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Adverse childhood experiences and substance use among Hispanic emerging adults in Southern California

Jon-Patrick Allem, Ph.D., M.A.[1], **Daniel W. Soto, M.P.H**[1], **Lourdes Baezconde-Garbanati, Ph.D.**[1], and **Jennifer B. Unger, Ph.D.**[1]

[1]University of Southern California Keck School of Medicine, 2001 N. Soto Street, 3rd Floor Mail, Los Angeles, CA 90032

Abstract

Introduction—Emerging adults who experienced stressful childhoods may engage in substance use as a maladaptive coping strategy. Given the collectivistic values Hispanics encounter growing up, adverse childhood experiences may play a prominent role in substance use decisions as these events violate the assumptions of group oriented cultural paradigms. Alternatively, adverse childhood events might not increase the risk of substance use because strong family ties could mitigate the potential maladaptive behaviors associated with these adverse experiences. This study examined whether adverse childhood experiences were associated with substance use among Hispanic emerging adults.

Method—Participants (n=1420, mean age=22, 41% male) completed surveys indicating whether they experienced any of 8 specific adverse experiences within their first 18 years of life, and past-month cigarette use, marijuana use, hard drug use, and binge drinking. Logistic regression models examined the associations between adverse childhood experiences and each category of substance use, controlling for age, gender, and depressive symptoms.

Results—The number of adverse childhood experiences was significantly associated with each category of substance use. A difference in the number of adverse childhood experiences, from 0 to 8, was associated with a 22% higher probability of cigarette smoking, a 24% higher probability of binge drinking, a 31% higher probability of marijuana use, and a 12% higher probability of hard drug use respectively.

Address for correspondence: Jon-Patrick Allem 2001 N. Soto Street, 3rd Floor Mail, Los Angeles, CA 90032. Phone: (858) 603-0812 allem@usc.edu.

Contributors:

Jon-Patrick Allem designed the concept of the study and was responsible for the analysis and interpretation of data and drafted the first version of the manuscript. Jennifer B. Unger, Daniel W. Soto and Lourdes Baezconde-Garbanati provided critical revisions of the manuscript for important intellectual content and approved the final manuscript.

Conflicts of Interest:

The authors declare no conflicts of interest.

Conclusions—These findings should be integrated into prevention/intervention programs in hopes of quelling the duration and severity of substance use behaviors among Hispanic emerging adults.

Keywords

Adverse childhood experiences; Hispanics; Emerging Adults; Young Adults; Substance use; Prevention

1. Introduction

Emerging adulthood is a time of exploration, transition, and development between the ages of 18 and 25 (Arnett, 2011). The use of tobacco products, illicit drugs, and binge drinking can undermine optimal development, and are prevalent behaviors among emerging adults in the U.S. (Substance Abuse and Mental Health Services Administration, 2013). The prevalence of tobacco product use, drug use, and binge drinking varies by ethnicity (Regina, Miles, Tucker, Zhou, & D'Amico, 2010), with Hispanics described as a priority population for substance use prevention (Stone, Becker, Huber, & Catalano, 2012). The literature on substance use among Hispanic emerging adults is growing, but still in its nascent stage.

Recent studies have focused on how role transitions are associated with substance use among Hispanic emerging adults. These studies viewed substance use as a maladaptive coping strategy where substance use starts and increases for emerging adults shortly after a role transition is experienced (Arnett, 2005). For example, loss of a job, experiencing a breakup, starting to date someone new, being arrested, and becoming a caregiver for a family member were associated with past-month cigarette use (Allem, Soto, Baezconde-Garbanati, & Unger, 2013). Being arrested, experiencing a breakup, starting to date someone new, starting a new job, and experiencing a demotion at work were found to be associated with binge drinking and marijuana use among Hispanic emerging adults (Allem, Lisha, Soto, Baezconde-Garbanati, & Unger, 2013). While identifying which role transitions are associated with substance use has been useful in furthering the literature on Hispanic emerging adults, a critical next step to reducing the prevalence of substance use among this priority population may involve understanding how adverse childhood experiences are associated with substance use (Rosenberg, 2011). Emerging adults who experienced stressful childhoods may also engage in substance use as maladaptive coping strategies in order to avoid negative emotions.

Frameworks that describe early emotional development provide insight to why maladaptive coping mechanisms start and continue among individuals who experience trauma in childhood (Bradley et al., 2011; Gerson & Rappaport, 2013; Schore, 2009). One of the earliest unfortunate situations an individual can be born into is abuse in childhood. Abuse and other traumatic events ultimately impact how the child sees the world and views interpersonal relationships (Schore, 2009). An automatic response to overwhelming situations, especially situations out of the control of the child, is to disassociate (e.g. emotionally detach from the immediate surroundings) (Dalenberg et al, 2012). When mechanisms like disassociation are repeatedly used as a defense in order to shut out

affective responses to events or people, there are direct consequences on child development (Schore, 2014). One such consequence is the inability to form secure attachment (e.g., a biological impulse to gravitate toward a caregiver or parent in the face of discomfort) (Schore, 2002; Landers & Sullivan, 2012; Sullivan, 2012), which has been described as the biological preamble for processes like intimacy and emotional regulation (Porgess & Furman, 2011).

It has been shown that biological experiences provide the capacity for individuals to develop attachment and eventually emotional regulation (Porgess, 2009; Rincón-Cortés & Sullivan, 2014). This biological development starts in infancy and is informed by social relationships. One specific requisite for secure attachment is the sense of safety (Porgess, 2003). The feeling of safety is developed by reciprocal signals between offspring and caregiver, and is molded by the offspring's environment. If the feeling of safety is present for the offspring, secure attachment can develop (Porgess, 2001). In other words, there are substrates for intimacy that allows for closeness and the capacity for emotional regulation. In the presence of adverse childhood experiences these processes are retarded, and the ability to form secure attachment, and subsequently the ability to regulate emotions is curbed. With an impaired ability to regulate emotions, individuals may engage in substance use or other maladaptive behaviors in order to cope with the sequela of trauma.

Adverse childhood experiences violate one of the pillars of group oriented cultural paradigms, the family (Triandis, McCusker, & Hui, 1990). Given the collectivistic values Hispanics encounter growing up (Arnett, 2003; Shkodriani & Gibbons, 1995; Gaines et al., 1997), this betrayal may have an influential role in substance use decisions. Alternatively, adverse childhood experiences may not have an association with substance use among Hispanics, as their strong family ties could mitigate the potential maladaptive behaviors associated with these adverse experiences. This study examined whether or not adverse childhood experiences were associated with substance use among Hispanic emerging adults in order to inform prevention and intervention programs for this priority population.

Hypothesis 1

The accumulated number of adverse childhood experiences is positively associated with substance use.

Hypothesis 2

Specific adverse childhood experiences are positively associated with substance use.

2. Methods

2.1 Participants

Participants filled out surveys for Project RED (Retiendo y Entendiendo Diversidad para Salud), a longitudinal study of cultural risk and protective factors for substance use among Hispanics in Southern California (Lorenzo-Blanco, Unger, Ritt-Olson, Soto, & Baezconde-Garbanati, 2013). Originally, participants joined the study as adolescents, while attending one of seven high schools in the greater Los Angeles area. Details on school recruitment,

student recruitment, and survey procedures have been published elsewhere (Unger, Ritt-Olson, Wagner, Soto, & Baezconde-Garbanati, 2009). The University's Institutional Review Board approved all procedures. Participants who self-identified as Hispanic, Latino or Latina, Mexican, Mexican-American, Chicano or Chicana, Central American, South American, Mestizo, La Raza, or Spanish were surveyed in emerging adulthood from January 2012 to December 2013. Research assistants sent letters to respondents' last known addresses, and invited them to call a toll-free phone number, or visit a website to participate in the study. If participants could not be contacted with the information they had provided in high school, staff searched for them online using social networking sites, and publicly available search engines. These tracking procedures resulted in 2,151 participants with valid contact information. A total of 1,420 (66%) emerging adults provided verbal consent over the phone, or read the consent script online, and clicked a button to indicate consent, and participated in the survey. Those lost to follow-up were significantly more likely to be male, report binge drinking, marijuana use, and hard drug use in high school, but did not differ on age, or smoking status in high school.

2.2 Measures

Researchers at Kaiser Permanente developed the adverse childhood experiences scale (Felitti et al., 1998); this scale was adopted for the present study. The adverse childhood experiences score is an integer count of eight distinct categories of adverse childhood experiences, and measures cumulative exposure to trauma in childhood. Coding of the adverse childhood experiences measures, and the subsequent analysis strategy were informed by prior research conducted by the original authors of the scale (Anda et al., 1999).

All questions regarding adverse childhood experiences referred to the participants' first 18 years of life. Participants were prompted with the statement: "The next set of questions will be about events that may have happened to you while growing up in the first 18 years of life…" **Verbal abuse** was determined from answers to the following two questions: "…how often did a parent, stepparent, or adult living in your home swear at you, insult you, or put you down?" and "…how often did a parent, stepparent, or adult living in your home threaten to hit you or throw something at you, but didn't do it?" Responses of "often," or "very often," to either item defined verbal abuse during childhood.

Physical abuse was determined from answers to the following two questions: "…how often did a parent, stepparent, or adult living in your home push, grab, slap, or throw something at you?" and "…how often did a parent, stepparent, or adult living in your home hit you so hard that you had marks or were injured?" A participant was defined as being physically abused if their response was either "often," or "very often," to the first question or "sometimes," "often," or "very often," to the second.

Sexual abuse was measured by the following: "Some people, while they are growing up in their first 18 years of life, had a sexual experience with an adult or someone at least 5 years older than themselves. These experiences may have involved a relative, family friend, or stranger. During the first 18 years of life, did an adult, relative, family friend, or stranger ever (1) touch or fondle your body in a sexual way, (2) have you touch their body in a sexual way, (3) attempt to have any type of sexual intercourse with you (oral, anal, or vaginal), (4)

actually have any type of sexual intercourse with you (oral, anal, or vaginal)?" A "yes" response to any 1 of the 4 questions defined a participant as having experienced sexual abuse during childhood.

Battered mother was determined by answers to four questions as follows: "Sometimes physical blows occur between parents. While you were growing up in your first 18 years of life, how often did your father (or stepfather) or mother's boyfriend do any of these things to your mother (or stepmother) (1) push, grab, slap or throw something at her, (2) kick, bite, hit her with a fist, or hit her with something hard, (3) repeatedly hit her over at least a few minutes, (4) threaten her with a knife or gun, or use a knife or gun to hurt her?" A response of "sometimes," "often," or "very often" to at least 1 of the first 2 questions or any response other than "never" to at least 1 of the third and fourth questions defined a participant as was having had a battered mother.

Household substance abuse was determined by asking participants if they lived with anyone who was a problem drinker or alcoholic, or with anyone who used street drugs during childhood. A "yes" response to either question indicated childhood exposure to substance abuse in the household.

Mental illness in the household was determined by asking participants if anyone in their household was depressed or mentally ill, or anyone in their household attempt to commit suicide during childhood. A "yes" response to either question indicated childhood exposure to mental illness in the household.

Parental separation or divorce was determined by a "yes" response to the question: "Were your parents ever separated or divorced?"

Incarcerated household members was determined by a "yes" response to the question: "While you were growing up, that is, in your first 18 years of life, did anyone in your household go to prison?"

Poor mental health, such as feeling depressed, could confound the relationship between adverse childhood experiences and substance use (Anda et al., 2002; Douglas et al., 2010). As such, a version of the Boston short-form CES-D as developed by Kohout and colleagues (1993), and validated among Hispanics by Grzywacz and colleagues (2006), was adopted to measure depressive symptoms. Participants were prompted with the statement, "These next question are about how you have felt in the past week…" and provided ten survey items which included, "I felt depressed," "I felt that everything I did was difficult," "I didn't sleep well," "I was happy," "I felt lonely," "People were unfriendly," "I enjoyed life," "I felt sad," "I felt people disliked me," and "I could not get 'going'." Response options were "Less than 1 day or never" coded as 1, "1–2 days" coded as 2, "3–4 days" coded as 3, and "5–7 days" coded as 4. Response options for items "I was happy," and "I enjoyed life" were reverse coded. For each of the ten items, participants who reported either a 0 or 1 were then recoded to 0 and those who reported a 2, 3 or 4, were recoded to 1 to approximate the yes/no response sequence described by Kohout and colleagues (1993). Responses to the ten items were then summed (Cronbach's alpha =. 84). Age and gender were also measured in this study.

Past-month cigarette use, past-month marijuana use, past-month binge drinking (e.g., five or more drinks of alcohol in a row, that is, within a couple of hours) and past-month hard drug use (e.g., cocaine, methamphetamines, MDMA or Ecstasy, LSD, and Inhalants) were the four specific outcomes of interest. Each outcome was coded so that a 1, or a "yes" response, represented any use in the past-month of the specific substance in question. A 0, or a "no" response, represented that the respondent did not use the substance in question in the past-month.

2.3 Analysis plan

While data gathered from Project RED are longitudinal, data were analyzed from a single time point (year 2 of emerging adulthood-the only year when adverse childhood experiences and substance use were measured). The total number of adverse childhood experiences was summed for each participant (range, 0–8); each substance use outcome was then regressed on the summed score as an ordinal variable. This analysis determined if the accumulated number of adverse childhood experiences was associated with substance use (H1). Each substance use outcome was then regressed on each category of adverse childhood experiences. This analysis determined which category of adverse childhood experiences was associated with substance use (H2). For every model the control variables were age, gender, and depressive symptoms. Statistical significance for all tests were determined by $p<.05$. Listwise deletion was used to handle non-responses. About 10% of participants were removed in analyses due to non-response. For all analyses, quantities of interest were calculated using the estimates from each multivariable analysis by simulation using 1,000 randomly drawn sets of estimates from a sampling distribution with mean equal to the maximum likelihood point estimates, and variance equal to the variance-covariance matrix of the estimates, with covariates held at their mean values (King, Tomz, & Wittenberg, 2000).

3. Results

Among the participants, 41% were male, and the average age was 22 years (Table 1). The three most common adverse childhood experiences were parental separation/divorce (37%), household substance abuse (36%), and physical abuse (30%). The average number of total adverse childhood experiences was two. Twenty-seven percent (27%) of participants reported 0 adverse childhood experiences, and 1% of participants reported experiencing all 8. The accumulated number of adverse childhood experiences was statistically significantly associated with each category of substance use.

A difference in the number of adverse childhood experiences, from 0 to 8, was associated with a 22% (95% Confidence Interval [CI], 11 to 35) higher probability of cigarette smoking among Hispanic emerging adults (Figure 1A). The same, 0 to 8, difference in the number of childhood experiences was associated with a 24% (95% CI, 13 to 35) higher probability of binge drinking among Hispanic emerging adults (Figure 1B). Additionally, the same difference in the number of adverse childhood experiences, from 0 to 8, was associated with a 31% (95% CI, 19 to 44), and 12% (95% CI, 4 to 20) higher probability of marijuana use (Figure 1C), and hard drug use (Figure 1D), respectively among Hispanic emerging adults.

Specific categories of adverse childhood experiences were also statistically significantly associated with substance use. Participants who reported verbal abuse, household substance abuse, parental separation or divorce, and mental illness in the household had higher probabilities of past-month cigarette use, ranging from 9% (95% CI, 3 to 16) to 7% (95% CI, 1 to 13), compared to those who did not, respectively (Figure 2A). Participants who reported physical abuse, household substance abuse, an incarcerated household member, mental illness in the household, sexual abuse, and verbal abuse had higher probabilities of past-month binge drinking, ranging from 13% (95% CI, 7 to 19) to 7% (95% CI, 0 to 15), compared to those who did not, respectively. Participants who reported mental illness in the household, parental separation or divorce, verbal abuse, household substance abuse, and physical abuse had higher probabilities of past-month marijuana use, ranging from 12% (95% CI, 6 to 19) to 9% (95% CI, 4 to 14), compared to those who did not, respectively (Figure 2B). Participants who reported sexual abuse, verbal abuse, and physical abuse had higher probabilities of past-month hard drug use, ranging from 6% (95% CI, 2 to 10) to 3% (95% CI, 1 to 6), compared to those who did not, respectively.

4. Conclusion

The present findings suggest there is a positive association between adverse childhood experiences and substance use among Hispanic emerging adults. Earlier studies have shown associations between adverse childhood experiences and cigarette use (Anda et al., 1999), alcohol use (Dube, Anda, Felitti, Edwards, & Croft, 2002) and drug use (Dube et al., 2003). These studies, however, did not comprise a sample of participants in the age group at highest risk for substance use, a priority ethnic population, nor did they include a sample of participants drawn from a collectivistic culture. Adverse childhood experiences represent the harms or disturbances within families or group dynamics. These disturbances could be paramount for populations like Hispanic emerging adults, as families are perceived as a source of strength and support, making Hispanic emerging adults especially vulnerable to the sequela of trauma in childhood.

There may be several explanations for these associations. Adverse events may make children more aggressive, more oppositional, or less bounded to schools, churches, and community organizations, so they start to affiliate with deviant peer groups who influence decisions regarding substance use. Certain adverse childhood experiences involve substance use, or may be more likely to occur when someone is using substances; therefore these associations may reflect an inherited susceptibility to substance use. Adverse experiences taking place in childhood may impair the cognitive, emotional, and behavioral development of children (Repetti, Taylor, & Seeman, 2002). This impairment may be a function of changes in the brain's physiology during the course of development (McEwen, 2007) and/or it may be a result of environmental factors inhibiting the child's ability to develop (Jaffee & Maikovich-Fong, 2011). In either case, these impairments may lead the child to develop unhealthy coping mechanisms (Stevens, Colwell, Smith, Robinson, & McMillan, 2005). Unhealthy coping mechanisms such as smoking, binge drinking, marijuana use, or hard drug use may not dissipate until they are properly treated, and the individual learns more effective responses to negative emotions. If not corrected by emerging adulthood, addiction may set

in with a physiological need for substances posing as an additional barrier to abstinence in the future.

4.1 Limitations

Limitations of this study include reliance upon self-reported data to determine substance use and adverse childhood experiences. Studies of test-retest reliability of retrospective reports of adverse childhood experiences have shown agreement (Dube, Williamson, Thompson, Felitti, & Anda, 2004), while other examinations suggested adult retrospective reports might be unreliable and biased (Hard & Rutter, 2004). It is likely, however, that false negatives would be more common than false positives, biasing results toward the null. In other words, individuals may be reticent to admit trauma in childhood therefore biasing the results toward no association with substance use. Given the significant associations found between adverse childhood experiences and substance use in the present study, one may conclude Hispanic emerging adults are willing to report on their adverse childhood experiences.

The adverse childhood experiences scale employed in the present study may not be an exhaustive measure of exposure to trauma in childhood. Previous research has suggested peer rejection, exposure to violence outside the home, low socioeconomic status, and poor academic performance be incorporated into the scale (Finkelhor, Shattuck, Turner, & Hamby, 2013). Including these constructs, and expanding the scale should be an area of future research. The scale used herein is one of many ways exposure to trauma in childhood has been correlated with substance use (Young-Wolff, Kendler, & Prescott, 2012; Schilling, Aseltine, & Gore, 2007; Douglas et al., 2010; Kabiru, Beguy, & Ezeh, 2010; Kauhanen, Leino, Lakka, Lynch, & Kauhanen, 2011; Koss et al., 2003; Schellekens et al., 2013; Zlotnick, Tam, & Robertson; 2004; Low et al., 2012; Rothman, Bernstein, & Strunin, 2010; Meara & Frank, 2005), and it is unclear whether these associations would replicate with alternative measures of childhood trauma.

4.2 Conclusion

Findings presented herein coincide with prior research on Hispanic emerging adults that suggest substance use is used as a maladaptive coping strategy (Allem et al., 2013a; Allem et al, 2013b; Allem, Soto, Baezconde-Garbanati, & Unger, 2015). Collectively, these findings indicate that substances are used as a way to relieve negative emotions from stress, and that life events, both past and present, are associated with these deleterious coping strategies among Hispanic emerging adults. Findings from the present study coupled with earlier studies have the potential to inform prevention and intervention programs targeted at this priority population. Primary and secondary prevention programs could focus on emotional regulation and/or cognitive restructuring, and the development of coping skills that address the distress associated with the problematic relationships and behaviors within the family. Participants could undergo group sessions that emphasize coping skills, mindfulness and social support. Certified specialists in the area of trauma recovery could lead programs on how to address shortterm and long-term consequences of victimization and trauma. Integrating these procedures into prevention/intervention aimed at Hispanic children, adolescents, and emerging adults may reduce substance use among this target population.

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References

Allem JP, Lisha NE, Soto DW, Baezconde-Garbanati L, Unger JB. Emerging adulthood themes, role transitions and subsstance use among Hispanics in Southern California. Addictive Behaviors. 2013a; 38(12):2797–2800. [PubMed: 24018219]

Allem JP, Soto DW, Baezconde-Garbanati L, Unger JB. Role transitions in emerging adulthood are associated with smoking among Hispanics in Southern California. Nicotine & Tobacco Research. 2013b; 15(11):1948–1951. [PubMed: 23811010]

Allem JP, Soto D, Baezconde-Garbanati L, Unger J. The Relationship Between the Accumulated Number of Role Transitions and Hard Drug Use among Hispanic Emerging Adults. Journal of Psychoactive Drugs. 2015; 47(1):60–64. [PubMed: 25715073]

Anda RF, Croft JB, Felitti VJ, Nordenberg D, Giles WH, Williamson DF, Giovino GA. Adverse childhood experiences and smoking during adolescence and adulthood. Journal of the American Medical Association. 1999; 282(17):1652–1658. [PubMed: 10553792]

Anda RF, Whitfield CL, Felitti VJ, Chapman D, Edwards VJ, Dube SR, Williamson DF. Adverse childhood experiences, alcoholic parents, and later risk of alcoholism and depression. Psychiatric Services. 2002; 53(8):1001–1009. [PubMed: 12161676]

Arnett JJ. Conceptions of the transition to adulthood among emerging adults in American ethnic groups. New Directions in Child and Adolescent Development. 2003; 2003(100):63–76.

Arnett JJ. The developmental context of substance use in emerging adulthood. Journal of Drug Issues. 2005; 35(2):235–254.

Arnett, JJ. Emerging adulthood(s): The cultural psychology of a new life stage. In: Jensen, LA., editor. Bridging cultural and developmental approaches to psychology: New synthesis in theory, research, and policy. New York, NY: Oxford University Press; 2011. p. 255-275.

Bradley B, DeFife JA, Guarnaccia C, Phifer J, Fani N, Ressler KJ, Westen D. Emotion dysregulation and negative affect: Association with psychiatric symptoms. Journal of Clinical Psychiatry. 2011; 72(5):685–691. [PubMed: 21658350]

Dalenberg CJ, Brand BL, Gleaves DH, Dorahy MJ, Loewenstein RJ, Cardeña E, Spiegel D. Evaluation of the evidence for the trauma and fantasy models of dissociation. Psychological Bulletin. 2012; 138(3):550–588. [PubMed: 22409505]

Dube SR, Anda RF, Felitti VJ, Edwards VJ, Croft JB. Averse childhood experiences and personal alcohol abuse as an adult. Addictive Behaviors. 2002; 27(5):713–725. [PubMed: 12201379]

Dube SR, Felitti VJ, Dong M, Chapman DP, Giles WH, Anda RF. Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: the adverse childhood experiences study. Pediatrics. 2003; 111(3):564–572. [PubMed: 12612237]

Dube SR, Williamson DF, Thompson T, Felitti VJ, Anda RF. Assessing the reliability of retrospective reports of adverse childhood experiences among adult HMO members attending a primary care clinic. Child Abuse & Neglect. 2004; 28(7):729–737. [PubMed: 15261468]

Douglas KR, Chan G, Gelernter J, Arias AJ, Anton RF, Weiss RD, Kranzle HR. Adverse childhood events as risk factors for substance dependence: partial mediation by mood and anxiety disorders. Addictive Behaviors. 2010; 35(1):7–13. [PubMed: 19720467]

Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, Marks JS. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. American Journal of Preventive Medicine. 1998; 14(4):245–258. [PubMed: 9635069]

Finkelhor D, Shattuck A, Turner H, Hamby S. Improving the adverse childhood experiences study scale. Journal of the American Medical Association Pediatrics. 2013; 167(1):70–75. [PubMed: 23403625]

Gaines SO Jr, Marelich WD, Bledsoe KL, Steers WN, Henderson MC, Granrose CS, Page MS. Links between race/ethnicity and cultural values as mediated by racial/ethnic identity and moderated by gender. Journal of personality and social psychology. 1997; 72(6):1460. [PubMed: 9177025]

Gerson R, Rappaport N. Traumatic stress and posttraumatic stress disorder in youth: recent research findings on clinical impact, assessment, and treatment. Journal of Adolescent Health. 2013; 52(2): 137–143. [PubMed: 23332476]

Grzywacz JG, Hovey JD, Seligman LD, Arcury TA, Quandt SA. Evaluating short-form versions of the CES-D for measuring depressive symptoms among immigrants from Mexico. Hispanic Journal of Behavioral Sciences. 2006; 28(3):404–424.

Hard J, Rutter M. Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. Journal of Child Psychology and Psychiatry. 2004; 45(2):260–273. [PubMed: 14982240]

Jaffee SR, Maikovich-Fong AK. Effects of chronic maltreatment and maltreatment timing on children's behavior and cognitive abilities. Journal of Child Psychology and Psychiatry. 2011; 52(2):184–194. [PubMed: 20735512]

Jessor, R.; Donovan, JE.; Costa, FM. Beyond adolescence: Problem behavior and young adult development. New York, NY: Cambridge University Press; 1991.

Kabiru CW, Beguy D, Ezeh AC. Self reported drunkenness among adolescents in four sub-Saharan African countries: Associations with adverse childhood experiences. Child and Adolescent Psychiatry and Mental Health. 2010; 4:17. [PubMed: 20569490]

Kauhanen L, Leino J, Lakka H, Lynch JW, Kauhanen J. Adverse childhood experiences and risk of binge drinking and drunkenness in middle-aged Finnish men. Advances in Preventive Medicine. 2011; 2011(478741):1–12.

King G, Tomz M, Wittenberg J. Making the most of statistical analyses: improving interpretation and presentation. American Journal of Political Science. 2000; 44(2):341–355. Retrieved from http://www.jstor.org/discover/10.2307/2669316.

Kohout FJ, Berkman LF, Evans DA, Cornoni-Huntley J. Two shorter forms of the CES-D depression symptoms index. Journal of aging and health. 1993; 5(2):179–193. [PubMed: 10125443]

Koss MP, Yuan NP, Dightman D, Prince RJ, Polacca M, Sanderson B, Goldman D. Adverse childhood exposures and alcohol dependence among seven Native American tribes. American Journal of Preventive Medicine. 2003; 25(3):238–244. [PubMed: 14507531]

Landers MS, Sullivan RM. The development and neuroiology of infant attachment and fear. Developmental Neuroscience. 2012; 34(2–3):101–114. [PubMed: 22571921]

Lorenzo-Blanco EI, Unger JB, Ritt-Olson A, Soto D, Baezconde-Garbanati Lourdes. A longitudinal analysis of Hispanic youth acculturation and cigarette smoking: The roles of gender, culture, family, and discrimination. Nicotine & Tobacco Research. 2013; 15(5):957–968. [PubMed: 23109671]

Low NCP, Dugas E, O'Loughlin E, Rodriguez D, Contreras G, Chaiton M, O'Loughlin J. Common stressful life events and difficulties are associated with mental health symptoms and substance use in young adolescents. BMC Psychiatry. 2012; 12:116. [PubMed: 22900789]

McEwen BS. Physiology and neurobilogy of stress and adaptation: Central role of the brain. Physiological Reviews. 2007; 87(3):873–904. [PubMed: 17615391]

Porgess SW. The polyvagal theory: phylogenetic substrates of a social nervous system. International Journal of Psychophysiology. 2001; 42(2):123–146. [PubMed: 11587772]

Porgess SW. Social engagement and attachment: A phylogenetic perspective. Annals of the New York Academy of Sciences. 2003; 1008:31–47. [PubMed: 14998870]

Porgess SW. The polyvagal theory: New insights into adaptive reactions of the autonomic nervous system. Cleveland Clinic Journal of Medicine. 2009; 76(Suppl2):S86–S90. [PubMed: 19376991]

Porgess SW, Furman SA. The early development of the autonomic nervous system provides a neural platform for social behavior: A polyvagal perspective. Infant and Child Development. 2011; 20(1): 106–118. [PubMed: 21516219]

Regina AS, Miles JNV, Tucker JS, Zhou AJ, D'Amico EJ. Racial/ethnic differences in adult substance use: Mediation by individual, family, and school factors. Journal of Studies on Alcohol and Drugs. 2010; 71(5):640–651. [PubMed: 20731969]

Repetti RL, Taylor SE, Seeman TE. Risky families: Family social environments and the mental and physical health of offspring. Psychological Bulletin. 2002; 128:330–366. [PubMed: 11931522]

Rincón-Cortés M, Sullivan RM. Early life trauma and attachment: immediate and enduring effects on neurobehavioral and stress axis development. Frontiers in Endocrinology. 2014; 5(33)

Rosenberg L. Addressing trauma in mental health and substance use treatment. Journal of Behavioral Health Services & Research. 2011; 38(4):428–431. [PubMed: 21874392]

Rothman EF, Bernstein J, Strunin L. Why might adverse childhood experiences lead to underage drinking among US youth? Findings from an emergency department-based qualitative pilot study. Substance Use & Misuse. 2010; 45(13):2290–2010.

Triandis HC, McCusker C, Hui CH. Multimethod probes of individualism and collectivism. Journal of personality and social psychology. 1990; 59(5):1006.

Schellekens AFA, Franke B, Ellenbroek B, Cools A, de Jong CAJ, Buitelaar JK, Verkes R. COMT Val158Met modulates the effect of childhood adverse experiences on the risk of alcohol dependence. Addiction Biology. 2013; 18(2):344–356. [PubMed: 22509987]

Schilling EA, Aseltine RH, Gore S. Adverse childhood experiences and mental health in young adults: a longitudinal survey. BMC Public Health. 2007; 7:30. [PubMed: 17343754]

Schore AN. Dysregulation of the right brain: a fundamental mechanism of traumatic attachment and the psychopathogenesis of posttraumatic stress disorder. Australian and New Zealand Journal of Psychiatry. 2002; 36(1):9–30. [PubMed: 11929435]

Schore AN. Relational trauma and the developing right brain: An interface of psychoanalytic self psychology and neuroscience. Annals of the New York Academy of Sciences. 2009; 1159:189–203. [PubMed: 19379241]

Schore AN. The right brain is dominant in psychotherapy. Psychotherapy. 2014; 51(3):388–397. [PubMed: 25068194]

Shkodriani GM, Gibbons JL. Individualism and collectivism among university students in Mexico and the United States. The Journal of Social Psychology. 1995; 135(6):765–772.

Stevens SL, Colwell B, Smith DW, Robinson J, McMillan C. An exploration of self- reported negative affect by adolescents as a reason for smoking: implications for tobacco prevention and intervention programs. Preventive Medicine. 2005; 41:589–596. [PubMed: 15917057]

Stone AL, Becker LG, Huber AM, Catalano RF. Review of risk and protective factors of substance use and problem use in emerging adulthood. Addictive Behaviors. 2012; 37(7):747–775. [PubMed: 22445418]

Substance Abuse and Mental Health Services Administration. Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings, NSDUH Series H-46, HHS Publication No. (SMA) 13-4795. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2013.

Sullivan RM. The Neurobiology of attachment to nurturing and abusive caregivers. The Hastings Law Journal. 2012; 63(6):1553–1570. [PubMed: 24049190]

Unger JB, Ritt-Olson A, Wagner KD, Soto D, Baezconde-Garbanati L. Parent-child acculturation patterns and substance use among Hispanic adolescents: A longitudinal analysis. Journal of Primary Prevention. 2009; 30(3–4):293–313. [PubMed: 19384604]

Young-Wolff KC, Kendler KS, Prescott CA. Interactive effects of maltreatment and recent stressful life events on alcohol consumption in adulthood. Journal of Studies on Alcohol and Drugs. 2012; 73(4):559–569. [PubMed: 22630794]

Zlotnick C, Tam T, Robertson MJ. Adverse childhood events, substance abuse, and measures of affiliation. Addictive Behaviors. 2004; 29(6):1177–1181. [PubMed: 15236820]

Highlights

- The average number of total adverse childhood experiences was two for participants.
- Verbal abuse was associated with binge drinking, cigarette, marijuana, and hard drug use.
- Physical abuse was associated with binge drinking, marijuana, and hard drug use.
- Parental separation or divorce was associated with cigarette and marijuana use.

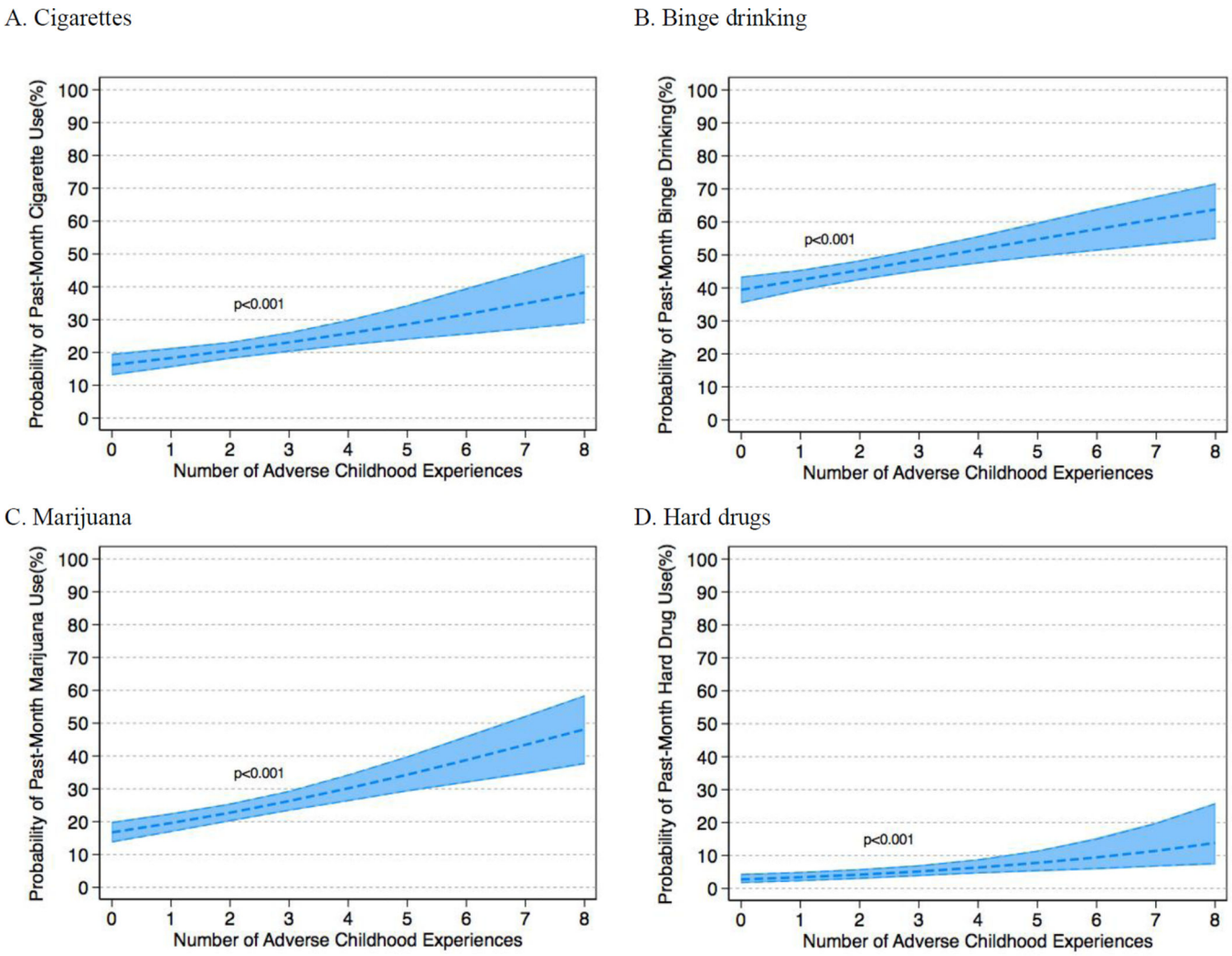

Figure 1. Accumulated number of adverse childhood experiences and substance use

(A) Shows the predicted probability of past-month cigarette use, (B) past-month binge drinking, (C) past-month marijuana use, and (D) past-month hard drug use by number of number of adverse childhood experiences. Quantities of interest were calculated by using the estimates from each multivariable analysis by simulation using 1,000 randomly drawn sets of estimates from a sampling distribution with mean equal to the maximum likelihood point estimates, and variance equal to the variance-covariance matrix of the estimates with covariates held at their mean values.

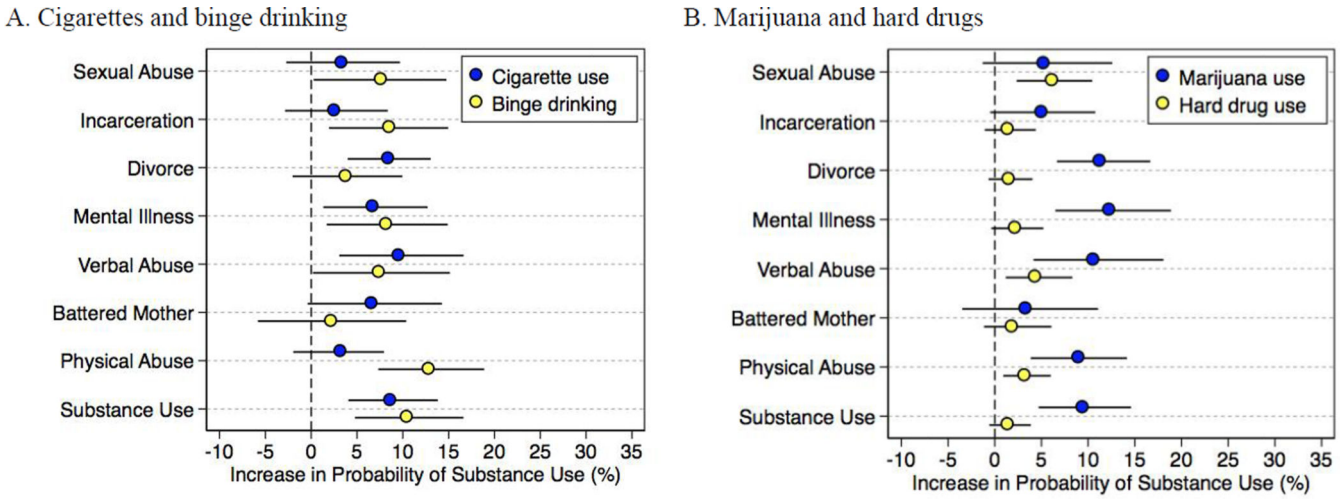

Figure 2. Categories of adverse childhood experiences and substance use

(A) Shows the increase in probability of past-month cigarette use, and binge drinking, while (B) shows the increase in probability of past-month marijuana use, and hard drug use, with 95% confidence intervals. An overlapping confidence interval with zero indicates a null result with $\alpha = .05$. Mean effect sizes and 95% confidence intervals were calculated by simulating the first difference in the adverse childhood experience e.g., verbal abuse from 0 to 1with the use of 1000 randomly drawn sets of estimates from the coefficient covariance matrix with covariates held at their mean values.

Table 1

Sample Characteristics.[a]

	Mean	95% C.I.	N
Age	22.60	22.58, 22.62	1417
Male	.41	.38, .44	1420
Past 30 day binge drinking	.45	.43, .48	1396
Past 30 day marijuana use	.24	.22, .26	1396
Past 30 day smoking	.23	.20, .25	1406
Past 30 day hard drugs	.05	.04, .06	1410
Parental separation/divorce	.37	.35, .40	1391
Household substance abuse	.36	.33, .38	1402
Physical abuse	.30	.27, .32	1394
Incarcerated household member	.23	.21, .25	1394
Mental illness in household	.22	.20, .24	1402
Sexual abuse	.16	.14, .18	1392
Verbal abuse	.16	.15, .18	1394
Battered mother	.13	.11, .15	1400

[a]Brief demographic and prevalence characteristics of sample. Numbers in cells are means, associated 95% confidence intervals, and useful sample size for each concept.