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The relationship between family-based adverse childhood experiences and substance use behaviors among a diverse sample of college students

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HIGHLIGHTS

- Family based adverse childhood experiences (ACE) are associated with college student substance use and polysubstance use.
- Future research needs to explore the role of ethnicity and culture in student's trauma response and help seeking behaviors.
- College could be key partners in coordinated efforts to provide services for ACE exposed students as they enter adulthood.

ABSTRACT

Introduction: Research suggests that college students are an especially vulnerable subset of the population for substance use and misuse. However, despite evidence of the high prevalence of adverse childhood experiences (ACE) among students and the link between family-based ACE and substance use among older adults, this relationship remains understudied in college populations. Moreover, whether ACE represents a shared risk across substance use behaviors and ethnic groups is unknown.

Methods: Data are student responses (n = 2953) on the 2015 American College Health Association's National College Health Assessment II (ACHA-NCHA II) administered at one of the largest, most diverse public universities in California. Multivariable logistic and negative binomial regression models tested the association between individual and accumulated ACE and past 30-day alcohol, tobacco, marijuana, and illicit drug use, past 12-month prescription medication misuse and polysubstance use.

Results: Between 50% and 75% of students involved in substance use were ACE exposed. There was a significant dose-response relationship between ACE and substance use and polysubstance use. Although accumulated ACE increased risk for substance use, there was considerable ethnic variability in these associations.

Conclusions: The graded effects of ACE for substance use underscore the link between family-based stressors and these behaviors in emergent adult college students. Our findings make a compelling case for investing in health initiatives that prioritize ACE screening and access to trauma-informed care in campus communities. Continued research with college populations is needed to replicate findings and clarify the role of ethnicity and culture in trauma response and help seeking behaviors.

1. Introduction

Currently, over 25 million people in the United States (US) report using illicit drugs and over 65 million acknowledge recent misuse of alcohol (Center for Behavioral Health Statistics and Quality, 2016), behaviors that have substantial economic and social costs. Although adolescent drug and alcohol use has stabilized in the US, research suggests that college students are especially vulnerable to substance use and misuse (National Institute on Drug Abuse, 2015). Compared to their non-college emerging adult peers, college students report more frequent binge drinking and past month use of alcohol (Substance Abuse and Mental Health Services Administration, 2015), have rates of illicit drug use that have risen from 34% to 41%, and have smaller yet significant increases in prescription medication misuse (McCabe, West, Teter, & Boyd, 2014; Miech et al., 2015). These trends have led to mounting concerns about the psychological and behavioral health of American college students (Gallagher, 2012) and a call for improved services for this population (Castillo & Schwartz, 2013). College is a critical period of transition when students must balance the demands of obtaining a degree and maintaining high academic performance while

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adapting to their increasing autonomy and responsibility. Misuse of drugs and alcohol threaten students' ability to successfully navigate these challenges and can have lasting implications for work force participation and health (Arnett, 2000; Kessler et al., 2007; Pascarella, Terenzini, & Feldman, 2005; Schwartz, Côté, & Arnett, 2005; White & Hingson, 2014).

Given the life course benefits of a positive college experience, ongoing efforts to identify targets for substance use prevention and intervention work in postsecondary institutions is needed. Toward this end, the present study draws upon the body of evidence demonstrating a strong link between adverse childhood experiences (ACE) and substance use (Anda et al., 2002; Dube et al., 2003; Dube, Anda, Felitti, Edwards, & Croft, 2002) that, despite the relatively high prevalence of ACE among college students (Read, Ouimette, White, Colder, & Farrow, 2011; Smyth, Hockemeyer, Heron, Wonderlich, & Pennebaker, 2008), has not been well researched in college populations. The landmark ACE study conducted by the Centers for Disease Control and Prevention (CDC) and Kaiser Permanente was the first to conceptualize and demonstrate that ACE, a set of highly correlated traumatic and negative events experienced prior to age 18, heighten risk for compromised health in adulthood (Anda et al., 1999, 2006). Because ACE can trigger stress responses and changes in brain functioning and physiology that undermine mood and behavioral self-regulation, exposure heightens vulnerability for maladaptive coping behaviors such as substance use (Anda et al., 1999, 2006; Anda, Brown, Felitti, Dube, & Giles, 2008; Ford, 2011; McEwen, 2005, 2006; Shonkoff et al., 2012). Since that initial ACE study, a substantial body of work has demonstrated a strong, graded relationship (e.g. the likelihood of poorer outcomes increases as the number of ACE experienced increases) between family-based ACE [childhood maltreatment (e.g. verbal, physical, and sexual abuse by a caregiver) and household dysfunction (e.g. parental alcohol and illicit substance misuse or abuse, and parental intimate partner violence)] and substance use among adolescents and older adults (Anda et al., 2008; Brown & Shillington, 2017; Dube et al., 2006; Young, Hansen, Gibson, & Ryan, 2006).

Research with college student samples thus far has found ACE are correlated with poor mental health (Masuda et al., 2007; Singh, Manjula, & Philip, 2012; Tran, Dunne, Vo, & Luu, 2015), alcohol use (Kim, 2017), and diminished health status (Karatekin & Ahluwalia, 2016). However, examinations of the ACE - health and health behavior association in this age group are often constrained by convenience samples drawn from relatively homogenous student populations from a single major (Smyth et al., 2008) or gender (Brener, McMahon, Warren, & Douglas, 1999), have been conducted outside the US (Masuda et al., 2007; McGavock & Spratt, 2014; Tran et al., 2015), and have predominantly focused on maltreatment and its impact on emotional or psychological health (Shen, 2009; Wolitzky-Taylor et al., 2017). Moreover, the literature regarding the effects of family stressors on substance use behaviors has often emphasized one specific form of maltreatment (e.g., sexual abuse or physical abuse) or aspect of household dysfunction (e.g. parental substance use, parental incarceration), and one type of substance use behavior (i.e. alcohol or marijuana). The extensive ACE scholarship however, suggests that individuals exposed to one form of victimization (e.g. physical abuse) often experience other types of maltreatment (e.g. verbal abuse) or household dysfunction (e.g., parental substance use, parental intimate partner violence) (Turner, Finkelhor, & Ormrod, 2010) such that the consequences attributed to one ACE may actually represent the influence of multiple ACE experienced simultaneously but not measured or included in statistical models.

Studies investigating whether there are ethnic differences in the ACE – substance use relationship are limited. Preliminary findings from community cohorts confirm the deleterious effect of adverse and negative events for alcohol and marijuana use among African Americans (Mersky, Topitzes, & Reynolds, 2013), alcohol use among Korean college students (Kim, 2017), and substance use among Hispanics (Allem, Soto, Baezconde-Garbanati, & Unger, 2015); however, whether ACE represent a shared set of risks for multiple substances use behaviors across ethnicities is unknown. To fill this gap in understanding, the present study assesses the relationship between individual and accumulated family-based ACE and past 30-day alcohol, tobacco, marijuana, and illicit drug use, and past 12-month prescription medication misuse and polysubstance use, in a sample of young adults attending one of the largest and most diverse public universities in California.

Pursuing this line of research has important implications for prevention work. First, emerging adulthood [the period between 18 and 26 years of age (Arnett, 2000)] is a stage of development that has considerable consequence for health in that many of the behaviors adopted during this phase are carried forward into middle and late adulthood (Bonnie, Stroud, & Breiner, 2015; Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008). Second, a more comprehensive understanding of the ACE substance use relationship will yield useful information that can inform the development of screening and intervention efforts for the 20 million individuals from increasingly varied socioeconomic and ethnic backgrounds enrolled in postsecondary institutions (U.S. Department of Education, 2016).

The present study had three aims. First, to describe the extent of ACE exposure among a college sample and the proportion of students with a history of family adversity engaged in substance use. Second, to examine the association between individual family-based ACE and substance use behaviors and third, to test a hypothesized dose-response relationship between accumulated ACE and four 30-day substance use behaviors, past 12-month prescription medication misuse, and polysubstance use (operationalized as endorsing the use of more than one substance in the past 30 days and/or prescription medication in the past 12-months). We hypothesized that increases in the number of ACE experienced would be associated with higher odds of past 30-day H1) alcohol use, H2) tobacco use, H3) marijuana use, H4) illicit drug use, H5) past 12-month prescription medication misuse and H6) polysubstance use. Lastly, we explored whether these associations varied by ethnic background although, due to the limited and inconsistent findings in the literature we did not develop a priori hypotheses regarding the direction of these relationships.

2. Methods

Data are student survey responses to the 2015 American College Health Association's National College Health Assessment II (ACHA-NCHA II) administered at a large, diverse California State University campus (College Portraits, 2013). During 2015, 55% of enrolled students were classified as low income, 95% were California residents and 5% were international. Student demographic profiles were 37% Hispanic, 28% Caucasian, 11% Asian, 7% were multiracial, 6% Black/African American, and 10% were unreported. The University's health services office sent a random sample of students an email asking them to participate in the survey that yielded a 35% response rate. The A-CHA-NCHA II is a 65-item web-based survey that focuses on health and health behavior related issues of students. The University Institutional Review Board (IRB) approved inclusion of six ACE items (drawn from the original ACE study items) in the survey. Using list-wise deletion, approximately 4% of students were removed from the sample due to non-response/missing data. Since our focus was on emerging adults, the analytic sample was limited to students between 18 and 26 years old (n = 2953).

2.1. Measures

2.1.1. Adverse Childhood Experiences (ACE)

Six items drawn from the original ACE study (Felitti et al., 1998) were added to the ACHA-NCHA II survey. All items were preceded by "Prior to the age of 18 did you…." *Household substance use* was comprised of two questions: "…live with anyone who drank too much