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Perinatal substance use, residential instability, and negative behavioral outcomes among adolescents: Lessons from the maternal lifestyle study

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Abstract

Problem: Both housing instability and prenatal substance use are known risk factors for behavioral problems among adolescents.

Methods: The purpose of this study was to investigate the association between residential instability (residential mobility and homelessness) and delinquent behaviors among adolescents enrolled in the maternal lifestyle study (MLS), a 16-year research study that explored short-term and long-term effects of in-utero exposure to cocaine and/or opiates ($N = 736$). Logistic regression was used to measure the association between housing problems with youth crimes, school delinquency, and substance use at 11, 15, and 16 years of age.

Findings: Both high-frequency residential mobility and homelessness were associated with deviant behaviors across the entire sample of children born with in-utero cocaine/opiate exposure and those without.

Conclusions: Psychiatric nursing care of youth should include a comprehensive assessment of residential instability to identify risk and target potential interventions.

Keywords

adolescents; housing instability; residential instability

1 | INTRODUCTION

Children born to mothers struggling with substance abuse are at risk for adverse outcomes, including physical, cognitive, and behavioral abnormalities (National Council on Child Abuse and Family Violence, 2015; Richardson, Goldschmidt, Larkby, & Day, 2015; Smith & Santos, 2016). Additionally, environmental problems may pose problems for these

families, including difficulties with housing (Cowal, Shinn, Weitzman, Stojanovic, & Labay, 2002; Zlotnick, Robertson, & Tam, 2003). Homelessness, according to the McKinney–Vento Homeless Assistance Act, is defined as one “(1) who lacks a fixed nighttime residence; and (2) whose primary nighttime residence is a supervised temporary shelter, institution, or a place not ordinarily used for sleeping” (US Department of Housing, 1995). Yet, residential mobility—or the frequent changing of physical residence—is also common. This is especially difficult for low-income families when moves are driven by poverty (i.e., rent is no longer affordable, deteriorating building, etc.) (Coulton, Theodos, & Turner, 2012, DeLuca, Rosenblatt, & Wood, 2013).

Housing problems during adolescence may be especially problematic as it has been associated with unwanted outcomes in several studies (see review by Cotton, 2016). Prior research highlights the associations between moving and externalizing behaviors (Fowler, Henry, Schoeny, Taylor, & Chavira, 2014), substance abuse (Brown et al., 2012; Lee, 2007), pregnancy (Crowder & Teachman, 2004; South & Haynie, 2005), violence (Haynie & South, 2005), and school suspensions (Boon, 2011) among adolescents. Additionally, residential mobility potentially disrupts relationships with peers (South, Haynie, & Bose, 2006), and increases likelihood of school victimization (Foster & Brooks-Gunn, 2013).

While most researches have focused either on homelessness or frequent moving, few studies have compared outcomes measuring both chronic residential mobility and homelessness within the same sample population. Further, scant research has examined the impact of housing problems among adolescents with prenatal substance exposure. The maternal lifestyle study (MLS), a 16-year study that explored short-term and long-term effects of in-utero exposure to cocaine and/or opiates ($N = 736$), offers a unique opportunity to investigate both. Although numerous research studies have been published investigating a wide breadth of topics using MLS data, this is the first to explore the impact of housing problems among this vulnerable sample.

Our present study is guided by social disorganization theory (Shaw et al., 1942) and life course perspective (Yoshioka & Noguchi, 2009). Social disorganization theory posits that residential movement in and out of neighborhoods weakens social control and increases risk for conduct-disordered behaviors. Through contextual social processes, social control is weakened by non-normative mobility patterns. Although social disorganization theory as a sociological framework contextualizes the role of delinquent behaviors on a community level, it minimizes the impact of developmental context and individual experience. Life course perspective captures the impact of moving at the individual level. Evidence supports a developmentally sensitive time (i.e., preschool years and adolescence) when correlations between residential mobility and unwanted outcomes are highest (Gillepsie, 2013; Fowler et al., 2014). As such, life course perspective and social disorganization theory provide a theoretical framework which captures both individual and ecological influences.

It is within this framework that we investigate the effect of residential instability on participants enrolled in the maternal lifestyle study. Our aim is to test the following hypotheses: (1) higher rates of residential mobility will be associated with an increase in delinquent behaviors among youth born with prenatal substance exposure and those without

and (2) higher rates of homelessness will be associated with an increase in delinquent behaviors among youth born with prenatal substance exposure and those without.

2 | METHODS

2.1 | Participants

The MLS is a longitudinal, multisite study that explores the long-term health and developmental outcomes of children with a history of prenatal cocaine or opiate exposure (National Institute of Health Grant # NO1-HD-2-3159). Women with exposure to cocaine and/or opiates during pregnancy who recently delivered an infant were recruited for the MLS based on in-person interview or positive toxicology screens. The two-group design consisted of infants exposed to cocaine and/or opiates and a comparison group of infants without prenatal exposure to cocaine or opiates. Groups were not matched on exposures to tobacco, alcohol, and marijuana. The comparison group was matched by gender, race/ethnicity, and gestational age (Lester et al., 2008). The study was conducted at four sites (Brown University, University of Miami, University of Tennessee at Memphis, and Wayne State University) from 1993 to 2007. Initially, 11,811 mothers consented to participate. By phase II (infant age of 1 month), the remaining participants totaled 1,388. ($n = 658$ participants in the exposed group; $n = 730$ in the comparison group). A large battery of assessments related to psychiatric symptomatology and health behaviors were assessed longitudinally for the offspring in the study from age 1 month to 16 years. For our analysis, we focused on data measuring residential mobility, homelessness, and youth delinquency. After considering the impact of missing data and distribution frequency, our analysis included a final sample of 736 participants.

2.2 | Measures

2.2.1 | Prenatal exposure—Prenatal exposure was measured as either (1) cocaine exposure, (2) opiate exposure, or (3) both cocaine and opiate exposure. The comparison group had no exposure to either cocaine or opiates.

2.2.2 | Residential mobility—Residential mobility was measured by the Administration on Children, Youth, and Families (ACYF) Environmental Questionnaire, a multi-item questionnaire developed specifically for the MLS for data collection purposes. For the present study, variables of interest included two items from the ACYF: whether or not the child had changed addresses since the last visit, and if so, how many times. Data were collected at 1 month, 4 months, 8 months, and then annually until the age of 15 years. Mobility was measured within three developmentally sensitive time periods determined a priori: Period 1: 1 month–5 years, Period 2: 6–10 years, and Period 3: 11–15 years. A similar developmentally sensitive method of measurement has been used in prior research (Anderson, Leventhal, & Duprere, 2014; Fowler et al., 2014), demonstrating that timing of moves is important to outcomes. Moves were dichotomized as 0–2 moves and 3 or more moves. This choice reflects differences between residential stability (no residential changes) versus a pattern of frequent residential movement (three or more moves within a 5-year period) and was based on the conceptual difference between one or two relocations versus a pattern of short-tenure occupancies (Cotton & Schwartz-Barcott, 2016). The ACYF

Environmental Questionnaire also asked participants' primary caregiver to select "which best describes the kind of housing the child currently lives in: (1) owner-occupied house or condominium, (2) rented apartment or house, (3) hotel/motel, (4) congregate care/social service facility, or (5) no stable residence."

2.2.3 | Homelessness—Homelessness was measured as residing in a hotel/motel, congregate care/social service facility, or "no stable residence" at any visit within each of the three time periods. This descriptor captures a continuum of homelessness and housing instability that is often attributable to "doubling-up" or seeking emergency shelters when no other accommodations are available.

2.2.4 | Demographics and contextual risk—Demographic variables and contextual risk factors were defined a priori and included gender of the child, maternal race, maternal education (> high school, = high school, and < high school), and maternal age (mean with standard deviation). Postnatal maternal substance use was measured (yes/no response) as any use of the following since the child's birth: cocaine, marijuana, opiates, and daily average alcohol intake of >0.6 oz.

Adverse childhood experiences were measured by (1) referrals to Child Protective Services for allegations of physical, sexual abuse, and/or neglect and (2) any changes in the child's primary caregiver. Controlling for changes in primary caretaker is conceptually important as to ensure that effect of residential mobility is not confounded by disruption in family structure by caretaker changes.

2.2.5 | Low-income status—Poverty was determined by maternal self-report of annual income. Income was dichotomized as less than or greater than 150% of the established Federal Poverty Limit (FPL) for year of visit (U.S. Department of Health and Human Services). Any report of annual income <150% of the FPL during 1 month–5 years, 6–10 years or 11–15 years was recorded as exposure to poverty.

2.2.6 | Delinquent behaviors—Behaviors related to adolescent deviance were measured using the screening instrument "things you have done." (Elliot, Huizinga, & Ageton, 1985). This tool is a 27-item instrument for measuring adolescent behaviors that is aggregated into subscales, eight which were used for the present study (see Table 1): (1) crimes against people, (2) theft, (3) vandalism, (4) school delinquency (e.g., skipping class or school or suspension/expulsion for behavior), (5) alcohol use, (6) tobacco use, (7) marijuana and (8) other drug use. Aggregate subscale scores were used based on previous work by Elliot and colleagues (1985). Although no psychometrics is available for this instrument, questions posed are similar to other instruments. Item responses were dichotomous yes/no for behaviors within the past 12 months, followed by an open response of "how many times?" The screening tool was administered at the age of 11 and 16 years. Participants completed a computer-version of the form in private to minimize response bias. Additionally, participants were also asked the number of times they had been arrested for any violation during the past 12 months during an in-person assessment at age 15.

3 | ANALYTIC STRATEGY

Distribution frequency was used to determine the impact of missing data, and inclusion criteria were established based on the results. The present study included a complete sample of participants who attended both the 11- and 16-year visit. The distribution frequency and impact of missing data were used to determine inclusion criteria: participants who attended more than 50% of all possible visits during each of three categorical age periods were included in the analysis (five of eight possible visits between age 1 month–5 years; at least three of five visits between the age of 6–10 years; and at least three of five visits during the ages 11–15 years) for a final sample of $N = 736$. (See Table 1 for the demographics of MLS participants included in the present study.) Please see Table 1 for the demographics of MLS participants included in the present study. The subanalysis that tested residential mobility and homelessness against police arrests at age 15 used the same criteria as outlined above, but missing data resulted in a modest decrease in sample size ($N = 710$) for this variable.

Logistic regression models were based on attrition results using Chi-square and analysis of variance (ANOVA) (see Table 1) to test for significance with bivariate and continuous variables respectively (see Table 1). Although gender was not significantly associated with either independent variable, due to potential gender effects related to delinquency, it was added a priori as a covariate to the final models. We controlled for gender, race/ethnicity, changes in primary caretaker, history of child abuse or neglect, maternal substance use after birth of a child, maternal age at birth, education. Separate age categories were created to capture developmentally sensitive transitions of childhood that were determined a priori: Period 1: 1 month–5 years, Period 2: 6–10 years, and Period 3: 11–15 years. The association between three or more residential moves and homelessness during Period 1 and 2 were measured with delinquent behaviors at age 11. These independent variables were also measured during Period 1, 2, and 3 for delinquent behaviors reported at age 16. Each model was determined to be a good fit for the data via Hosmer and Lemeshow Test (Hosmer and Lemeshow, 2000).

4 | RESULTS

The correlation between residential mobility (three or more address changes) and homelessness during Period 1 was $r = 0.146$ ($p < .001$); Period 2: 0.195 ($p < .001$); and Period 3: $.169$ ($p < .001$). Given these correlations, the two independent variables were modeled separately. Correlations among the dependent variables—delinquency subscales—were small to medium in effect (range: $.04$ – 0.5) with two notable exceptions: crimes against people and general delinquency had a higher correlation of $r = 0.9$ ($p < .001$) and marijuana use was correlated with other drugs abuse at $r = 0.7$ ($p < .001$).

Among the sample, 91% of children ages 1 month–5 years were low income ($<150\%$ of the FPL) (See Table 1). This percentage decreased to 81% during Period 2, and to 77.6% during Period 3. The overwhelming majority of the participants remained within low-income status and these families were more likely to move when compared with families with higher income. This pattern held constant over time.

Residential mobility of three or more moves was significant for youth crimes against people for both the exposed and comparison group at age 11 and 16; participants with three or more moves during Period 2 demonstrated elevated risk at age 11 and children with three or more moves during Period 3 were at increased risk at age 16 (See Table 2). Homelessness during Period 2 was significant for Crimes against people at age 11, but not at the 16-year visit (See Table 3).

Youth vandalism was not associated with three or more residential moves. However, vandalism behaviors at age 11 was associated with homelessness during early childhood and at age 16 for homelessness during Period 3 (See Table 3). Youth school delinquency at age 11 was associated with three or more residential moves during early childhood and significant at age 16 for three or more moves during Period 3 (See Table 2). Additionally, homelessness during Period 3 was associated with school delinquency at age 16 (See Table 3). Youth general delinquency was associated with three or more moves during Period 2 at age 11. Youth tobacco use at age 16 was associated with three or more moves during Period 3 (See Table 2). Tobacco use demonstrated no association with homelessness. Risk for youth alcohol use at age 11 was increased for the entire sample for children with early housing instability; however, odds ratio decreased over time with no significance at age 16. Results were consistent across the entire sample, for youth with prenatal cocaine and/or opiate exposure as well as those without. Finally, police arrests were significant for both three or more moves and homelessness at the 15-year assessment. Youth police arrests were also associated with in-utero cocaine exposure.

5 | DISCUSSION

This is the first study to investigate residential instability within the MLS and findings suggest that both homelessness and frequent changes in residence were associated with negative behaviors across the entire sample. Residential mobility was associated with several delinquent behaviors among adolescents, including crimes against people and school behavioral problems, consistent with prior work that demonstrated residential mobility was associated with externalizing behaviors in adolescence (Adam & Chase-Landsdale, 2002; Fowler et al., 2014; Flouri, Mavroveli, & Midouhas, 2013). Additionally, residential mobility was associated with nicotine use which is a finding supported in previous studies (Buu et al., 2009; Thorlindsson, Valdimarsdottir, & Hrafn Jonsson, 2012). As hypothesized, three or more moves and homelessness increased risk for several delinquent behaviors across the sample for both children with prenatal substance exposure and those without.

Residential instability among low-income families has been defined as a “patterning of abrupt, unforeseen changes in short-tenure occupancies that are driven by imperative need” (Cotton & Schwartz-Barcott, 2016). This patterning of residential movement often persists over time and is unlikely related to the attainment of social, financial, or educational capital; rather, it perpetuates neighborhood churning (Coulton et al., 2012). MLS participants who moved frequently failed to demonstrate obvious financial gain; the overwhelming majority of movers maintained an income below 150% of the FPL. The rate of mobility among low-income families in the MLS provides further evidence that chronic mobility is highly correlated with poverty (Fowler et al., 2014). Disadvantaged families are more likely to

move and change schools, reflecting potential differences between movers and nonmovers (Gasper, DeLuca, & Estacion, 2010, Porter et al., 2013). Youth moving into disadvantaged neighborhoods are at particular risk for delinquency (Sharkey & Sampson, 2010). As housing problems were associated with youth delinquency across the entire sample of MLS participants, a lack of stable housing likely contributes to a complex array of environmental stressors which influence unwanted outcomes on vulnerable youth.

Finally, the timing of moves is likely important (Fowler et al., 2014). In the present study, recent moves had a stronger effect on delinquent behaviors. Children were more likely to commit crimes against people if recent past included frequent changes in residence or homelessness. Further, frequent changes in address during early childhood were associated with later delinquent behavior such as alcohol use, vandalism, and school delinquency. These results support an equally compelling argument that instability during a child's early years increases odds for behavioral problems that persist over time (Fowler et al., 2014). For adolescents who grapple with developmental and social changes, disruptions in social networks and community connections may be more impactful.

This study is not without limitations. Although the measurement of residential mobility and housing instability included frequency across three developmental ages, we did not have information pertaining to the reason for each individual move so could not identify contextual influences. Additionally, measuring school changes is important because school mobility is associated with delinquency and often occurs for reasons other than a residential move (Gasper et al., 2010). Measuring neighborhood disadvantage through census data and poverty indices is equally important in that the degree of disadvantage has been linked to delinquent outcomes in adolescents (Sharkey & Sampson, 2010). These data, however, were not collected within the MLS protocol. While the research design controlled for childhood abuse, changes in primary caregivers, and ongoing maternal substance use—all factors that create additional risk for adolescent delinquency—the degree and duration, as well as the influence on residential mobility trajectories and behavioral outcomes are not definitive. Lastly, due to limitations in study designs, police arrests were measured at age 15, instead of age 16, as in other measures; therefore it is possible that confounding for this outcome influenced results, since researchers cannot guarantee that exposure occurred before police arrests. However, results were congruent with other measures of deviance and further strengthen study results. Finally, measures of delinquency included self-report that is subject to bias, especially when the content of the questions is sensitive in nature. In spite of these limitations, the novel data available in the MLS created the opportunity for critical inquiry into the impact of housing problems on delinquent behaviors among a high-risk group of adolescents.

6 | CONCLUSION

For adolescents, negative behaviors such as truancy and delinquency are frequently the reason for referral to psychiatric care. Comprehensive nursing assessment is a routine component of mental health services and should include questions on homelessness as well as frequent moving. Similarly, assessments completed within adult psychiatric settings should include residential histories, especially when patients are caregivers. Such

assessments should screen for a history of temporary homelessness, frequent changes in residence, and the degree of neighborhood disadvantage from the patient's perspective. For care-givers struggling with addiction—or in early stages of recovery—secure housing is paramount to the well-being of youth. More broadly, the results from this study challenge current sociological currents, which too often fail to consider the importance of safe, affordable, and stable housing as a necessary condition for overall mental health. Future research is needed to further our understanding of this critical connection and to inform programming, policy, and clinical practice, especially as it impacts vulnerable youth.

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TABLE 1

Participants retained versus not retained

N = 1,388

	Included n = 736 (53%)	Not included n = 652(47%)	p
Male	372(51.2)	355 (48.8)	.146
Cocaine exposure	300(49.5)	306(50.5)	.021
Opiate exposure	49(41.9)	68(58.1)	.012
Maternal education			.547
<HS	280(51.4)	265(48.6)	
HS	300(54.6)	257.3(45.4)	
>HS	156(53.6)	135(46.4)	
Ethnicity/race of mother	649(55.6)	519(44.4)	<.001
Postnatal marijuana use	206(58.7)	145(41.3)	.079
Maternal opiate use after delivery	31(49.2)	32(50.8)	.371
Maternal alcohol use after delivery	86(59.3)	59(40.7)	.236
Poverty during 1 month–5 years	673(55.7)	535(44.3)	<.01
Poverty during 6–10 years	597(65.7)	311(34.3)	<.01
Poverty during 11–15 years	571(68.4)	264(31.6)	.01
History of child abuse	38(53.5)	33(46.5)	.006
Change in primary caregiver	294(49.3)	302(50.7)	.013
Mean (Standard Deviation)			
Maternal age	28.48(49.3)	28.19(5.1)	.353

TABLE 2
Logistic regression model of three or more moves and association with deviant behaviors

N = 736		Early childhood 1 month–5 years n = 255 (34.6%)			Middle childhood 6–10 years n = 184 (25%)		Young adolescent 11–15 years n = 236 (32.1%)	
Reference: 0–2 Moves		3 + Move			Moves		3 + Moves	
Deviant behaviors		n (%)	OR(CI)		OR(CI)	OR(CI)		OR(CI)
Crimes					1.55(1.05–2.25)			
Age 11		194 (26.4)	1.27(0.89–1.82) ^a					
Age 16		286(38.9)	0.98(0.71–1.36)		0.93(0.64–1.35) ^a			1.45(1.05–2.01)
Vandalism								
Age 11		18(2.4)	2.37(0.88–6.4)		2.24(0.84–6.01)			
Age 16		44(6.0)	1.23(0.65–2.34)		1.56(0.79–3.09)			1.70(0.89–3.27)
School delinquency								
Age 11		156(21.2)	1.67(1.17–2.37)		1.20(0.83–1.75)			
Age 16		302(41.0)	1.22(0.88–1.69)		0.97(0.67–1.40) ^a			1.60(1.16–2.25)
General delinquency								
Age 11		223(30.2)	1.40(0.99–1.97) ^a		1.49(1.03–2.16)			
Age 16		423(57.5)	1.19(0.87–1.63)		0.97(0.68–1.40)			1.35(0.97–1.87)
Substance and Nicotine use								
Alcohol								
Age 11		13(1.80)	0.93(0.28–31.0)		0.58(0.14–2.40)			
Age 16		159(21.6)	0.96(0.66–1.40)		0.99(0.64–1.51)			0.98(0.66–1.46)
Tobacco								
Age 11		2(0.27)	0.72(0.04–13.5)		61(0.09–30.2)			
Age 16		58(7.90)	1.44(0.80–2.60)		1.07(0.54–2.12)			^a 1.97(1.07–3.61)
Marijuana								
Age 11		2(0.27)	0.72(.04–1.30)		1.61(0.09–30.2)			
Age 16		121(16.4)	1.25(.82–1.90)		1.21(0.75–1.95)			1.43(0.92–2.24)
Drug use								

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<i>N</i> = 736		Early childhood 1 month–5 years <i>n</i> = 255 (34.6%)		Middle childhood 6–10 years <i>n</i> = 184 (25%) 3 + Moves		Young adolescent 11–15 years <i>n</i> = 236 (32.1%) 3 + Moves	
Reference: 0–2 Moves		3 + Move		Inestimable		Inestimable	
Age 11	1(0.13)	Inestimable		Inestimable		Inestimable	
Age 16	26(3.53)	0.88(0.40–1.94)		1.03 (0.43–2.50)		1.57(0.71–3.45)	

Controlled for gender, race/ethnicity, changes in primary caretaker, history of child abuse or neglect, maternal substance use after birth of child, maternal age at birth, education.

^a *p* < .05.

TABLE 3
Logistic regression model of housing instability and association with deviant behaviors

<i>N</i> = 736		Early childhood 1 month–5 years <i>n</i> = 35 (4.8%)		Middle childhood 6–10 years <i>n</i> = 14(1.9%)		Young adolescent 11–15 years <i>n</i> = 15 (2.0%)	
Reference: Stable housing							
Deviant behaviors		<i>n</i> (%)	OR(CI)	OR(CI)	OR(CI)	OR(CI)	OR(CI)
Crimes							
Age 11		194 (26.4)	1.04(0.47–2.31) ^a		3.20(1.01–10.12)		
Age 16		286(38.9)	0.99(0.48–2.04)		2.08(0.69–6.29)		1.32(0.46–3.78)
Vandalism							
Age 11		18(2.4) ^a	4.55(1.22–16.39)		inestimable		
Age 16		44(6.0)	0.74(0.16–3.44)		3.14(0.64–15.46) ^a		4.37(1.18–16.18)
School delinquency							
Age, 11		156(21.2)	2.17(0.98–4.82)		0.44(0.01–2.21)		
Age 16		302(41.0)	1.52(0.75–3.08)		0.70(0.22–2.21) ^a		2.99(1.01–8.94)
General delinquency							
Age 11		223(30.2)	1.25(1.04–10.33) ^a		3.28(1.04–10.3)		
Age 16		423(57.5)	0.98(0.47–2.06)		2.59(0.69–9.67)		2.04(0.64–8.65)
Substance and nicotine use							
Alcohol							
Age 11		13(1.80)	3.77(0.97–14.59)		Inestimable		
Age 16		159(21.6)	0.87(0.37–2.01)		1.34(.38–4.17)		2.50(.86–7.27)
Tobacco							
Age 11		2(0.27)	Inestimable		Inestimable		
Age 16		58(7.90)	0.93(0.25–3.46)		2.32(0.45–12.1)		
Marijuana							
Age 11		2(0.27)	Inestimable		Inestimable		
Age 16		121(16.4)	0.85(0.33–2.22)		1.19(0.29–4.92)		1.39(0.45–4.39)
Drug use							
Age 11		1(0.13)	Inestimable		Inestimable		

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N = 736

Reference: Stable housing

Age 16	26(3.53)	Early childhood 1 month–5 years <i>n</i> = 35 (4.8%)	Middle childhood 6–10 years <i>n</i> = 14(1.9%)	Young adolescent 11–15 years <i>n</i> = 15 (2.0%)
		Inestimable	3.4(0.37–31.4)	Inestimable

Controlled for gender, race/ethnicity, changes in primary caretaker, history of child abuse or neglect, maternal substance use after birth of child, maternal age at birth, education.

^a *p* < .05