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POSTPARTUM DOMESTIC VIOLENCE IN HOMES WITH YOUNG CHILDREN: THE ROLE OF MATERNAL AND PATERNAL DRINKING

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Abstract

There has been limited investigation of mothers' drinking patterns and their experience of domestic abuse while parenting young children, especially in the context of co-resident fathers' drinking. Using data representative of the 2001 U.S. birth cohort, the authors conducted longitudinal latent class analyses of maternal drinking over four perinatal time points as predictors of maternal victimization at two years postpartum due to intimate partner violence. Women classified as higher risk drinkers over the study period faced significantly increased risk of physical abuse while parenting a two-year old child. Among non-drinking mothers, paternal binge drinking signaled additional risk, with clinical and programmatic implications.

Keywords

maternal drinking; paternal drinking; domestic abuse; intimate partner violence (IPV); longitudinal latent class analyses (LLCA); Early Childhood Longitudinal Study-Birth Cohort (ECLS-B)

INTRODUCTION

Intimate partner violence (IPV) is associated with poor health outcomes, including adverse pregnancy outcomes for mothers (Black, 2011). In addition to potential physical injuries, women who experience abuse suffer a greater incidence of gynecological, chronic stress-related, depression, suicidality, and total health problems when compared to women who were never abused (Campbell, Jones, Dienemann, & et al., 2002; Stockl, Devries & Watts, 2015; Pico-Alfonso et al., 2006; Sarkar, 2008). Women who are parenting young children are a subpopulation of particular concern because children of victimized mothers are themselves at risk of abuse (Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008; Holt, Buckley, & Whelan, 2008; Kitzmann, Gaylord, Holt, & Kenny, 2003) and are at high risk for developing social, emotional, academic, and behavioral problems (Geffner, Igelman, & Zellner, 2003; Holt et al., 2008; Kitzmann et al., 2003) including alcohol use problems in adulthood (Raul Caetano, Field, & Nelson, 2003).

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However, there is limited data available regarding the rates of physical abuse of mothers of young children. The lifetime rate of physical abuse of a woman by an intimate partner in 2011 was an estimated 22.3% (Breiding et al., 2014). Among married or co-habiting women in a nationally representative U.S. sample from the early 1990s, 17.4% reported minor physical abuse and 6.5% reported severe physical abuse (Kessler, Molnar, Feurer, & Appelbaum, 2001). A recent study of 40,338 women ages 18–44 in the Pregnancy Risk Assessment Monitoring System (PRAMS) reported that 3.8% of mothers experienced physical abuse by their partner one year prior to conception (Robbins et al., 2014), whereas a review of U.S. studies conducted in public and private clinics indicated an alarming 10–15% of pregnant women experienced physical abuse during pregnancy (Bailey, 2010). Moreover, a significant proportion of mothers may be physically abused in the first months postpartum. For example, 3.2% of mothers in North Carolina were physically abused by their partners at 3.6 months postpartum (Martin, Mackie, Kupper, Buescher, & Moracco, 2001). A study of young mothers (ages 18 and younger) reported a physical IPV rate of 21% at three months postpartum (Harrykissoo, Rickert, & Wiemann, 2002). Despite this evidence from related populations, the prevalence of and risk factors for physical abuse of mothers parenting young children *per se* is not clear.

Empirical studies have established the relationship between maternal alcohol consumption and domestic violence victimization. Beyond findings of said association in the general population of women (Devries et al., 2014), there is evidence that maternal drinking during the critical period of pregnancy and child-bearing is associated with domestic abuse by her partner (Flynn, Walton, Chermack, Cunningham, & Marcus, 2007; Martin, Beaumont, & Kupper, 2003; Meschke, Hellerstedt, Holl, & Messelt, 2008; Parsons & Harper, 1999). Research on this topic has been largely cross-sectional, limiting inferences regarding directionality, with one exception. In a high risk sample (African-American women who screened positive for 7+ drinks per week at a prenatal visit), Jester et al. (2000) found that despite a positive cross-sectional association between frequent, heavy maternal drinking and reported domestic violence seven years post childbirth, the association between maternal alcohol use during pregnancy and domestic violence seven years later was not significant.

To our knowledge, consistent with calls for longitudinal research (Devries et al., 2014; Klostermann & Fals-Stewart, 2006), there have been no national studies of the relationship between longitudinal patterns of maternal perinatal alcohol use and domestic violence victimization. This is a critical question because women's consumption of alcohol tends to resume post childbirth (Liu, Mumford, & Petras, 2015; Substance Abuse and Mental Health Services Administration, 2008). Moreover, while research indicates that maternal alcohol use and domestic violence are likely confounded by partner alcohol use, most studies do not take into account partner alcohol use (Jester et al., 2000; Martin et al., 2003; Meschke et al., 2008). Alcohol use by one or both partners has been found to be associated with several measures of relationship quality and/or dysfunction in studies that examined concordant and discordant partner drinking behaviors. Discordant drinking by partners has been found to be associated with relational distress (Leadley, Clark, & Caetano, 2000), reduced marital satisfaction (Homish & Leonard, 2007), divorce (Ostermann, Sloan, & Taylor, 2005), as well as IPV/marital violence (Leadley et al., 2000; Quigley & Leonard, 2000). Based on the

literature (Devries et al., 2014), Abbey (2014) concluded that studies of women's alcohol use and IPV experience should take into account partner's alcohol consumption.

Several researchers have posed theoretical explanations for the relationship between women's alcohol use around the time of childbirth and their exposure to domestic violence. For example, women who drink heavily around pregnancy are more likely to be perceived as trespassing traditional gender roles, which their partners may use as justification to 'punish' the woman through violent acts (Martin et al., 2003). Kantor and Straus (1989) hypothesized that alcohol use problems among one or both parties in marital relationships may lead to increased family conflict, which may bring about physical abuse of the wife. Consistent with Kantor and Straus' theory, other studies have suggested that alcohol use interferes with cognitive abilities, causes high levels of aggression, and promotes counterproductive argument styles (DeMaris, Benson, Fox, Hill, & Van Wyk, 2003; Klostermann & Fals-Stewart, 2006), which can be detrimental for relationship quality and may partially explain the association between a couple's drinking and domestic violence. This hypothesis applies to the drinking behavior of either partner. In sum, following family systems theory, problem alcohol use by one or both partners contributes to behavioral feedback loops within the dyadic relationship (Bowen, 1974) that may have further negative consequences. Thus, beyond the potential direct health risks from alcohol consumption (Hange, Sigurdsson, Björkelund, Sundh, & Bengtsson, 2015; Knott, Coombs, Stamatakis, & Biddulph, 2015; Nova, Baccan, Veses, Zapatera, & Marcos, 2012), to the extent that alcohol use increases the risk of domestic violence and potentiates additional indirect risks to family outcomes, understanding the relationship between maternal alcohol use, paternal drinking, and domestic violence is an important step for violence prevention.

Using a nationally representative sample, the present study investigates the temporal relationship between longitudinal patterns of maternal alcohol use from pre-conception through parenting a two-year old child and IPV victimization outcomes at two-years postpartum. We explicitly take into account the drinking behavior of co-residing fathers. This investigation of IPV prevalence during the early parenting years will fill a gap in the literature regarding a critical period in which maternal alcohol consumption tends to increase and during which children are present and vulnerable. According to data from the Child Development Supplement to the Panel Study of Income Dynamics, children age zero to two spend the smallest proportion of their time in school or day care compared to other age groups through age 12 (Hofferth & Sandberg, 2001). Additionally, in a nationally representative survey of Americans covering the period 1990–2007, Kornrich and Furstenberg (2012) found that parents spend most time with their children ages zero to five compared to time spent with children ages six to 18.

We hypothesize that maternal drinking around childbirth plays two important roles in influencing their experience of domestic violence: (a) a direct relationship, i.e., that heterogeneous patterns of maternal alcohol use around childbirth are associated with a different likelihood of being physically abused by their co-resident partners; and (b) a moderation relationship, i.e. that mother's drinking behavior over the study period moderates the relationship between father's alcohol consumption and maternal physical victimization. Understanding the relationship between parents' alcohol use and the physical

abuse of mothers is expected to help detect during healthcare visits those women and young children who may be more at risk for postpartum abuse, with potential implications for clinical intervention targeting both women's and partners' drinking around the important time period of pregnancy, childbirth, and the child's first years.

METHODS

Sample

This study was approved by the Institutional Review Board of NORC at the University of Chicago. Data are drawn from the Early Childhood Longitudinal Study (ECLS-B). The ECLS-B was collected by the US Department of Education-National Center for Education Statistics (NCES), as a prospective longitudinal data set of a nationally representative sample of 10,700 children from the 2001 U.S. birth cohort drawn from the vital statistics clustered at the county level (for more details, see Flanagan & West, 2004). The data set included in-home interviews conducted by trained interviewers with biological mothers when their child was 9 months old (baseline survey) and 2 years old (2003–04). The response rate for maternal respondents was 76.8% at the baseline interview and 92.8% at the two-year follow-up. For co-resident paternal participants, the respective response rates were 75.1% (baseline) and 75.9% (two-year follow-up) (National Center for Education Statistics). An indicator of alcohol use “during the last three months of your pregnancy” was retrospectively collected when the child was 9 months old, circumventing the potential underreporting of antenatal reports during pregnancy (Alvik, Haldorsen, Groholt, & Lindemann, 2006a; Hannigan et al., 2010; May et al., 2009). In addition, mothers were asked at the baseline interview to report their alcohol consumption at the time point “three months before you got pregnant.” Paternal drinking information comes from interviews of the co-resident father of the child when the child was approximately two years old.

We selected the study sample based on the following criteria: (1) lived with a partner at time of both the 9-month and 2-year interviews; (2) at least one non-missing value on the alcohol consumption measures at the four time points (three months prior to conception, during pregnancy, and when child was 9 months and 2 years old); (3) no missing data on any of the exogenous variables. A sample of 6,100 (sample size rounded to the nearest 50 in compliance with the ECLS-B confidentiality rules (National Center for Education Statistics, accessed June 8, 2012)) adult biological mothers were included in the analysis (see Table 1 for sample characteristics).

Measures

Distal outcome—At the two year interview, mothers responded to a self-administered questionnaire (which provided privacy to answer sensitive questions). The study outcome item read, “Since your child was about nine months old, have you been physically abused? (Physical abuse means pushing, hitting, slapping, kicking, or any other way of physically hurting someone.)” This item was coded as an indicator variable for any physical abuse (1) or no physical abuse (0) over the specified time period. A follow-on question for mothers who reported having experienced physical abuse identified the abuser(s), with a “mark all that apply” option for responses (my spouse or partner; a family or household member other

than my spouse or partner; a friend; someone else). Respondents who answered “yes” to any physical abuse and reported “my spouse or partner” as the abuser were counted as IPV victims.

Longitudinal measures of maternal perinatal drinking—Based on a screener of any maternal alcohol consumption, quantity of alcohol use was assessed in preset categories of the number of drinks consumed in an average week (<1, 1–3, 4–6, 7–13, 14–19, and 20+ drinks). Consistent with Brown et al. (2010) using the same data, we collapsed the original measures into a four-level ordinal variable: no alcohol, <1 drink per week, 1–3 drinks per week, and 4+ drinks per week. This was done to maintain an ordinal scale while managing the low response frequencies in the higher use categories that pose problems for model estimation (across the four time points, 1.3–6.3% of mothers drank 4+ drinks per week and 0–1.9% drank 7+ drinks per week). The weighted distribution of alcohol consumption at the four time points are presented in Table 1.

Exogenous variables—The following information was collected at baseline: *maternal age* (18–25; 25–35; 36+); *maternal education* (< high school, high school degree, some college, and college or graduate school); *race/ethnicity* (white, black, Hispanic, and others); mother’s *marital status* (married, other); *household income-poverty* (< poverty line, 100–130% of poverty line, 130–185% of poverty line, 185% of poverty line); the presence of *other children* in the household (yes, no). In addition, at the 2 year interview, co-resident fathers were asked, first, whether they drank alcohol in the past 12 months and, second, whether they binge drank in the past month. These two variables were used to recode a three level categorical variable for *paternal drinking at 2 years* (did not drink; drank but did not binge drink; binge drank at least once in the past month.) A small proportion (10% for drinking and 20% for binge drinking) of the missing values at the 2-year interview was supplemented by answers provided by these fathers at the 9 month interview. As there is a high level consistency between the 9-month and 2-year interview for those partners reporting both measures (over 80% of those who did not drink at 9 months stayed abstinent at the 2-year interview), we believe that this procedure did not bias the study results.

Analytic plan

Longitudinal latent class analysis (LLCA)—LLCA, a method often used to study heterogeneity in development of substance use and related behavior (Feldman, Masyn, & Conger, 2009; Lanza & Collins, 2006; Liu, Lynne-Landsman, Petras, Masyn, & Jalongo, 2013), was applied to examine the longitudinal pattern of maternal drinking from pre-conception to 2 years after child birth. LLCA uses a latent class variable to represent subpopulations of individuals that are similar with regards to their outcome patterns over time (see Figure 1).

Class enumeration and regression analysis—Deciding on the number of longitudinal latent classes is based on substantive evaluation of the classes as well as fit statistics for non-nested models, such as the Bayesian Information Criterion (BIC) and the Lo-Mendell-Rubin likelihood ratio test (LMR-LRT; a significant p-value indicates that the model with $K-1$ number of classes can be rejected in favor of the model with K number of

classes) (Lo, Mendell, & Rubin, 2001). The BIC value assumes particular importance given evidence that it outperforms other criteria (Nylund, Asparouhov, & Muthén, 2007a).

Upon finalizing class enumeration, we re-estimated the preferred LLCA model and simultaneously estimated the association of exogenous variables with class via multinomial logistic regression equations (Long & Cheng, 2004). All covariates were included simultaneously in a multivariate model, and the odds ratio was reported for each covariate, adjusting for other covariates. We then regressed physical abuse measured at 2 years on class membership via logistic regression in order to investigate the association between physical abuse victimization and maternal drinking class membership (i.e., whether the likelihood of being physically abused differs by class). We also regressed physical abuse measured at 2 years on resident father's drinking at 2 years to examine the effect of partner drinking on mother's physical abuse victimization moderated by class membership. Complex sampling design was accounted for by computing robust standard errors using a sandwich estimator (White, 1980), and results were weighted to represent the 2001 birth cohort. Missing data on the measures of maternal drinking and maternal physical abuse at 2 years were accounted for by using the widely accepted full information maximum likelihood (FIML) estimation method (Arbuckle, 1996; Schafer & Graham, 2002). All analyses were conducted using Mplus version 7.3 (Muthén & Muthén, 1998–2012).

RESULTS

Heterogeneity in the drinking patterns

Statistical criteria and substantive considerations (Table 2) guided the selection of a 4-class model ($LL=-16197.2$ (51), $BIC=32838.75$) with acceptable Entropy. We present graphs of the structure for each class, representing the three drinking quantity categories (no drinking, <1 drinks per week, 1–3 drinks per week, and 4+ drinks per week; see Figure 2). From preconception through pregnancy until 2 years after childbirth, mothers in this sample fell into one of four alcohol consumption patterns. Over half (55%) of mothers in the sample (*Non-Drinkers; NDs*) exhibited a pattern of very low probability (<0.1) of any drinking. Nearly all mothers reduced or quit alcohol consumption by the third trimester of pregnancy. A *Higher Risk Drinkers (HRDs)* group (4.4% of the sample) is featured with particularly steady high probability of drinking at varying levels. With the exception of a lower probability during pregnancy (0.3), mothers in the HRD class had a higher than 0.9 probability of drinking any alcohol (including <1, 1–3 and 4+ drinks per week) throughout the study period. These HRDs had a probability as high as 0.7 to drink 4+ drinks per week by the time their child was 2 years old. One in seven (13.9%) of the recent mothers exhibited a moderate risk pattern of drinking (the *Moderate Drinkers; MDs*), with a similar pattern of drinking as the HRDs, with the exception that mothers in this group were unlikely (<0.1 probability) to drink 4+ drinks per week and most likely to report 1–3 drinks per week with the exception of during pregnancy. One third (26.8%) mothers (the *Low-level Drinkers; LDs*) had a probability of 0.7 to drink any alcohol — generally <1 drink weekly — throughout the study period with the exception of during pregnancy when they mostly quit drinking altogether.

Covariate effects

Table 3 presents the effect of covariates on the log odds of being in one of the three drinking classes using *Non-Drinkers (ND)* class as the reference group. When compared to their peers ages 26 to 35, mothers younger than 25 were 60% as likely (OR=0.41) and those who were older than 36 were 50% more likely (OR=1.50) to be in the MD (versus the ND class). In addition, mothers older than 36 were more than twice as likely (OR=2.23) to be in the HRD (versus the ND class). Age did not play a significant role in influencing profile membership for the LD class.

Non-white mothers were less likely (ORs range from 0.17 to 0.56) to be in any of the three drinking classes versus the ND class, when compared to mothers of white race. Mothers with more than a high school education were more likely to be in the LD class (versus the ND class), compared to those with less than high school education (OR for some college=2.27; OR for college or graduate school=2.24). Mothers with college or graduate degree were nearly twice as likely (OR=1.72) to be in the HRD class (versus the ND class), compared to those with less than high school degree. Mothers with more than a high school education were more likely to be in the MD class (versus the ND class), compared to those with less than a high school education (OR for some college=1.89; OR for college or graduate school=3.34). Married mothers were less likely (ORs range from 0.33 to 0.49) to be in any of the three drinking classes versus the ND class, when compared to unmarried mothers. Also, mothers with other children in the household at 9 months postpartum were 50% as likely to be in the HRD class (versus the ND class) when compared against mothers without other children in the house (OR=0.51). Other co-resident children did not play a significant role in influencing profile membership for the MD or LD class. Mothers with a household income greater than 185% of the poverty line were almost three times more likely to be in the LD class (OR=2.88), greater than six times more likely to be in the MD class (OR=6.42), and nearly two and a half times more likely to be in the HD class (OR=2.4) (versus the ND class), compared to those with a household income less than 100% of the poverty line.

The association between maternal drinking, paternal drinking, and mothers' physical victimization

We investigated the extent to which physical abuse victimization experienced by recent mothers in the study sample when the child was 2 years old is a function of women's membership in latent classes of alcohol consumption by regressing maternal IPV victimization on class membership. Predicted probabilities of mothers being physically abused for each class are presented in Table 4. Pairwise comparison indicates that those women who were in the HRD class were 14 times (OR=14.14) as likely to be physically abused by their partner, compared to those who were in the ND class. Table 5 presents the effects of partner drinking by class on the probability of mothers being physically abused. While the association is not significant for other classes, for the ND class, women were more than three times (OR=3.029) as likely to be physically abused when their partner drank alcohol, compared to those with partners who did not drink.

DISCUSSION

This study is the first to present national rates of domestic physical abuse of mothers of two-year olds with co-resident fathers. This sample of adult mothers of the 2001 U.S. birth cohort co-residing with the child's father post-childbirth reported a rate of physical abuse victimization of 1%, in comparison to much higher rates in high risk samples (Taylor, Guterman, Lee, & Rathouz, 2009) and among adolescent mothers (Harrykisson et al., 2002). This abuse rate measured two-years post-childbirth is also surpassed by at least one state-level rate (3.2%) measured at only a few months postpartum (Martin et al., 2001), which may represent geographic or measurement differences. Alternatively, the risk of domestic violence may decline for recent mothers with time since delivery. As of yet, the longitudinal pattern of domestic violence after childbirth is not well documented. Thus, the pattern of maternal abuse postpartum over time warrants further investigation to determine the timing of increased risk for recent mothers in the context of alcohol abuse.

Further, this is the first study that examines how women's longitudinal patterns of alcohol consumption preconception, during pregnancy and early parenthood relate to these recent mothers' experiences of domestic physical abuse while parenting a toddler. In a nationally representative sample, women who lived with the birth father of the child exhibit heterogeneous longitudinal latent class membership based on their weekly alcohol consumption preconception, during pregnancy, and at 9 months and two years post childbirth. In this sample of recent mothers living in a two-parent household, the patterns of maternal alcohol use suggest a low probability of risky drinking behavior. Only 4.4% were classified as higher risk drinkers, 13.9% were likely moderate drinkers, and 26.8% showed declining risk of any drinking. The majority (55%) of respondents were classified as non-drinkers.

Our findings extend, through longitudinal alcohol consumption profiles, the existing cross-sectional evidence of an association between women's drinking and physical abuse victimization (Devries et al., 2014; Kantor & Straus, 1989; Leonard, 2001; Testa & Parks, 1996) during a critical reproductive period for women. Despite the overall low risks from drinking in this sample, we found that women's alcohol consumption patterns over time were related to their experience of domestic physical abuse. Women who exhibit a high probability (over 0.75, with the exception of during pregnancy) of drinking 4+ drinks per week (i.e., at an elevated risk of heavy episodic drinking) were significantly more likely to be physically abused in the early parenting period than those women who did not consume alcohol during the perinatal period. Importantly, although the current data do not indicate whether these higher risk drinkers are having one drink on multiple days or occasionally are drinking heavily in a single session, this limitation does not preclude clinical screening of weekly quantity of alcohol consumption to discern recent mothers' risk of abuse in an intimate partnership. Further informing clinical screening of recent mothers for risk of domestic violence, the descriptive findings from this study are consistent with the profile of higher risk drinking identified in other studies — that higher risk drinkers are more likely to be White (Little, Lambert, & Worthington-Roberts, 1990), unmarried (Jagodzinski & Fleming, 2007), to have at least a college education (Williams Brown, Carmichael Olson, & Croninger, 2010), to report a higher household income (R. Caetano, Ramisetty-Mikler,

Floyd, & McGrath, 2006), and to give birth in their mid-30s or older (Liu et al., 2015). We also found that higher risk drinkers are less likely to have additional children in the home.

The co-resident father's alcohol consumption played a significant role only for the non-drinking women, such that non-drinking women were three times as likely to be physically abused when the resident father reported binge drinking at two years after childbirth. This finding is in line with cross-sectional evidence of an impact of couples' discordant drinking behavior on IPV risks (Leadley et al., 2000; Quigley & Leonard, 2000). This is the first study to investigate the role of discrepant partner drinking in the context of women's own longitudinal drinking profiles. It is possible that these non-drinking women have been aware of their risk of being physically abused since before their pregnancy, and thus over a longer period of time avoided drinking themselves as a self-defense mechanism to avoid escalating conflicts (Kantor & Straus, 1989) in the face of their partner's drinking. Family systems theory also suggests that paternal binge drinking would result in increased emotional dysregulation among other family members, which may cyclically reinforce paternal drinking patterns (Bowen, 1974). Additionally, disruption of healthy family relations may result from the unpredictability of paternal participation in family routines as a result of paternal binge drinking behavior (Haugland, 2005). Thus, clinicians may consider querying even non-drinking women about their partner's alcohol consumption during routine preconception and prenatal care visits in concert with screening for domestic violence.

Limitations

Interpretation of these results is limited by the self-reported nature of the data. Further, the ECLS-B data do not include measures of maternal *perpetration* of domestic abuse, which may mitigate the relationship between their own drinking, their partner's drinking and maternal victimization. Reports of prior abuse are not available in these data, introducing a potential bias in our results; however, the inclusion of covariates in the model known to be related to the likelihood of IPV victimization (Capaldi, Knoble, Shortt, & Kim, 2012) may partly mitigate this limitation. While there is the potential for biased measures of alcohol consumption due to awareness of the social undesirability of alcohol consumption during pregnancy, the ECLS-B measures of pre-conception and third trimester drinking are retrospective thus ostensibly reducing said bias (Alvik, Haldorsen, Groholt, & Lindemann, 2006b; Heath et al., 2003; Reich, Todd, Joyner, Neuman, & Heath, 2003). Further, although self-reported alcohol consumption may be improved by multiple data sources and detailed contextual observation, overall self-reported measures of alcohol use may be considered reliable and valid (Del Boca & Darkes, 2003).

Conclusion

The existence of a physically abusive relationship between parents in households with very young children is of enduring concern for child as well as maternal wellbeing, and these results support the call for generalized partner violence screening in pediatric settings (Holtrop et al., 2004). This call is in line with growing attention to screening for parental alcohol use in pediatric settings (Jonas et al., 2012). Our findings suggest that prevention efforts for risky parental drinking in pediatric settings should also be attentive to the related risks of IPV victimization among the high risk maternal drinkers and among maternal non-

drinkers whose co-resident partners are known to binge drink. Physically abused women (Ulrich et al., 2003) and their children use health services more often than populations (with elevated usage enduring years past the time of abuse (Rivara et al., 2007)), which provides additional opportunity both to screen and intervene for parental alcohol use and domestic violence or to refer to treatment.

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Biographies

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Figure 1. LLCAa model with covariates and distal outcomes

^aLongitudinal Latent Class Analysis. IPV=Intimate partner violence.

Figure 2.
Longitudinal latent classes of mothers' weekly quantity of alcohol consumption (ECLS-B, n=6,100)

Table 1

Weighted distribution of alcohol consumption and baseline personal characteristics (ECLS-B, N=6,100)

<i>Maternal Age</i>	25	25.6%
	26–35	57.7%
	36+	16.8%
<i>Maternal Race/Ethnicity</i>	White	67.8%
	Black	5.7%
	Hispanic	20.5%
	Asian or Others	6.0%
<i>Maternal Education</i>	Less than high school	13.1%
	High school degree	23.5%
	Some college	30.1%
	College or graduate school	33.3%
<i>Household Income</i>	<100% poverty threshold	13.9%
	100–130% poverty threshold	9.7%
	131–185% poverty threshold	11.8%
	185% poverty threshold	64.6%
<i>Maternal Marital Status, married</i>		86.2%
<i>Other children in household at 9 month interview</i>		62.3%
<i>Maternal Alcohol Use</i>	<i>3 months before pregnancy</i>	
	No alcohol use	59.7%
	Less than 1 drink a week	17.0%
	1–3 drinks a week	16.9%
	4 or more drinks a week	6.3%
	<i>Last 3 months of pregnancy</i>	
	No alcohol use	96.4%
	Less than 1 drink a week	2.3%
	1–3 drinks a week	1.2%
	4 or more drinks a week	0.1%
	<i>9 month post- partum</i>	
	No alcohol use	61.2%
	Less than 1 drink a week	21.0%
	1–3 drinks a week	14.0%
	4 or more drinks a week	3.8%
	<i>2 years post- partum</i>	
	No alcohol use	67.6%
	Less than 1 drink a week	15.8%
	13 drinks a week	11.5%
	4 or more drinks a week	4.6%
<i>Paternal Alcohol Use</i>	Non-binge drinking	22.2%
	Binge drinking	32.6%
<i>Mother reports domestic physical abuse</i>		1.0%

Table 2

Determining the number of classes in GGMM (ECLS-B, N=6,100)

Model	LL ^a	# of parameters	BIC ^b	VLMR-LRT ^c P-value	Entropy
1 class model	-19642.6	12	39389.67	NA	NA
2 class model	-17024.1	25	34266.01	<0.001	0.821
3 class model	-16402.8	38	33136.65	<0.001	0.791
4 class model	-16197.2	51	32838.75	0.561	0.812
5 class model	-16173.7	64	32904.87	<0.001	0.782

^aLog Likelihood;

^bBayesian Information Criterion;

^cLo-Mendell-Rubin likelihood ratio chi-square test.

While the LMR-LRT p-value points to a 3-class solution, the BIC value points to a 4-class solution. We follow the statistical guidance that BIC is the most reliable criterion and should be given more emphasis in model selection when there is inconsistent evidence (Nylund, Asparouhov, & Muthén, 2007b).

Table 3

Multivariate model of maternal characteristics as predictors of three maternal drinking patterns (*Non-Drinkers* class as the reference class; ECLS-B, N=6,100)

	Higher Risk Drinkers (4.4%)		Moderate Drinkers (13.9%)		Low-level Drinkers (26.8%)	
	OR	P-value	OR	P-value	OR	P-value
<i>Maternal Age (reference: 26–35)</i>						
Age 18–25	0.73	0.45	0.41	0.002	1.07	0.714
Age 36+	2.23	0.02	1.50	0.022	0.90	0.46
<i>Maternal Race (reference: White)</i>						
Black	0.20	0.01	0.38	0.002	0.56	0.007
Hispanic	0.17	<0.001	0.24	<0.001	0.30	<0.001
Asian	0.42	0.03	0.23	<0.001	0.34	<0.001
<i>Maternal Education (reference: less than high school degree)</i>						
High school	1.15	0.78	1.50	0.361	1.14	0.64
Some college	1.33	0.52	1.89	0.162	2.27	0.003
College or graduate school	1.72	0.26	3.34	0.004	2.24	0.008
<i>Marital Status (reference: not married)</i>						
Married	0.33	0.003	0.43	0.006	0.49	<0.001
<i>Other children in household at 9 month interview (reference: no other children)</i>						
Having other children	0.51	0.004	1.00	0.998	0.92	0.466
<i>Household Income</i>						
100–130% poverty line	0.74	0.606	2.92	0.112	1.30	0.306
130–185% poverty line	0.84	0.779	2.80	0.095	1.43	0.126
>185% poverty line	2.40	0.038	6.42	0.002	2.88	<0.001

Adjusted odds ratios (OR) and significance level are presented, with an OR > 1 indicating increasing log odds of being assigned to a given class compared to the *ND* class See: Long JS. (1997) *Regression models for categorical and limited dependent variables*, Thousand Oaks, CA: Sage Publications, Inc.

Table 4

Probability of mother's physical abuse victimization by class membership, (ECLS-B, n=6,100)

Class membership	Probability of maternal abuse
Higher Risk Drinkers (HRD)	0.090 [#]
Moderate Drinkers (MD)	0.031
Low-level Drinkers (LD)	0.013
Non-Drinkers (ND)	0.007 [#]

[#] Pairwise comparison of HRD to ND: p-value=0.013

Table 5

The effect paternal drinking on mother's physical abuse victimization by class membership, (ECLS-B, n=6,100)

Class membership	OR of maternal abuse given paternal drinking without binge drinking	P-value	OR of maternal abuse given paternal binge drinking	P-value
Higher Risk Drinkers (HRD)	Fixed *	Fixed *	0.228	0.249
Moderate Drinkers (MD)	0.369	0.454	0.377	0.466
Low-level Drinkers (LD)	0.016	0.572	0.450	0.466
Non-Drinkers (ND)	1.415	0.603	3.029	0.012

* Fixed by Mplus due to sparse cell count.