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Gender-Specific Profiles of Adverse Childhood Experiences, Past Year Mental and Substance Use Disorders, and Their Associations among a National Sample of Adults in the United States

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Abstract

Purpose—This study examined profiles of adverse childhood experiences (ACEs) and mental and substance use disorders (MSUDs), and associations between distinct profiles of ACEs and MSUDs.

Methods—Participants were adults (N= 34, 652) involved in the National Epidemiologic Survey on Alcohol and Related Conditions. Latent class analysis was used to examine both profiles of ten ACEs and ten past year MSUDs. Dual latent class analysis regression was used to examine associations between profiles of ACEs and MSUDs. Given gender differences in ACEs and MSUDs, analyses were conducted separately for females and males.

Results—Four profiles of ACEs and 3 profiles of MSUDs were selected for both genders. The 4 profiles of ACEs were characterized by the following probabilities: high multiple ACEs, high parental substance abuse, high childhood physical abuse, and low ACEs. The 3 profiles of MSUDs were characterized by the following probabilities: high multiple MSUDs for females and low MSUDs except alcohol use disorders for males, moderate-to-high major depressive episode, and low MSUDs. When compared to the low ACEs and MSUDs profiles, members in the higher ACEs profiles had 3.71-89.75 times greater odds of also being members in the higher MSUDs profiles. However, more than one third of members in the high multiple ACEs profiles were also in the low MSUDs profiles.

Conclusions—Study findings suggest four profiles of the ACEs widely studied as part of the Adverse Childhood Experiences study and risk and resilience for recent MSUDs among men and women nationally affected by ACEs.

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Conflicts of Interest: None

Keywords

mental disorders; adverse childhood experiences; latent class analysis; national; gender

Introduction

Adverse childhood experiences (ACEs) including childhood sexual abuse [1], childhood physical abuse [2], and parental psychopathology [3]are risk factors for mental and substance use disorders (MSUDs)and are estimated to account for one third of all mental disorders [4,5].Increased attention has been paid to the cumulative impact of ACEs on health outcomes including MSUDs. Many related studies have come from The Adverse Childhood Experiences Study (called ACE study)[6], with findings showing a dose-response relationship between the number of ACEs individuals report having experienced and various adult health outcomes [7],including alcoholism, drug abuse, and depression[8-11].Increasing evidence suggests that ACEs may result in neurobiological sensitivity to stress that make affected individuals more vulnerable to developing mental disorders [12,13].

Since ACEs co-occur, it is important to study the heterogeneity of ACEs or different profiles of ACEs because different profiles may be associated with different problems and thus treatment needs [14]. However, only a few studies have examined the heterogeneity of ACEs. The heterogeneity of ACEs and adverse experiences have been examined among young adults in Baltimore, Maryland [15] and adolescents in England [16] with findings revealing distinct profiles in ACEs and adversity, which were associated with different degrees of psychopathology [16].

There are three limitations in the existing literature pertaining to ACEs and associated MSUDs. First, we are unaware of any national studies in the United States examining the heterogeneity of ACEs. Second, studies examining the impact of ACEs on MUSDs have tended to focus on only a single MSUD or treated MSUDs as discrete outcomes [10,9]and thus ignored the comorbidity of MSUDs[17]. Without taking into account the comorbid nature of ACEs and MSUDs, associations between ACEs and MSUDs may be estimated with bias[18]. Third, given gender differences in ACEs [19,8] and MSUDs [20-22], there is a need for gender-specific examinations of ACEs and associated problems.This national study sought to address these gaps in the literature by 1) usinglatent class analysis (LCA) to examine profiles of ACEs and MSUDs, 2)examine the associations between profiles of ACEs and MSUDs, and 3) conduct analyses separately among males and females.

Materials and Methods

Participants and procedures

This study used data from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) with the exception of one variable (parental divorce) that was assessed in Wave 1. The NESARC is a longitudinal study that received ethical review and approval from the U.S. Census Bureau and the U.S. Office of Management and budget[23] and was performed in accordance with the ethical standards laid down in the

1964 Declaration of Helsinki and its later amendments. Noninstitutionalized adult civilians were recruited to participate in this study and informed about the nature of the study in writing. Consenting individuals then participated in a face-to-face, computer-assisted personal interview in respondents' homes. Wave 1 data was collected from 43,093 participants during 2001-2002 and the response rate was 81 percent. Wave 2 data, which was different from wave one in that it asked about ACEs, was collected from 34,653 participants during 2004-2005.Of those, 14, 564 were male and 20, 089 were female. One female was missing data on all ten ACEs examined and was therefore removed leaving a final analytic sample of 34, 652, 14, 564 of whom were male and 20,088 of whom were female.

Variables

Adverse childhood experiences—While there are a number of ACEs that warrant attention [24], this investigation focused specifically on the ten ACEs studied in the ACE Study given the attention paid to those ACEs [6] and evidence that several of those ACEs are more strongly associated with mental disorders than other types of ACEs [4,5]. The NESARC included adapted questions from the ACE study [25,26,11] and the ACE study included adapted questions from the Childhood Trauma Questionnaire [27], the Conflict Tactics Scale [28] and questions used by other investigators to assess childhood sexual abuse [29,26]. These questions asked about events that occurred before the participant was 18 years of age. This study included the following ten ACEs occurring during childhood (i.e., before age 18): (1) psychological abuse, (2) physical abuse, (3) sexual abuse, (4) emotional neglect, (5) physical neglect, (6) parental divorce/separation, (7) mother treated violently, (8) parental substance abuse, (9) parental mental illness, and (10) having an incarcerated household member. The ACEs variables were coded in a manner consistent with the ACEs calculator[30] and other studies[9,8]. Participants classified as having experienced each ACE were coded as 1 and otherwise 0. More information about the operationalization of ACEs may be found in Supplementary Table 1.

Mental disorders—Mental disorders were assessed with the Alcohol Use Disorder and Associated Disabilities Interview [31,26], which assessed mental disorders according to the Diagnostic and Statistical Manual of Mental Disorders-4th Edition [32]. This study included the following past year mental disorders: (1) major depressive episode, (2) dysthymic episode, (3) manic or hypomanic episode, (4) posttraumatic stress disorder, (5) panic disorder with or without agoraphobia, (6) social phobia, (7) specific phobia, (8) generalized anxiety disorder, (9) alcohol abuse and/or dependence, (10) drug abuse and/or dependence (i.e., sedatives, tranquilizers, opioids, amphetamines, cannabis, hallucinogens, cocaine, inhalants, heroin or other drugs). Agoraphobia was not included because of the low prevalence of individuals affected by this disorder in the past year. Ten variables representing these mental disorders were coded so that 1and 0 represented individuals who did and who did respectively meet criteria for that disorder during the past year.

Analytic Approach

LCA[33], which is a person centered approach for classifying individuals with similar profiles on co-occurring categorical outcomes, was used to examine profiles of ACEs and

profiles of MSUDs separately among females and males. The indicator variables for the LCA of ACEs were the yes/no codes of the ten ACEs described above. The indicator variables for the LCA of MSUDs were whether or not participants met criteria for one of the ten past year MSUDs described above. LCA models with increasing numbers of profiles for ACEs and past year MSUDs were estimated. Fit statistics appropriate for mixture models [34] and substantive and feasibility criteria were used to determine candidate models of ACEs and MSUDs for both genders. The Bayesian Information Criterion [BIC; 35]and adjusted BIC [36]were examined for each of the models run to determine where reductions in these fit statistics began to level off. The p-value for the Lo-Mendell-Rubin Test [37]was also documented for each model run. A significant p-value on the Vuong-Lo-Rubin likelihood test indicates that the model with k-1 classes can be rejected in favor of the k-class model at a conventional p-level. The absolute and relative frequencies of the lowest class of each candidate model were also taken into consideration as was the interpretability of the model classes. Candidate LCA models for ACEs and MSUDs were chosen for each gender based upon the fit statistics and interpretability of the models.

In order to draw more confident inferences about the profiles of ACEs and MSUDs and their association, we used a split sample replication approach. The male and female samples were each randomly split in half so that models could be built on one half of the sample (n=10,044 females and n=7,282 for males) and reestimated on the second half (n=10,044 females and n=7,282 for males). The reestimated models for ACEs and MSUDs were inspected with respect to replication of class prevalence and posterior probabilities. In order to inspect the magnitude and significance of the associations between the profiles of ACEs with the profiles of MSUDs, the two latent categorical variables were regressed onto each other (referred to hereafter as dual LCA regression) using the second halves of the sample for both genders. The dual LCA regression essentially resembles a multinomial logistic regression with a categorical predictor. If this approach would be applied to ACEs assessed at two points in time, this model would be called a Latent Transition Model. All analyses considered the complex sampling design and included the sample weight, stratum, and principal stratification units. Unequal probability sampling was incorporated in all analyses by applying the pseudomaximum likelihood method, originally developed by Skinner [38] and implemented in the Mplus software [39].

Missing Data

Between 0.1-1.4% of the participants had missing data on one of the ten ACEs and no participants were missing data on the ten MSUDs studied. Only one participant had missing data on all ten ACEs and as mentioned above that participant was removed from the data analysis. The estimates of parameters in the models were adjusted for attrition. Mplus uses full information maximum likelihood estimation under the assumption that the data were missing at random. Missing at random assumes that the reason for the missing data is either random or random after incorporating other variables measured in the study [40,41]. Full information maximum likelihood, used in the present study, is widely accepted as an appropriate way of handling missing data [42,43].

Results

Participant Demographics

The mean age of participants was (M=48.16: SE=0.06) and the majority was female (52.1%) and white (70.9% white; 11.0% Black, 11.6% Hispanic; 4.3% Asian/Native Hawaiian/Other pacific islander; and 2.2% American Indian/Alaska Native). The prevalence of the LCA indicators for the total and split halves of the male and female samples are shown in Table 1. The prevalence of six LCA indicators of ACEs and MSUDs significantly differed between the split halves. For females, there was a higher prevalence of mother being treated violently (9.9% versus 9.3%; p<.05) and past -year generalized anxiety disorder (5.4% versus 4.7%, p<.01) in sample 1 than 2, and a higher prevalence of child physical neglect in sample 2 than 1 (8.4% versus 8.0%; p<.05). For males, there was a higher prevalence of parental divorce among sample 2 than 1 (16.6% versus 15.7%; p<.01), past year panic disorder among sample 1 than 2 (1.9% versus 1.6%, p<.05), and generalized anxiety disorder among sample 2 than 1 (2.8% versus 2.0%; p<.01). The differences between samples were less than 1% and thus appear to be more statistical than substantively meaningful.

Class Enumeration

The fit statistics for the LCAs for ACEs and MSUDs, separately by gender are shown in Supplementary Tables 2 and 3 respectively. Based upon the model statistics and interpretability, the 4- and 5-class model for females and the 3-, 4-, and 5-class model for males were identified as candidate models of ACEs. The candidate models of past year MSUDs chosen were 3- and 4-class for females and 2- and 3-class for males. The 4-class ACEs model and 3-class MSUDs models were chosen as the model most supported by the data for both males and females given model fit statistics and interpretability.

Class Profiles

As shown in Table 2, the four profiles of ACEs were characterized by the following probabilities on the first half of the sample: high (>.6) multiple ACEs (Profile 1), high parental substance abuse (Profile 2), high childhood physical abuse (Profile 3), and low ACEs (Profile 4). The class characteristics were similar for both genders and the prevalence for these profiles based upon the LCA on the first halves of the samples were as follows: The high multiple ACEs profile: 5% for females and 4% for males, the parental substance abuse profile: 10% for females and 8% for males, the child physical abuse profile: 13% for females and 14% for males, and the low ACEs profile: 72% for females and 75% for males. The differences in the class prevalence between the first and second halves of the sample ranged from 0%-2% for females and 0%-1% for males. Furthermore, there was very little change in the posterior probabilities for each indicator variable for each class. The largest difference in posterior probabilities of indicator variables for the profiles on the split halves of the sample were .10 (e.g., for sexual abuse for the child physical abuse profile) for females and .15 (e.g., for the childhood physical abuse for profile) for males. The small difference in the class prevalence and posterior probabilities between the halves of the sample support the hypothesis of model replication.

Also shown in Table 3, the 3 profiles of MSUDs were characterized by the following probabilities on the first half of the sample: high multiple MSUDs for females and low MSUDs except alcohol use disorders for males (Profile 1), moderate-to-high (.4-.6) major depressive episode (Profile 2), and low MSUDs (Profile 3). Thus, the class characteristics of Profile 1 for MSUDs differed by gender. The prevalence for these profiles based upon the LCA on the first halves of the sample were as follows: the multiple ACEs profile: 2% for females and low MSUDs except alcohol use disorders profile: 9% for males, the major depressive episode profile: 21% for females and 6% for males, and the low MSUDs profile: 76% for females and 85% for males. The differences in class prevalence between the second halves of the samples ranged from 1%-6% for females and 0%-1% for males. The largest difference in the posterior probabilities of indicator variables for the profiles on the split halves of the sample was .37 (i.e., social phobia for the multiple MSUDs profile) for females and .09 (e.g., generalized anxiety disorder for the major depressive disorder profile) for males. Of note, the multiple MSUDs profile for females had a low prevalence of 2% that was reduced to 1% in the replication on the second half of the sample. This may have resulted in some instability in the estimations of the posterior probabilities. The probabilities for other MSUDs (e.g., panic disorder, social phobia, and specific phobia) were higher for females in the multiple ACEs profile on the model run on the second split half of the sample.

Association Analyses—Dual LCA regression was used to test the associations between the final 4-profiles of ACEs model and the final 3-profiles of MSUDs. The low ACEs and MSUDs profiles were the reference profiles (Profile 4 ACEs and Profile 3 MSUDs). Table 4 shows the odds ratios and the 95% confidence intervals for these comparisons. As shown, when compared to Profiles 4 and 3 of ACEs and MSUDs respectively, which were characterized by low ACEs and low MSUDs, members in the higher ACEs profiles (Profiles 1-3) had 3.71-89.75 times greater odds of also being members in the higher MSUDs profiles (Profiles 1-2). For example, female members in the high multiple ACEs profile (ACEs profile 1) had 89.75 and 18.07 greater odds of being in high multiple MSUDs profile (MSUDs profile 1) and moderate-to-high major depressive episode profile (MSUDs profile 2) respectively. Also, for females, the highest odds for being in the high multiple MSUDs profile (MSUDs profile 1) or moderate-to-high major depressive episode profile (MSUDs profile 2) was for members in the high multiple ACEs profile followed by the high childhood physical abuse profile and then the high parental substance abuse profile. For males, the highest odds for being a member in the low MSUDs except alcohol use disorders was for members in the high childhood physical abuse profile followed by the high parental substance abuse profile and then the high multiple ACEs profile. Finally, for males, the highest odds for being a member in the moderate-to-high major depressive episode profile was for members in the high multiple ACEs profile followed by the high childhood physical abuse profile and then the high parental substance abuse profile. The odds ratios and confidence intervals were inflated for some of the comparisons due to small profile prevalences.

Additionally, the probability estimates shown in Table 5 indicate that most of the members in the low all ACEs profile(Profile 4) were also in the low all MSUDs profile (Profile 3).

For example, 92% of females and males in the low all ACEs profile(Profile 4) were also assigned to the low MSUDs profiles (Profile 3). However, only 9% of females and 11% of males in Profile 1 of ACEs, which was characterized by the greatest probability of experiencing multiple ACEs, were in profile 1 of MSUDs, which was characterized by the greatest probability of MSUDs. Interestingly, for females and males, 35% and 53% respectively of the members in Profile 1 of ACEs, which was characterized by high multiple ACEs, were in the low MSUDs profiles.

Discussion

ACEs and MSUDs are co-occurring and related problems that affect a substantial number of individuals in the United States[17,44,5,18]. However, little is known about the heterogeneity of ACEs and MSUDs and the associations between distinct profiles of ACEs with distinct profiles of MSUDs. This study used LCA to examine distinct profiles of ACEs and MSUDs, and dual LCA regression approach to examine the associations between profiles of ACEs and MSUDs among gender-specific samples of adults nationally so that gender-specific profiles and associations could be investigated. The preferred model consisted of four profiles of ACEs and three profiles of MSUDs. Few gender differences emerged in these profiles. For example, while one of the largest gender differences in ACEs has been reported for the prevalence of childhood sexual abuse[45] and the class probabilities for childhood sexual abuse were 2-3 times higher for females than males, the higher probabilities for childhood sexual abuse among females didn't yield any gender differences in the characteristics of the profiles of ACEs since the profiles were characterized by probabilities of other or low ACEs, which were the same for both genders. For the parental substance abuse, childhood physical abuse, and low ACEs profiles, childhood sexual abuse probabilities were low for both genders. For the multiple ACEs profile, childhood sexual abuse probabilities were higher for females than males, but the profile was largely characterized by higher probabilities of multiple ACEs other than childhood sexual abuse(e.g., child psychological abuse and child physical abuse).In other words, the conditional probability of experiencing other ACEs for those reporting to have experienced childhood sexual abuse was high, which is consistent with other work showing that females who had experienced childhood sexual abuse are more likely than females who don't report having experienced childhood sexual abuse to also experience other childhood traumas [46].

The most notable gender difference in the profiles of MSUDs was for profile 1 of MSUDs, which was characterized by multiple MSUDs for females (e.g., major depressive episode, generalized anxiety disorder, and phobia disorders) and low MSUDs except alcohol use disorders for males. This gender difference is consistent with evidence that females are more likely than males to experience internalizing disorders while males are more likely than females to experience externalizing disorders [47]. There were also noteworthy gender differences in MSUDs profile 2, which was characterized by major depressive episode. This profile was comprised of many more females than males (16-21% females versus 6-7% males) which is consistent with the epidemiological research showing that depression is more common among women than men [47]. Also, female members in this profile had moderate probabilities of experiencing major depressive episode (.37 & .44) while males

had moderate-to-high probabilities (.55-.61) of experiencing major depressive episode. Also, males in this profile had slightly higher probabilities for several other MSUDs than did females. This may suggest that once men met the threshold for membership in this prolife, they had slightly higher probability for several MSUDs compared to the women in this profile.

Profiles characterized by more ACEs were generally associated with profiles characterized by more MSUDs. All but one of the associations between profiles characterized by more ACEs and more MSUDs were significant. Also, the majority of members in the low ACEs profiles were also in the low MSUDs profiles. In contrast, the majority of members in the high multiple ACEs profile (ACEs profile 1) were not also in the profiles characterized by the greater MSUDs [i.e., high multiple MSUDs profile for females (MSUDs profile 1) or low MSUDs except alcohol use disorders or major depressive episode profiles for males (MSUDs profiles 1 or 2).This is surprising since a dose response relationship between the number of different ACEs and numerous mental and physical health problems suggests that members in the high multiple ACEs profile would be most likely to have the greatest mental health problems, and thus might be expected to be in MSUDs profile 1 for females and MSUDs profiles 1 or 2 for males. In fact, the highest proportion of members in the multiple ACEs profile were in the major depressive episode profile for females (MSUDs profile 2) and low MSUDs profile for males(MSUDs profile 3). More than a third of members in the multiple ACEs profile were in the low MSUDs profiles for both females and males suggesting that people are resilient to ACEs.

This study extends work using LCA to examine profiles of ACEs among young adults and adolescents [15,16] and profiles of MSUDs among adults in the United States [44] by examining profiles of ACEs and gender-specific profiles of MSUDs among adults nationally in the United States. To our knowledge, this study is also novel in using dual LCA regression to examine associated profiles of ACEs and MSUDs and contributes to the growing literature using advanced statistical techniques to better understand the nature of ACEs, MSUDs, and their associations[17,4,5,18,19,15,16]. Our findings for multiple profiles of ACEs and MSUDs are consistent with other work documenting multiple profiles of ACEs [15,16]and MSUDs [44]. While methodological differences across studies make it difficult to compare the profiles of ACEs and MSUDs reported here with other studies, it is interesting to note that the optimal model of MSUDs reported here consisted of 3-profiles of past year MSUDs, which dramatically differs from 7-profiles of past year MSUDs among adults who participated in the National Comorbidity Survey-Replicated[44]. However, since the latter study was conducted using acombined sample of men and women, the different gender composition of these two studies may have influenced the different findings. The different number of profiles of past year MSUDs reported here and elsewhere [44] may have also been due to different methods for choosing the optimal models, but this is difficult to evaluate given the limited information provided about the models fit statistics and model selection decisions of the other study[44].

Limitations

This study had a number of limitations that should be considered when interpreting the results. This study focused on ten ACESs studied in the CDC's ACE study given the attention to those ACEs in the academic literature[6]. However, the ten ACEs studied in the ACE study are not the only ACEs individuals experience [24]and studies examining profiles of different ACEs are also needed to understand the distinct profiles of ACEs among various populations. Also, the multiple MSUDs profile for females was the least prevalent of all the profiles (i.e., 2% and 1% on the split halves examined) and it was characterized by some instability as evidenced by higher probabilities for several other MSUDs on model replication on second half of the sample. Finally, this study data from the National Epidemiologic Survey on Alcohol and Related Conditions relies on retrospective reports of both ACEs and MSUDs and such reports, particularly for ACES may be influenced by poor or inaccurate recall of these events, which may lead to underestimates of ACEs[48].

Despite these limitations, this study advances the extant literature by accounting for the co-occurring nature of ACEs and MSUDs and providing a clearer picture of the associations between ACEs and past year MSUDs than studies that use more simplistic data analytic techniques which may lead to biased estimates of the associations between ACEs and MSUDs because they don't account for the co-occurring nature of these problems. Furthermore, our validation of the single LCA and dual LC Aregression models on the second halves of the samples for females and males increases the validity of the inferences that may be drawn from these results and also shows where there is some instability in model inferences (i.e., multiple MSUDs profile for women). Finally, we built gender-specific models in order to best clarify profiles of these associations that may be unique for females and males.

This national study has implications for clinical research and practice. Nearly half of individuals in the United States who meet criteria for a MSUD in the past year (45%) will have a comorbid MSUD during the same time period [44]. Thus, practitioners and researchers must understand the heterogeneity of past year MSUDs among adult females and males in order to understand the mental health needs of adults nationally in the United States. This study provides that information. Additionally, since ACEs account for one third of MSUDs [4,5], and more than 50 studies from the ACE study have shown a dose response relationship between ACEs and problems including MSUDs, it is important to understand the distinct profiles of ACEs among adult females and males in the United States. This national study provides that information and demonstrates the associations between profiles of ACEs and MSUDs. Finally, this study should promote additional studies that inform clinical research and practice. Studies are needed to test mediating and moderating factors of the associations between distinct profiles of ACEs and MSUDs. For example, one outstanding question is whether there are racial/ethnic differences in the profiles of ACEs, MSUDs, and their associations. Research building upon this study and using advanced statistical methods to understand these co-occurring and related problems may clarify the mechanisms linking these problems and inform interventions to prevent these related problems from occurring as well as treat affected individuals.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Unweighted Counts and Weighted Percentages for Having Adverse Childhood Experiences and Past-year Mental Disorders by Gender and Split Samples for Each Gender (N=34, 652)

	Female sample (N=20,088)						Male sample (N=14, 564)					
	Total		1st half (N=10, 044)		2nd half (N=10, 044)		Total		1st half (N=7, 282)		2nd half (N=7, 282)	
Variable	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Adverse childhood experiences[a]												
Child psychological abuse	1820	8.6	923	8.7	897	8.5	1077	7.0	550	7.2	527	6.8
Child physical abuse	3198	15.2	1638	15.4	1560	14.9	2547	17.0	1295	17.3	1252	16.7
Child sexual abuse	2950	14.7	1439	14.4	1511	14.9	836	5.2	416	5.2	420	5.2
Child emotional neglect	3398	16.1	1686	16.1	1698	16.2	2019	13.3	1007	13.2	1012	13.5
Child physical neglect	1770	8.2	874	8.0	896	8.4	1081	7.1	559	7.3	522	6.9
Parental divorce/separation	3321	15.9	1672	15.8	1649	16.1	2359	16.1	1178	15.7	1181	16.6
Mother treated violently	2090	9.6	1087	9.9	1003	9.3	1098	6.9	578	6.9	1098	6.9
Parental substance abuse	4928	24.3	2477	24.6	2451	24.1	3160	21.4	1582	21.1	1578	21.7
Parental mental illness	1453	7.4	743	7.5	710	7.4	898	6.2	464	6.4	434	6.1
Incarcerated household member	1417	6.9	709	6.9	708	6.8	1059	7.2	538	7.4	521	7.0
Past year mental disorders												
Major depressive episode	2203	10.8	1128	11.1	1075	10.5	820	5.5	401	5.3	419	5.7
Dysthymic episode	342	1.5	176	1.5	166	1.6	136	0.8	62	0.7	74	0.9
Hypomanic/manic episode	772	3.6	394	3.6	378	3.7	458	3.1	224	3.1	234	3.2
Panic disorder	704	3.4	369	3.5	335	3.2	246	1.7	131	1.9	115	1.6
Social phobia	613	2.9	305	2.9	308	3.0	332	2.1	162	2.0	170	2.2
Specific phobia	2054	9.9	1036	10.0	1018	9.9	704	4.9	336	4.9	368	4.8
Generalized anxiety	1000	5.1	524	5.4	476	4.7	363	2.4	162	2.0	201	2.8
Posttraumatic stress	1248	6.0	629	5.9	619	6.0	467	2.8	222	2.7	245	3.0
Alcohol abuse/dependence	1053	5.3	528	5.2	525	5.4	2089	14.4	1047	14.6	1042	14.2
Drug abuse/dependence	273	1.5	142	1.6	131	1.5	475	3.3	230	3.3	245	3.3

Note. Significant differences between Samples 1 and 2 reported in text.

[a] 0.1%-1.4% missing for females and 0.1-0.8% for males

Table 2

Class Prevalence and Posterior Probabilities from a Four Profile LCA Model of Adverse Childhood Experiences, Separately by Gender and Sample (N=34, 652)

	Profile 1 Multiple ACEs		Profile 2 Parental substance abuse		Profile 3 Child physical abuse		Profile 4 Low ACEs	
Sample	**1st half**	**2nd half**	**1st half**	**2nd half**	**1st half**	**2nd half**	**1st half**	**2nd half**
Female N (%)	543 (5%)	485(5%)	950 (10%)	1115(11%)	1315 (13%)	1079(11%)	7236(72%)	7365 (73%)
Psychological abuse	0.824	0.816	0.020	0.033	0.296	0.372	0.003	0.002
Physical abuse	0.907	0.873	0.129	0.163	0.557	0.610	0.028	0.032
Sexual abuse	0.639	0.603	0.247	0.238	0.334	0.429	0.060	0.066
Emotional neglect	0.704	0.664	0.151	0.167	0.389	0.446	0.081	0.086
Physical neglect	0.671	0.666	0.051	0.050	0.232	0.304	0.012	0.019
Parental divorce	0.363	0.378	0.296	0.309	0.243	0.254	0.108	0.111
Mother treated violently	0.716	0.754	0.248	0.265	0.244	0.202	0.008	0.008
Parental substance abuse	0.822	0.918	0.856	0.844	0.327	0.278	0.108	0.101
Parental mental illness	0.330	0.300	0.353	0.327	0.077	0.097	0.019	0.018
Household Incarceration	0.414	0.510	0.437	0.366	0.025	0.000	0.003	0.005
Male N (%)	257(4%)	286 (4%)	593(8%)	603 (8%)	994(14%)	1031(14%)	5438(75%)	5362(74%)
Psychological abuse	0.817	0.817	0.033	0.034	0.282	0.208	0.003	0.005
Physical abuse	0.941	0.971	0.194	0.175	0.681	0.530	0.042	0.054
Sexual abuse	0.302	0.327	0.066	0.049	0.137	0.165	0.024	0.017
Emotional neglect	0.618	0.656	0.147	0.163	0.244	0.264	0.087	0.079
Physical neglect	0.533	0.681	0.064	0.052	0.208	0.158	0.028	0.023
Parental divorce	0.403	0.375	0.333	0.377	0.198	0.222	0.118	0.121
Mother treated violently	0.665	0.646	0.219	0.161	0.181	0.190	0.004	0.005
Parental substance abuse	0.849	0.781	0.907	0.900	0.306	0.311	0.089	0.093
Parental mental illness	0.270	0.269	0.419	0.367	0.037	0.042	0.021	0.019
Household incarceration	0.449	0.349	0.539	0.542	0.044	0.034	0.011	0.009

Table 3

Class prevalence and posterior probabilities from LCA model of past year mental disorders, separately by gender and sample (N=34, 652)

	Profile1		Profile 2		Profile 3	
	Multiple MSUDs for females/Low MSUDs except alcohol use disorders for males		Major depressive episode		Low MSUDs	
Sample	**1st half**	**2nd half**	**1st half**	**2nd half**	**1st half**	**2nd half**
Female N (%)	243(2%)	116(1%)	2134(21%)	1636 (16%)	7667(76%)	8292(83%)
Major Depressive Episode	0.824	0.784	0.370	0.438	0.016	0.030
Dysthymic Episode	0.255	0.312	0.039	0.073	0.000	0.000
Manic or Hypomanic Episode	0.430	0.538	0.106	0.150	0.004	0.008
Panic Disorder	0.470	0.730	0.105	0.113	0.002	0.006
Social Phobia	0.493	0.860	0.066	0.098	0.004	0.005
Specific Phobia	0.547	0.726	0.228	0.251	0.050	0.060
Generalized Anxiety Disorder	0.670	0.725	0.169	0.204	0.002	0.007
Posttraumatic Stress Disorder	0.398	0.454	0.179	0.242	0.015	0.018
Alcohol Abuse and/or Dependence	0.228	0.062	0.126	0.148	0.026	0.035
Drug Abuse and/or Dependence	0.153	0.159	0.056	0.068	0.000	0.002
Male N (%)	650(9%)	638(9%)	462 (6%)	490 (7%)	6170 (85%)	6154 (85%)
Major Depressive Episode	0.093	0.048	0.549	0.607	0.011	0.014
Dysthymic Episode	0.000	0.000	0.102	0.112	0.001	0.001
Manic or Hypomanic Episode	0.071	0.029	0.284	0.307	0.008	0.010
Panic Disorder	0.032	0.000	0.225	0.173	0.002	0.005
Social Phobia	0.025	0.039	0.224	0.202	0.004	0.006
Specific Phobia	0.086	0.090	0.288	0.244	0.027	0.029
Generalized Anxiety Disorder	0.019	0.020	0.240	0.327	0.004	0.005
Posttraumatic Stress Disorder	0.013	0.074	0.257	0.220	0.011	0.010
Alcohol Abuse and/or Dependence	0.643	0.552	0.236	0.312	0.087	0.086
Drug Abuse and/or Dependence	0.288	0.275	0.117	0.131	0.000	0.000

Table 4

Odds Ratios and 95% Confidence Intervals from Dual LCA Regressions by Gender (N=34, 652)

	Latent Classes of MSUDs			
	Females		Males	
Latent Classes of ACEs	**Profile 1 (High multiple MSUDs) vs. Profile 3 (Low MSUDs)**	**Profile 2 (Moderate-to-high major depressive episode)vs. Profile 3 (Low MSUDs)**	**Profile 1 (Low MSUDs, except alcohol use disorders)vs. Profile 3 (Low MSUDs)**	**Profile 2 (Moderate-to-high major depressive episode) vs. Profile 3 (Low MSUDs)**
1 (High multiple ACEs)vs. 4 (Low ACEs)	89.75** (26.79-300.67)	18.07** (11.20-29.11)	3.71 (.072-19.13)	24.61** (14.07-43.03)
2 (High parental substance abuse) vs 4 (Low ACEs)	9.63** (2.51-36.97)	4.12** (2.79-6.09)	5.31** (2.44-11.53)	6.19** (3.40-11.28)
3 (High childhood physical abuse) vs. 4 (Low ACEs)	20.27** (5.53-74.29)	9.14** (6.34-13.17)	5.85** (3.12-10.98)	10.31** (5.76-18.43)

** p<.01;

* p<.05;

MSUDs=mental and substance use disorders; ACEs=adverse childhood experiences

Table 5

Probability Estimates from the Dual LCA Model Sample 2 (N=34, 652)

	Latent classes of Mental Disorders					
	Females			Males		
Latent Classes of ACEs	**Profile 1: High Multiple MSUDs**	**Profile 2: Moderate-to-high major depressive episode**	**Profile 3: Low MSUDs**	**Profile 1: Low MSUDs, except alcohol use disorders**	**Profile 2: Moderate-to-high major depressive episode**	**Profile 3: Low MSUDs**
Class 1: High multiple ACEs	0.09**	0.56**	0.35	0.11	0.36**	0.53
Class 2: High parental substance abuse	0.02**	0.26**	0.72	0.20**	0.12**	0.68
Class 3: High childhood physical abuse	0.30**	0.44**	0.54	0.20**	0.18**	0.62
Class 4: Low ACEs	0.00	0.08	0.92	0.51	0.03	0.92

** $p<.001$,

* $p<.05$