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Childhood abuse and neglect and transitions in stages of alcohol involvement among women: A latent transition analysis approach

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Abstract

Background—Childhood abuse and neglect have been linked with alcohol disorders in adulthood yet less is known about the potential of early trauma to influence transitions in stages of alcohol involvement among women. Study aims were to (1) identify stages of women's alcohol involvement, (2) examine the probability of transitions between stages, and (3) investigate the influence of four domains of childhood abuse and neglect (sexual abuse, physical abuse, neglect, and witness to domestic violence), assessed individually and as poly-victimization, on transitions.

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Contributors

Authors La Flair and Reboussin designed the study and undertook statistical analyses. Author La Flair wrote the first draft of the manuscript and Authors Reboussin, Storr, Letourneau, Green, Mojtabai, Pacek, Alvanzo, Cullen, and Crum edited manuscript drafts. All authors contributed to and have approved the final manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

Methods—The sample consisted of 11,750 adult female current drinkers identified in Wave 1 (2001–2002) and re-interviewed in Wave 2 (2004–2005) of the National Epidemiological Survey on Alcohol and Related Conditions.

Results—Three stages of alcohol involvement emerged from latent class analysis of 11 DSM-IV abuse/dependence criteria: severe (1.5% at Wave 1, 1.9% at Wave 2), hazardous (13.6% at Wave 1, 16.0% at Wave 2), and non-problem drinking (82.1% at Wave 1, 84.5% at Wave 2). Adjusted latent transition analyses determined transition probabilities between stages across waves. Women reporting any childhood abuse and neglect were more likely to advance from the non-problem drinking class at Wave 1 to severe (AOR = 3.90, 95% CI = 1.78–8.53) and hazardous (AOR = 1.56, 95% CI = 1.22–2.01) drinking classes at Wave 2 relative to women without this history. Associations were also observed between individual domains and transition from no problems to severe alcohol stage.

Conclusions—Results suggest a long-term impact of childhood abuse and neglect as drivers of progression in women's alcohol involvement.

Keywords

Alcohol abuse; Alcoholism; Drinking; Alcohol; Childhood abuse and neglect; Latent transition analysis; NESARC; Women and alcohol

1. Introduction

Prior research has established a consistent association between childhood abuse and neglect (CAN) and alcohol problems in adulthood (Dube et al., 2002a; Fetzner et al., 2011; Magnusson et al., 2011; Miller et al., 1993; Molnar et al., 2001; Nayak et al., 2012; Pilowsky et al., 2009; Tucci et al., 2010; Widom et al., 2007; Wu et al., 2010). Child victimization is associated with numerous psychiatric sequelae (Jarvis and Copeland, 1997; Putnam, 2003; Stewart, 1996; Sugaya et al., 2012), and mounting evidence implies a differential impact of CAN on women's mental health (Danielson et al., 2009; Horwitz et al., 2001; Widom and Hiller-Sturmhofel, 2001).

Poly-victimization, or experiencing multiple types of victimization and neglect, has emerged as a distinct phenomenon in recent literature (Finkelhor et al., 2007). In a study of HMO-enrolled adults, a graded relationship was found between the number of adverse childhood events and alcohol problems in adulthood (Dube et al., 2002a; Pilowsky et al., 2009). Other studies explored the context of individual domains of CAN. Exposure to domestic violence in childhood has been associated with alcohol problems later in life (Dube et al., 2002b). Emotional and physical neglect and witnessing domestic violence are often inter-related, especially if parents abuse alcohol (Dong et al., 2004; Dube et al., 2001b). Similarly, although physical and sexual abuse often co-occur, child physical abuse has been found to be independently associated with alcohol dependence, negative alcohol-related consequences, drinking to intoxication, and heavy episodic drinking (Lown et al., 2011; Nayak et al., 2012). Several studies have reported a direct association between child sexual abuse and women's alcohol dependence (Dinwiddie et al., 2000; Kendler et al., 2000; Nelson et al., 2002), and other alcohol-related problems (Klanecky et al., 2008).

With few exceptions, the majority of research on the link between childhood victimization and women's alcohol involvement has focused on drinking status at time of interview or on lifetime alcohol use. These approaches do not account for changes in the course of alcohol involvement. Alcohol and other substance use disorders are often described as stage-sequential processes (Graham et al., 1991; Guo et al., 2000). Latent transition analysis is a useful method for modeling transitions between stage-specific processes over time and has

ready application to the substance use framework (Lanza et al., 2010; Reboussin and Ialongo, 2010).

Additional research is needed that examines the associations between CAN and women's alcohol involvement longitudinally with a focus on growth or transitions. In one such study, the influence of child sexual abuse on two stages of alcohol involvement (drinking initiation and subsequent transition to alcohol dependence in adulthood) was explored (Sartor et al., 2007). The results demonstrated an association between sexual abuse and drinking initiation, but not for transition to alcohol dependence. Widom et al. (2007) examined the influence of childhood sexual or physical abuse and neglect on patterns of alcohol involvement among a large cohort of women followed into adulthood. They reported that CAN predicted alcohol use disorders in young adulthood but the impact diminished with progression into middle-adulthood (age 40).

It is not surprising that the influence of distal early experiences such as CAN diminish over time. However, important interactions might be missed by failing to account for more proximal adult outcomes such as earlier drinking behaviors and adult trauma. Although prior investigations have considered other important factors in this association (e.g., Sartor et al., 2007 accounted for family history of alcoholism), the importance of accounting for adult outcomes largely has been overlooked. In particular, alcohol use and interpersonal violence have been shown to influence the transition between stages of problematic drinking (Auerbach and Collins, 2006; Guo et al., 2000; Keiley et al., 2009).

To more fully explore the relationship between early child and more recent adult experiences on transitions between adult stages of alcohol use, the present study used latent transition analysis to examine independent associations between domains of CAN on the probabilities of transitioning between stages of alcohol involvement among a female cohort of current drinkers in a United States (U.S.) population-based sample followed up over a 3-year period. The objectives of this study were to: (1) identify stages of women's alcohol involvement; (2) examine the probability of transitions between stages; and (3) investigate the influence of four domains of CAN (physical abuse, sexual abuse, witness to domestic violence, and severe neglect) assessed individually and as poly-victimization, on transitions, after accounting for adult violence and alcohol use.

2. Methods

2.1. Study population

The sample consisted of 11,750 adult female current drinkers identified in Wave 1 (2001–2002) and re-interviewed in Wave 2 (2004–2005) of the National Epidemiological Survey on Alcohol and Related Conditions (NESARC), a nationally representative survey of 43,093 civilian participants ages 18 or older in the U.S. Data from eligible participants were collected through computer-assisted personal interviews (CAPI) for an overall response rates for Waves 1 and 2 of 81% and 87%, respectively. The interview last approximately 1 h, and participants who completed the interview were given \$80. Blacks, Hispanics, and young adults (aged 18–24 years) were oversampled. Data were weighted based on 2000 Census demographic information to be representative of the U.S. non-institutionalized, civilian population. Additional sampling procedures and retention strategies for the NESARC are described in detail elsewhere (Grant et al., 2004). The analyses were based on deidentified publicly available data that is exempt from review by the Institutional Review Board.

2.2. Measures

2.2.1. Alcohol involvement—Alcohol abuse and dependence criteria were assessed with the Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS-IV; Grant et al., 2003; Ruan et al., 2008), a structured diagnostic interview designed to assess alcohol, drug, and mental disorders according to DSM-IV diagnostic criteria (American Psychiatric Association, 2000). The current study used alcohol use disorder criteria, created from a set of past-year symptom questions combined to form binary indicators (1 = yes, 0 = no) used in identifying latent classes of alcohol involvement.

The four alcohol abuse criteria included (Fig. 1a and b; indicators 1–4, left to right on X-axis): recurrent drinking resulting in failure to fulfill major role obligations; recurrent drinking in hazardous situations; recurrent drinking-related legal problems; and continued drinking despite recurrent interpersonal problems caused or exacerbated by drinking. The seven alcohol dependence criteria included (Fig. 1a and b; indicators 5–11, left to right on X-axis): tolerance; having two or more withdrawal symptoms; drinking larger amounts or for a longer period than intended; having a persistent desire or unsuccessful attempts to cut down on drinking; spending a great deal of time obtaining alcohol, drinking, or recovering from drinking's effects; giving up important social, occupational, or recreational activities to drink; and continued drinking despite physical or psychological problems caused by drinking. These criteria were used successfully in a prior latent class analysis (LCA) among female NESARC participants (La Flair et al., 2012).

2.2.2. Childhood abuse and neglect—Childhood abuse and neglect were assessed exclusively at Wave 2 with a series of questions adapted from the Adverse Childhood Experiences Study (Dong et al., 2003; Dube et al., 2001a, 2003) relating to exposure to the following domains of CAN before the age of 18: sexual abuse, including rape and molestation; physical abuse by a parent or caregiver; witness to domestic violence in the home, including inter-parental violence; and neglect by a parent or caregiver (Ruan et al., 2008). Response categories for each domain were used to produce a binary measure (1 = yes, 0 = no) of any childhood victimization. A binary poly-victimization category was created to represent women who reported experiencing more than one form of CAN.

2.2.3. Covariates—Other variables included in the analyses were age, race/ethnicity, prior alcohol use disorder (past-year alcohol abuse or dependence at Wave 1). An intimate partner violence (IPV) measure was derived from an affirmative response to any of six abusive behaviors, abstracted from the Conflict Tactics Scales (Straus, 1979), perpetrated by a current or former intimate partner within the last 12 months at Wave 2: (1) pushing, grabbing, or shoving; (2) slapping, kicking, biting, or hitting; (3) threatening with a weapon such as a knife or gun; (4) cutting or bruising; (5) having forced sex; and (6) inflicting an injury that required medical care.

2.3. Statistical analysis

LCA is an empirical “person-centered” approach, which was used to derive subtypes or stages (classes) of alcohol involvement based on shared clinical features using DSM-IV criteria for alcohol abuse and dependence. The objective of LCA is to identify the fewest number of latent classes that adequately describe the associations among alcohol use disorder criteria. This approach has been applied in recent research with alcohol abuse and dependence diagnostic criteria among population-based samples (Ko et al., 2010; La Flair et al., 2012; Muthén, 2006).

To determine the correct class structure for the data, a series of unconstrained latent class models (1–4 classes) were fit separately for Waves 1 and 2 using the 11 DSM-IV abuse and

dependence criteria as categorical latent class indicators. Conventional fit statistics, including the lowest Akaike Information Criterion (AIC), lowest sample-size adjusted Bayesian Information Criterion (a-BIC), and significance of the Lo–Mendell–Rubin(LMR)test (McCutcheon, 1987; Nylund et al., 2007) guided the selection of the most parsimonious model providing adequate fit to the data under standard assumptions of conditional independence and independent individuals (i.e., any association between criteria is attributed to the underlying categorical latent variable and an individual's class membership is not affected by that of another in the same study cohort). Entropy was used as a measure of classification accuracy distinction with values approaching 1 indicating a clear distinction of classes (Celeux and Soromenho, 1996). In general, the best-fitting class solution is indicated by the lowest BIC/a-BIC value. Furthermore, in testing consecutive models with increasing number of classes, the first nonsignificant p value associated with the LMR likelihood ratio test suggests that the model with one less class is preferred over the current model. The measurement model selection process was guided by a combination of global fit indices, classification quality, and substantive interpretation of the latent classes.

Next, latent transition analysis (LTA) was conducted to determine the probability of transitioning between the LCA-derived stages of alcohol involvement (classes) across waves and to examine the impact of CAN on these transitions, adjusting for potential confounders. LTA extends LCA to the longitudinal framework to include modeling transitions in stages over time using a multinomial logistic regression formulation. Measurement invariance was imposed across the two waves to ensure that the interpretation of the latent classes was held constant. Both LCA and LTA were carried out using *Mplus* version 6.0 (Muthén and Muthén, 1998–2010). Survey sampling weights, clustering, and stratification variables were applied in both LCA and LTA models to account for the complex survey design of the NESARC.

3. Results

3.1. Prevalence and type of childhood abuse

Women with childhood victimization histories were, on average, older, non-White, currently in an intimate relationship, and had less educational attainment than their non-abused counterparts (Table 1). Significant differences were also noted with respect to diagnoses of major depression and alcohol use disorder, as well as IPV experience. The overall weighted prevalence of any CAN within this cohort of female drinkers was 21.9%. Child sexual abuse (12.3%) and witnessing domestic violence (12.3%) were the most prevalent domains of childhood trauma among women, followed by physical abuse (4.4%) and neglect (3.8%). Low to modest correlation ($r = 0.23$ – 0.39) was observed between each of the CAN variables. A total of 7.1% of women reported experiencing >1 domain, indicating poly-victimization. Primary analyses were conducted assessing any CAN, individual domains of CAN, and poly-victimization.

3.2. Stages of alcohol involvement: latent class analysis

Fit indices for the latent class models at each wave are presented in Table 2. Both the BIC and a-BIC indices favored a three-class model at Wave 1. However, at Wave 2, the BIC supported a four-class solution and the a-BIC a five-class solution. The LMR test p value remained statistically significant, suggestive of additional class extraction; however, the LMR test tends to overestimate the number of classes (Nylund et al., 2007). Due to low prevalence of the additional classes and inadequate model identification (not presented) for the 4- and 5-class solutions, the more parsimonious three-class model was retained for female drinkers at Wave 2.

Fig. 1a and b illustrates the patterns of alcohol disorder criteria probabilities across the three classes for Waves 1 and 2. Female drinkers in Class 3, reported few criteria of alcohol abuse and dependence. The estimated prevalence of this *no problem* subtype was 87% in Wave 1 and 84% in Wave 2. Class 2 was characterized by drinking in physically hazardous situations, having problems cutting down drinking, drinking in large amounts, and experiencing criteria of tolerance and withdrawal. The estimated prevalence of the *hazardous drinking* subtype was 11% in Wave 1 and 14% in Wave 2. Class 1 was characterized by high levels of social impairment (major role failure, personal problems, more time spent getting alcohol, giving up activities that are enjoyable, and physical and psychiatric problems). Drinkers in this class were classified as being *severe*, and the estimated prevalence of this class was 1.5% in Wave 1 and 1.9% in Wave 2.

3.3. Transitions between stages of alcohol involvement: latent transition analysis

Table 3 shows the overall estimated transition probabilities across stages of alcohol involvement identified above from Wave 1 to Wave 2. The probabilities on the diagonal represent no change in alcohol involvement stage across survey waves. Overall, transition probabilities tended toward recovery, or moving from a more to a less severe stage (Table 3: recovery transition probabilities are located at the bottom left of the diagonal). Highest stability was seen among women who did not report alcohol problems at Wave 1. Any CAN, individual domains of CAN, and poly-victimization were modeled as predictors of Wave 1 alcohol involvement stages and transitions between stages over time. Consistent with previous research, prior alcohol use disorder, IPV victimization, age, and race/ethnicity were included as covariates in these models (Agrawal et al., 2007; La Flair et al., 2012).

3.3.1. Any childhood victimization—Table 4 reports the crude and adjusted odds ratios (AOR) for domains of CAN predicting transitions between stages of alcohol involvement from Wave 1 to Wave 2 relative to remaining in the same stage. Associations with progression are reported first, followed by recovery. Relative to women without a history of CAN, women reporting any childhood trauma were more likely to advance from no problems at Wave 1 to severe (AOR = 3.9, 95% CI = 1.8–8.5) and hazardous (AOR=1.6, 95% CI = 1.2–2.0) stages at Wave 2 rather than remain in the same stage adjusting for age, race/ethnicity, prior alcohol use disorder, and current IPV (Table 4). Women with a history of CAN also were more likely to transition from the hazardous to the severe drinking stage compared to women without such history after adjusting for potential confounders (AOR= 1.8, 95% CI = 1.00–3.2). Regarding recovery, no statistically significant transitions were observed.

3.3.2. Specific childhood victimization domains—Increased risk of transition to severe from no problems at Wave 1 was observed in analyses of sexual abuse (AOR = 4.8, 95% CI = 1.9–12.0), physical abuse (AOR = 5.0, 95% CI = 1.7–14.5), witnessing domestic violence as a child (AOR = 2.6, 95% CI = 1.0–6.6), and child neglect (AOR = 6.2, 95% CI = 2.1–17.9) (Table 4). Similarly, increased risk of transition from hazardous use to severe at Wave 1 was observed in analyses of sexual abuse (AOR =1.8, 95% CI = 1.4–2.4). Regarding recovery, women reporting a history of child sexual abuse (OR = 0.1, 95% CI = 0.03–0.4) and child physical abuse (OR = 0.2, 95% CI = 0.04–0.9) were less likely to transition from the severe to the hazardous drinking stage rather than remain in the severe stage compared to women without these histories, but neither association remained statistically significant in the adjusted analyses.

3.3.3. Poly-victimization—Poly-victimization (reporting a history of >1 CAN domain) was associated with an increased risk of transition to severe from no problems at Wave 1

only (AOR = 4.6, 95% CI = 1.8–11.8). Regarding recovery, no statistically significant transitions were observed.

4. Discussion

The present study extends existing research on the association between CAN and women's alcohol use by employing a longitudinal assessment within a latent transition framework. Using nationally representative longitudinal data on alcohol use, we first identified stages of alcohol involvement among women in the U.S. general population and then examined the impact of any CAN, individual domains of CAN, and poly-victimization on transitions between these empirically derived stages. The results demonstrate an association between childhood trauma and progression in women's alcohol involvement.

This study emphasizes that, for women, there are distinct subtypes of alcohol involvement characterized by levels of social impairment. Three stages of women's alcohol involvement were identified based on endorsement of DSM-IV diagnostic criteria for alcohol use disorders: severe drinkers stage, hazardous drinkers stage, and a non-problem drinkers stage. The severe drinkers stage was characterized by symptom probabilities greater than those in the hazardous drinkers stage plus endorsement of symptoms related to: role failure, personal problems, more time spent getting alcohol, giving up activities that were enjoyable, and physical and psychiatric problems. This finding, which we have previously demonstrated in Wave 1 of the NESARC (La Flair et al., 2012) and now extended to Wave 2, has implications for specific criteria that distinguish between stages of problem drinking severity among women. Moreover, this subtyping strategy is not available in the current version of the DSM-IV and emphasizes the importance of distinguishing between those with severe social impairment from those with moderate alcohol problems.

Women reporting any CAN were more likely to progress from no problems to the hazardous stage of alcohol compared to women without such history. Previous examinations of the impact of adverse events in childhood have demonstrated a graded relationship between the number of events and risk of alcohol problems in adulthood (Dube et al., 2002a; Felitti et al., 1998; Pilowsky et al., 2009), but did not account for specificity of CAN or adverse events experienced in adulthood. The current study extends prior work in two important ways: first by examining the independent associations between changes in alcohol involvement and individual domains of CAN, and second, by modeling the probability of transitioning between stages of alcohol involvement across time. Individually, all four domains of CAN were significantly associated with increased odds of progressing from the no problems stage to the severe stage, with the strongest association observed among women reporting child neglect. These results are somewhat in contrast to previous work on the risk of emergent and enduring alcohol problems among adults with a history of CAN (Sartor et al., 2007; Widom et al., 2007). Using data from a cohort of female twins, Sartor et al. (2007) examined the impact of child sexual abuse on the speed of transition to alcohol dependence and concluded that the impact of abuse on alcohol outcomes diminished over time. Widom et al. (2007) found that CAN heightened the risk of alcohol use disorders in young adulthood among women but did not directly impact excessive drinking in middle-adulthood (described as approximately age 40). In contrast, our study, comprised mostly of women of comparable age (between 36 and 49 years), found the probability of alcohol stage transition to be significant among women with histories of CAN.

A potential explanation for these discrepant results may reside with selection of covariates, particularly those related to more proximal adult outcomes. Neither Widom et al. (2007) nor Sartor et al. (2007) included adult victimization experiences in their analyses. In contrast, our study controlled for recent history of intimate partner violence victimization, which has

been associated with excessive alcohol use throughout the life course (Fargo, 2009; Martino et al., 2005; Testa et al., 2003). Also, the current study focused on transitions between stages of alcohol use, not simply alcohol use disorders as outcomes.

It is also possible that differences in measurement of CAN may have resulted in compositionally different exposure groups (i.e., a narrow definition resulting in a shorter trajectory to alcohol problems and a broader definition yielding a potentially delayed transition between alcohol stages). Age effects (i.e., those who experienced victimization at younger ages may be less likely to recall abuse than older victims and may be at risk for different domains of abuse than older children) or cohort effects (i.e., younger cohorts may have benefited from recent interventions to reduce and prevent child abuse) may also influence findings. Varying definitions with respect to number and type of early trauma may have had bearing on the results. As seen in our study, the prevalence of childhood victimization can vary widely across domains of CAN.

All domains of CAN we studied were associated with a direct transition from no problems stage to a severe stage. Child sexual abuse was unique in that it was also associated with progression from the no problems stage to a hazardous drinking stage. This finding not only corroborates prior associations between sexual abuse and alcohol problems among women (Dinwiddie et al., 2000; Kendler et al., 2000; Klanecky et al., 2008; Lown et al., 2011; Molnar et al., 2001; Nelson et al., 2002) but also is distinct in that we have modeled transitions over several years and not static associations.

Child sexual abuse was the only form of CAN associated with transitions from no problems to hazardous and severe stages. Childhood sexual abuse and its consequences, including depressive and post-traumatic stress symptoms, may confer a risk of self-destructive behavior in adulthood (Gladstone et al., 2004; Lown et al., 2011), particularly if the abuse occurs during a sensitive developmental period or is perpetrated by a close relation (Kendall-Tackett et al., 1993; Putnam, 2003) and may explain this finding. Self-medication of mood and posttraumatic stress symptoms related to the abuse with alcohol or other drugs also may explain this trajectory seen among women with histories of child sexual abuse (Filipas and Ullman, 2006; Jarvis et al., 1998).

Poly-victimization was also associated with progression from no problems to a severe stage of alcohol involvement. The magnitude of this association supports poly-victimization as an important predictor of transitions in women's alcohol involvement, potentially over certain individual forms of childhood victimization (e.g., witnessing domestic violence). Further study of the interactions between specific combinations of victimization histories is needed to better understand the impact of cumulative and co-occurring child victimization on women's alcohol use transitions.

Although none of the associations met criteria for statistical significance, there was evidence of inhibited recovery by CAN. It is possible that CAN impedes the process leading to self-change or natural recovery from substance use disorders (Sobell et al., 2000).

Several limitations of the present study should be noted. First, CAN was assessed retrospectively by self-report in adulthood and not by objectively measured means (e.g., documented court cases) that might be less subject to recall bias or error. Recall bias may be especially problematic, as the interval between CAN experience and the time of the interview may be considerable in length. It is possible that women with severe alcohol involvement may be more likely to report a history of CAN, particularly if they are self-medicating in response to the abuse itself or its psychological sequelae. Women with severe alcohol involvement may be more motivated to reflect on past traumatic incidents than those without a history of victimization, and thus may report these behaviors more accurately.

However, since most abuse and neglect remains unreported (Finkelhor, 2008), self-report even from adults likely captures more such events than official documents. Second, although modest overlap between CAN domains has been reported in other studies (Edwards et al., 2003; Higgins and McCabe, 2000), the present study did not model specific combinations of childhood victimization types due to the low prevalence of these paired combinations and subsequent underpowered latent transition models; instead, we report the independent associations between domains of CAN on alcohol stage transition probability. Third, we could not adjust for all potential confounders (e.g., mood, anxiety, illegal drug use) and did not test intermediary pathways. Potential limitations to the application of LCA in the present study should also be noted. The decision regarding the appropriate number of classes to extract is guided by both model fit indices and clinical meaningfulness, the latter being subject to interpretation. Similarly, there may be difficulty in determining the appropriate number of classes given either poor discrimination or low endorsement of the manifest indicators (Albert et al., 2001).

Despite these limitations, there are a number of strengths to this study. LCA and its extension, LTA, are advantageous for examining stage-sequential processes such as alcohol involvement. There are several additional advantages of latent variable modeling with self-reported alcohol use. First, latent variable models assume measurement error endemic to biobehavioral research in which the construct of interest is unobserved and adjusts estimates accordingly. Second, LCA permits a more nuanced picture of alcohol involvement stages by applying a data-driven approach to detect unobserved categories, in contrast to current diagnostic approaches. This method uses all available information in the data to describe a hierarchy of symptoms, not just their presence in number. Third, LCA also identifies which DSM-IV diagnostic criteria distinguish well the alcohol involvement stages. The ability to detect which symptoms (and not how many) place an individual in an alcohol involvement stage distinguishes latent variable modeling from other methods.

Future directions for this work may be to examine other factors that might influence progression and recovery in alcohol involvement, such as early detection of CAN and receipt of treatment. Also, as there were insufficient data points in the present study to evaluate temporal trends over the lifecourse, expanded longitudinal studies are needed to examine the extent of the association between CAN and progression in women's alcohol involvement.

The main findings of this research – a history of CAN being a significant predictor of transitions between stages of alcohol involvement among women – has important implications, particularly if these results are replicated. First, these results support previous recommendations that substance abuse assessments include assessment for CAN (Stewart, 1996). Second, these results lend support to previous recommendations for integrated interventions that address common sequelae of abuse (e.g., posttraumatic stress disorder) and substance abuse (Cohen et al., 2003). Third, and perhaps most importantly, these results further amplify the importance of primary prevention. Childhood victimization increases the risk of numerous negative outcomes (Finkelhor, 2008; Putnam, 2003). Although child abuse rates have fallen considerably since the early 1990s, they remain substantial, and rates of child neglect have remained persistently high overtime (Finkelhor, 2008). More resources should be aimed at preventing childhood victimization than is currently the case.

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Fig. 1.

(a) Alcohol abuse and dependence clinical feature probabilities from the three class model for female drinkers at Wave 1. (b) Alcohol abuse and dependence clinical feature probabilities from the three class model for female drinkers at Wave 2

Characteristics of female ($n=11,750$) NESARC participants classified as current drinkers by report of childhood abuse and/or neglect at Wave 1.

Table 1

Characteristics at baseline	Total			Any childhood victimization				Sexual abuse			
	N	Wt%		Absent	Present	N	Wt%	Absent	Present	N	Wt%
Age (years)											
18–35	1993	19.21	1501	14.74	492	4.48		1700	16.53	293	2.68
36–49	5515	44.2	4092	42.34	1423	50.75		4695	37.55	820	6.65
50+	4274	36.58	3452	38.73	822	29.05		3882	33.47	392	3.12
Race/ethnicity											
White	7663	78.75	5974	79.41	1689	76.45		6668	68.77	995	9.98
Black	1960	9.21	1459	8.89	501	10.31		1702	8.04	258	1.17
Hispanic/other	2159	12.04	1612	12	547	13		1847	10.74	252	1.28
Education (years)											
<12	1139	8.28	786	7.3	353	11.71		963	7.03	176	1.25
12	10643	91.72	8259	92.7	2384	88.29		9314	80.52	1329	11.19
Relationship											
Absent	2691	17.92	2161	18.86	530	14.63		2428	16.24	263	1.68
Present	9091	82.08	6884	81.14	2207	85.37		7849	71.31	1242	10.77
Major depression ^a											
Absent	10574	90.06	8356	92.58	2218	81.19		9408	80.41	1166	9.65
Present	1208	9.94	689	7.42	519	18.81		869	7.15	339	2.8
Alcohol use disorder ^b											
Absent	10903	92.66	8453	72.85	2450	19.81		9573	81.66	1330	11.01
Abuse only	472	3.82	319	2.59	153	1.24		384	3.08	88	0.74
Dependence	407	3.51	273	2.4	134	1.11		320	2.82	87	0.7
Intimate partner violence											
Absent	11095	94.7	8690	96.56	2405	88.16		9780	83.7	1315	10.99
Present	687	5.3	355	3.44	332	11.84		497	3.85	190	1.45

Characteristics at baseline			Physical abuse			Neglect			Witness to domestic violence							
			Absent		Present	Absent		Present	Absent		Present		p-Value ^c	p-Value ^c		
			N	Wt%	N	Wt%	N	Wt%	N	Wt%	N	Wt%	N	Wt%		
Age (years)																
18-35			1906	18.4	87	0.81	1908	18.46	85	0.75	1734	16.97	259	2.24	<.0001	
36-49			5253	42.16	262	2.04	5274	42.35	241	1.86	4703	38.16	812	6.04	<.0001	
50+			4109	35.34	165	1.25	4114	35.41	160	1.18	3786	32.74	488	3.85	<.0001	
Race/ethnicity																
White			7335	75.67	328	3.08	7363	75.91	300	2.84	6765	69.89	898	8.86	<.0001	
Black			1894	8.89	66	0.32	1877	8.81	83	0.4	1669	7.86	291	1.35	<.0001	
Hispanic/other			2039	11.34	120	0.69	2056	11.5	103	0.54	1789	10.12	370	1.92	<.0001	
Education (years)																
<12			1069	7.79	70	0.49	1061	7.74	78	0.54	915	6.75	224	1.53	<.0001	
12			10199	88.11	444	3.61	10235	88.48	408	3.24	9308	81.12	1335	10.6	<.0001	
Relationship																
Absent			2582	17.22	109	0.7	2578	17.27	113	0.66	2383	16.06	308	1.86	0.4527	
Present			8686	78.68	405	3.4	8718	78.95	373	3.13	7840	71.81	1251	10.27	<.0001	
Major depression ^a																
Absent			10190	86.88	384	3.18	10204	87.15	370	2.91	9291	79.92	1283	10.14	<.0001	
Present			1078	9.03	130	0.92	1092	9.07	116	0.88	932	7.95	276	2	<.0001	
Alcohol use disorder ^b																
Absent			10453	89.1	450	3.56	10463	89.27	440	3.39	9517	81.83	1386	10.83	<.0001	
Abuse only			442	3.55	30	0.27	452	3.66	20	0.17	377	3.14	95	0.69	<.0001	
Dependence			373	0.26	34	0.26	381	3.3	26	0.22	329	2.9	78	0.61	<.0001	
Intimate partner violence																
Absent			10656	91.18	439	3.51	10673	91.45	422	3.25	9739	84.12	1356	10.58	<.0001	
Present			612	4.72	75	0.58	623	4.77	64	0.54	484	3.75	203	1.55	<.0001	

^aMajor depression within the past year.

^bIncludes DSM-IV alcohol abuse or dependence with or without abuse within the past year.

^cRao-Scott chi-square tests of difference.

Table 2

Fit statistics for latent class analysis models for female drinkers at Wave 1 and 2.

	Number of classes				
	1	2	3	4	5
Wave 1					
BIC	41294.25	33252.9	32428.66	32477.5	32533.74
a-BIC	41259.3	33179.81	32317.44	32328.14	32346.24
LMR	N.A.	87743.78 *	64816.11 *	62138.57 *	62008.20 *
Entropy	N.A.	0.926	0.9	0.846	0.855
Wave 2					
BIC	44178.17	36144.73	35211.04	35167.42	35198.71
a-BIC	44143.21	36071.64	35099.81	35018.06	35011.22
LMR	N.A.	93854.04 *	70963.01 *	68016.23 *	67634.16 *
Entropy	N.A.	0.90	0.88	0.87	0.85

BIC, Bayesian Information Criterion; a-BIC, sample-size-adjusted Bayesian Information Criterion; LMR, Lo-Mendell-Rubin; N.A., not available.

* $p < 0.001$.

Table 3

Estimated transition probabilities across alcohol involvement stages for female drinkers in the NESARC, Wave 1 (2001–2002) and Wave 2 (2004–2005).

	Wave 2		
	No problems	Hazardous	Severe
Wave 1			
No problems	0.908	0.087	0.005
Hazardous	0.357	0.579	0.064
Severe	0.259	0.43	0.312

Row headings represent stage at Wave 1; column headings represent stage at Wave 2.

Table 4

Estimated adjusted odds ratios^a and 95% CI for childhood abuse and neglect forms at Wave I predicting transitions in stages of alcohol involvement from Wave 1 to Wave 2 for female drinkers ($n=11,750$) in the NESARC, Waves 1 (2001–2002) and 2 (2004–2005).

	Any childhood victimization		Sexual abuse		Physical abuse		Neglect		Witness to DV		Poly-victimization	
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Progression												
No problems to hazardous	1.6**	1.2–2.0	1.8***	1.4–2.4	1.1	0.6–1.9	0.9	0.5–1.7	1.3	1.0–1.9	1.3	0.8–2.0
No problems to severe	3.9**	1.8–8.5	4.8**	1.9–12.0	5.0**	1.7–14.5	6.2**	2.1–17.9	2.6*	1.0–6.6	4.6**	1.8–11.8
Hazardous to severe	1.8*	1.0–3.2	1.8	0.9–3.5	1.3	0.2–2.9	0 ^b		1.6	0.9–3.0	1.7	0.7–3.9
Recovery												
Hazardous to no problems	0.8	0.5–1.3	1.1	0.6–2.0	0.54	0.2–1.5	0.819	0.3–2.5	0.7	0.4–1.4	0.9	0.4–1.9
Severe to hazardous	0.6	0.3–1.2	0.43	0.2–1.1	0.43	0.1–1.4	1.457	0.4–5.8	0.8	0.3–1.8	0.7	0.3–1.7
Severe to no problems	0.7	0.3–1.5	0.68	0.3–1.8	1.1	0.4–2.7	1.565	0.4–7.1	0.6	0.2–1.6	0.5	0.2–1.8

^aModels adjusted for age, race/ethnicity, prior alcohol use disorder, and current intimate partner violence victimization.

^bWomen who reported childhood neglect had a zero probability of transitioning from the severe to the hazardous stage; women who did not report childhood neglect had a 0.067 probability of transitioning from the hazardous to the severe stage.

* $p<.05$.

** $p<.01$.

*** $p<.001$.