<sup>8,9</sup> This article adds to the existing literature by using a “risk environment” approach and exploring novel border-bound risk factors including border community and immigration stress, the normalization of drug trafficking, and perceived disordered neighborhood stress. This article informs the field of the importance of considering the border experience and its relationship to substance use among border adolescents. In particular, the predictive value of these findings can be used to guide interventions for adolescent health promotion, drug use prediction, and risk reduction associated with adolescent substance use on the border and in other high-risk settings. Public health practitioners, educational institutions, and policy makers should consider the economic and normative environment of the border for future adolescent substance use prevention and risk reduction efforts. Further, these efforts should be interprofessional in nature as a meant to creatively and comprehensively promote the development of the potential of these adolescents and thereby contribute to the overall development of society.

**Table 1.**

**BASUS Demographics and Study Variables.**

Characteristic	All participants N (%)	Nontobacco users N (%)	Tobacco users N (%)	Nonalcohol users N (%)	Alcohol users N (%)	Non-Marijuana users N (%)	Marijuana users N (%)
Total	445 (100.0)	387 (87.0)	58 (13.0)	294 (66.1)	151 (33.9)	393 (88.3)	52 (11.6)
Age							
14	47 (10.6)	46 (11.9)	1 (1.7)	34 (11.6)	13 (8.6)	43 (10.9)	4 (7.7)
15	95 (21.4)	87 (22.5)	81 (3.8)	73 (24.8)	22 (14.6)	89 (22.7)	6 (11.5)
16	95 (21.4)	81 (20.9)	14 (24.1)	64 (21.8)	31 (20.5)	86 (21.9)	9 (17.3)
17	113 (25.4)	93 (24)	20 (34.5)	65 (22.1)	48 (31.8)	95 (24.2)	18 (34.6)
18	95 (21.4)	80 (20.7)	15 (25.9)	58 (19.7)	37 (24.5)	80 (20.4)	15 (28.4)
Gender							
Male	189 (42.5)	157 (40.6)	32 (55.2)	121 (41.2)	68 (45.0)	167 (42.5)	22 (41.3)
Female	255 (57.3)	229 (59.6)	26 (44.8)	172 (58.5)	83 (45.0)	225 (57.3)	30 (57.7)
Country of Residence							
United States	412 (92.6)	361 (93.3)	51 (87.9)	285 (96.9)	127 (84.1)	368 (93.6)	44 (84.6) <sup>a</sup>
Mexico	33 (7.4)	26 (6.7)	7 (12.1)	9 (3.1)	24 (15.9)	25 (6.4)	8 (15.4)
Ethnicity							
Non-Hispanic	7 (1.8)	6 (2.0)	1 (3.0)	4 (1.3)	3 (0.1)	7 (1.8)	0 (0.0)
Hispanic	438 (98.4)	381 (98.0)	57 (97.0)	290 (65)	148 (33.3)	438 (98.4)	52 (100)
Family structure							
Both parents	245 (55.1)	219 (56.5)	26 (44.8)	172 (58.5)	73 (48.4)	219 (55.7)	26 (50)
Single parents	143 (32.1)	119 (30.8)	24 (41.4)	86 (29.3)	57 (37.8)	120 (30.5)	23 (44.2)
Other family	57 (12.8)	49 (12.7)	8 (13.8)	36 (12.2)	21 (13.9)	54 (13.7)	3 (5.8)
Mother education							
<High school	85 (19.1)	77 (19.9)	8 (13.8)	46 (15.6)	39 (25.8)	73 (18.6)	12 (23.1)
High school	115 (25.8)	101 (26.1)	14 (24.1)	73 (24.8)	42 (27.8)	99 (25.2)	16 (30.1)
Some college	115 (25.8)	94 (24.3)	21 (36.2)	80 (27.2)	35 (23.2)	99 (25.2)	16 (30.1)
College	85 (19.1)	75 (19.4)	10 (17.2)	60 (20.4)	25 (16.6)	78 (19.9)	7 (13.5)
Unknown	45 (10.1)	40 (10.3)	5 (8.6)	35 (11.9)	10 (6.6)	44 (11.2)	1 (1.9)

Risk factors	Mean, min, max, (SD)	Mean, min, max, (SD)	Mean, min, max, (SD)	Mean, min, max, (SD)	Mean, min, max, (SD)	Mean, min, max, (SD)
Border community and immigration stress	16.87, 10, 37 (4.82)	16.61, 10, 37 (4.78)	18.53, 10, 31 (4.79)	16.31, 10, 37 (4.67)	17.75, 10, 31 (4.93) <sup>b</sup>	16.65, 10, 37 (4.69)
Normalization of drug trafficking	10.29, 6, 17 (2.41)	10.24, 6, 17 (2.37)	10.66, 6, 17 (2.63) <sup>b</sup>	10.21, 6, 17 (2.42)	10.45, 10, 16 (2.38)	10.18, 6, 17 (2.37)
Perceived disordered neighborhood stress	29.67, 15, 52 (6.37)	29.53, 15, 52 (6.33)	30.52, 18, 47 (6.60)	28.76, 15, 45 (5.79)	31.40, 15, 52 (7.05) <sup>b</sup>	29.28, 15, 52 (6.36)

Abbreviations: BASUS, Border Adolescent Substance Use Survey; max, maximum; min, minimum; SD, standard deviation.

<sup>a</sup>  $P < .05$ .

<sup>b</sup>  $P < .00$ .

<sup>c</sup>  $P < .01$ .

**Table 2.**

Logistic Regression Assessing Tobacco Use Past 30 Days.

Characteristic	(1) aOR (95% CI)	(2) aOR (95% CI)
Border community and immigration stress	1.41 (1.07–1.84) <sup>a</sup>	1.43 (1.09–1.90) <sup>a</sup>
Normalization of drug trafficking	1.11 (.84–1.49)	1.18 (.88–1.58)
Perceived disordered neighborhood stress	1.06 (.80–1.41)	.99 (.73–1.34)
Age		1.41 (1.10–1.80) <sup>b</sup>
Gender		.55 (.30–1.01) <sup>c</sup>
Country of residence		2.62 (.99–6.94) <sup>c</sup>
Family structure		.75 (.48–1.16)
Mother education (SES)		1.13 (.89–1.45)

Abbreviations: aOR, adjusted odds ratio; SES, socioeconomic status.

<sup>a</sup> $P < .01$ .<sup>b</sup> $P < .00$ .<sup>c</sup> $P < .05$ .

**Table 3.**

Logistic Regression Assessing Alcohol Use Past 30 Days.

Characteristic	(1) aOR (95% CI)	(2) aOR (95% CI)
Border community and immigration stress	1.31 (1.07–1.61) <sup>a</sup>	1.34 (1.08–1.67) <sup>a</sup>
Normalization of drug trafficking	.99 (.81–1.22)	1.01 (.81–1.25)
Perceived disordered neighborhood stress	1.46 (1.18–1.81) <sup>b</sup>	1.32 (1.05–1.65) <sup>c</sup>
Age		1.24 (1.05–1.47) <sup>a</sup>
Gender		.66 (.43–1.02)
Country of residence		5.02 (2.16–11.66) <sup>b</sup>
Family structure		.84 (.60–1.16)
Mother education (SES)		.82 (.00–.94) <sup>c</sup>

Abbreviations: aOR, adjusted odds ratio; SES, socioeconomic status.

<sup>a</sup>*P* < .01<sup>b</sup>*P* < .00.<sup>c</sup>*P* < .05.

**Table 4.**

Logistic Regression Assessing Marijuana Use Past 30 Days.

Characteristic	Model 1 aOR (95% CI)	Model 2 aOR (95% CI)
Border Community and Immigration-Related Stress Scale	1.26 (0.96–1.67)	1.31 (0.98–1.75)
Normalization of Drug Trafficking Scale	1.45 (1.06–1.89) <sup>a</sup>	1.45 (1.06–2.00) <sup>a</sup>
Perceived Disordered Neighborhood Stress Scale	1.47 (1.09–1.97) <sup>b</sup>	1.32 (0.98–1.79)
Age		1.33 (1.03–1.71) <sup>a</sup>
Gender		.74 (0.39–1.40)
Country of residence		2.2 (0.87–5.67)
Family structure		.56 (0.34–.92) <sup>a</sup>
Mother education (SES)		.84 (.00–.36) <sup>a</sup>

Abbreviations: aOR, adjusted odds ratio; SES, socioeconomic status.

<sup>a</sup>*P* < .05.<sup>b</sup>*P* < .01.