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Examining adverse childhood experiences among Native American persons in a nationally representative sample: Differences among racial/ethnic groups and race/ ethnicity-sex dyads

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ABSTRACT

Background: Existing research using nationally representative samples has provided valuable in- formation regarding the prevalence and context of childhood adversity, but Native American persons have largely been absent from these studies.

Objective: We examined adverse childhood experiences (ACEs) among persons identifying as White, Black, Asian, Hispanic, and Native American in the NESARC, a longitudinal study (Wave 1: 2001–2002; Wave 2: 2004–2005) using a nationally representative sample from the United States. *Methods:* Means tests and negative binomial regression were used to examine the prevalence and variety of ACEs across racial/ethnic groups and race/ethnicity-sex dyads.

Results: Native American persons reported the greatest average number and variety of ACEs than persons from any other racial/ethnic group, and reported the highest rates of physical abuse, sexual abuse, parental substance abuse, and witnessing violence than members of any other racial/ethnic category. Native American females reported the greatest rates of emotional abuse, while Native American males reported the greatest rates of physical neglect; the highest rates of parental substance use among the race/ethnicity-sex dyads were reported by both Native American females and males. Significantly higher rates of sexual violence were reported by Native American females compared to other groups; almost 1 in 4 Native American females re- ported sexual violence.

Conclusions: Future research should make a concerted effort to broaden examinations of ACEs to include Native American respondents and to include measures of historical trauma and racial discrimination. Broader support for system change as well as increased development and use of culturally responsive prevention and intervention programming is likely necessary to reduce ACEs among Native American persons.

Keywords:
Adverse childhood experiences, Native American person, Child maltreatment

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1. Introduction

Adverse childhood experiences (ACEs) include traumatic events such as experiencing child abuse, caregiver substance use, emotional or physical neglect, or witnessing caregiver domestic violence (Felitti et al., 1998). Findings from a growing body of research suggest that ACEs are widespread (Merrick, Ford, Ports, & Guinn, 2018), and linked to a range of negative health and well-being outcomes in adulthood: alcoholism, depression, obesity, financial stress, sexual violence, intimate partner violence, and chronic diseases, among others (Felitti et al., 1998; Ports, Ford, & Merrick, 2016; Sheats et al., 2018; Strine et al., 2012).

Native American persons have largely been absent from large scale and/or nationally representative research on ACEs. For example, Felitti et al.'s (1998) seminal study surveyed nearly 8000 adults (M = 56.1 years old) about their exposure to 17 different adverse events in childhood as well as a range of health risk factors in adulthood. Findings showed that over half of respondents reported exposure to at least one ACE while 6.2 % reported 4 or more exposures, one's exposure to any single ACE increased the probability of one's exposure to another ACE (i.e., cumulative risk), and the number of ACE exposures was significantly related to health risk factors in adulthood. Important differences were uncovered across racial/ethnic categories in that ACE exposure, and thus, cumulative risk and risk of problems in adulthood varied across White, Black, Hispanic, Asian, and "Other" respondents (Felitti et al., 1998). However, no respondents identifying as Native American were included in this study.

Although studies differ substantially regarding sampling and methodological designs, including the operationalization and inclusion/exclusion of specific ACEs, Kinney and Singh's (2016) examination of parent-reported ACEs from the 2011–2012 National Survey of Children's Health (NSCH) provides contemporary nationally representative data on adverse experiences among Native Americans, and compares their exposure to that of non-Hispanic White children. Results indicated that Native American children were 2–3 times more likely to have multiple (≥2 to ≥5) ACEs compared to non-Hispanic White children (9.9–40.3% versus 3.3–21.0%). Regarding specific ACEs, Native American children were almost twice as likely to be a victim of violence or to have witnessed violence in their neighborhood, to live with caregivers with a drug or alcohol problem, or to have witnessed parent-on-parent violence, and 10 times more likely to report experiencing race-based discrimination than non-Hispanic White children. Two primary limitations of this study were the omission of ACEs related to physical or sexual violence and the inclusion of only Native American and non-Hispanic White children (Kinney & Singh, 2016). Further, the validity of parental reports is contingent on parent's knowledge of their children's experiences.

Another non-representative, state-based study from South Dakota (Warne et al., 2017), surveyed Native and non-Native youth about their exposure to 10 adverse events and found that Native American youth self-reported significantly higher rates than Non-Native youth across all 10 ACEs. Approximately 17 % of Native youth reported no ACE exposure compared to 50 % of non-Native youth, while 19 % of Native youth reported 6 or more ACEs compared to 4 % of non-Native youth. Regarding specific ACEs, the authors note a stark contrast between Native and non-Native youth regarding physical neglect (i.e., lack of sufficient food, clothing, protection, or medical care) and witnessing domestic violence of their mother, 16 % versus 3 % and 24 % versus 5 %, respectively. Further, the percent of Native youth reporting physical abuse and/or sexual abuse was also significantly higher than that of non-Native youth (24.5 % versus 12 % and 15 % and 10 %, respectively).

More research is clearly needed regarding exposure to ACEs among Native American persons and the potential differences in exposure among Native American persons and persons of other racial/ethnic groups. In addition, information regarding the interplay between race/ethnicity and sex would inform our understanding of risk and assist in the development of prevention and intervention strategies. Further, historical information on ACEs among Native Americans would help gauge whether more contemporary, current studies and findings from future research demonstrate a change in ACE exposure over time.

The study of ACEs among Native American persons and Native American communities must be understood within the context of pervasive structural inequalities and historical trauma or the "cumulative emotional and psychological wounding over the lifetime and across generations, emanating from massive group trauma experiences" (Brave Heart, 2003, p. 7). In the United States, Indigenous persons have been subjected to genocide, colonization, and racism since the inception of the country. In the U.S., at least 300 Indian boarding schools were established in the late 1800s to assimilate Native American children in the Euro American way, as described in the often-cited motto, "Kill the Indian, save the man" (Trafzer, Keller, & Sisquoc, 2006). Generations of Native American children were removed from their families, taken far from their homes to live in these residential institutions, and subjected to harsh discipline and in many cases physical and emotional abuse, in order to severe their ties with their Native culture.

Olson and Dombrowski (2020) note that the impact of residential boarding schools on Native children was profound, resulting in "a dual loss – identity and family connection" (p. 62), and suggest that many boarding school attendees may be unable to form secure attachments in their interpersonal relationships, thus perpetuating a cycle of recurring trauma within Native families and communities. To this end, a recent Canadian study examining ACEs among a convenience sample of 114 Indigenous adults whose parents had and had not attended government-run boarding schools found that participants whose mother or father attended residential school had significantly higher ACE scores (M = 5 ACEs) than participants whose mother or father did not attend residential school (M = 3 ACEs) (Moon-Riley, Copeland, Metz, & Currie, 2019).

State-perpetrated family disruption continues in Native American communities as Native children are placed into foster care at disparate rates: 2.7 times greater than their proportion in the general population (Woods & Summers,

2016) and experience disproportionately lower rates of family reunification compared to children of other racial backgrounds (Wildeman, Edwards, & Wakefield, 2020). Native American children are also removed from their homes due to child maltreatment at disproportionate rates (U. S. Department of Health & Human Services, 2020); however, like children across other racial groups, Native American children are most often removed due to neglect, not abuse (U.S. Department of Health & Human Services, 2020). Some scholars point to the connections between poverty and "neglectful" behaviors (e.g., inadequate nutrition, housing) and suggest that children and families would be better served through supportive measures (for a review see Dale, 2014). Further, and likely in connection to widespread familial disruptions, Native American adolescents report significantly greater rates of drug and alcohol use compared to adolescents of other racial and ethnic groups (Wu, Woody, Yang, Pan, & Blazer, 2011; Yu & Stiffman, 2010) and experience disproportionate rates of violent crime victimization (Bureau Justice Statistics, 1999).

In addition, high rates of gender-based violence reported by Native American persons (Rosay, 2016), and Native women in particular, suggest that the prevalence of ACEs among Native American girls may be of particular concern. For example, Native American women suffer higher lifetime rates of rape and stalking than women of other races/ethnicities (Rosay, 2016; Tjaden & Thoennes, 2000) and experience intimate partner violence victimization over two times more often than African American women and three times more often than White women (18.2 % versus 8.2 % and 6.3 %, respectively) (Catalano, 2007). The lasting impacts of genocide, colonization, and continued racism provide important context for the high rates of violence against Native women and children (e.g., Deer, 2015; Smith, 1999; Weaver, 2009). As Native women were sexually exploited and Native children were forcibly removed from their homes, their family environments were disrupted, their economic opportunities were restricted, they were disconnected from their cultural values, and their ties with other Native persons were severed. Further, traditional values regarding the sacredness of women and children and tribal government's legal power to respond to violence has been diminished (Deer, 2015; Smith, 2005; Weaver, 2009).

Finally, given the historic and ongoing trauma experienced by Native American persons, unsurprisingly Native American adults report significant levels of psychological distress and are more likely to have poorer overall physical and mental health as well as greater levels of unmet health needs compared to persons of other races/ethnicities (Barnes, Adams, & Powell-Griner, 2010). While research indicates similar rates of alcohol use between Native Americans and Whites (Cunningham, Solomon, & Muramoto, 2016; Whitesell, Beals, Crow, Mitchell, & Novins, 2012), higher rates of substance use treatment engagement (Substance Abuse & Mental Health Services Administration, Center for Behavioral Health Statistics & Quality, 2012) and greater rates of alcohol induced deaths have been observed for Native American persons compared to persons of other racial groups (Spillane et al., 2020). In addition, Native American adults and youth suffer from suicide rates that are higher than the national average, with suicide being the second leading cause of death for Native Americans from 10 to 24 years of age (Suicide Prevention Resource Center, 2013). Further, Native persons are incarcerated at rates nearly 40 % greater than the national average (Bureau Justice Statistics, 1999). And yet, despite these significant challenges, for centuries Native American persons have demonstrated resiliency and self-determination. More empirical attention must be paid to Native American persons in an effort to reduce disparities and support Native American communities.

2. Current study

Native American persons have been omitted from the majority of large scale and/or nationally representative surveys of adverse events, leading to a significant gap in the baseline knowledge of their exposure to ACEs and the potential differences in their exposure compared to that of persons of other racial/ethnic groups. Given the evidence of concentrated disparities and the high rates of gender- based violence, historical trauma, and on-going experiences with racism among Native American persons, understanding their exposure to ACEs and attempting to guage any changes over time is of particular importance. The current research aims to address critical gaps in the literature by examining (1) the prevalence and variety of ACEs among a nationally-representative sample of Native American persons in comparison to persons of other racial/ethnic groups and (2) the prevalence and variety of ACEs disaggregated across males and females across racial/ethnic identities. Further, although methodological differences prevent making direct comparisons across different studies, the present research will provide baseline data for White, Black, Asian, Hispanic, and Native American persons using a nationally representative sample from the same time period as Felitti et al.'s (1998) first study on ACEs.

3. Methods

3.1. Data

The current study analyzed data from the second wave of the NESARC, a longitudinal and nationally-representative sample of noninstitutionalized adults aged 18 or older from the United States (Grant & Kaplan, 2005; Grant, Kaplan, Shepard, & Moore, 2003). The first wave of data collection was completed between 2001–2002 and included a total of 43,093 individuals. The household response rate at Wave 1 was 89 % with a 93 % individual response rate (Grant & Kaplan, 2005). The second wave was collected between 2004–2005 and included 34,653 individuals from the first wave. The Wave 2 response rate was 86.7 %, resulting in a cumulative response rate of 70.2 %. Interviews were performed by trained U.S. Census Bureau Field Representatives and consisted of topics ranging from substance use to

life experiences. Participants were selected using a multistage stratified sampling design, with an initial sampling frame consisting of all housing units included in the Census 2000/2001 Supplementary Survey (C2SS). Separate sample weights were constructed for each individual wave to maintain the representativeness of the sample (Grant et al., 2003). Due to the comprehensiveness of the sampling frame and the scale of the sampling procedures, a sizable number of participants identified as Native American at Wave 2 (n = 578). The current study is primarily focused on the subsample of Native Americans nested within the full NESARC sample, but we retain the full Wave 2 sample (N = 34,653) in an effort to contextualize findings from the Native American subsample with the larger, nationally-representative sample. Additional information regarding the collection and sampling procedures, survey instrument, measures, and sample have been presented previously (Grant & Kaplan, 2005; Grant et al., 2003).

3.2. Measures

3.2.1. Adverse childhood experiences (ACEs)

ACEs were measured using an adapted version of the original CDC ACE Study (Anda et al., 2006; Felitti et al., 1998). At Wave 2, participants answered questions from the Childhood Trauma Questionnaire (CTQ; Fink, Bernstein, Handelsman, Foote, & Lovejoy, 1995), the Conflict Tactics Scale (CTS; Straus, 1979), and other questions related to adversity that occurred prior to age 18. Following previous studies (Choi, DiNitto, Marti, & Choi, 2017; Roos et al., 2013; Vaughn et al., 2017), 10 forms of adversity were identified: 1) physical abuse; 2) emotional abuse; 3) sexual abuse; 4) physical neglect; 5) emotional neglect; 6) parental divorce or separation; 7) parent or other adult household member incarcerated; 8) witnessed violence against mother or other adult female; 9) parent or other adult household member attempted suicide, committed suicide, or treated/hospitalized for mental illness; and 10) parent or other adult household member had problems with drugs or alcohol. Consistent with previous studies (Choi et al., 2017), all 10 forms of adversity were coded such that 0 = not present and 1 = present. The resulting dichotomous measures were then summed to indicate
the total number of ACEs experienced.

3.2.2. Socioeconomic measures

Two self-reported measures tapping overall socioeconomic status (SES) at Wave 2 were also included in the analysis. First, educational attainment was reported by participants and coded nominally, such that 1 = less than high school, 2 = high school or equivalent, and 3 = secondary education. Second, total household income was self-reported and also coded nominally, such that 1 = less than or equal to $19,000, 2 = $20,000 to $34,999, 3 = $35,000-$69,999, and 4 = greater than or equal to $70,000.

3.2.3. Demographic measures

Three self-reported demographic measures taken at Wave 2 were also included in the analysis. First, sex was coded such that 0 = female and 1 = male. Second, participants were asked to identify the race/ethnicity that they felt best described them, including: 1) White, non-Hispanic; 2) Black, non-Hispanic; 3) American Indian/Alaska Native, non-Hispanic; 4) Asian/Native Hawaiian/Other Pacific Islander, non-Hispanic; and 5) Hispanic. Participants were allowed to select more than one category, but all participants that selected the American Indian/Alaska Native, non-Hispanic category were coded as such by the NESARC research team. Third, participant's age was recorded as a continuous variable.

3.3. Analytic strategy

The analytic strategy was carried out in four interconnected steps. First, the group mean for the ACEs measure was calculated across all racial/ethnic categories. This step of the analysis was aimed at examining average levels of ACEs across racial/ethnic groups. Second, to gain a better understanding of differences in specific forms of adversity across racial/ethnic categories, the prevalence of each of the 10 examined ACEs were plotted across each examined racial category. Third, in an effort to examine the extent to which the patterns identified in the previous steps vary between males and females, the group mean of the ACEs measure as well as the prevalence of each individual ACE was calculated across race/ethnicity and sex. Fourth and finally, to examine the extent to which any differences observed in the previous steps persist after adjusting for SES and demographic differences, the ACEs measure was regressed on race/ethnicity, education, household income, age, and sex. All nominal variables were entered into the equation as a series of dummy indicator variables. For race/ethnicity, White was identified as the reference category, but all pairwise comparisons between all included racial/ethnic categories were performed (the complete set of results of these comparisons are presented in the accompanying supplemental information). Since the employed ACEs measure was an over dispersed count (i.e., the standard deviation exceeded the mean), a negative binomial regression equation was employed. All analyses were performed in Stata 15.1 (StataCorp, 2017). Survey weights were used for all estimates (aside from frequencies using Stata's *svy* suite of commands. Since all measures examined in the current study were assessed during Wave 2, the Wave 2 survey weights, which were appropriately calibrated and account for longitudinal attrition, were employed (Grant & Kaplan, 2005). Alpha was set at $p < .05$ for all analyses.

Table 1
Descriptive Statistics for All Study Mea ures across Racial/Ethnic Categories.

Variables	Full Sample (N = 34,653)	White Subsample (n = 20,161)	Black Subsample (n = 6,587)	Native American Subsample (n = 578)	Asian Subsample (n = 968)	Hispanic Subsample (n = 6,359)
ACEs Count (mean)	1.44	1.41	1.59	2.15	1.00	1.53
ACEs (%)						
0	14072 (42.07)	8550 (43.20)	2371 (36.21)	172 (32.26)	492 (51.43)	2487 (39.14)
1	8199 (23.76)	4696 (23.45)	1591 (24.60)	128 (21.36)	242 (25.88)	1542 (24.57)
2	4521 (12.61)	2536 (12.37)	982 (14.72)	78 (14.41)	80 (8.31)	845 (13.35)
3	2872 (7.91)	1602 (7.76)	632 (9.54)	43 (6.16)	67 (6.52)	528 (8.16)
4	1920 (5.40)	1064 (5.19)	411 (6.41)	49 (7.54)	35 (3.11)	361 (6.14)
5	1277 (3.50)	701 (3.38)	284 (3.86)	31 (6.06)	32 (3.13)	229 (3.51)
6	871 (2.37)	484 (2.37)	166 (2.41)	31 (4.39)	13 (1.16)	177 (2.43)
7	522 (1.36)	296 (1.28)	87 (1.33)	25 (4.54)	7 (0.46)	107 (1.59)
8	268 (0.64)	152 (0.63)	52 (0.69)	12 (1.98)	0 (0.00)	52 (0.60)
9	116 (0.35)	74 (0.35)	8 (0.20)	8 (1.28)	0 (0.00)	26 (0.44)
10	15 (0.02)	6 (0.02)	3 (0.03)	1 (0.03)	0 (0.00)	5 (0.07)
Total Household Income (%)						
≤$19,000	8031 (18.55)	3802 (15.92)	2288 (30.60)	171 (27.03)	151 (14.52)	1619 (23.08)
$20,000-$34,999	6882 (18.49)	3644 (17.12)	1493 (22.37)	127 (21.04)	140 (14.49)	1478 (24.20)
$35,000-$69,999	10820 (32.78)	6511 (33.29)	1786 (29.06)	163 (30.19)	317 (32.29)	2043 (33.83)
≥$70,000	8920 (30.18)	6204 (33.67)	1020 (17.96)	117 (21.74)	360 (38.70)	1219 (18.89)
Educational Attainment (%)						
Less than high school	5514 (14.02)	2058 (10.06)	1258 (17.61)	112 (19.52)	103 (11.45)	1983 (34.75)
High school or equivalent	9452 (27.48)	5579 (28.21)	1977 (30.11)	163 (28.32)	156 (16.54)	1577 (24.42)
Secondary education	19687 (58.50)	12524 (61.73)	3352 (52.28)	303 (52.17)	709 (72.01)	2799 (40.82)
Sex (%)						
Females	20089 (52.08)	11308 (51.87)	4261 (56.30)	338 (54.83)	542 (51.24)	3640 (49.14)
Males	14564 (47.92)	8853 (48.13)	2326 (43.70)	240 (45.17)	426 (48.76)	2719 (50.86)
Age (mean)	48.16	49.90	45.42	48.47	44.53	41.38

Note: Frequencies are unweighted, all other presented values are weighted. Percentages presented in parentheses.

4. Results

The prevalence and means for all study measures are presented in Table 1. The overall sample was just over 48 years old (M = 48.16), and included slightly more females (n = 20,089, 52.08 %) than males (n = 14,564, 47.92 %). The majority of the sample reported a total household income of $35,000 or greater (56.96 %) and greater than a high school education (58.50 %). Total household income (χ^2 [8] = 1990.59, p < .001) and education (χ^2 [4] = 44.32, p < .001) both significantly varied across race/ ethnicity. The full sample reported approximately 1.44 ACEs. The group means for the ACEs measure (along with the accompanying 95% confidence intervals) are presented in Fig. 1. Means with nonoverlapping 95 % confidence intervals yield a statistically significant difference, akin to a mean comparison test with a p-value of less than .05. As can be seen in Fig. 1, there was significant variability in ACEs across racial/ethnic categories. Native American participants reported the greatest number of adverse experiences (M = 2.15) and Asian participants reported the lowest number of adverse experiences (M = 1.00). Black participants reported the next highest number of adverse experiences (M = 1.59), followed by Hispanic (M = 1.53) and White (M = 1.41) participants. The average level of ACEs among Native American participants was significantly greater than the average level reported among other racial/ethnic groups: the standardized mean differences reported as Cohen's d find differences between Native American and White (d = .43), Black (d =.34), Asian (d = .63), and Hispanic participants (d = .35), with mean differences ranging between small to moderate in size (Cohen, 1988 notes differences of .2–.5 as small and .5–.8 as medium in size).

The next step of the analysis involved examining the extent to which the individual experiences included in the ACEs measure vary in the full sample and across race/ethnicity. The most commonly reported ACE in the full sample was physical neglect (22.89 % of the full sample), followed by substance problems among parents (22.44 %), emotional abuse (21.64 %), parental divorce (17.91 %), physical abuse (16.48 %), sexual abuse (9.58 %), emotional neglect (8.63 %), witnessing violence (7.80 %), parental mental illness (6.82 %), and parental incarceration (6.59 %). The group-based prevalence of each ACE across racial/ethnic groups are presented in Fig. 2. Importantly, the accompanying 95 % confidence intervals are also included to more easily allow for comparisons across the plotted probabilities. Calculated difference scores and accompanying inferential statistics are presented in the accompanying supplemental information. As can be seen in Fig. 2, Native Americans reported the greatest prevalence of physical abuse (28.54 %), emotional abuse (32.05 %), sexual abuse (17.96 %), physical neglect (32.05 %), emotional neglect (32.05 %), witnessing violence (17.17 %), parental substance abuse (33.43 %), parental incarceration (10.24 %), and parental mental illness (9.84 %) and differences were statistically significant for physical abuse, sexual abuse, witnessing violence, and parental substance abuse. Persons identifying as Black reported the greatest prevalence of parental divorce, but no statistical differences for parental divorce were identified across racial/ethnic groups.

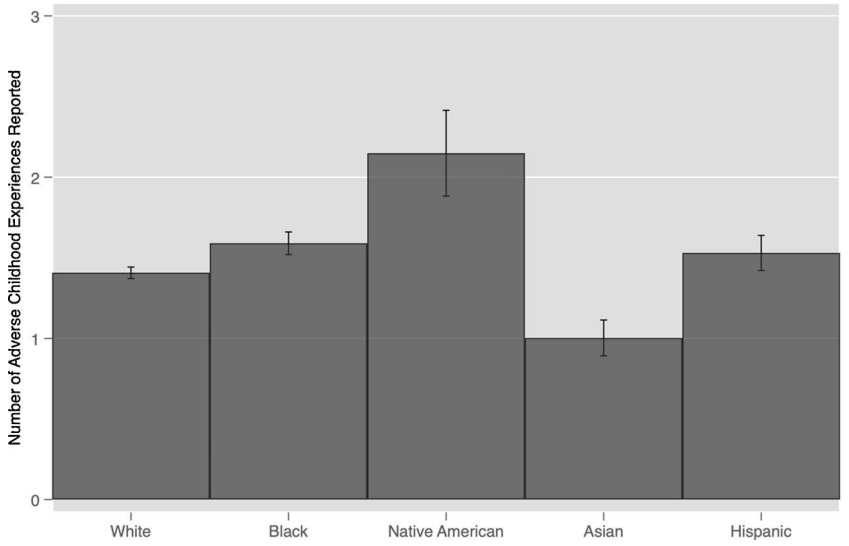

Fig. 1. Mean Number of Adverse Childhood Experiences (ACEs) across Racial/Ethnic Categories.
Note: Bars represent the group average number of adverse childhood experiences and error bars represent accompanying 95 % confidence intervals. All estimates were weighted.

The next step of the analysis involved the calculation of the group mean of the ACE measures across both race/ethnicity and sex. The results are presented in Fig. 3, and, once again, 95 % confidence intervals are presented to aid in identifying significant differences across the plotted means. The direct comparisons (i.e., difference scores) and accompanying inferential statistics are presented in the accompanying supplemental information. As can be seen in Fig. 3, Native American females (M = 2.24) and males (M = 2.03) reported the greatest overall number of ACEs, followed by Black females (M = 1.63) and males (M = 1.54). Additional comparisons of the probability of the individual adversity measures were also examined and results are presented in Fig. 4. Findings show that Native American females and males reported the greatest prevalence of nearly all examined ACEs. Among Native American females, emotional abuse (33.82 %) and parental substance abuse (33.96 %) were the most prevalent ACEs, while Native American males reported the highest rates of physical neglect (35.17 %) and parental substance use (32.79 %), in each instance these rates were significantly greater than any other examined group (aside from their Native American group counterpart). Native American females reported the greatest overall prevalence of sexual abuse (24.25 %), which was significantly greater than any other examined group. Across the other examined ACEs, Native American participants – both females and males – reported exposure to ACEs that was consistently and significantly greater than their White and Asian counterparts. Comparisons between Native American females and males and Hispanic and Black females and males were more mixed in regard to significant differences. Overall, these findings directly align with those examining the composite ACEs measure and suggest that Native American females and males experience ACEs at a significantly greater rate than other racial/ethnic groups, but that important differences exist in regard to the experiences of females and males. A similar pattern was observed regarding comparisons between Black and Hispanic females and males and White and Asian females and males as well, but the overall disparities were greatest for Native American participants.

The final step of the analysis involved fitting a negative binomial regression model to adjust average levels of ACEs across the examined racial/ethnic groups for the SES and demographic covariates. The results from the negative binomial regression model are presented in Table 2, with additional information presented in the supplemental accompanying information. For the results presented in the table, White was treated as the reference category, but all pairwise comparisons across all examined racial/ethnic categories are presented in the accompanying supplemental information. As can be seen in Table 2, Native Americans reported significantly greater numbers of ACEs relative to White participants (b = 0.38, p < .001), such that Native American participants reported a 46 % increase in the number of ACEs relative to White participants (IRR = 1.46, 95 % CI = 1.29, 1.65). Further, as displayed in the contrasts presented in the accompanying supplemental information, Native American participants displayed significantly greater numbers of ACEs relative to all other examined racial/ethnic groups. Importantly, this pattern of results persisted even after adjusting for the included statistical covariates. Despite the consistency of these findings, however, it is worth noting that the detected effect size of the observed differences was small to moderate in size.

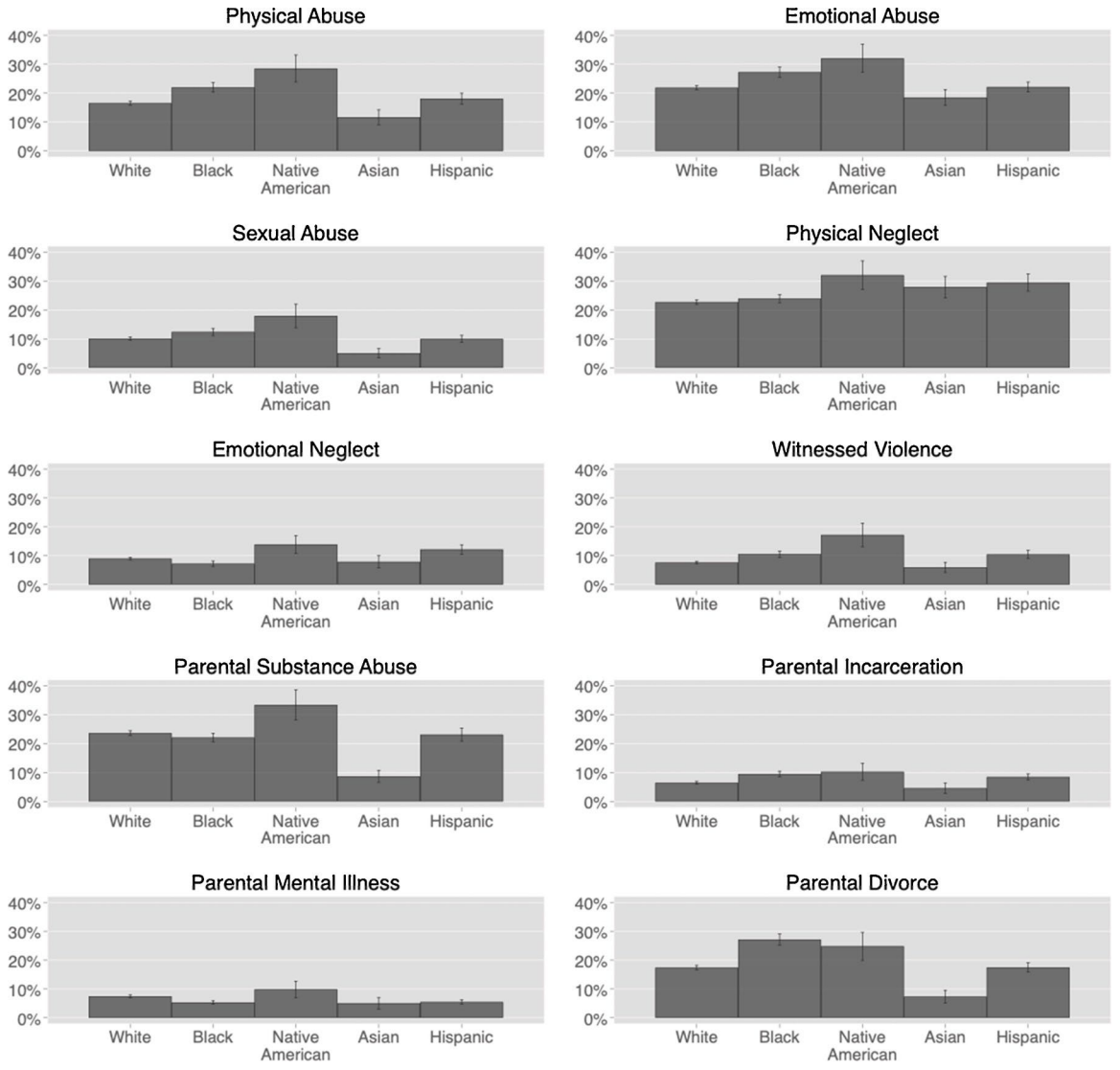

Fig. 2. Prevalence of Each Examined form of Childhood Adversity across Racial/Ethnic Categories.
Note: Bars represent the group prevalence of each examined form of adversity and error bars represent accompanying 95 % confidence intervals. All estimates were weighted.

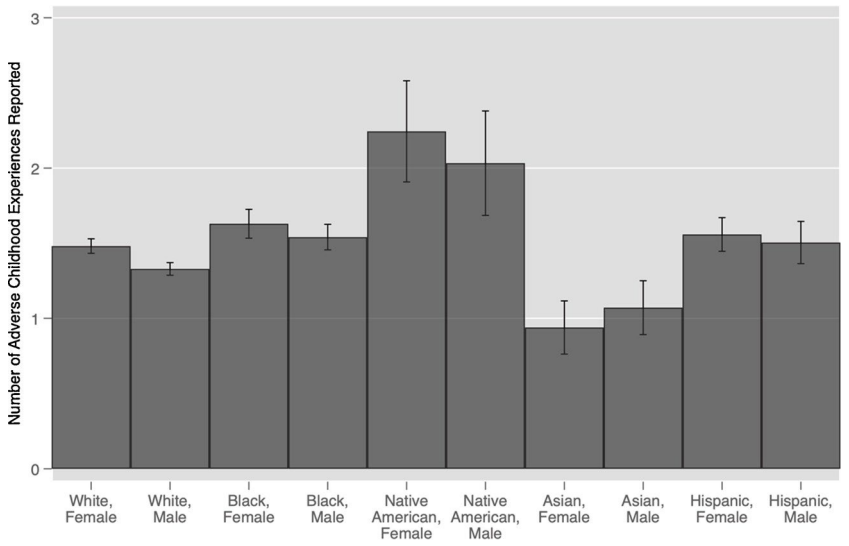

Fig. 3. Mean Number of Adverse Childhood Experiences (ACEs) across Racial/Ethnic Categories and Sex.
Note: Bars represent the group average number of adverse childhood experiences and error bars represent accompanying 95 % confidence intervals. All estimates were weighted.

5. Discussion

The current study builds on the paucity of existing research that uses nationally representative data to examine the prevalence of ACEs among Native American persons in comparison to persons of other racial/ethnic groups; this study further unpacks differences by race/ethnicity-sex dyads. The present research found that Native American persons reported the greatest number and variety of ACEs, with Native American persons reporting higher rates of physical abuse, emotional abuse, sexual abuse, physical neglect, emotional neglect, witnessing violence, parental substance abuse, parental incarceration, and parental mental illness than members of any other racial/ethnic group; these differences were significantly different for physical abuse, sexual abuse, witnessing violence, and parental substance abuse. As previously described, these results pertain to participants' experiences with ACEs as children in the 1940s and 1950s – during the same time period as described by respondents in Felitti et al.'s (1998) groundbreaking study on ACEs that failed to include Native American persons. While a direct comparison between the present research and Felitti et al. is not possible, the present findings suggest that Felitti et al.'s results on racial disparities in ACE exposure would have likely been different if their sample had included Native American participants – Native American respondents, as opposed to Black respondents, would have likely reported the greatest rates and variety of ACEs.

These results are also consistent with a handful of existing studies using more contemporary data (Kinney & Singh, 2016; Warne et al., 2017), which suggests that the disparate ACE exposure among Native American persons compared to persons of other racial groups remains a problem. Importantly, the limited existing research has only compared Native American persons to non-Hispanic White persons (Kinney & Singh, 2016), a group that consistently reports the lowest frequency and variety of ACEs, and "Non-Native" persons (Warne et al., 2017) making it difficult to hypothesize about the relationship between more contemporary experiences with ACEs among Native American persons as compared to the experiences of Black and Hispanic persons.

Important differences were also uncovered for males and females across racial/ethnic groups. Native American females reported the greatest rates of emotional abuse, while Native males reported the greatest rates of physical neglect; the highest rates of parental substance use among the race/ethnicity-sex dyads were reported by both Native American males and females; these respective rates of emotional abuse, physical neglect, and parental substance use were all significantly higher than those of the other race/ethnicity-sex dyads. Further, Native American females reported significantly more sexual abuse than any other race/ethnicity-sex dyad; nearly one in four Native American females reported sexual abuse. These findings suggest that future research on ACEs should include the presentation of results by race/ethnicity-sex dyads so that more nuanced interpretations regarding experiences with ACEs can be made. Regardless of sex, however, Native American persons reported higher rates of ACEs exposure than non-Native persons, which suggests the need for targeted interventions and policy changes.

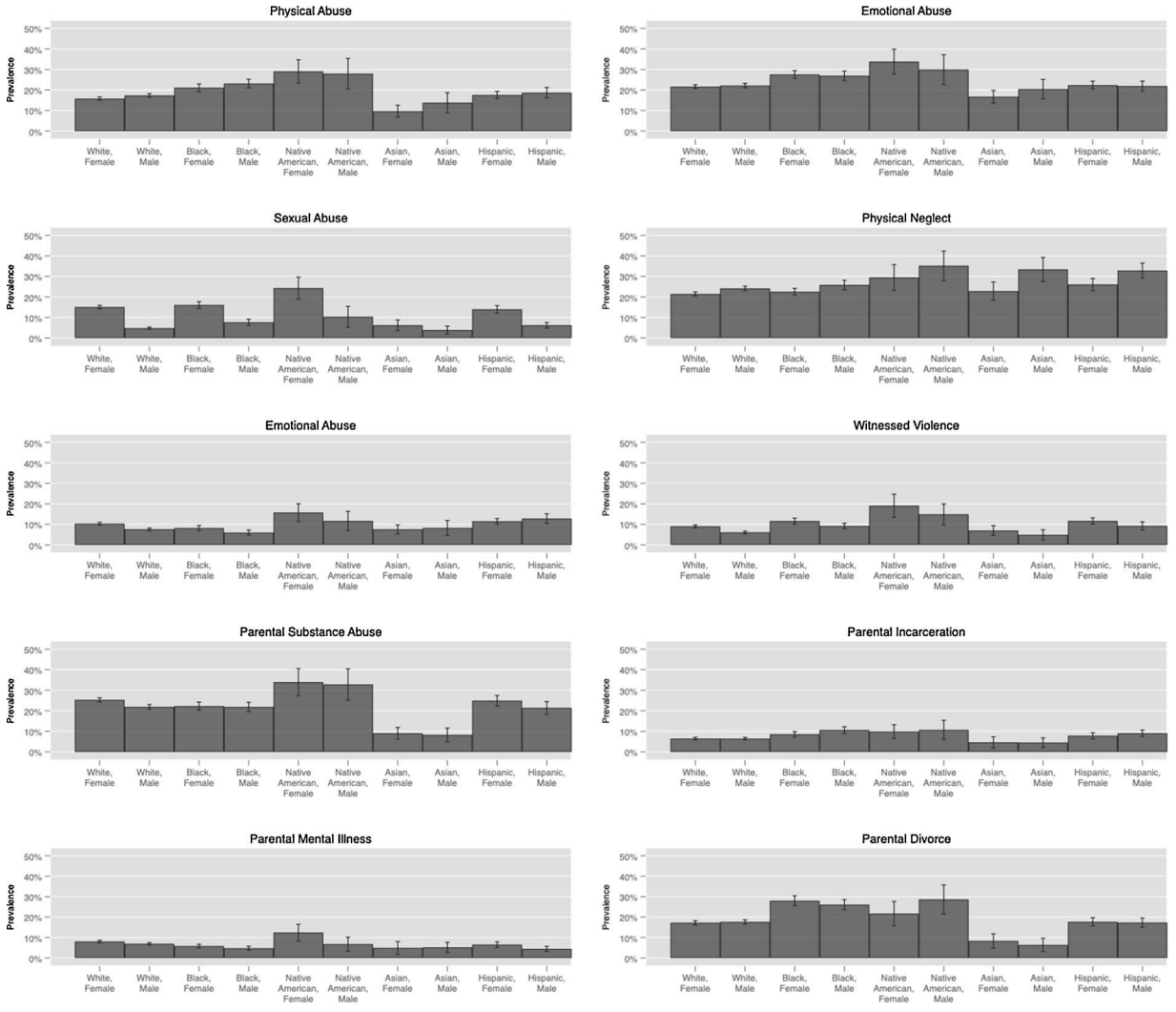

Fig. 4. Prevalence of Each Examined form of Childhood Adversity across Racial/Ethnic Categories and Sex: National Epidemiologic Survey of Alcohol and Related Conditions, United States, 2004-2005.

Note: Bars represent the group prevalence of each examined form of adversity and error bars represent accompanying 95 % confidence intervals. All estimates were weighted.

Table 2
Negative Binomial Regression Model Examining Differences in Adverse Childhood Experiences (ACEs) among Racial/Ethnic Groups.

Variables	b	SE	IRR	95 % CI	
Race/Ethnicity					
White	ref.				
Black	**.05**	**.02**	**1.05**	**1.01;**	**1.10**
Native American	**.38**	**.06**	**1.46**	**1.29;**	**1.65**
Asian	**−.37**	**.05**	**.69**	**.62;**	**.77**
Hispanic	−.02	.04	.98	.91;	1.05
Sex					
Female	ref.				
Male	**−.08**	**.02**	**.92**	**.89;**	**.95**
Age	**−.01**	**.00**	**.99**	**.99;**	**.99**
Total Household Income					
≥$19,000	ref.				
$20,000-$34,999	**−.05**	**.02**	**.95**	**.91;**	**.99**
$35,000-$69,999	**−.08**	**.02**	**.92**	**.89;**	**.96**
≤$70,000	**−.15**	**.02**	**.86**	**.82;**	**.90**
Educational Attainment					
Less than high school	ref.				
High school or equivalent	**−.07**	**.03**	**.93**	**.89;**	**.98**
Secondary education	**−.12**	**.02**	**.89**	**.85;**	**.93**
Intercept	.95		2.58		
N	34653				

Note: Unstandardized negative binomial coefficients (*b*) along with accompanying standard errors (SE), incident rate ratios (IRR), and 95 % con- fidence intervals (95 % CI) presented. Reference category of nominal covariates noted as "ref." Bolded coefficients have an IRR with an accompanying 95 % CI that does not include 1 and an accompanying *p*-value of less than .05.

At the same time, our results do not identify or explain *why* Native American persons report these high rates of adversities, but a historical contextualization of the sustained trauma experienced by Native Americans and Native communities may provide a better understanding of these results. Scholars suggest that a "key characteristic of historical trauma is that the trauma is transferred to subsequent generations through biological, psychological, environmental, and social pathways, resulting in an intergenerational cycle of trauma response" (Sotero, 2006, p.95), and it is possible that this may account – at least in part – for the pattern of results uncovered in this study. We purport that historical trauma including colonization, racism, and genocide have impacted Native Americans' opportunities for economic stability and improvement, disrupted family connections and ties to important Indigenous cultural values and social networks – all of which can have long-term impacts on Native Americans' futures, opportunities, and, particularly important to this study, vulnerabilities. Finally, prior research in both nationally-representative and reservation-based samples have found a high prevalence of historical loss and racial discrimination among Native American youth (Brockie, Dana-Sacco, Wallen, Wilcox, & Campbell, 2015; Kinney & Singh, 2016).

In this vein, we acknowledge the possibility that the ACEs captured in this study are not culturally-specific and this may inadvertently or unintentionally impact the findings we uncovered here. To be specific, since some of the foundational issues that have been speculated to increase violence and victimization among Native communities, such as the historical traumas of colonialization, forced migration, and others, happened in the past, some may wonder how these issues may continue to impact Native persons and Native communities. The answer is that these processes *defined* what it was – and is – to be Native American, and served to disrupt the very fabric of Native society; unfortunately, continued racism against Native American persons has limited their opportunities for generations as is evidenced in persistent and interrelated economic, health, and social challenges. This cumulative disadvantage may be reflected in our findings, explaining why Native American persons report more adverse events than other racial/ethnic groups. Thus, we call for greater attention to cultural context within measures of ACEs.

Reducing ACEs among Native American persons will require direct action to address the lasting impacts of colonialism, structural racism, and state violence. To begin, the federal government should continue work to fully fund essential Native American institutions such as the Indian Health Service and Tribal colleges and universities. These institutions provide life sustaining and life changing services for Native Americans, yet they are perpetually under resourced. In addition, legislation such as the proposed Violence Against Women Reauthorization Act (2019) which provides Tribes' more power to enforce and prosecute violent crimes against Native persons by non-Native perpetrators on tribal land are critical to Native persons' – particularly Native women's and children's – access to safety and justice. The proposed VAWA reauthorization must become law. Finally, recent Court decisions legally, and publicly, recognizing Tribal sovereignty (e.g., McGirt v. Oklahoma, 2020; Standing Rock Sioux Tribe et al. & Cheyenne River Sioux Tribe, 2020), reaffirm Native Americans' rights to their land and natural resources, and in turn, their culture and traditions. Taken together, these policy actions provide examples of systemic changes that must take place to renew Native Americans' and Native communities' access to self-determination.

In addition, prevention efforts to reduce ACEs among Native American children and youth as well as interventions for Native persons (i.e., including adults) should consider culturally-specific programming. Native American persons often prefer interventions that incorporate traditional beliefs and practices (e.g., music, dance, sweat lodges) and evidence

suggests that Western treatment models are rarely effective in Native communities (see Attorney General's Advisory Committee on American Indian/Alaska Native Children Exposed to Violence, 2014). For example, Honoring Children, Mending the Circle (HC-MC), is an adaption of an evidence-based treatment, trauma-focused cognitive-behavioral therapy, which blends traditional Native American concepts – the importance of extended family, respect, the sacred Circle, and the connection between one's spirituality and healing – with cognitive-behavioral methods (Bigfoot & Schmidt, 2010). Other examples include home visitation programs designed for Native American mothers and their children – such as the Safe Care and Family Spirit programs – which use culturally specific modalities to "promote mothers' parenting, coping, and problem-solving skills to address demographic challenges, family-of-origin problems, and personal stressors" (Attorney General's Advisory Committee on American Indian/Alaska Native Children Exposed to Violence, 2014, p.95). The Family Spirit curriculum incorporates traditional tribal teachings into "lessons on prenatal care, child development, toddler care, life skills, and healthy living while the Safe Care curriculum addresses the dynamics of child abuse and domestic violence and provides referrals to services available in the community" (Attorney General's Advisory Committee on American Indian/Alaska Native Children Exposed to Violence, 2014, p. 95).

The Tribal Law and Policy Institute has developed best-practices for developing culturally relevant social service departments as well as practitioner models for tribal advocates working with Native children who have experienced abuse (Yurok, 2006). In addition, the National Child Traumatic Stress Network (NCTSN) Trauma-Informed Child Welfare training toolkit has been adapted for training state child welfare workers working with minority populations (Attorney General's Advisory Committee on American Indian/Alaska Native Children Exposed to Violence, 2014). The adaptations include information on the Indian Child Welfare Act, case studies of Native children, modules on the impacts of historical and intergenerational trauma for Native families, and a reframing of Secondary Traumatic Stress from a tribal perspective. In addition, the Substance Abuse and Mental Health Services Administration (SAMHSA) has developed a pocket resource, "CultureCard: A Guide to Build Cultural Awareness: American Indian and Alaska Native," which provides brief summaries of customs, beliefs, and social norms with the aim of improving cultural competence and better serving families in Tribal communities. In sum, the findings reported here suggest that rates of violence exposure differ across racial/ethnic groups, and as such, culturally-specific prevention and intervention techniques are recommended.

Despite the potential contributions of our findings, the results from the current study should be considered alongside at least four limitations. First, while the NESARC employed a validated sampling procedure to secure a nationally representative sample, there is no way to ensure that the same levels of generalizability can be extended to subsamples of the data. In this way, it can be expected that the Native American subsample of the NESARC resembles the overall population of Native American persons and these data have been used to provide Native American population estimates in at least one other recent study (on mental health diagnoses) (Brave Heart et al., 2016), but this cannot be ensured. Second, while the NESARC is an impressive data source, the second wave of data was collected between 2004 and 2005, raising concerns surrounding the representativeness of the findings within a contemporary context. Third, while the ACEs measure used here has been employed in previous studies (Choi et al., 2017), it relies on retrospective reports, potentially leading to increased levels of recall bias, an issue that is further exacerbated by the age of the sample when the second wave of data collection was completed ($M = 48.16$). Fourth, reporting biases for ACEs that differ across racial groups may exist. Finally, while Native American participants consistently displayed greater average levels of ACEs relative to the other racial /ethnic groups examined, the overall effect size of these differences were small to moderate in size. The average standardized mean difference ranged between $d = .63$ (difference between Native American and Asian participants) and $d = .34$ (difference between Native American and Black participants), representing small to moderate effects (Cohen, 1988). In this way, differences between the examined groups appear to be consistent and statistically significant, but concerns regarding the substantive significance of such differences persist.

Future research must focus on both designing studies aimed at collecting generalizable samples of Native American persons and more thoroughly investigating such samples. In addition, given the age of these data, efforts should be made to replicate the present research using comparable measures of ACEs and examine whether these findings are replicable or if significant changes in Native American person's experiences with ACEs have changed over time. These studies must make comparisons across diverse racial/ethnic groups to fill critical gaps in our knowledge regarding Native American persons experiences with ACEs in comparison to other groups who have experienced historical and on-going discrimination, particularly Black and Hispanic persons. Further, survey instruments designed to address ACEs would be well-served to include questions regarding cultural context, and future research should prioritize capturing these potential impacts.

6. Conclusions

The findings presented here provide evidence of higher rates of ACEs among Native American persons, particularly Native American girls, when compared to other racial/ethnic groups. Further, Native American persons reported experiencing the highest rates of cumulative ACE exposure, increasing the risk for serious and lifelong negative consequences on health and wellbeing. Future research examining the specific linkages between intergenerational trauma, racial discrimination, and ACE exposure is necessary to better understand the context of ACEs among Native Americans, and the potential changes in the types and concentration of ACEs experienced by Native American persons

over time. Such examinations will require the development and widespread implementation of more wholistic measures of ACEs which include questions addressing historical trauma and racial discrimination as well as questions addressing protective factors such as access to culturally-specific resources and programming.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.chiabu.2020.104812.

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