

2018

Childhood interpersonal violence and adult alcohol, cannabis, and tobacco use disorders: Variation by race/ethnicity?

Jacquelyn L. Meyers
State University of New York

Carolyn E. Sartor
Washington University School of Medicine in St. Louis

Kimberly B. Werner
Washington University in St. Louis

Karestan C. Koenen
Harvard University

Bridget F. Grant
National Institute on Alcohol Abuse and Alcoholism

See next page for additional authors

Follow this and additional works at: https://digitalcommons.wustl.edu/open_access_pubs

Please let us know how this document benefits you.

Recommended Citation

Meyers, Jacquelyn L.; Sartor, Carolyn E.; Werner, Kimberly B.; Koenen, Karestan C.; Grant, Bridget F.; and Hasin, Deborah, "Childhood interpersonal violence and adult alcohol, cannabis, and tobacco use disorders: Variation by race/ethnicity?." *Psychological Medicine*. 48, 9. 1540-1550. (2018).
https://digitalcommons.wustl.edu/open_access_pubs/7305

This Open Access Publication is brought to you for free and open access by Digital Commons@Becker. It has been accepted for inclusion in Open Access Publications by an authorized administrator of Digital Commons@Becker. For more information, please contact vanam@wustl.edu.

Authors

Jacquelyn L. Meyers, Carolyn E. Sartor, Kimberly B. Werner, Karestan C. Koenen, Bridget F. Grant, and Deborah Hasin

Original Article

Cite this article: Meyers JL, Sartor CE, Werner KB, Koenen KC, Grant BF, Hasin D (2018). Childhood interpersonal violence and adult alcohol, cannabis, and tobacco use disorders: variation by race/ethnicity? *Psychological Medicine* **48**, 1540–1550. <https://doi.org/10.1017/S0033291717003208>

Received: 1 May 2017

Revised: 22 September 2017

Accepted: 2 October 2017

First published online: 9 January 2018

Key words:

AUD; CUD; maltreatment; NESARC; trauma

Address for correspondence:

Jacquelyn L. Meyers, E-mail: jacquelyn.meyers@downstate.edu

Childhood interpersonal violence and adult alcohol, cannabis, and tobacco use disorders: variation by race/ethnicity?

Jacquelyn L. Meyers¹, Carolyn E. Sartor^{2,3}, Kimberly B. Werner⁴, Karestan C. Koenen⁵, Bridget F. Grant⁶ and Deborah Hasin^{7,8}

¹Department of Psychiatry, State University of New York, Brooklyn, NY, USA; ²Department of Psychiatry, Yale School of Medicine, New Haven, CT, USA; ³Department of Psychiatry, Alcohol Research Center, Washington University School of Medicine, St. Louis, MO, USA; ⁴George Warren Brown School of Social Work, Washington University, St. Louis, MO, USA; ⁵Department of Epidemiology, Harvard T. H. Chan School of Public Health, Boston, MA, USA; ⁶Laboratory of Epidemiology and Biometry, National Institute on Alcohol Abuse and Alcoholism, Bethesda, MD, USA; ⁷Department of Psychiatry, College of Physicians and Surgeons, Columbia University, New York, NY, USA and ⁸New York State Psychiatric Institute, New York, NY, USA

Abstract

Background. Exposure to child maltreatment has been shown to increase lifetime risk for substance use disorders (SUD). However, this has not been systematically examined among race/ethnic groups, for whom rates of exposure to assaultive violence and SUD differ. This study examined variation by race/ethnicity and gender in associations of alcohol (AUD), cannabis (CUD), and tobacco (TUD) use disorders with three types of childhood interpersonal violence (cIPV): physical abuse, sexual abuse, and witnessing parental violence.

Method. Data from the National Epidemiologic Survey of Alcohol-Related Conditions-III (N: 36 309), a US nationally representative sample, was utilized to examine associations of DSM-5 AUD, CUD and TUD with cIPV among men and women of five racial/ethnic groups. Models were adjusted for additional risk factors (e.g. parental substance use problems, participant's co-occurring SUD).

Results. Independent contributions of childhood physical and sexual abuse to AUD, CUD, and TUD, and of witnessing parental violence to AUD and TUD were observed. Associations of cIPV and SUD were relatively similar across race/ethnicity and gender [Odds Ratios (ORs) ranged from 1.1 to 1.9], although associations of physical abuse with AUD and TUD were greater among males, associations of parental violence and AUD were greater among females, and associations of parental violence with AUD were greater among Hispanic women and American Indian men.

Conclusions. Given the paucity of research in this area, and the potential identification of modifiable risk factors to reduce the impact of childhood interpersonal violence on SUDs, further research and consideration of tailoring prevention and intervention efforts to different populations are warranted.

Introduction

Exposure to child maltreatment and related aspects of the rearing environment (e.g. parental substance use, parental violence) have been shown to increase the risk for substance use disorders (SUD) and comorbid psychopathology (McLaughlin *et al.* 2010). However, recent studies have shown that these exposures are not as strongly associated with SUD among African-Americans (AAs; Sartor *et al.* 2015; Werner *et al.* 2016a, b) and that associations may differ by gender (Smith *et al.* 2010; Schiff *et al.* 2014). These findings, together with known differences in rates of exposure to childhood trauma (Roberts *et al.* 2011; Sumner *et al.* 2015) and adult SUD (Grant *et al.* 2015; Chou *et al.* 2016; Hasin *et al.* 2016), warrant further research investigating potential racial/ethnic and gender heterogeneity in the relation of childhood trauma and adult SUD.

Three recent studies utilizing data from the Missouri Adolescent Female Twin Study (MOAFTS) and the Missouri Family Study have shown that the influence of childhood trauma on SUD differs among AA and White women (Sartor *et al.* 2015; Werner *et al.* 2016a, b). Werner and colleagues found that childhood physical and sexual abuse were associated with the transition from alcohol initiation to DSM-V alcohol use disorder (AUD) among Whites, but not among AAs (Werner *et al.* 2016a). Another study (Werner *et al.* 2016b) showed that childhood physical abuse predicted transition from cannabis initiation to DSM-IV cannabis use disorder (CUD) symptoms among Whites, but not among AAs. Further, this study revealed different psychiatric predictors for cannabis initiation and the

transition to DSM-IV CUD diagnosis among White and AA participants. Given the relatively small number of AA participants in the MOAFTS ($N = 554$, ~21% exposed to sexual abuse and ~47% exposed to physical abuse, ~25% with AUD or CUD), the null association observed among AAs may relate to a lack of statistical power. Alternatively, distinct etiologic models of SUDs could be implicated, wherein rates of exposure to childhood trauma, substance use, and the role of other important risk factors (e.g. depression, parental SUD) in the relation of childhood trauma and SUD may differ by race/ethnicity. Further, the samples consisted of all-female populations residing in Missouri, limiting generalization of these findings to males, non-twins, and individuals in the US general population.

Several studies have found that women have a higher risk for SUD following adverse childhood experiences [e.g. parental violence (Smith *et al.* 2010; Schiff *et al.* 2014)], while some studies found that men had a greater risk for SUD [e.g. sexual abuse (Kendler *et al.* 2015)]. Recently, a large Canadian population-based study (Fuller-Thomson *et al.* 2016) indicated no significant gender differences in the associations of maltreatment with alcohol or drug dependence. Differences in measurement, sample composition, and developmental timing of outcomes are clearly important sources of these mixed findings (Kristman-Valente & Wells, 2013), however, it remains unclear whether associations of childhood trauma and SUD are more pronounced for males or females.

There are several important factors that may impact group differences in associations of childhood trauma and SUDs. In the USA, the most common SUDs, AUD, CUD, and tobacco use disorders (TUD), vary in prevalence by race/ethnicity and by gender (Grant *et al.* 2015; Chou *et al.* 2016; Hasin *et al.* 2016), as do cultural norms and acceptability of substance use and problems (Caetano & Clark, 1999; Sartor *et al.* 2013; Zapolski *et al.* 2014). Rates of exposure to interpersonal violent trauma also differ across race/ethnicity and gender (Roberts *et al.* 2011; Breiding *et al.* 2014; Sumner *et al.* 2015). Further, SUDs are often comorbid, both with each other and with other psychopathology (Kessler, 2012). For example, individuals who meet criteria for CUD also have higher odds of meeting criteria for AUD or TUD [Odds Ratios (ORs) 7.8, and 6.6 respectively (Hasin *et al.* 2016)], and are more likely to experience other mental health problems, especially mood disorders (Grant *et al.* 2015). Given this high degree of comorbidity, it is important to consider the associations of childhood traumas with a given SUD, and potential racial/ethnic and gender differences, in the context of other commonly co-occurring substance use and psychiatric disorders.

Relatedly, traumatic exposures, particularly when experienced in childhood, rarely occur in isolation. Childhood physical and sexual abuse often occurs in the context of a stressful rearing environment characterized by other types of interpersonal violence (IPV) including parental physical violence (Bottoms *et al.* 2016), and/or parental mental health and substance use problems (Sartor *et al.* 2008). Therefore, individuals who meet criteria for AUD, CUD, and TUD are more likely to have experienced childhood maltreatment (Dohrenwend, 2000; Khoury *et al.* 2010; Sartor *et al.* 2012), in addition to other related familial risk factors, such as parental substance use and parental violence (Howell *et al.* 2014). Due to the clustering of both adverse childhood experiences, and adult substance use and psychiatric disorders, disentangling the specific effects of any individual risk factor to any particular SUD are challenging (Sartor *et al.* 2008). Although such investigations are rare, a recent study conducted with a

Canadian general population-based sample reported independent effects of three adverse childhood events (physical and sexual abuse, and witnessing parental domestic violence), when mutually adjusted for, in alcohol and drug dependence (Fuller-Thomson *et al.* 2016). While this study examined variation by gender, differences by race/ethnicity were not explicitly investigated.

In summary, recent findings indicate the importance of considering potential racial/ethnic and gender heterogeneity when examining the relation of childhood IPV and SUDs. However, it remains unknown if the relation of childhood trauma and SUD differ by race/ethnicity and/or gender. The current study aims to fill this gap by utilizing data from the National Epidemiologic Survey of Alcohol-Related Conditions-III (NESARC-III), a large nationally representative sample of adults in the USA, to examine the associations of the most commonly occurring, and co-occurring, DSM-5 SUD (AUD, CUD, TUD) with three commonly assessed forms of childhood IPV: physical and sexual abuse, and witnessing parental violence. Toward the aim of teasing apart the specific contribution of childhood IPV to AUD, CUD, and TUD, we also examine the role of parental alcohol and drug use problems, as well as commonly co-occurring substance use and psychiatric disorders. We hypothesize that racial/ethnic and gender differences in rates of exposure to childhood IPV, and in rates of SUD, as well as co-occurring factors such as parental history of substance use problems or participant's mental health problems, may contribute to differences in the associations of childhood IPV and adult SUD.

Methods

Sample

The NESARC-III target population was the non-institutionalized civilian population of adults (ages 18–65 years) in households and selected group quarters (Grant *et al.* 2015). Respondents were selected through multistage probability sampling, including primary sampling units (counties/groups of contiguous counties), secondary sampling units (groups of census-defined blocks), and tertiary sampling units (households within secondary sampling units), with NH Black, Asian, and Hispanic Americans oversampled. Data were collected from April 2012 to June 2013 and were adjusted for nonresponse and weighted to represent the US population based on the 2012 American Community Survey (Grant *et al.* 2015). The total sample size was 36 309: the household response rate was 72%, the person-level response rate was 84%, and the overall response rate was 60.1%, comparable with the rates in other current US national surveys (Substance Abuse and Mental Health Services Administration, 2014 report). NESARC-III sample characteristics are presented elsewhere (Grant *et al.* 2015). Informed consent was electronically recorded; respondents received \$90.00 for participation. Institutional review boards at the National Institutes of Health and Westat (NESARC-III contractor) approved the study protocol.

All NESARC participants were asked if they are of 'Hispanic or Latino origin.' Next, participants were asked to select one or more categories to describe their race. Response options included: 'American Indian or Alaska Native', 'Asian', 'Black or African American', 'Native Hawaiian or Other Pacific Islander', and 'White'. Of 36 309 participants, 19 194 self-identified as 'non-Hispanic or Latino' and 'White', 7766 self-identified as 'non-Hispanic or Latino' and 'Black or African-American', 7037 self-identified as 'Hispanic or Latino,' 499 self-identified as

'American Indian or Alaska Native,' and 1781 self-identified as 'Asian' or 'Native Hawaiian or Other Pacific Islander' for a total of 36 073 participants. Of this sample, 56.3% were female, with an age range of 20–90 ($M = 45.5$, $s.d. = 17.5$). We acknowledge that one's racial, ethnic, and cultural identity are complex entities. Throughout this paper we describe one's self-report of these identities (as described above) as race/ethnicity. Further, we will describe those who self-identified as 'non-Hispanic or Latino' and 'White' as non-Hispanic White (White) and those who self-identified as 'non-Hispanic or Latino' and 'Black' as non-Hispanic Black (Black). Those who identified as 'Hispanic or Latino' will be described as Hispanic, those who identified as 'American Indian or Alaska Native' will be described as American Indian, and those who identified as 'Asian' or 'Native Hawaiian or Other Pacific Islander' will be described as Asian.

Measures

Substance use and psychiatric disorders

The NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule–V (AUDADIS-V; Grant *et al.* 2015) measures DSM-5 AUD, CUD, TUD, and selected psychiatric disorders in past year and prior to the past year. Each DSM-5 SUD diagnosis requires at least two of 11 criteria within a 12-month period. Within each SUD considered, 12-month and prior diagnoses were aggregated to form lifetime diagnoses. Test-retest reliabilities were moderate to substantial for these disorders ($\kappa = 0.40$ – 0.87) and their criteria scales ($ICC = 0.45$ – 0.84) (Grant *et al.* 2015). Concordance between AUDADIS-5 and PRISM-5 for SUDs was fair to substantial ($\kappa = 0.36$ – 0.66 ; $ICC = 0.68$ – 0.91) (Hasin *et al.* 2015). Additional DSM-5 disorders included in this study were: primary major depression, generalized anxiety, and antisocial personality disorder, as these disorders are most consistently co-morbid with SUD (Cerda *et al.* 2008; Hasin *et al.* 2015). Post-traumatic stress disorder, and adult IPV exposure (binary measure of any violent trauma exposure experienced after age 18) were also included given the documented relation of childhood IPV, adult IPV, and PTSD (Koenen *et al.*, 2007). The reliability and validity of these diagnoses in the NESARC-III were fair to moderate (Grant *et al.* 2015; Hasin *et al.* 2015).

Parental histories of problems with alcohol and drugs were ascertained using the AUDADIS-V. In assessing family history, interviewers read definitions to respondents that included examples of observable manifestations of the diagnostic criteria, since these are the most likely to be known to family members, increasing sensitivity (Andreasen *et al.* 1977; Zimmerman *et al.* 2004; Heiman *et al.* 2008). Interviewers then asked whether respondents' biological mother and father experienced the condition as defined. From this information, separate variables were created representing parental (either biological mother or father) histories of alcohol and drug problems.

Childhood IPV

Ten items adapted from two empirically validated scales (Straus, 1979, 1990; Wyatt, 1985) were used to assess physical and sexual abuse, and witnessing parental/domestic violence before age 18. Scales of these items have excellent reliability [intraclass coefficients, 0.79–0.88 (Ruan *et al.* 2008)]. A three-factor model with a latent dimension indexing each IPV type provided an excellent fit to the data [Comparative Fit Index (CFI) (Bentler, 1990)]: 0.96, Tucker-Lewis Index [TLI (Tucker & Lewis, 1973)]: 0.89, RMSEA (Root Mean Square Error of Approximation): 0.05).

Physical Abuse was assessed with the following questions: (1) How often did a parent or other adult living in your home push, grab, shove, slap or hit you? (2) How often did a parent or other adult living in your home hit you so hard that you had marks or bruises or were injured? Response options ranged from never (0) through very often (5). *Sexual Abuse* was assessed with the following questions: How often an adult engaged in the following when the respondent either did not want them to or was too young to know what was happening: (1) Touch or fondle you in a sexual way when you didn't want them to or when you were too young to know what was happening? (2) Have you touched their body in a sexual way when you didn't want to or you were too young to know what was happening? (3) Attempt to have sexual intercourse with you when you didn't want them to or you were too young to know what was happening? (4) Actually have sexual intercourse with you when you didn't want them to or you were too young to know what was happening? Response options ranged from never (0) through very often (5). *Witnessing parental violence* was assessed with the following questions: How often did your father, stepfather, foster or adoptive father or mother's boyfriend do ANY of these things to your mother, stepmother, father's girlfriend, or your foster or adoptive mother: (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 for at least a few minutes? (4) Threaten her with a knife or gun or use a knife or gun to hurt her? Response options ranged from never true (0) through very often true (5). While we acknowledge that this variable assesses violence on behalf of the participant's father figure (or mother's partner) towards mother figure (or father's partner), herein we refer to this variable as 'parental violence.'

Statistical analyses

All analyses were conducted in Mplus version 7.4 (©Muthén & Muthén, 1998–2015), with all estimates, weights, and standard errors adjusted for the complex sample design of the NESARC survey. Missing data were addressed via full-information maximum likelihood. A model (Fig. 1) that assessed the main effects of three types of childhood IPV (physical abuse, sexual abuse, witnessing parental violence, and their covariance) on three substance use disorders (AUD, CUD, TUD, and their covariance) was evaluated. All models included the following covariates: age, gender, race/ethnicity, household income, employment status, level of education, and marital status (N: 36 073, Number of Free Parameters (NP): 30, Loglikelihood (LL): $-47\,820.55$, Akaike's Information Criterion [AIC; (Akaike, 1976)]: 95 701.011, Bayesian Information Criterion (BIC): 9596.006). Secondary models also included parental alcohol and drug use problems and participants' comorbid MDD, GAD, ASPD, adult trauma exposure, and PTSD (N: 36 073, NP: 45, LL: $-46\,164.835$, AIC: 92 421.670, BIC: 92 804.163). Tertiary models included multiplicative interactions among race/ethnicity, gender, and each type of childhood IPV (i.e. race/ethnicity \times IPV; gender \times IPV; race/ethnicity \times gender \times IPV) to test for statistical differences in associations among each childhood IPV and each SUD observed across race/ethnic and gender groups (N: 36 073, NP: 54, LL: $-46\,143.899$, AIC: 92 395.798, BIC: 92 854.790). Main and interaction effects are presented in Table 1. To further understand the variation across race/ethnic and gender groups underlying interaction effects observed, associations and adjusted associations stratified by race/ethnicity and gender are presented in Table 2.

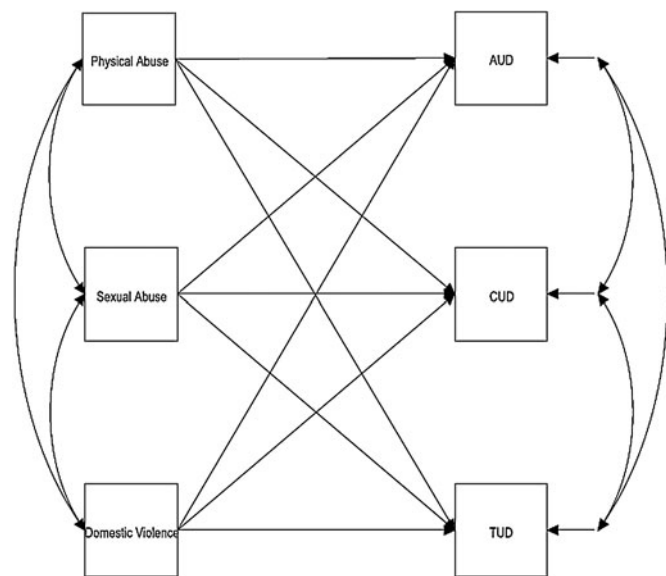


Fig. 1. Model employed to examine the associations of childhood IPV and adult alcohol, cannabis and tobacco use disorders. Note, that the following covariates are not pictured, but are included in models: age, gender, race/ethnicity (in combined models), interactions between each type of IPV and race/ethnicity (in overall model), household income, employment status, level of education, marital status, parental alcohol and drug use problems, and participants' comorbid depression, post-traumatic stress disorder, antisocial personality disorder, and adult trauma exposure. Physical Abuse, Physical abuse experienced prior to age 18; Sexual Abuse, Sexual abuse experienced prior to age 18; Domestic Violence, witnessing parental (father figure to mother figure) violence prior to age 18. AUD, DSM-V Alcohol Use Disorder (lifetime); CUD, DSM-V Cannabis Use Disorder (lifetime); TUD, DSM-V Tobacco Use Disorder (lifetime).

Results

Rates of DSM-5 SUDs by race/ethnicity and gender

Rates of lifetime disorders by race/ethnicity and gender have been reported previously for AUD (Grant *et al.* 2015), CUD (Hasin *et al.* 2016), and TUD (Chou *et al.* 2016). Overall, rates of lifetime SUDs are highest among White and American-Indian men, and lowest among Asian-American women (online Supplementary Fig. S1).

Childhood physical abuse

Among all participants, childhood physical abuse was reported by 35.5% of the sample. Rates and frequency varied by race/ethnicity and gender (Table 3); compared with Whites (women: 34.6%; men: 40.2%), rates of physical abuse were significantly higher among American Indian participants (women: 46.5%; men: 51.0%), and lower among Asian-American women (24.8%). In the full sample (race/ethnicity and gender as covariates), more frequent exposure to physical abuse was associated with AUD [OR 1.3, adjusted OR (aOR) 1.2]. Interactions with race/ethnicity ($p = 0.222$) and race/ethnicity \times gender were non-significant ($p = 0.586$). However, there was a significant interaction with gender ($p < 0.001$), wherein greater associations were observed among males (males OR 1.4, females OR 1.3) (Fig. 2). In the full sample, more frequent exposure to physical abuse was associated with CUD (OR 1.4, aOR 1.2). Interactions with race/ethnicity ($p = 0.218$), gender ($p = 0.240$) and race/ethnicity \times gender were non-significant ($p = 0.568$). In the full sample, physical abuse was associated with TUD (OR 1.3, aOR 1.2). Interactions with race/ethnicity

($p = 0.831$) and race/ethnicity \times gender were non-significant ($p = 0.218$). However, there was a significant interaction with gender ($p < 0.001$) wherein greater associations were observed among males (males OR 1.4, females OR 1.2).

Childhood sexual abuse

Among all participants, sexual abuse was reported by 18.5% of the sample. Rates and frequency varied by race/ethnicity and gender (Table 3); sexual abuse was more frequently endorsed females regardless of race/ethnicity, and by American Indian participants (women: 29.6%; men: 20.0%) and less frequently endorsed by Asian Americans (women: 14.2%; men: 13.4%). Among all participants, more frequent exposure to sexual abuse was associated with AUD (OR 1.1, aOR: null), and associations did not differ significantly by race/ethnicity ($p = 0.171$), gender ($p = 0.545$) or race/ethnicity \times gender ($p = 0.119$). Among all participants, more frequent exposure to sexual abuse was associated with CUD (OR 1.1, aOR: 1.1), and associations did not differ significantly by race/ethnicity ($p = 0.864$), gender ($p = 0.075$), or race/ethnicity \times gender ($p = 0.185$). Among all participants, more frequent exposure to sexual abuse was associated with TUD (OR 1.1, aOR: 1.1), and associations did not differ significantly by race/ethnicity ($p = 0.314$), gender ($p = 0.187$), or race/ethnicity \times gender ($p = 0.627$).

Parental violence

Among all participants, exposure to parental violence was reported by 11.8% of the sample. Rates and frequency varied by race/ethnicity and gender (Table 3); overall rates and frequency of parental violence were greater for females and among American Indian males (22.3%), and lower among Asian Americans (6.4%). The frequency of exposure to parental violence was associated with AUD (OR 1.1, aOR: null). The magnitude of these associations differed significantly by race/ethnicity ($p < 0.001$; White OR: null, Black OR: null, Hispanic OR 1.1, American Indian OR 1.3, Asian OR: null), gender ($p = 0.016$; males OR 1.0, females OR 1.1), and race/ethnicity by gender ($p < 0.001$) (Fig. 3); statistically significant associations of parental violence and AUD were only observed among Hispanic (OR 1.2, aOR 1.1), Black (OR 1.1, aOR: null), and White (OR 1.1, aOR: null) females, and American Indian males (OR 1.8, aOR 1.9). The frequency of exposure to parental violence was not associated with CUD in the full sample (Table 2), and associations did not differ significantly by race/ethnicity ($p = 0.180$), gender ($p = 0.819$) or race/ethnicity \times gender ($p = 0.185$). The association of parental violence and CUD was only present among Black males in unadjusted models (OR 1.2, aOR: null) and American Indian females (OR 1.4, aOR 1.3). The frequency of exposure to parental violence was associated with TUD (OR = 1.1, aOR 1.1). Associations did not differ significantly by race/ethnicity ($p = 0.274$), gender ($p = 0.711$) or race/ethnicity \times gender ($p = 0.350$).

Discussion

Findings from this study suggest that there are independent contributions of childhood physical and sexual abuse to AUD, CUD, and TUD, and of witnessing parental violence to AUD and TUD. Overall, associations of all childhood IPVs and SUDs were relatively similar across race/ethnicity and gender (ORs ranged from 1.1 to 1.9). However, interaction analyses indicated that there is modest heterogeneity in the associations of witnessing

Table 1. Main effects of childhood interpersonal violence on AUD, CUD, and TUD and interactions with race/ethnicity and gender

	All participants			p Value
	OR		95% CI	
DSM-5 Alcohol Use Disorder				
Physical Abuse	1.32	1.25	1.39	<0.0001
Sexual Abuse	1.10	1.07	1.34	0.007
Parental Violence	1.07	1.03	1.11	0.001
Sexual Abuse × Race/Ethnicity	1.01	0.99	1.03	0.171
Physical Abuse × Race/Ethnicity	1.01	0.99	1.03	0.222
Parental Violence × Race/Ethnicity	1.03	1.01	1.05	0.007
Sexual Abuse × Gender	1.03	0.95	1.11	0.545
Physical Abuse × Gender	0.90	0.85	0.96	0.001
Parental Violence × Gender	1.08	1.01	1.15	0.016
Sexual Abuse × Race × Gender	1.01	1.00	1.02	0.119
Physical Abuse × Race × Gender	1.00	0.99	1.01	0.586
Parental Violence × Race × Gender	1.02	1.01	1.03	<0.0001
DSM-5 Cannabis Use Disorder				
Physical Abuse	1.38	1.26	1.47	<0.0001
Sexual Abuse	1.14	1.08	1.26	<0.0001
Parental Violence	1.03	0.94	1.07	0.145
Sexual Abuse × Race/Ethnicity	1.00	0.97	1.03	0.864
Physical Abuse × Race/Ethnicity	1.02	0.99	1.05	0.218
Parental Violence × Race/Ethnicity	1.02	0.99	1.05	0.180
Sexual Abuse × Gender	0.92	0.83	1.01	0.075
Physical Abuse × Gender	0.95	0.87	1.04	0.240
Parental Violence × Gender	0.99	0.90	1.09	0.819
Sexual Abuse × Race × Gender	0.99	0.98	1.01	0.405
Physical Abuse × Race × Gender	1.01	0.99	1.02	0.568
Parental Violence × Race × Gender	1.01	1.00	1.03	0.185
DSM-5 Tobacco Use Disorder				
Physical Abuse	1.32	1.25	1.38	<0.0001
Sexual Abuse	1.13	1.08	1.21	<0.0001
Parental Violence	1.14	1.10	1.22	<0.0001
Sexual Abuse × Gender	1.06	0.97	1.14	0.187
Physical Abuse × Gender	0.91	0.86	0.96	0.001
Parental Violence × Gender	0.99	0.92	1.06	0.711
Sexual Abuse × Race/Ethnicity	0.99	0.97	1.01	0.314
Physical Abuse × Race/Ethnicity	1.00	0.98	1.02	0.831
Parental Violence × Race/Ethnicity	0.99	0.97	1.01	0.274
Sexual Abuse × Race × Gender	1.00	0.99	1.01	0.627
Physical Abuse × Race × Gender	0.99	0.98	1.00	0.218
Parental Violence × Race × Gender	0.99	0.98	1.01	0.350

Bold significance: $p < 0.05$.

Reference Groups: Male Gender, NH White Race/Ethnicity, NH White Males.

Table 2. Main effects of childhood interpersonal violence on AUD, CUD, and TUD stratified by race/ethnicity and gender

	DSM-5 AUD			DSM-5 CUD			DSM-5 TUD		
	Model 1 Odds Ratio ^{p-value}		All	Model 1 Odds Ratio ^{p-value}		All	Model 1 Odds Ratio ^{p-value}		All
	Males	Females		Males	Females		Males	Females	
Physical Abuse									
All	1.36*** 1.21***	1.26*** 1.13***	1.32*** 1.17***	1.40*** 1.21***	1.35*** 1.17***	1.38*** 1.19***	1.35*** 1.23***	1.24*** 1.14***	1.29*** 1.18***
NH White	1.34*** 1.21***	1.26*** 1.15***	1.30*** 1.17***	1.37*** 1.21***	1.37*** 1.19***	1.37*** 1.20***	1.37*** 1.26***	1.23*** 1.14***	1.29*** 1.19***
NH Black	1.41*** 1.26***	1.22*** 1.12*	1.32*** 1.19***	1.43*** 1.21*	1.21** 1.08*	1.34*** 1.16*	1.33*** 1.19**	1.29*** 1.22***	1.31*** 1.20***
Hispanic	1.49*** 1.31***	1.23*** 1.08	1.34*** 1.17***	1.49*** 1.23	1.52*** 1.24*	1.49*** 1.22**	1.37*** 1.19**	1.18*** 1.05	1.27*** 1.11**
American Indian	1.24 0.96	1.14 0.99	1.20* 1.00	1.24 1.08	1.27 1.05	1.19 1.01	1.14 0.87	1.42* 1.35*	1.28* 1.14
Asian	1.48** 1.33	1.58* 1.43	1.53*** 1.36**	2.10*** 1.95***	1.68 1.26	2.02*** 1.77***	1.25 1.19	1.37 1.26	1.29* 1.20
Sexual Abuse									
All	1.08* 0.98	1.12*** 1.04*	1.10*** 1.02	1.22*** 1.11*	1.13*** 1.05	1.14*** 1.06*	1.09* 1.00	1.15*** 1.09***	1.13*** 1.06***
NH White	1.05 0.95	1.11*** 1.04	1.09*** 1.02	1.22** 1.11	1.19*** 1.05	1.14*** 1.06	1.06 0.98	1.18*** 1.12	1.15*** 1.08***
NH Black	1.10 1.01	1.11** 1.04	1.10** 1.03	1.14 0.99	1.22*** 1.13*	1.14** 1.07	1.14* 1.05	1.06* 1.01	1.09** 1.03
Hispanic	1.23* 1.11	1.18*** 1.08*	1.16*** 1.07*	1.30* 1.17	1.05 0.91	1.12 0.99	1.20* 1.10	1.13** 1.05	1.12** 1.05
American Indian	2.17 1.78	1.00 0.90	0.98 0.87	2.89* 2.72*	0.90 0.94	1.03 1.01	1.91 1.50	0.96 0.93	1.03 1.01
Asian	0.88 0.91	1.14 0.99	1.06 0.95	0.81 0.86	1.68* 1.25	1.30 1.12	0.90 0.94	1.18 1.07	1.06 0.99
Parental Violence									
All	1.02 0.92**	1.10*** 1.03	1.07** 0.98	1.04 0.94	1.03 0.96	1.03 0.95*	1.15*** 1.08**	1.14*** 1.10***	1.14*** 1.09***
NH White	0.97 0.87**	1.08** 1.00	1.04 0.95	1.01 0.90*	0.97 0.91*	0.99 0.91**	1.18*** 1.11*	1.15*** 1.12***	1.16*** 1.11***
NH Black	1.02 0.97	1.09* 1.02	1.05 0.99	1.15* 1.08	1.09 1.01	1.11** 1.04	1.05 1.01	1.09** 1.05	1.08** 1.04
Hispanic	1.05 0.93	1.15*** 1.10**	1.12*** 1.04	1.04 0.90	1.07 0.99	1.06 0.95	1.05 0.99	1.09 1.06	1.08* 1.04
American Indian	1.75* 1.85**	1.20 1.04	1.30** 1.23*	1.11 1.34	1.40* 1.33*	1.25* 1.29*	1.47** 1.77**	1.41** 1.35**	1.40*** 1.39***
Asian	1.12 0.98	1.17 1.06	1.17 1.06	1.10 1.02	0.82 0.86	0.96 0.88	1.25 1.24	1.16 1.11	1.24 1.18

Note: All models included the following covariates: age, gender, race/ethnicity (in combined models only), household income, employment status, level of education, and marital status. Secondary models also included parental alcohol and drug use problems and participants' comorbid MDD, GAD, ASPD, adult trauma exposure, and PTSD.

* $p < 0.05$; ** $p < 0.001$; *** $p < 0.0001$.

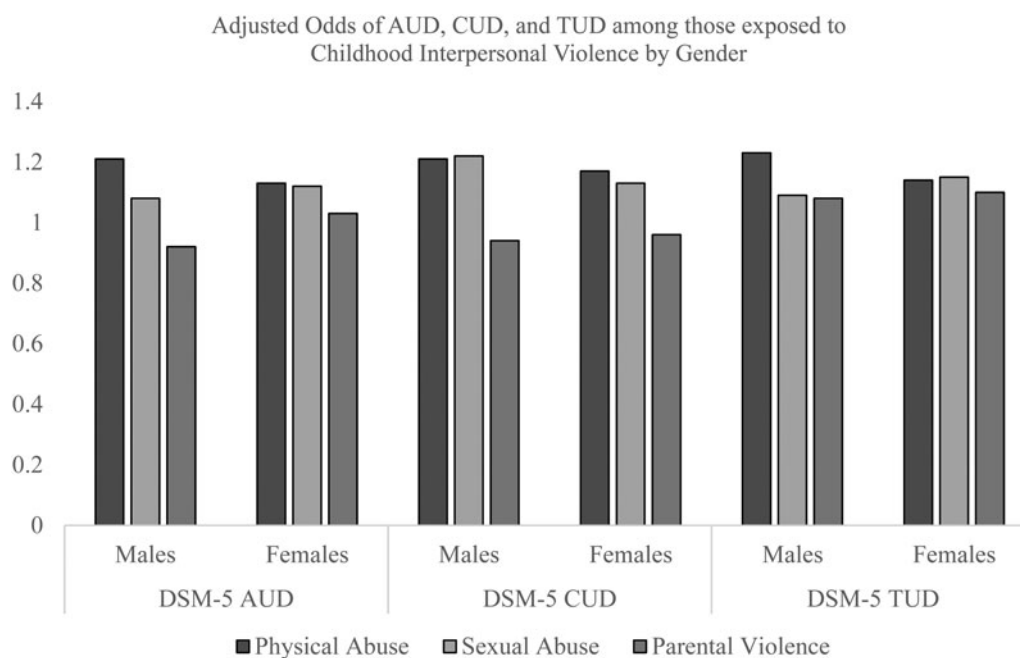
parental violence with AUD, such that this association is only observed among White, Black, and Hispanic females and American Indian males (and only among Hispanic females and American Indian males in adjusted models). In addition, gender moderates associations of physical abuse with AUD and TUD (increased risk among males), and of parental violence and AUD (increased risk among females). We note, however, that differences in all effect sizes are modest.

Childhood physical abuse

Exposure to physical abuse prior to age 18 was associated with increased odds of AUD, CUD, and TUD; the magnitude of these associations did not appear to differ significantly by race/ethnicity. This supports previous studies that show physical abuse experienced early in life is a significant risk factor for alcohol, cannabis, and tobacco use problems (Fuller-Thomson *et al.*

Table 3. Rates and frequency of childhood interpersonal violence by race/ethnicity and gender

	N	Physical abuse frequency			Sexual abuse frequency			Parental violence frequency		
		% any	Mean	s.d.	% any	Mean	s.d.	% any	Mean	s.d.
Females										
NH White	10 575	34.6	-0.005	1.021	18.6	0.110	1.175	16.9	-0.004	0.999
NH Black	4577	32.6	-0.017	0.997	21.2	0.142	1.274	15.3	0.109	1.162
American Indian	299	46.5	0.368	1.353	29.6	0.737	2.057	20.6	0.374	1.486
Asian	943	24.8	-0.212	0.734	14.2	-0.140	0.633	7.3	-0.124	0.759
Hispanic	3921	31.5	0.031	1.124	22.1	0.134	1.206	16.3	0.155	1.272
Males										
NH White	8509	40.2	0.010	0.956	15.9	-0.163	0.572	6.2	-0.095	0.809
NH Black	3123	37.9	0.048	0.985	17.7	-0.099	0.822	6.9	-0.030	0.922
American Indian	208	51.0	0.455	1.365	20.0	-0.115	0.658	9.1	0.169	1.202
Asian	845	35.4	-0.096	0.782	13.4	-0.205	0.338	5.3	-0.177	0.582
Hispanic	3073	33.5	-0.050	0.928	19.0	-0.165	0.532	5.9	-0.009	0.938

**Fig. 2.** Associations of childhood interpersonal violence with DSM-5 Alcohol, Cannabis, and Tobacco Use Disorder, by gender. AUD, DSM-V Alcohol Use Disorder (lifetime); CUD, DSM-V Cannabis Use Disorder (lifetime); TUD, DSM-V Tobacco Use Disorder (lifetime).

2016). In addition, variation by gender was observed for AUD and TUD, such that associations of CPA with AUD and TUD were generally greater among males than females. We note that these effects are modest (1.4 for males *v.* 1.3 for females), and hypothesize that greater ORs may be due to the higher rates of SUDs and greater frequency of physical abuse endorsed by males compared with females in this sample. Previous studies examining gender differences in the relations of childhood IPV and SUD have produced mixed results (Kristman-Valente & Wells, 2013), with the largest and most comparable study (Fuller-Thomson *et al.* 2016) indicating no significant gender

differences in the associations of CPA with alcohol or drug dependence. The authors offered several explanations for their findings that may also apply to the current study, including the use of retrospective self-report, which may result in more conservative findings, and the potential influence of cohort effects, whereby the negative stigma surrounding women's substance use has become less salient. Consequently, more women are thought to be using substances, potentially developing AUD, thus leading to a "washing out" of the effect (Kristman-Valente & Wells, 2013). Continued investigation of gender moderation is required, with special attention given to potential cohort effects.

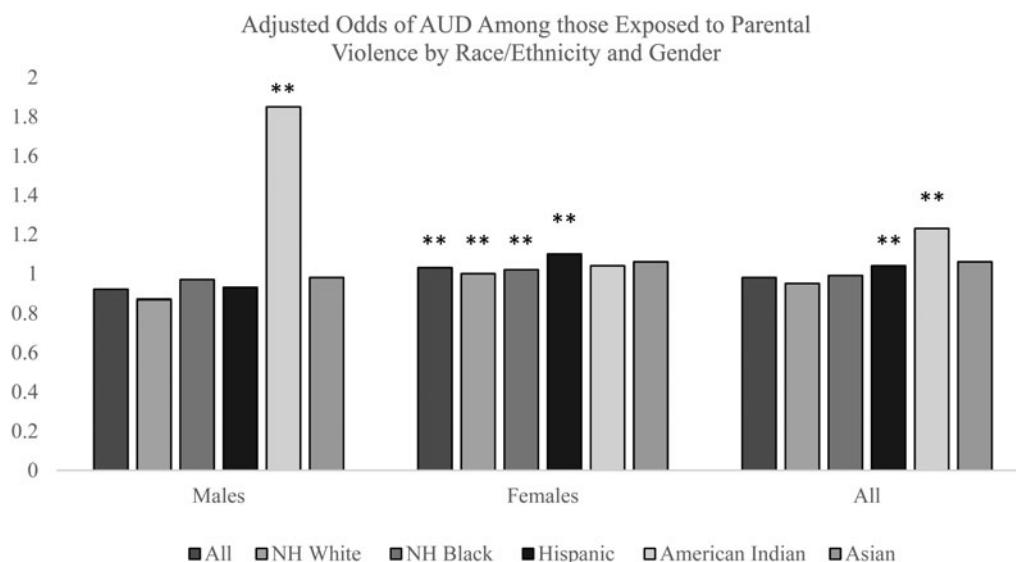


Fig. 3. Frequency of exposure to parental violence and DSM-5 Alcohol Use Disorder, by race/ethnicity and gender. ** indicates $p < 0.001$.

Childhood sexual abuse

Across race/ethnicity and genders, CSA was associated with elevated risk for AUD, CUD, and TUD. This is in agreement with several previous studies that link CSA to risk for SUD, even after taking into account other known shared risk factors (Kendler *et al.* 2000; Sartor *et al.* 2012). Interestingly, the relation of CSA and AUD was no longer significant after adjusting for other risk factors and psychiatric comorbidities among most groups (e.g. White and Black women), yet remained among Hispanic females, indicating robust CSA associated risk for AUD. Similarly, adjusted associations of CSA and CUD were no longer significant among most groups (e.g. White men and women, Hispanic men, and Asian women), yet remained among Black females and American Indian males, indicating robust CSA associated risk for CUD among these groups. In a review of the literature regarding the sociocultural context for mental health effects of sexual assault for AA, Asian-American, Latina, and Native-American women, Davis *et al.* 2008 discuss numerous barriers to obtaining protection and assistance that ethnic minority women are confronted with, including discriminatory policies, financial constraints, social stigma around mental health issues, and mistrust of agencies based on personal and historical experiences of violations. Future research should consider the mediating role of these factors in SUD risk among those exposed to CSA.

Parental violence

Across race/ethnicity and genders, exposure to parental violence was associated with increased odds of AUD and TUD, and after adjusting for other risk factors and psychiatric comorbidities, only TUD. Associations among parental violence with AUD and TUD also differed by gender, and for AUD also differed by race/ethnicity, and by race/ethnicity and gender. Witnessing parental violence in childhood has been linked to mental health and substance use problems throughout the life-course (Howell *et al.* 2014), and some prior evidence supports similar gender differences. Schiff *et al.* (2014) found that offspring of women

experiencing IPV were more likely to manifest AUD, CUD, and TUD in young adulthood. Similar to the current study's findings, stronger associations of witnessing IPV and AUD were observed among females. Smith *et al.* (2010) reported that adolescent exposure to IPV predicted increased odds of AUD (and depression) in early adulthood among females. Results from the current study extend this previous research in demonstrating associations of the frequency of exposure to parental violence and adult AUD and TUD across various racial/ethnic and gender groups in the US general population.

Associations of parental violence and AUD were relatively similar across race/ethnicity (statistically significant ORs ranged from 1.1 to 1.9). However, statistically significant group differences in the associations of parental violence and AUD were observed; increased risk for AUD was observed for White (OR 1.1), Black (OR 1.1), and Hispanic women (OR 1.2), and American-Indian men (OR 1.8). In adjusted models, however, only associations among Hispanic women (aOR 1.1) and American Indian men (aOR 1.9) remained. Previous studies have found that women and racial/ethnic minorities are more commonly exposed to domestic and/or partner violence (Caetano *et al.* 2005; Cho, 2012; Clark *et al.* 2016) although, other research suggests these group differences in exposure to IPV are no longer present when socioeconomic factors are taken into account (Klevens *et al.* 2007; Bonomi *et al.* 2009; Cho, 2012). In the present study, female participants and American-Indian males report increased rates of exposure to parental violence. These findings must be interpreted in the context of the father-figure towards mother-figure direction embedded within these variables since previous studies have shown that the gender of the perpetrator, and attitudes regarding gender and violence, both impact the influence of parental violence on behavior (Temple *et al.* 2013; Howell *et al.* 2014). Increased rates of exposure to partner violence may contribute to more normative views of domestic and partner violence (Cunradi *et al.* 1999; Caetano *et al.* 2000, 2001; Cunradi & Caetano, 2002), which together with limited access to mental health services (Krishnan *et al.* 2001; Lipsky *et al.* 2006) may decrease the likelihood of treatment services following traumatic exposure and

increase risk for AUD. While exposure to parental violence clearly has adverse mental and physical health consequences for all groups, exposure to father-figure towards mother-figure violence may be a particularly potent negative life event that increases the risk for adult AUD among women, and ethnic/minority groups with extremely high rates of exposure (e.g. American Indians). More research is needed to understand the relation between parental violence and SUD in racial/ethnic minority groups, and to identify factors explaining these differences beginning to emerge in epidemiological research, including norms regarding domestic and partner violence and accessibility of mental health resources following trauma exposure.

Strengths and limitations

The following limitations should be considered. First, NESARC diagnostic interviews were administered by trained lay interviewers rather than clinicians, which has the potential to decrease the validity and reliability of measurement via false-negative diagnoses (Eaton *et al.* 2000). This concern is somewhat mitigated by the AUDADIS's structured design (Hasin & Paykin, 1999). Second, this is a cross-sectional study, which limits causal inferences. Third, retrospective self-reports may be unstable over time (Fergusson *et al.* 2000; Polanczyk *et al.* 2009), typically underestimating trauma exposure prevalence, potentially biasing this study's findings towards the null. Additionally, participants' perceptions of how stressful each childhood IPV exposure was not measured. Fourth, race/ethnicity categories were based on US census options, categorizing heterogeneous populations as five homogeneous groups. Fifth, as noted above, parental violence assesses violence on behalf of the participant's father figure (or mother's partner) towards mother figure (or father's partner), and therefore excludes mother-on-father figure violence, and other non-traditional familial structures (e.g. mother-on-mother or father-on-father violence).

These limitations are counterbalanced by several study strengths. As described above, the clustering of adverse childhood experiences, and adult psychopathology, makes disentangling the specific effects of any individual risk factor to any particular SUD is extremely challenging. In the current study, we used a large US representative sample, and an analytic model that enabled the examining of variables simultaneously, to explore the relations between childhood IPV and SUD in different racial/ethnic and gender groups. The NESARC-III is the largest and most recent psychiatric epidemiological survey of the US general population conducted to date, with data available on childhood trauma and a range of SUDs, and adequate representative qualities to examine associations of childhood IPV exposures, AUD, CUD, and TUD among participants of diverse racial/ethnic backgrounds, incorporating co-occurring risk factors and relevant socio-demographic characteristics.

Both a strength and limitation of the current study was full consideration of Asian-American and American-Indian participants as distinct race/ethnicity groups. Because of smaller population sizes, epidemiological studies typically focus on White, Black, and Hispanic groups, and include smaller numbers of members from other groups (i.e. Asian American, Native American, Native Hawaiian, other Pacific-Islanders). These individuals of are often pooled (i.e. 'other' race/ethnicity) or omitted from reports (Johnston *et al.* 2016). For these reasons, it is difficult to place specific findings within the context of previous studies. Although the current study included a sizable number of

American Indian (N: 499) and Asian American (N: 1781) participants, the available sample was still small in comparison with other groups (N: 7037–19 194), limiting statistical power and our ability to comment conclusively on non-significant associations observed specifically among American-Indian and Asian-American participants, especially when analyses were further stratified by gender (i.e., comparable ORs but larger confidence intervals). Future studies would benefit from larger minority recruitment and examination of subpopulations within race/ethnic groups, including those who identify with more than one race/ethnic group.

Conclusions

In summary, findings from this study suggest that there are independent contributions of childhood physical and sexual abuse to AUD, CUD, and TUD, and of witnessing parental violence to AUD and TUD. Associations of all childhood IPVs and SUDs were relatively similar across race/ethnicity and gender, although associations of physical abuse with AUD and TUD were greater among males, and associations of parental violence and AUD were greater among females. Further, modest group differences in associations of parental violence with AUD indicated an increased risk for AUD among Hispanic women and American Indian men. This may reflect differing norms and rates of domestic violence and adult SUD among racial/ethnic and gender groups. Further research is needed to replicate and understand this finding. However, one clear implication is the importance of considering childhood trauma, culture, and gender in etiological models of SUD. When attempting to develop culturally appropriate intervention and prevention strategies, it is essential that mental health professionals understand the specific risk conferred by each IPV type and the specificity of that risk for SUD development across demographic characteristics. This research can inform efforts to tailor interventions specific to the individual – ensuring the content of such programs highlights population-specific risk factors. Given the paucity of research in this area, and the potential for the identification of modifiable risk factors to lead to reductions in the impact of childhood IPV on SUDs, further research, and consideration of tailoring prevention and intervention efforts to different populations, is warranted.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S0033291717003208>

Acknowledgements. This research was funded by National Institute of Drug Abuse (K01DA037914, Meyers) and the New York State Psychiatric Institute (Hasin). K Werner is funded by National Institute of Drug Abuse (T32DA015035, Cunningham-Williams), and C Sartor is funded by National Institute on Alcohol Abuse and Alcoholism (AA023549, Sartor).

References

- Akaike H** (1976) Canonical correlation analysis of time series and the use of an information criterion. *Mathematics in Science and Engineering* **126**, 27–96.
- Andreasen NC, Endicott J, Spitzer RL and Winokur G** (1977) The family history method using diagnostic criteria. Reliability and validity. *Archives of General Psychiatry* **34**, 1229–1235.
- Bentler PM** (1990) Comparative fit indexes in structural models. *Psychological bulletin* **107**, 238–246.

- Bonomi AE, Anderson ML, Cannon EA, Slesnick N and Rodriguez MA** (2009) Intimate partner violence in Latina and non-Latina women. *American Journal of Preventive Medicine* **36**, 43–48.e1.
- Bottoms BL, Peter-Hagene LC, Epstein MA, Wiley TRA, Reynolds CE and Rudnicki AG** (2016) Abuse characteristics and individual differences related to disclosing childhood sexual, physical, and emotional abuse and witnessed domestic violence. *Journal of Interpersonal Violence* **31**, 1308–1339.
- Breiding MJ, Smith SG, Basile KC, Walters ML, Chen J and Merrick MT** (2014) Prevalence and characteristics of sexual violence, stalking, and intimate partner violence victimization – national intimate partner and sexual violence survey, United States, 2011. *Morbidity and Mortality Weekly Report. Surveillance Summaries (Washington, D.C.: 2002)* **63**, 1–18.
- Caetano R and Clark CL** (1999) Trends in situational norms and attitudes toward drinking among whites, blacks, and hispanics: 1984–1995. *Drug and Alcohol Dependence* **54**, 45–56.
- Caetano R, Cunradi CB, Clark CL and Schafer J** (2000) Intimate partner violence and drinking patterns among white, black, and Hispanic couples in the United States. *Journal of Substance Abuse* **11**, 123–138.
- Caetano R, Field CA, Ramisetty-Mikler S and McGrath C** (2005) The 5-year course of intimate partner violence among White, Black, and Hispanic couples in the United States. *Journal of Interpersonal Violence* **20**, 1039–1057.
- Caetano R, Nelson S and Cunradi C** (2001) Intimate partner violence, dependence symptoms and social consequences from drinking among white, black and Hispanic couples in the United States. *The American Journal on Addictions* **10**(Suppl), 60–69.
- Cerda M, Sagdeo A and Galea S** (2008) Comorbid forms of psychopathology: key patterns and future research directions. *Epidemiologic Reviews* **30**, 155–177.
- Cho H** (2012) Racial differences in the prevalence of intimate partner violence against women and associated factors. *Journal of Interpersonal Violence* **27**, 344–363.
- Chou SP, Goldstein RB, Smith SM, Huang B, Ruan WJ, Zhang H, Jung J, Saha TD, Pickering RP and Grant BF** (2016) The epidemiology of DSM-5 nicotine use disorder: results from the national epidemiologic survey on alcohol and related conditions-III. *The Journal of Clinical Psychiatry* **77**, 1404–1412.
- Clark HM, Galano MM, Grogan-Kaylor AC, Montalvo-Liendo N and Graham-Bermann SA** (2016) Ethnoracial variation in women's exposure to intimate partner violence. *Journal of Interpersonal Violence* **31**, 531–552.
- Cunradi C and Caetano R** (2002) Alcohol-related problems, drug use, and male intimate partner violence severity among US couples. *Alcoholism: Clinical and Experimental Research* **26**, 493–500.
- Cunradi C, Caetano R and Clark C** (1999) Alcohol-related problems and intimate partner violence among white, black, and Hispanic couples in the U.S. *Alcoholism: Clinical and Experimental Research* **23**, 1492–1501.
- Davis RG, Ressler KJ, Schwartz AC, Stephens KJ and Bradley RG** (2008) Treatment barriers for low-income, urban African Americans with undiagnosed posttraumatic stress disorder. *Journal of Traumatic Stress* **21**, 218–222.
- Dohrenwend BP** (2000) The role of adversity and stress in psychopathology: some evidence and its implications for theory and research. *Journal of Health and Social Behavior* **41**, 1–19.
- Eaton WW, Neufeld K, Chen LS and Cai G** (2000) A comparison of self-report and clinical diagnostic interviews for depression: diagnostic interview schedule and schedules for clinical assessment in neuropsychiatry in the Baltimore epidemiologic catchment area follow-up. *Archives of General Psychiatry* **57**, 217–222.
- Fergusson DM, Horwood LJ and Woodward LJ** (2000) The stability of child abuse reports: a longitudinal study of the reporting behaviour of young adults. *Psychological Medicine* **30**, 529–544.
- Fuller-Thomson E, Roane JL and Brennenstuhl S** (2016) Three types of adverse childhood experiences, and alcohol and drug dependence among adults: an investigation using population-based data. *Substance Use & Misuse* **51**, 1451–1461.
- Grant BF, Goldstein RB, Saha TD, Chou SP, Jung J, Zhang H, Pickering RP, Ruan WJ, Smith SM, Huang B and Hasin DS** (2015) Epidemiology of DSM-5 alcohol use disorder: results from the national epidemiologic survey on alcohol and related conditions III. *JAMA Psychiatry* **72**, 757–766.
- Hasin D and Paykin A** (1999) Alcohol dependence and abuse diagnoses: concurrent validity in a nationally representative sample. *Alcoholism, Clinical and Experimental Research* **23**, 144–150.
- Hasin DS, Kerridge BT, Saha TD, Huang B, Pickering R, Smith SM, Jung J, Zhang H and Grant BF** (2016) Prevalence and correlates of DSM-5 cannabis use disorder, 2012–2013: findings from the national epidemiologic survey on alcohol and related conditions-III. *American Journal of Psychiatry* **173**, 588–599.
- Hasin DS, Shmulewitz D, Stohl M, Greenstein E, Aivadyan C, Morita K, Saha T, Aharonovich E, Jung J, Zhang H, Nunes EV and Grant BF** (2015) Procedural validity of the AUDADIS-5 depression, anxiety and post-traumatic stress disorder modules: substance abusers and others in the general population. *Drug and Alcohol Dependence* **152**, 246–256.
- Heiman GA, Ogburn E, Gorroochurn P, Keyes KM and Hasin D** (2008) Evidence for a two-stage model of dependence using the NESARC and its implications for genetic association studies. *Drug and Alcohol Dependence* **92**, 258–266.
- Howell KH, Barnes SE, Miller LE and Graham-Bermann SA** (2014) Developmental variations in the impact of intimate partner violence exposure during childhood. *Journal of Injury and Violence Research* **8**, 43–57.
- Johnston LD, O'Malley PM, Miech RA, Bachman JG and Schulenberg JE** (2016) *Monitoring the Future National Survey Results on Drug Use, 1975–2015: Overview, Key Findings on Adolescent Drug Use*. Ann Arbor: Institute for Social Research, The University of Michigan.
- Kendler KS, Bulik CM, Silberg J, Hettema JM, Myers J and Prescott CA** (2000) Childhood sexual abuse and adult psychiatric and substance use disorders in women: an epidemiological and cotwin control analysis. *Archives of General Psychiatry* **57**, 953–959.
- Kendler KS, Edwards AC and Gardner CO** (2015) Sex differences in the pathways to symptoms of alcohol use disorder: a study of opposite-sex twin pairs. *Alcoholism, Clinical and Experimental Research* **39**, 998–1007.
- Kessler RC** (2012) The costs of depression. *The Psychiatric Clinics of North America* **35**, 1–14.
- Khoury L, Tang YL, Bradley B, Cubells JF and Ressler KJ** (2010) Substance use, childhood traumatic experience, and Posttraumatic Stress Disorder in an urban civilian population. *Depression and Anxiety* **27**, 1077–1086.
- Klevens J, Shelley G, Clavel-Arcas C, Barney DD, Tobar C, Duran ES, Barajas-Mazaheri R and Esparza J** (2007) Latinos' perspectives and experiences with intimate partner violence. *Violence Against Women* **13**, 141–158.
- Koenen KC, Moffitt TE, Poulton R, Martin J and Caspi A** (2007) Early childhood factors associated with the development of post-traumatic stress disorder: results from a longitudinal birth cohort. *Psychological Medicine* **37**, 181–192.
- Krishnan SP, Hilbert JC and VanLeeuwen D** (2001) Domestic violence and help-seeking behaviors among rural women: results from a shelter-based study. *Family & Community Health* **24**, 28–38.
- Kristman-Valente A and Wells EA** (2013) The role of gender in the association between child maltreatment and substance use behavior: a systematic review of longitudinal research from 1995 to 2011. *Substance Use & Misuse* **48**, 645–660.
- Lipsky S, Caetano R, Field CA and Larkin GL** (2006) The role of intimate partner violence, race, and ethnicity in help-seeking behaviors. *Ethnicity & Health* **11**, 81–100.
- McLaughlin KA, Green JG, Gruber MJ, Sampson NA, Zaslavsky AM and Kessler RC** (2010) Childhood adversities and adult psychiatric disorders in the national comorbidity survey replication II: associations with persistence of DSM-IV disorders. *Archives of General Psychiatry* **67**, 124–132.
- Polaczyk G, Caspi A, Williams B, Price TS, Danese A, Sugden K, Uher R, Poulton R and Moffitt TE** (2009) Protective effect of CRHR1 gene variants on the development of adult depression following childhood maltreatment: replication and extension. *Archives of General Psychiatry* **66**, 978–985.
- Roberts AL, Gilman SE, Breslau J, Breslau N and Koenen KC** (2011) Race/ethnic differences in exposure to traumatic events, development of post-

- traumatic stress disorder, and treatment-seeking for post-traumatic stress disorder in the United States. *Psychological Medicine* **41**, 71–83.
- Ruan WJ, Goldstein RB, Chou SP, Smith SM, Saha TD, Pickering RP et al.** (2008) The Alcohol Use Disorder and Associated Disabilities Interview Schedule—IV (AUDADIS-IV): Reliability of new psychiatric diagnostic modules and risk factors in a general population sample. *Drug and Alcohol Dependence* **92**, 27–36.
- Sartor CE, Agrawal A, Grant JD, Duncan AE, Madden PAF, Lynskey MT, Heath AC and Bucholz KK** (2015) Differences between African-American and European-American women in the association of childhood sexual abuse with initiation of marijuana use and progression to problem use. *Journal of Studies on Alcohol and Drugs* **76**, 569–577.
- Sartor CE, Agrawal A, McCutcheon VV, Duncan AE and Lynskey MT** (2008) Disentangling the complex association between childhood sexual abuse and alcohol-related problems: a review of methodological issues and approaches. *Journal of Studies on Alcohol and Drugs* **69**, 718–727.
- Sartor CE, McCutcheon VV, Nelson EC, Duncan AE, Bucholz KK and Heath AC** (2012) Investigating the association between childhood sexual abuse and alcohol use disorders in women: does it matter how we ask about sexual abuse? *Journal of Studies on Alcohol and Drugs* **73**, 740–748.
- Sartor CE, Nelson EC, Lynskey MT, Madden PAF, Heath AC and Bucholz KK** (2013) Are there differences between young African-American and European-American women in the relative influences of genetics versus environment on age at first drink and problem alcohol use? *Alcoholism, Clinical and Experimental Research* **37**, 1939–1946.
- Schiff M, Plotnikova M, Dingle K, Williams GM, Najman J and Clavarino A** (2014) Does adolescent's exposure to parental intimate partner conflict and violence predict psychological distress and substance use in young adulthood? A longitudinal study. *Child Abuse & Neglect* **38**, 1945–1954.
- Smith CA, Elwyn LJ, Ireland TO and Thornberry TP** (2010) Impact of adolescent exposure to intimate partner violence on substance use in early adulthood. *Journal of Studies on Alcohol and Drugs* **71**, 219–230.
- Straus MA** (1979) Measuring intrafamily conflict and violence: The Conflict Tactics (CT) Scales. *Journal of Marriage and the Family* **41**, 75–88.
- Straus MA** (1990) The conflict tactics scales and its critics: An evaluation and new data on validity and reliability. In Straus MA and Gelles RJ (eds). *Physical Violence in American Families: Risk Factors and Adaptations to Violence in 8,145 Families*. New Brunswick, NJ: Transaction Books, pp. 49–74.
- Sumner SA, Mercy JA, Dahlberg LL, Hillis SD, Klevens J and Houry D** (2015) Violence in the United States: status, challenges, and opportunities. *JAMA* **314**, 478–488.
- Temple JR, Shorey RC, Tortolero SR, Wolfe DA and Stuart GL** (2013) Importance of gender and attitudes about violence in the relationship between exposure to interparental violence and the perpetration of teen dating violence. *Child Abuse & Neglect* **37**, 343–352.
- Tucker LR and Lewis C** (1973) A reliability coefficient for maximum likelihood factor analysis. *Psychometrika* **38**, 1–10.
- Werner KB, Grant JD, McCutcheon VV, Madden PAF, Heath AC, Bucholz KK and Sartor CE** (2016a) Differences in childhood physical abuse reporting and the association between CPA and alcohol use disorder in European American and African American women. *Psychology of Addictive Behaviors* **30**, 423–433.
- Werner KB, McCutcheon VV, Agrawal A, Sartor CE, Nelson EC, Heath AC and Bucholz KK** (2016b) The association of specific traumatic experiences with cannabis initiation and transition to problem use: differences between African-American and European-American women. *Drug and Alcohol Dependence* **162**, 162–169.
- Wyatt GE** (1985) The sexual abuse of Afro-American and White American women in childhood. *Child Abuse & Neglect* **9**, 507–519.
- Zapolski TCB, Pedersen SL, McCarthy DM and Smith GT** (2014) Less drinking, yet more problems: understanding African American drinking and related problems. *Psychological Bulletin* **140**, 188–223.
- Zimmerman M, Coryell W, Pfohl B and Stangl D** (1988) The reliability of the family history method for psychiatric diagnoses. *Archives of General Psychiatry* **45**, 320–322.