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Substance use outcomes for Hispanic emerging adults exposed to incarceration of a household member during childhood

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Abstract

This study investigates whether Hispanic emerging adults exposed to household incarceration before age 18 report higher rates of past 30-day cigarette, alcohol, binge drinking, marijuana use, and negative substance use consequences, relative to participants not exposed to incarceration of a household member. Respondents were matched on key characteristics to create balanced groups of exposed and non-exposed respondents. Negative binomial regression models assessed primary research questions. There were significant long-term associations between household incarceration and the frequency of past 30-day binge drinking, marijuana use, and number of negative substance use consequences. Policies and health programs addressing household incarceration may be a promising prevention approach to reduce negative substance use outcomes among Hispanic emerging adults.

Keywords

incarceration; Hispanic/Latinx; alcohol; tobacco; marijuana; negative consequences

Over 2.5 million children in the U.S. have a family member incarcerated in state or federal prison (Kaeble, Glaze, Tsoutis, & Minton, 2015; Carson, 2015; Walmsley, 2013), and more than five million have had a parent incarcerated at some point during childhood (Murphey & Cooper, 2015). In California, the state with the highest concentration of Hispanics (Krogstad, 2017), Hispanic children are nearly two times as likely to have a family member in prison than non-Hispanic White peers (Bailey & Hayes, 2006).

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Hispanics account for roughly 17% of the United States (U.S.) population (U.S. Census Bureau, 2017) and 26% of the Hispanic population are emerging adults between the ages of 18-26 (Patten, 2016). Given the steady growth of the Hispanic population in the U.S., it is imperative that we continue to investigate the etiology of substance use in this population. Emerging adults have the highest rates of substance use, misuse, and dependence relative to other age groups (Hedden, 2015), regardless of college enrollment status (Johnston et al., 2016; SAMHSA, 2016). Ethnic minority groups tend to have higher alcohol-related negative consequences relative to their non-Hispanic White peers (Galvan & Caetano, 2003; Chartier & Caetano, 2010; Zapolski et al., 2014), while Hispanics, who report less recent alcohol use events than non-Hispanic Whites, consume higher volumes of alcohol during drinking events (Chartier & Caetano, 2010) .

Recent studies suggest a link between familial incarceration and substance use among adolescents (Davis & Shlafer, 2017; Murray, Furrington, & Sekol, 2012) and emerging adults (Shin, McDonald, & Conley, 2018), yet the long-term effects of familial incarceration during childhood on health behavior outcomes has not been well studied, especially among Hispanic emerging adults. Thus far, the bulk of this research has focused on the effect of familial incarceration on outcomes in adolescents (Huebner & Gustafson, 2007; Shlafer, Reedy, & Davis, 2017; Nichols & Loper, 2012; Trice & Brewster, 2004; Davis & Shlafer, 2017a; Davis & Shlafer, 2017b; Murray, Loeber, & Pardini, 2012; Murray & Farrington, 2008; Wilbur et al., 2007) rather than early adulthood (Mears & Siennick, 2016; Forster, Davis, Shlafer, Unger, 2017). The present study addresses this gap by using longitudinal data to examine consequences of experiencing household incarceration prior to age 18 on early adult substance use and consequences among a community sample of Hispanics in Southern California.

This line of research has important implications for substance use prevention and treatment. First, misuse of drugs and alcohol in early adulthood is especially risky as it can undermine young adults' ability to successfully adopt new responsibilities and increases vulnerability to health problems in later adulthood (Arnett, 2000; Schwartz, Cote, & Arnett, 2005). Second, a proportion of the documented racial and ethnic disparities in substance use prevalence and related negative consequences may be explained by contextual factors and experiences such as familial involvement in the justice system (King, Dube, Tynan, 2012; Windle, 2003). Third, increasing the scientific understanding of factors involved in substance use will assist with the development of evidence informed screening and treatment protocols that can address the unique needs of young adults whose family members have been incarcerated.

The goal of the present study is to build upon prior findings that have found suboptimal health outcomes among youth (Wakefield & Wildeman, 2011) and emerging adults (Mears & Siennick, 2016) with a history of familial incarceration; however, these studies were primarily comprised of non-Hispanic White samples. Using data from a longitudinal cohort study allowed us to account for substance use during adolescence, possible confounders (e.g. internalizing symptoms, socioeconomic status), and to disentangle the effects of household incarceration from other adverse childhood experiences (ACE) such as maltreatment (e.g. sexual abuse, physical abuse, verbal abuse) and family dysfunction (e.g. parental drug use, intimate partner violence, or mental illness) that tend to co-occur (Murray & Farrington,

2005; Porter & King, 2015) and are highly correlated with household member incarceration (Braman & Wood, 2003; Mears & Siennick, 2016).

We hypothesized that compared to participants who did not experience household incarceration, emerging adults exposed to household incarceration in childhood would report higher rates of past 30-day a) cigarette; b) alcohol; c) binge drinking; and c) marijuana use; and d) negative substance use consequences. We hypothesized that participants with a history of household incarceration would experience more negative substance use consequences because the stress associated with the loss of family member (due to incarceration) likely increases vulnerability to maladaptive coping behaviors—a predictor of negative substance use consequences (Merrill, Wardell, & Read, 2014) and earlier initiation of substance use (Hawkins et al., 1997; Warner, White, & Johnson, 2007; Grigsby et al., 2016).

Methods

Data are from Project RED, a longitudinal study of acculturation and substance use among Hispanics in Southern California (Unger et al., 2009). The Institutional Review Board at the University of Southern California approved all procedures. Participants were enrolled in the study as adolescents, while attending one of seven randomly selected high schools in the Los Angeles area with a student body at least 70% Hispanic. In high school, data collectors distributed surveys to all students who provided active parental consent and student assent. Between the 9th and 10th grade surveys, one school district divided and transferred students from one of the participating schools to a new school. We included the 10th grade class from the new school in the sample as well as any new students who moved to the participating schools, resulting in an additional 704 Hispanic participants in 10th grade.

All the participants who self-identified as Hispanic in high school (n=2,722) were contacted two years after completion of the initial project when they were emerging adults to participate in a series of follow-up online surveys. Research assistants sent letters to participants' last known addresses and invited them to call a toll-free phone number or visit a website to participate in the study. Emerging adults provided consent verbally or online, and completed surveys annually over a four-year period. Research staff searched for participants without unknown whereabouts using social networking sites and publicly available search engines, resulting in a sample size of 1,389 participants. Those lost to follow-up from high school to emerging adulthood were more likely to be male and engage in substance use during high school ($p < .05$), but did not differ from the analytic sample on age or SES. Data for the analytic sample (n=1,289) were from participants with complete data on the variables on interest in the high school (10th grade) and the second wave of the emerging adulthood surveys—the first survey when participants were asked about ACE exposure.

Measures

Household incarceration was assessed with one item from the ACE questionnaire on the EA survey asking respondents to indicate whether prior to the age of 18 anyone in their

household went to prison and was coded as “Yes” = 1 and “No” = 0. This item was not included in the ACE index score used as a covariate for matching.

Substance use frequency was assessed in 10th grade and EA by presenting separate items to assess how often participants used cigarettes, alcohol, and marijuana in the past 30 days as well as how many times they drank five or more drinks in one sitting in the past 30 days. The models predicting substance use outcomes in EA controlled for all forms of substance use in 10th grade.

Negative substance use consequences were assessed using seven items from the Rutgers Alcohol Problem Index (RAPI; White & Labouve, 1989) included on the EA survey. Instructions were modified to reflect alcohol and drug use consequences (see Grigsby et al., 2014) in the past 30 days. Items were summed to create a count variable ranging from 0 to 7 negative consequences.

Adverse Childhood Experiences (ACE). Consistent with the original ACE study (Felitti et al., 1998), an index score (range: 0-6) was created that assessed the number of following experiences endorsed by participants: childhood sexual abuse; physical abuse; verbal abuse; having a household member who was depressed or mentally ill; having a household member who misused alcohol or was an alcoholic; and having a household member who used street drugs. ACE were assessed as part of the EA survey battery.

Household composition was measured in 10th grade by asking students whether they lived with 1 = both parents, 2 = mother only, 3 = mother and stepfather (or partner), 4 = father only, 5 = father and stepmother (or partner), 6 = sometimes with mother and sometimes with father, or 7 = other.

Depressive symptoms were assessed on the 10th grade survey with the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) a measure that has been validated for Hispanic populations (Grzywacz et al., 2006). The instrument contains 20 items assessing specific depressive symptoms, e.g., “I felt depressed,” and “I felt that everything I did was difficult.” Response options were “Less than 1 day or never,” “1-2 days,” “3-4 days,” and “5-7 days.” Responses to the 20 items were summed (Cronbach’s alpha=.84).

Covariates included *sex* coded female = 1 and male = 0, *foreign born* coded 1 = born outside the US, 0 = born in the US, and *economic insecurity* measured as qualifying for free lunch in high school = 1 or not qualifying = 0. Data for covariates were extracted from the 10th grade survey.

Analytical approach

The present study utilized coarsened exact matching (CEM), a nonparametric approach that can improve inferences from observational research (Ho, Imai, King, & Stuart, 2007; Imai, King & Stuart, 2008; Stuart, 2010). The overall idea of matching is to systematically remove observations from a non-experimental research study in order to establish treatment and control groups akin to those found in an experiment. CEM allows the balance between the exposed and non-exposed groups to be chosen before estimation such that the imbalance on

one variable has no effect on the balance of other variables (i.e., monotonic imbalance; see Iacus, King & Porro, 2012), CEM matches respondents *ex ante* rather than using an iterative process of checking after estimation, modifying the method, and repeating estimation (Iacus, King, & Porro, 2009).

The analytical approach began with processing the data to reduce the differences (i.e., reduce imbalance in the data) in the empirical distribution of the covariates between the exposed (experienced household incarceration before age 18) and non-exposed (did not experience household incarceration before age 18) groups. If treated and control groups are better balanced (e.g., covariates are similar across treated and control units) due to a reduction in data, model dependence is reduced. Also, if reducing data is a function of the primary explanatory variable and the control variables, but not the outcome variable of interest, no bias is introduced. In other words, reducing data as a result of matching does not bias inferences because the procedure does not predetermine the outcome of interest (King, Keohane, & Verba, 1994). The global imbalance statistic (GI), as described by Iacus, King, and Porro (2012), calculates reductions in imbalance after matching, with GI=0 indicating perfect balance and GI=1.0 indicating maximum imbalance. CEM attempts to use as much of the data as possible, which results in strata with different numbers of treated and control units. Participants were matched using a 1:k approach on alcohol, cigarette and marijuana use gender, economic insecurity, foreign-born (US or other), family composition, depression, in 10th grade, and total number of ACE (excluding household incarceration) assessed in EA. Separate multivariable negative binomial regression models assessed the association between household incarceration (primary explanatory variable) and past 30-day cigarette, alcohol and marijuana use frequency; and past 30-day substance use consequences. Results are presented as incident rate ratios (IRR) with 95% confidence intervals (95% CI). To compensate for the difference in size of strata (matched participants), CEM returns weights for analyses.

Results

Descriptive Statistics

The average age of participants in 10th grade was 15 (SD=0.99), 44% were male, 21% reported qualifying for free/reduced lunch, and 12% stated that they were born outside the US. At wave 2 in emerging adulthood, the average age of participants was 23 (SD=1.01) and 41% were male. Nearly 1 in 4 (23%) respondents indicated that before they were 18 years old, a member of their household went to prison. The mean number of ACE for the aggregate sample was 1.71 (SD=1.62) although among those who reported any ACE the average was 2.52 (SD=1.33). The mean number of days participants used each substance in the past 30 days in emerging adulthood was 1.59 (SD = 1.31), 0.80 (SD = 1.49) and 0.48 (SD = 1.26) for alcohol, tobacco, and marijuana use, and the mean number of occasions of binge drinking in the past 30 days was 1.38 (SD = 1.41).

Main findings

Household incarceration prior to age 18 was defined as the primary explanatory variable and substance use outcomes were examined in emerging adulthood. The measure of imbalance

between exposed and non-exposed groups was $GI = .46$ before matching on covariates, and $GI = 6.43 \times 10^{-6}$ after matching indicating nearly perfect balance between exposed and non-exposed groups. There were significant long-term effects of household incarceration on the frequency of past 30-day binge drinking (IRR = 1.23, 95% CI=1.07-1.68), marijuana use (IRR=1.48, 95% CI=1.16-2.01), and the number of past 30-day negative substance use consequences (IRR=1.41, 95% CI=1.08-1.64) in emerging adulthood (Figure 1). However, there were no significant differences between the exposed and non-exposed groups in terms of past 30-day cigarette use (IRR=1.21, 95% CI=.97, 1.49) or alcohol use (IRR=1.07, 95% CI=.96-1.20).

Discussion

These findings provide preliminary evidence that experiencing household incarceration is uniquely associated with the amount of past 30-day binge drinking, marijuana use and negative substance use consequences as respondents enter emerging adulthood. Previous research has shown that accumulative ACE, but not household incarceration, leads to an increased odds of cigarette smoking in Hispanic young adults (Allem et al., 2015). It is possible that we lack the statistical power to detect an association between household incarceration and frequency of cigarette or alcohol use behavior. Alternatively, the normative uptake of cigarette and alcohol use during adolescence and young adulthood (Eisenberg et al., 2014; Grossband et al., 2016) that are robustly associated with peer and contextual influences rather than exposure to traumatic events in childhood are a possible explanation for our null findings.

Reducing the number of adults in a household decreases levels of parental supervision/involvement, economic resources, and emotional support—robust predictors of substance use outcomes through adolescence—and probable mediators that explain the associations observed here (Anderson & Henry, 1994; Conger et al., 2016). The unforeseen consequences of familial incarceration for the next generation have been attributed to the trauma of forced separation, strain to the family system, lingering effects of social stigma related to criminal justice system involvement, and resulting adverse environmental exposures (Lopoo & Western, 2005; Wildeman & Wakefield, 2013; Davis & Shlafer, 2017a). For example, parental incarceration may constitute a pivotal event in the lives of children, one that the present findings demonstrate has lasting consequences on children as they transition into adulthood (Chapman, Wall, & Barth, 2004; Dong et al., 2004; Foster & Hagan, 2007; Lee, Fang, & Luo, 2013; Gjelsvik, Dumont, Nunn, & Rosen, 2014).

Given the life course consequences of substance use for later adult health, these findings have two important implications to guide future research and practice for this population. First, policies and interventions need to acknowledge and address the strain associated with household incarceration. For example, promoting extended family care for children with incarcerated parents can lead to positive developmental and psychological outcomes (Miller, 2007). Second, multilevel interventions are needed to promote the adoption of effective coping skills for youth whose family members interact with justice system. Social emotional learning programs are one approach that may prove useful for children with incarcerated parents or other household members. Social emotional learning is a process of learning to

understand and manage emotions, maintain positive relationships, and make responsible decisions (O'Conner et al., 2017). This approach might intervene on correlates and other antecedents of substance use uptake such as increasing empathy (Castillo et al., 2013), promoting adaptive coping, social skills, and emotion management (O'Conner et al., 2017), and reducing aggressive behavior (Castillo et al., 2013; Espelage et al., 2015). Additionally, social emotional learning interventions are beneficial economically (Bellfield et al., 2015) and demonstrate a public health value (Jones, Greenberg, & Crowley, 2015). The design of programs that account for cultural values in developing and strengthening emotion regulation strategies (Savina & Wan, 2017) could prove useful for minority populations who experience incarceration of a household member in childhood.

Limitations and Conclusions

Information was based on self-reported measures and relied on recall of ACE. An abbreviated number of negative substance use consequences drawn from the RAPI were included in the survey, resulting in a possible underestimation of substance use problems experienced. The sample was primarily second and third generation Mexican American emerging adults from Southern California, limiting generalizability. We did not specify the relationship of the incarcerated family member to the participant, and this may be an important characteristic that can explain the relationships observed in this study. However, previous research has indicated that even the incarceration of extended family members can be disruptive to the household and promote negative behavioral and health outcomes (Nichols & Loper, 2012; Gottlieb, 2016). We did not collect data on the family member's incarceration history (i.e., reason, timing and length of incarceration) and specifically asked about prison, and not jail, incarceration. While we controlled for other forms of maltreatment—adverse childhood experiences—in the statistical analysis, this does not rule out that incarceration of a household member may have led to other forms of trauma. This is important as children are likely exposed to multiple negative behaviors in the household that culminate in the arrest of the family member engaging in such practices.

Experiencing the incarceration of a family member has become a significant concern for U.S. children (Murphey & Cooper, 2015) – with nearly 10% reporting that they had experienced the arrest and incarceration of a household member (Bynum et al., 2010). While the normative onset of substance use begins in adolescence, the incidence of substance use disorders—chronic patterns of negative substance use consequences that interfere with one's life—most commonly occurs in emerging adulthood (Kessler, 2005). Future research should examine other proximal, and perhaps mediational, processes that might contribute to uptake of substance use in emerging adulthoods. For example, there may be differences in substance use motives and expectancies (Kuntsche et al., 2010) that might explain variation in substance use behaviors between individuals exposed and not exposed to traumatic events such as incarceration of a household member. Alternatively, exposed individuals may have a more difficult time handling stressors that accompany the transition to adulthood which have been found to relate to substance use behaviors (Allem et al., 2016). Nevertheless, researchers should continue to investigate mechanisms that promote or inhibit resilience for children affected by incarceration of a household member and what policies and services are needed to effectively buffer the negative consequences of household incarceration for

exposed children and their families in order to facilitate a healthy and successful transition to adulthood.

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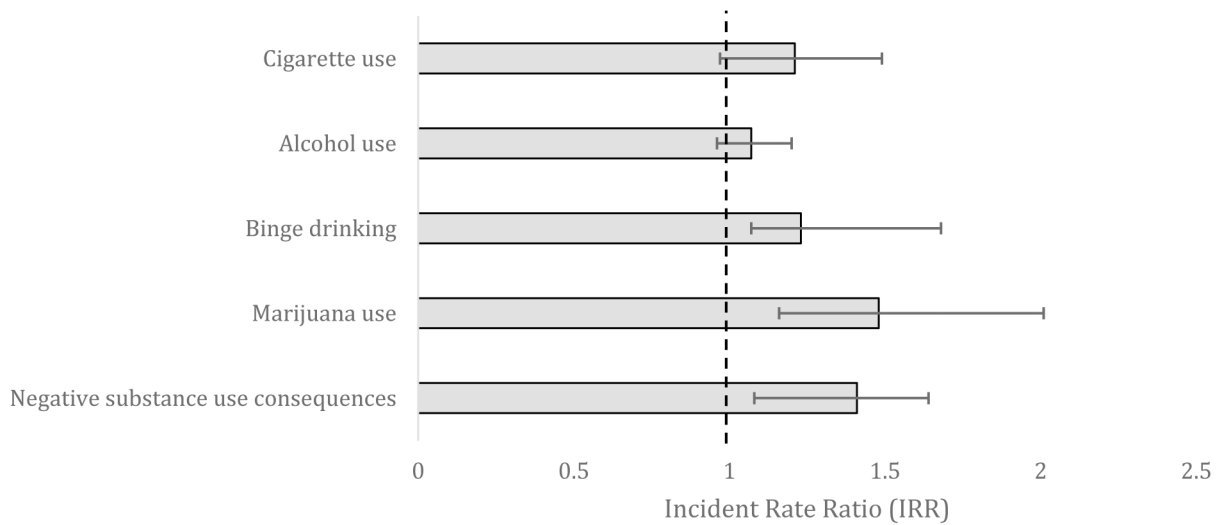


Figure 1. Incident Rate Ratios (IRRs) and 95% confidence intervals (95% CI) showing difference in amount of past 30-day substance use outcomes associated with exposure to household incarceration prior to age 18. Participants were matched using a 1:k coarsened exact matching approach on alcohol, cigarette and marijuana use gender, economic insecurity, foreign-born (US or other), family composition, depression, in 10th grade, and total number of other ACE assessed in EA.. The measure of imbalance between exposed and non-exposed groups was $GI = .46$ before matching on covariates. and $GI = 6.43 \times 10^{-6}$ after matching indicating nearly perfect balance between exposed and non-exposed groups.. Error bars crossing dashed line indicate statistically insignificant associations.