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Latent Class Patterns of Adverse Childhood Experiences and Their Relationship to Veteran Status and Sex in the National Epidemiologic Survey of Alcohol and Related Conditions Wave III

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ABSTRACT

Introduction:

Adverse childhood experiences (ACEs) are associated with poor psychosocial and health outcomes in adulthood. Veterans and females experience ACEs disproportionately. A greater understanding of this disparity may be achieved by examining the relationship between distinct ACE patterns and these demographic characteristics. Therefore, this study examined distinct ACE patterns and their association with Veteran status, sex, and other demographics in a nationally representative sample of U.S. adults to inform interventions tailored to ACE patterns experienced by specific groups.

Materials and Methods:

Latent class analysis (LCA) was conducted with data from the National Epidemiologic Survey of Alcohol and Related Conditions-III, a nationally representative structured diagnostic interview conducted from 2012-2013. The target population was the noninstitutionalized adult population living in the USA. The analytic sample was 36,190 (mean age 46.5 years; 48.1% male). Of these participants, 3,111 were Veterans. Data were analyzed between September 2020 and January 2021.

Results:

Latent class analysis revealed a four-class solution: (1) “Low adversity” (75.3%); (2) “Primarily household dysfunction” (9.0%); (3) “Primarily maltreatment” (10.7%); and (4) “Multiple adversity types” (5.1%). Compared to “Low adversity,” members in the other classes were more likely to be Veterans (odds ratio (OR)_{C2vC1} = 1.33, OR_{C3vC1} = 1.55, OR_{C4vC1} = 1.98) and female (OR_{C2vC1} = 1.58, OR_{C3vC1} = 1.22, OR_{C4vC1} = 1.65). While lower education and income were also related to higher adversity class membership, Veteran status and sex were the strongest predictors, even when controlling for education and income.

Conclusions:

Distinct and meaningful patterns of ACEs identified in this study highlight the need for routine ACE screenings in Veterans and females. As in the current study, operationalizing and clustering ACEs can inform screening measures and trauma-informed interventions in line with personalized medicine. Future work can test if classes are differentially associated with health outcomes.

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INTRODUCTION

Adverse childhood experiences (ACEs) are potentially traumatic childhood events or experiences in the home environment that impact safety and stability¹ and are disproportionately experienced by Veterans.² It is well-established that ACEs are associated with numerous subsequent poor health outcomes in adulthood including smoking, overweight/obesity, and mental illness.^{1,3} Most research examining these associations either consider the total number of ACEs endorsed or use the threshold of four or more ACEs.^{3,4} These methods assume each ACE type is equally impactful, do not consider patterns among ACE types, and lack information about the inherent heterogeneity of adverse

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experiences. Latent class analysis (LCA) can be used to overcome these limitations by identifying distinct subgroups (or “classes”) of individuals based on shared ACE patterns. This has been done primarily using data from surveys of two nationally representative U.S. samples.^{5,6} The handful of studies examining LCAs of ACEs in these samples have identified three to five distinct classes, with one low adversity and several high-adversity groups differing by prevalence rates of ACE types.⁷⁻¹⁴

Veteran status may be uniquely associated with ACE exposure as, for some, enlisting may provide escape from adverse household environments.^{15,16} However, it is recognized that many individuals are resilient to adversity and there are many reasons individuals choose to enlist.¹⁷ Regarding counts of ACEs, a study examining the current all-volunteer enlistment era found that both males and females with military service reported higher rates of all ACE types than civilians,¹⁸ with female Veterans reporting more ACEs than male Veterans.¹⁹ Female Veterans also report more ACE types than civilians, suggesting LCA may be useful in exploring patterns of co-occurring ACEs in this population.²⁰ Notably, previous research has not examined such ACE patterns with civilian comparison groups,^{9,10,21} limiting the applicability of findings and hindering the overall utility for health outcome prediction and intervention development. For example, LCA of ACEs in the most recent National Epidemiologic Survey of Alcohol and Related Conditions (NESARC-III). [NESARC is an interview-based survey conducted in all 50 states at three time periods, called waves (Wave 1 from 2001-2002, Wave 2 from 2004-2005, Wave III from 2012-2013). Waves 1 and 2 consist of the same sample of individuals, while Wave III comprises an entirely new sample and is the sample used in the current study.⁵ only evaluated ACE classes within specific subsamples such as U.S. military Veterans,^{9,10} emerging adults,¹¹ and older adults.¹² Examining only subsamples impedes relevant comparisons across subpopulations. The one LCA study that used the full NESARC-III included a broader range of adversities in addition to the standard set of ACEs (e.g., childhood poverty).²² Therefore, there is a need to comprehensively examine ACE patterns in male and female Veterans to better understand and address ACEs as potential risk factors for conditions prevalent in Veterans, such as posttraumatic stress disorder (PTSD), depression, and alcohol misuse.¹⁸

The current study distinguishes specific patterns of ACEs using the total NESARC-III, which provides an opportunity to examine the replicability of previously identified ACE classes. No studies have comprehensively examined the association of ACE classes with Veteran status. Understanding the differences in ACE patterns between Veterans and civilians could inform our understanding of the mechanisms underlying health disparities among Veterans.²³ Further, female Veterans remain underrepresented in research.² Thus, the aims of the current study were to: (1) Identify unique classes of ACE patterns in the total NESARC-III using LCA; (2)

Identify and compare relationships between ACE classes and Veteran status, sex, and other demographics; and (3) Examine the interaction between Veteran status and sex in relation to ACE classes. Greater understanding of ACE patterns in a representative U.S. sample may elucidate intervenable mechanisms between ACEs and poor health outcomes²⁴ in Veterans, and guide targeted health intervention development²⁵ and evaluation.²⁶

METHODS

Data and Sample

Data were obtained from NESARC-III. The target population was the noninstitutionalized U.S. population 18 years or older. Multistage probability sampling was used to collect the data via a computer-assisted personal interviewing system from a final representative sample of 36,309 individuals.⁵ To conduct the LCA, participants missing values on all ACE items were excluded, resulting in an analytic sample of 36,190. Data were obtained through a Data Use Agreement with National Institute on Alcohol Abuse and Alcoholism and the study was approved by the Research and Development Committee at VA San Diego Healthcare System.

Measures

Adverse childhood experiences (ACEs)

Adverse childhood experiences were assessed and operationalized consistent with the Adverse Childhood Experiences Study,²⁷ resulting in nine indicators. The National Epidemiologic Survey of Alcohol and Related Conditions included variables adapted from the Conflict Tactics Scale,²⁸ Childhood Trauma Questionnaire,²⁹ and questions from Wyatt (1985).³⁰ Respondents rated questions about five types of maltreatment (sexual abuse, physical abuse, physical neglect, emotional abuse, and emotional neglect) and four types of household dysfunction (witnessing interpersonal violence, adult substance use, adult mental health issues, and adult incarceration). Sexual abuse (4 items), physical abuse (2 items), physical neglect (4 items), emotional abuse (3 items), witnessing interpersonal violence (4 items), and emotional neglect (5 items) were assessed using 5-point Likert scales. Household substance use was indicated if respondents answered “yes” to at least one of two items inquiring about problematic (1) alcohol or (2) drug use by an adult in one’s home. Household mental health issues were indicated if participants endorsed at least one of three items regarding whether a parent or adult in the home (1) was treated or hospitalized for a mental illness, (2) attempted suicide, or (3) committed suicide. All domains were dichotomously coded for the current study.¹⁰

Sociodemographic variables

Sociodemographic variables included age, sex, race/ethnicity, education, employment, and household income. Age was

a continuous variable, and all others were dichotomized, with one as the referent. Sex was coded (0) male, (1) female as the NESARC survey assessed only self-reported sex, and not gender identity. Race/ethnicity was coded (0) White, non-Hispanic, (1) Non-white; education was coded (0) some college education or higher, (1) high school degree or less; unemployment was coded (0) employed, (1) unemployed; lower income was coded as earning (0) \geq \$40,000, (1) \leq \$39,999, based on median income of NESARC-III.

Veteran status was operationalized as endorsing serving on active duty in the U.S. Armed Forces, Reserves, or National Guard.¹⁰ Veteran status was coded as (0) Civilian, (1) Veteran.

Data Analysis

The complex samples module in SPSS 26 was used to calculate descriptive statistics. These analyses accounted for the complex sample design by adjusting for sample weights, clustering, and strata. Latent class analysis was used to identify distinct ACE profiles using Mplus Version 8.6.³¹ The latent groups examined were based on endorsement of

the nine summary binary (yes/no) ACE types. Missing data were accounted for using Full Information Maximum Likelihood. Models were conducted based on 100 or 500 random starts. Relative model fit indices were examined to determine the best fitting model, including Akaike’s information criterion (AIC), Bayesian information criterion (BIC), sample-size adjusted Bayesian information criterion (adj BIC), the Lo–Mendell–Rubin likelihood ratio test (LMR LRT), and entropy.³² Smaller AIC, BIC, and adj BIC values indicate better model fit. The LMR LRT compares the model being examined to a model with *k*-1 classes. Significant *P*-values suggest improved model fit relative to a model with *k*-1 classes. Entropy represents the overall precision of group classification (range = 0-1), with values closer to 1 indicating higher precision. Agreement with theory was considered in determining the number of classes.

Based on the LCA, a nominal variable indicating each participant’s most likely class membership was constructed. Chi-Square Tests of Independence were used to examine the association of class membership with sociodemographics

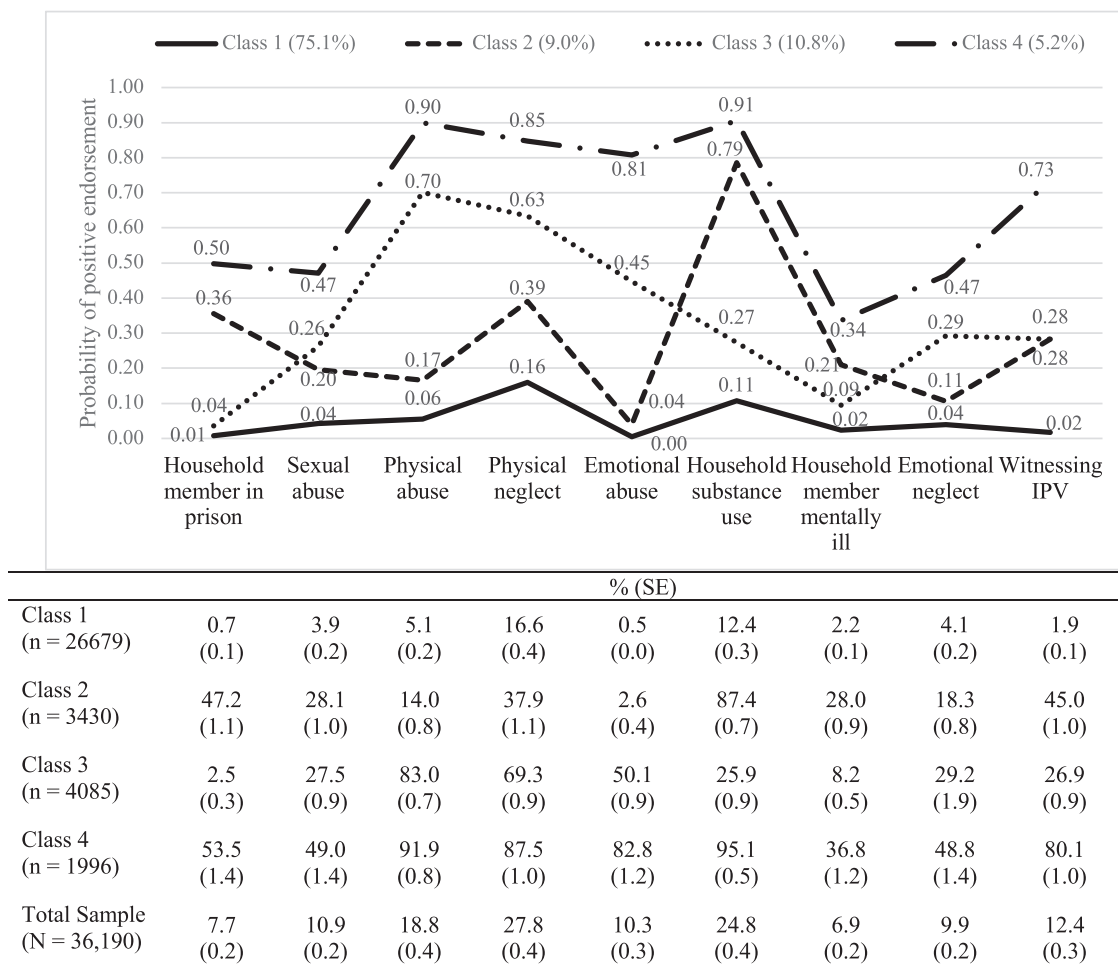


FIGURE 1. Latent classes and associated endorsement probabilities and frequencies of childhood adversities. Class 1 = Low adversity; Class 2 = Primarily household dysfunction; Class 3 = Primarily maltreatment; Class 4 = Multiple adversity types.

and Veteran status. Multinomial logistic regression was used to examine the odds of class membership as a function of sociodemographics and Veteran status. A sex by Veteran interaction was evaluated to determine whether sex moderated the association between Veteran status and class membership. These analyses also accounted for the complex sample design by adjusting for sample weights, clustering, and strata. Alpha was set at 0.05 for all analyses.

RESULTS

The supplementary table shows fit statistics and class proportions for the latent class models examined. Models up to five classes were examined, whereupon the best log-likelihood value could not be replicated. Considering all fit indices and examining profiles associated with different models, the 4-class model demonstrated the best fit. Figure 1 presents the probability of experiencing each ACE type among participants in each class and the proportion of participants endorsing each of the nine ACEs per class. Probability estimates were used to interpret the classes. Class 1 (“Low adversity;” 75.1%) demonstrated low probability of any form of maltreatment or household dysfunction. Class 2 (“Primarily household dysfunction;” 9.0%) exhibited moderate probabilities of all ACEs and higher probabilities of household dysfunction indicators, especially household substance use. Class 3 (“Primarily maltreatment;” 10.8%) represented high probability for maltreatment indicators and moderate to low probability for household dysfunction. Class 4 (“Multiple adversity types;” 5.2%) demonstrated high probability of all ACE types.

Table I presents sociodemographic characteristics across the entire sample and for each latent class. Class membership was significantly related to sex, race/ethnicity, employment, income, education, and Veteran status ($ps < 0.001$). Results of the polynomial logistic regression examining class membership as a function of sociodemographics are in Table II. Compared to individuals in Class 1, those in Class 2 had 33% higher odds of being a Veteran ($P = .002$), 58% higher odds of being female ($P < .0001$), and 25% higher odds of unemployment ($P = .001$); those in Class 3 had 55% higher odds of being a Veteran ($P < .0001$), 22% higher odds of being female ($P < .0001$), and 16% higher odds of unemployment ($P = .01$); and those in Class 4 had 98% higher odds of being a Veteran ($P < .0001$), 65% higher odds of being female ($P < .0001$), and 56% higher odds of unemployment ($P < .0001$). Education and income differentiated Classes 2 and 4 from Class 1 with those with high school education or less having 26% and 49% higher odds and those with an income of less than \$40,000 having 27% and 37% higher odds of being in Class 2 and 4, respectively. Class 3 uniquely did not exhibit this association.

Table III presents the rates of ACE types and classes by Veteran status and sex. Physical Neglect was the most reported ACE in the entire sample and among Veterans. Household Substance Use was the most reported adversity in females overall and female Veterans. Chi-square analyses showed

female civilians and female Veterans had significantly higher rates of most ACEs than their male counterparts with the largest discrepancy in Sexual Abuse and Emotional Abuse. Although female Veterans had higher rates of many ACEs and Class 4 membership compared to female civilians, and Veterans had higher rates of many ACEs and adverse classes than civilians, the sex by Veteran interaction was not statistically significant.

DISCUSSION

To our knowledge, this is the first study to comprehensively examine the association of ACE patterns with sociodemographic characteristics and specifically compare profiles between Veterans and civilians. Four unique classes emerged: (1) “Low adversity;” (2) “Primarily household dysfunction;” (3) “Primarily maltreatment;” and (4) “Multiple adversity types.” Veteran status was associated with greater odds of higher adversity than any other characteristic. There was some support this was driven by female Veterans, who had significantly higher prevalence of Class 2 membership than male Veterans. Female sex was associated with membership in higher adversity classes compared to the “Low adversity” reference group. Less education and lower income were associated with membership in Classes 2 and 4, but not with Class 3.

Veterans, regardless of sex, were twice as likely as civilians to be in Class 4. This is consistent with previous research that reported higher prevalence of ACE types in male Veterans than civilians,¹⁸ and extends it to suggest both male and female Veterans are more likely to experience patterns of severe childhood maltreatment than civilians. As previously hypothesized for male Veterans,¹⁸ joining the military may provide some males and females with a means of escape from dysfunctional home environments. Clinically, these findings suggest military and Veteran healthcare may benefit from ACE screening to inform comprehensive biopsychosocial and personalized treatment decision-making. For example, screening could occur during initial visits to a VA or military healthcare facility so that adversity-related physical and mental concerns can be better recognized and addressed, and trauma-informed care and services can be employed to mitigate the potential harm caused by ACEs.³³ This information would provide clinicians insight into potential contributing and maintaining factors for certain health outcomes, and any resilience or protective factors present, to help them better understand their patients’ contexts. Brief ACE screening in healthcare settings also can flag adversity- or trauma-related somatic and mental health symptoms and conditions, and ensure appropriate referrals to services and supports for identified issues. This care approach could provide a holistic streamlined team-based healthcare experience to connect patients with necessary healthcare services as needed.

However, a history of ACEs should not be implied to necessarily cause poor health. In fact, military service could be protective for individuals who have experienced ACEs, for

TABLE I. Demographic Characteristics across the Total Sample and within Each Latent Class

	Total Sample (N = 36,190) n, % (SE)	Mean # ACEs (M = 1.29, SE = 0.02) M (SE)	≥4 ACEs (11.5%, SE = 0.3%) % (SE)	Class 1 (n = 26,679) n, % (SE)	Class 2 (n = 3430) n, % (SE)	Class 3 (n = 4,085) n, % (SE)/M (SE)	Class 4 (n = 1,996) n, % (SE)/M (SE)	χ ²
Age in years, M (S.E.)	36,190, 47.1 (0.2)	-	-	46.9 (0.2)	43.2 (0.4)	47.8 (0.4)	44.6 (0.4)	
Female	20,387, 51.9 (0.3)	1.38 (0.02) F 1.19 (0.02) M 1.44 (0.04)	13.3 (0.3) F 9.6 (0.3) M 13.2 (0.8)	14,661, 50.3 (0.3)	2,158, 59.7 (1.0) ^a	2,289, 53.2 (0.9)	1,279, 59.5 (0.9) ^b	153.08
Veteran	3,111, 9.6 (0.3)			2,211, 9.2 (0.3) ^a	258, 8.4 (0.6) ^b	442, 12.8 (0.7) ^a	200, 11.6 (1.1)	63.39
Race/ethnicity								
Non-white ^c	17,052, 33.8 (0.8)	1.30 (0.02)	12.5 (0.4)	12,481, 33.6 (0.8)	1,687, 35.0 (1.2)	1,987, 35.1 (1.2)	897, 31.9 (1.4)	8.36
White non-Hispanic	19,138, 66.2 (0.8)	1.30 (0.02)	11.6 (0.3)	14,198, 66.4 (0.8)	1,743, 65.0 (1.2)	2,098, 64.9 (1.2)	1,099, 68.1 (1.4)	104.36
Black non-Hispanic	7,733, 11.8 (0.7)	1.34 (0.03)	11.8 (0.5)	5,571, 11.2 (0.7) ^b	813, 14.2 (0.9) ^a	962, 64.9 (0.9) ^a	387, 11.1 (0.9)	
Other non-Hispanic	2,302, 7.3 (0.5)	1.98 (0.04)	8.7 (0.7)	1,804, 7.8 (0.5) ^a	139, 4.4 (0.6) ^b	255, 6.8 (0.6)	104, 6.0 (0.7)	
Any race Hispanic	735, 14.7 (0.7)	1.32 (0.03)	12.4 (0.5)	5,106, 14.6 (0.7)	735, 16.4 (1.1) ^a	770, 14.3 (0.8)	406, 14.9 (1.1)	
Unemployed ^d	11,121, 34.1 (0.6)	1.43 (0.02) UE 1.26 (0.03) E	13.1 (0.4) UE 10.6 (0.3) E	7,999, 33.1 (0.6) ^b	1,042, 34.3 (1.2)	1,347, 37.4 (1.1) ^a	733, 41.1 (1.6) ^a	61.64
Household income								
Lower income ^e	19,592, 44.4 (0.7)	1.43 (0.02)	14.0 (0.4)	13,994, 42.6 (0.7) ^b	2,046, 51.3 (1.2) ^a	2,264, 45.9 (1.2)	1,288, 55.5 (1.7) ^a	194.84
<\$20,000	9,891, 41.2 (0.6)	1.51 (0.03)	15.7 (0.5)	6,931, 19.3 (0.5)	1065, 25.2 (0.9)	1,133, 21.3 (0.9)	762, 30.5 (1.4) ^a	328.63
\$20,000-\$39,999	9,701, 27.2 (0.3)	1.36 (0.03)	12.6 (0.5)	7,063, 23.3 (0.4) ^b	981, 26.2 (1.0) ^a	1,131, 24.6 (0.8)	526, 24.9 (1.1)	
\$40,000-\$69,999	7,852, 18.3 (0.3)	1.30 (0.03)	11.3 (0.5)	5,810, 22.6 (0.3)	709, 22.0 (0.8)	932, 24.8 (0.9) ^a	401, 23.3 (1.3)	
\$70,000+	8,746, 13.2 (0.4)	1.09 (0.02)	8.3 (0.4)	6,875, 34.8 (0.7) ^a	675, 26.6 (1.0) ^b	889, 29.3 (1.1) ^b	307, 21.2 (1.5) ^b	
Education								
Less education ^c	15,224, 38.7(0.8)	1.44 (0.03)	14.6 (0.4)	10,956, 73.4 (0.6) ^b	1,592, 44.3 (1.1) ^a	1,691, 39.0 (1.1)	985, 48.5 (1.3) ^a	138.01
Less than HS	15,224, 13.0 (0.4)	1.51 (0.04)	15.4 (0.8)	3,854, 12.1 (0.5) ^b	566, 15.2 (0.7) ^a	648, 14.4 (0.8) ^a	394, 18.5 (1.0) ^a	420.94
Completed HS	9,762, 25.8 (0.5)	1.38 (0.03)	12.6 (0.5)	7,102, 25.2 (0.6) ^b	1,026, 29.1 (0.9) ^a	1,043, 24.6 (0.9)	591, 30.0 (1.2) ^a	
Some college	12,065, 33.1(0.5)	1.38 (0.02)	12.9 (0.4)	8,638, 32.1 (0.5) ^b	1,230, 35.6 (1.0) ^a	1,437, 35.4 (1.0) ^a	760, 37.9 (1.4) ^a	
BA or higher	8,901, 28.1 (0.8)	1.01 (0.02)	7.2 (0.3)	7,085, 30.5 (0.8) ^a	608, 20.0 (1.1) ^b	957, 25.6 (1.0) ^b	251, 13.7 (1.1) ^b	

Class 1 = Low adversity; Class 2 = Primarily household dysfunction; Class 3 = Primarily maltreatment; Class 4 = Multiple adversity types. χ² = chi-square test of independence. BA = Bachelor's degree, E = Employed, F = Female, HS = High school, M = Male, UE = Unemployed. ^aStandardized residuals > 2; ^bStandardized residuals < -2; ^cDichotomous variable used in primary analyses.

TABLE II. Summary of Polynomial Regressions Examining Associations between Latent Class and Demographic Characteristics

Variable	Class 2 V Class 1			Class 3 V Class 1			Class 4 V Class 1		
	OR	95% CI	P-value	OR	95% CI	P-value	OR	95% CI	P-value
Age	0.98	0.98, 0.99	<.0001	1.00	1.00, 1.00	.06	0.98	0.98, 0.98	<.0001
Female	1.58	1.43, 1.74	<.0001	1.22	1.10, 1.34	<.0001	1.65	1.45, 1.88	<.0001
Veteran	1.33	1.11, 1.60	.002	1.55	1.32, 1.81	<.0001	1.98	1.51, 2.60	<.0001
Unemployed	1.25	1.09, 1.42	.001	1.16	1.04, 1.31	.01	1.56	1.35, 1.79	<.0001
Lower education	1.26	0.72, 0.88	<.0001	1.05	0.87, 1.05	.34	1.49	0.59, 0.77	<.0001
Non-white	0.91	0.82, 1.01	.076	1.11	0.99, 1.23	.06	0.78	0.68, 0.90	.001
Lower income	1.27	1.15, 1.41	<.0001	1.05	0.96, 1.15	0.26	1.37	1.18, 1.58	<.0001
Veteran status × Female	1.14	0.75, 1.72	.54	1.03	0.67, 1.57	0.90	1.19	0.75, 1.88	.46

Class 1 = Low adversity; Class 2 = Primarily household dysfunction; Class 3 = Primarily maltreatment; Class 4 = Multiple adversity types.

example by providing socioeconomic benefits. Elements of military experience, such as unit cohesion, also may help mitigate the relationship between stressful life experiences and poor mental health outcomes, suggesting resiliency.³⁴ Because ACEs do not ensure poor health outcomes or imply a lack of fitness for duty, such screening should be reserved for VA and other healthcare settings. More research is needed to better understand motivating factors for joining the military, the role of ACEs, subsequent military experiences, and any potential compounding or attenuating effect on physical and mental health in Veterans. Understanding the complex interplay between ACEs, military experience, and PTSD or suicidality, for example, can inform military and Veteran healthcare systems to design tailored prevention and intervention strategies.

Females were more likely to fall within each higher adversity class than males, indicating greater likelihood of experiencing these patterns of ACE types. This is consistent with previous reports of adversity patterns,^{35,36} and of increased childhood sexual and emotional abuse, and household substance abuse and mental illness in females compared to males.¹ Given the significantly higher rates of sexual and emotional abuse in both civilian and Veteran females than males, female membership in higher adversity classes may have been driven by these ACE types. The observed sex differences suggest further research is needed to understand mechanisms underlying associations between sex, ACEs, and health outcomes.

We found higher rates of some ACEs among female Veterans than female civilians or male Veterans, which may drive the association between Veteran status and higher adversity profiles. However, sex did not moderate the relationship between Veteran status and ACE profiles, likely due to the relatively small sample of female Veterans. Because this dataset was designed to be representative of the general population without consideration of the Veteran population, only 9.6% of the total sample were Veterans and only 1% were female Veterans. Thus, the fact that the sex by Veteran interaction was not significant should be viewed with caution and not interpreted as a conclusive absence of an effect. More research is needed to examine how a history of ACEs in females may be

implicated in vulnerability to subsequent abuse³⁷ or influence exposure to adverse experiences, like sexual assault¹⁵ or military sexual trauma, in adulthood.

Our overall findings confirm ACE patterns previously identified among various subsamples.^{9,10,12,13} The similarities between previously identified ACE profiles and those in this study demonstrate the replicability of ACE patterns. Specifically, patterns distinguishing Classes 2 and 3 show that exposure to household substance use often co-occurs with a moderate amount of maltreatment and that severe maltreatment often co-occurs with household dysfunction. The unique association of Classes 2 and 4 with less education and lower income potentially reflects a relationship between increased household substance use and socioeconomic status.³⁸ Consistent with prior research,^{8-10,12,14,22} our identified class structure suggests individuals either experience comparatively minimal ACEs or a combination of multiple adversities.

Limitations

The current study has limitations. First, NESARC-III is cross-sectional and retrospective reports of ACEs may be prone to recall bias. Further, we lacked data on frequency and severity of ACEs. Future prospective studies should focus on the temporal relationship of ACEs of various frequency and severity with time-sensitive demographics (e.g., Veteran status, education, employment, and income). Second, Veteran status was self-reported and because NESARC-III was developed to be representative of the general population and included one question about Veteran status, we were unable to assess military specific factors like combat experience to better describe the sample or examine complex relationships. Future research should examine the role and impact of ACEs in the context of other military specific experiences. Third, NESARC did not distinguish between sex and gender, limiting our analyses to the use of self-reported sex. Future research should differentiate these important aspects of identity. Finally, the association of race/ethnicity as white versus non-white with ACE profiles approached significance, indicating a need for more nuanced investigation of racial/ethnic

TABLE III. Prevalence of ACE Types and Classes by Sex and Veteran Status

ACE/Class	Civilians			Veterans			Civilian female v. veteran female χ^2	
	Female % (SE) n = 20,008	Male % (SE) n = 13,071	Total % (SE) n = 33,079	Female v. male χ^2	Female % (SE) n = 379	Male % (SE) n = 2,732		Total % (SE) n = 3,111
Household member in prison or jail	8.1 (0.2) n = 1,782	7.4 (0.3) n = 1,060	7.8 (0.2) n = 2,842	4.54	10.7 (2.0) n = 45	6.3 (0.5) n = 182	6.7 (0.5) n = 227	3.49
Sexual abuse	15.5 (0.4) n = 3,113	5.6 (0.3) n = 755	11.2 (0.3) n = 3,868	806.95**	19.3 (2.8) n = 78	6.9 (0.6) n = 194	8.1 (0.6) n = 272	3.92
Physical abuse	18.2 (0.5) n = 3,730	17.7 (0.5) n = 2,432	17.9 (0.4) n = 6,162	1.38	28.9 (3.0) n = 104	26.6 (1.2) n = 726	26.9 (1.1) n = 830	28.24**
Physical neglect	25.5 (0.5) n = 5,210	29.4 (0.6) n = 3,957	27.2 (0.4) n = 9,167	59.39**	30.6 (3.2) n = 113	33.6 (1.2) n = 904	33.3 (1.2) n = 1,017	4.89
Substance use in the home	26.3 (0.5) n = 5,238	22.6 (0.5) n = 2,971	24.7 (0.4) n = 8,209	62.63**	34.7 (2.6) n = 126	25.2 (1.1) n = 678	26.2 (1.0) n = 804	13.11*
Mental health issues	7.8 (0.2) n = 1,504	5.8 (0.2) n = 752	6.9 (0.2) n = 2,256	52.52**	12.2 (2.3) n = 39	6.3 (0.5) n = 183	6.9 (0.5) n = 222	9.79*
Emotional neglect	11.0 (0.3) n = 2,360	8.3 (0.3) n = 1,189	9.8 (0.3) N = 3,549	69.33**	12.6 (2.3) n = 50	10.9 (0.7) n = 298	11.1 (0.7) n = 348	36.62**
Emotional abuse	11.4 (0.3) n = 2,319	8.3 (0.3) n = 1,162	10.1 (0.3) n = 3,481	91.14**	21.6 (2.5) n = 301	11.6 (0.8) n = 321	12.6 (0.7) n = 398	36.62**
Witnesses IPV	14.0 (0.4) n = 2,946	9.9 (0.4) n = 1,391	12.2 (0.3) n = 4,337	125.26**	17.8 (2.4) n = 71	13.3 (0.7) n = 353	13.7 (0.7) n = 424	4.36
Class 1	72.9 (0.5) n = 14,426	78.7 (0.5) n = 10,042	75.4 (0.4) n = 24,468	146.61**	62.1 (3.0) n = 235	72.8 (1.0) n = 1,976	71.7 (1.0) n = 2,211	21.59**
Class 2	10.3 (0.3) n = 2,107	7.6 (0.3) n = 1,065	9.1 (0.2) n = 3,172	71.31**	12.8 (1.7) n = 51	7.2 (0.5) n = 207	7.8 (0.5) n = 258	2.60
Class 3	11.0 (0.3) n = 2,237	9.7 (0.3) n = 1,406	10.4 (0.2) n = 3,643	14.49*	15.0 (2.4) n = 52	14.2 (0.8) n = 390	14.3 (0.8) n = 442	5.81
Class 4	5.8 (0.2) n = 1,238	4.0 (0.2) n = 558	5.0 (0.2) n = 1,796	146.61**	10.1 (2.1) n = 41	5.8 (0.6) n = 159	6.2 (0.6) n = 200	12.20*

Class 1 = Low adversity; Class 2 = Moderate maltreatment with substance use; Class 3 = Severe maltreatment with moderate household dysfunction; Class 4 = Severe multi-type adversities. Boldface indicates statistical significance (* $P < .01$; ** $P < .001$).

groups, acculturation, intersectionality, and how these interact with ACE patterns.¹ Further, this standard method of assessing race/ethnicity is potentially stigmatizing and does little to elucidate intervenable mechanisms for change.³⁹

CONCLUSIONS

We found three distinct ACE patterns and their variable association with Veteran status, sex, and other sociodemographic characteristics in the large, nationally representative NESARC-III sample. Understanding characteristics that may be associated with certain ACE patterns can facilitate future research to examine underlying mechanisms among sets of experiences, resilience factors, and specific health outcomes. Being Veteran and female were consistently associated with greater odds of membership in all higher adversity classes. This underscores the need for: proactive ACE screenings in healthcare settings for service members, Veterans, and females; longitudinal research with service members and Veterans, especially females; and development and evaluation of streamlined prevention and intervention strategies in healthcare settings for service members and Veterans who may be at risk for physical and mental health conditions linked to ACEs. Using a person-centered approach to operationalize and cluster ACEs could inform personalized and focused interventions that prove most effective for individuals with specific ACE patterns and associated health risk factors.²⁵

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SUPPLEMENTARY MATERIAL

Supplementary material is available at *Military Medicine* online.

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CONFLICT OF INTEREST STATEMENT

None of the authors have any conflicts of interest to declare.

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