

The complex nature of parental substance use: Examining current and recent use behaviors as
correlates of child maltreatment frequency

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Abstract

Background: Child maltreatment studies typically have focused on dichotomous substance use variables, resulting in limited understanding about how a range of substance use is related to child maltreatment. *Objectives:* To examine how dichotomous measures conflate the unique contribution of specific substance use behaviors to child maltreatment frequency and to assess the utility of considering recent history of substance use disorder within the past 4 years.

Method: Cross-sectional, secondary data analyses were conducted using the National Survey of Child and Adolescent Well-being (NSCAW I). The study sample is composed of 2,100 high-risk parents with complete child maltreatment and substance use history. The study used weighted negative binomial regression to examine the relationships between child maltreatment frequency and different ways of operationalizing substance use behaviors. *Results:* Dichotomous approaches overestimated the unique contribution of past year heavy drinking and/or illicit drug use and underestimated the unique contribution of past year substance use disorder. When recent history was considered, previously concealed relationships were observed: child maltreatment incidence was 64% lower on average among parents with a recent but not current substance use disorder compared to parents reporting current substance use disorder (Holm's $p = .002$).

Conclusions/Importance: Substance-using parents may need tailored interventions to address a range of substance-related maltreatment risk. Future studies would benefit from exploring longitudinal effects of use reduction on parenting behaviors and underlying mechanisms that may explain observed differences in maltreatment frequency.

Keywords: heavy drinking; illicit drug use; substance use disorder; child maltreatment

Glossary of Key Terms & Concepts:

Child Maltreatment: a constellation of harmful, interrelated behaviors directed toward a child; limited to physical abuse, emotional abuse, and neglect within this study.

Drinking Patterns: ordinal categories that capture the maximum number of drinks an individual will imbibe during one time period, behaviors range from no use (0 drinks at most) to heavy drinking (4-5 drinks or more).

Illicit Drug Use: intended ingestion of marijuana/hashish, sedatives, tranquilizers, analgesics, heroin, cocaine/crack/freebase, amphetamines, inhalants, and/or LSD/hallucinogens for non-medical use.

Substance Use Disorder: past year heavy alcohol and/or illicit drug use associated with at least 2 substance-related problems in biological, cognitive, social, or educational/occupational functioning as defined by the *DSM-5*.

Introduction

A concerning number of children are exposed to parental substance misuse and its associated harms (Grella, Hser, & Huang, 2006; Haber et al., 2010; Hser et al., 2015; Kelleher, Chaffin, Hollenberg, & Fischer, 1994; Sedlak et al., 2010; Substance Abuse and Mental Health Services Administration, 2009). Of these, child maltreatment is particularly disquieting given its connection to toxic stress and long-term negative consequences (Jaffee & Christian, 2014; Sperry & Widom, 2013). To effectively address service needs among substance-using parents, research must incorporate methods that capture the complex and varied behaviors observed with both substance use (Mayes & Truman, 2002) and child maltreatment (Herrenkohl, 2005). Yet, our knowledge about child maltreatment behaviors among substance-using parents remains limited due to the vast majority of studies (a) focusing on any occurrence of child maltreatment and/or (b) operationalizing substance use as dichotomous variables (Dunn et al., 2002; Staton-Tindall, Sprang, Clark, Walker, & Craig, 2013; Widom & Hiller-Sturmhöfel, 2001).

These dichotomous approaches likely obscure important differences in parenting behaviors across a range of substance use behaviors. For example, studies observed both frequent heavy alcohol use and substance use severity were positively associated with children witnessing violence within the household (Connors-Burrow, Johnson, & Whiteside-Mansell, 2009; Jester, Jacobson, Sokol, Tuttle, & Jacobson, 2000). In addition, alcohol studies specific to child maltreatment outcomes provide preliminary evidence that (a) maternal frequency of intoxication is positively associated with physical abuse occurrence (Berger, 2005) and (b) drinking patterns have variable associations with physical abuse frequency and supervisory neglect occurrence (OMITTED FOR PEER REVIEW). This study aims to build upon these findings by examining (1) how a range of both alcohol and drug use are associated with child

maltreatment frequency and (2) how inclusion of parents meeting criteria for substance use disorder (SUD) within the last 4 years may alter these relationships.

Method

Design, setting, & participants

The National Survey of Child and Adolescent Well-being (NSCAW I) is a national panel survey conducted between 1999 to 2007 that sampled children who were identified as being at-risk for experiencing child maltreatment due contact with child protective services (CPS) (Biemer, Dowd, & Webb, 2010). This study used the Child Protect Services sample ($N = 4,034$ permanent caregivers at baseline). The final analytic sample included 2,100 permanent caregivers who (a) maintain permanent caregiver status and (b) were identified as the same key respondent across Wave 1 (baseline), Wave 3 (18 months), and Wave 4 (36 months) of data collection. Table 1 shows the study sample characteristics. Attrition analyses indicated no significant differences in baseline substance use behaviors between parents included and excluded from the study sample.

<INSERT TABLE 1 ABOUT HERE>

Measures

Child maltreatment frequency was measured using Wave 4 parent self-reported behaviors from the Conflict Tactics Scale – Parent Child (CTS-PC) (Straus, Hamby, Finkelhor, Moore, & Runyan, 1998) Items measuring severe to very severe physical abuse, severe psychological maltreatment, and neglect were recoded to counts and summed to obtain annual frequencies (Straus, 2004; Straus & Field, 2003). The mean count was 6.9 (LSE = 0.6) with a range from 0 to 108 incidents. Internal consistency was $\alpha = 0.58$; the low internal consistency ($\alpha < 0.70$) is likely due to items capturing rare events (Straus et al., 1998).

All substance use measures were constructed using the Composite International Diagnostic Interview-Short Form (CIDI-SF) (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). General substance use measures for (a) drinking patterns, (b) illicit drug use, and (c) substance use disorder (SUD) were used to create the substance use variables defined in Table 2. *Current drinking patterns* were based on Wave 4 parent self-report of the largest number of drinks the respondent had in any single day during the past 12 months. These responses were recoded into: (a) no alcohol use (0 drinks at most), (b) light to moderate drinking (1–3 drinks at most), and (c) heavy drinking (4 or more drinks) (OMITTED FOR PEER REVIEW). *Current illicit drug use* was based on Wave 4 parent self-report of whether or not they used illicit drugs during the past 12 months. Parents met *criteria for SUD* at each wave of data collection if they reported (a) heavy drinking or illicit drug use and (b) endorsed 2 or more substance-related impairments in functioning during the past 12 months (American Psychiatric Association, 2013).

<INSERT TABLE 2 ABOUT HERE>

Control variables included a dichotomous variables for receipt of CPS services at baseline, family-oriented services, and lifetime mental health or substance-related treatment (Grella, Needell, Shi, & Hser, 2009). Parenting risk factors included Wave 4 physical and emotional health (Ware, Kosinski, & Keller, 1996) and lifetime history of arrests for criminal activity. The study also controlled for sociodemographic characteristics reported in Wave 4 and listed in Table 1.

Statistical Analysis

The study used negative binomial regression models (NBRM) to address over-dispersion that arises when measuring frequency of rare events (Hilbe, 2011; Straus, 2004). Stata 13 survey estimation and domain analysis procedures were used to apply survey weights to the

subpopulation selected for this study (Biemer, Christ, Wheelless, & Wiesen, 2008). Holm's Sequential Bonferroni Correction were calculated for multiple comparisons (Abdi, 2010; Holm, 1979).

Results

Table 3 compares incidence rate ratios (IRR) comparing annual incidence of child maltreatment by substance use categories. Wald tests indicate all substance use variables significantly contribute to their respective models. However, dichotomous approaches to defining parent substance use (i.e., Model 1 to Model 3) appeared to either overestimate the unique contribution of harmful/risky use or underestimate the unique contribution of SUD. Holding all other variables constant in the model, Model 4 indicates current harmful/risky use is associated with a 60% higher predicted incidence of child maltreatment than non-use, and current SUD is associated with a 209% higher predicted incidence of child maltreatment than non-use.

<INSERT TABLE 3 ABOUT HERE>

Table 4 details multiple comparisons for substance use categories used in Models 4 and 5. First, SUD significantly differed from all other categories. In addition, current harmful/risky use is related to a higher rate of child maltreatment incidents compared to non-users but a lower rate compared to parents currently meeting criteria for SUD. Finally, recent history provided additional insight that parents reporting prior SUD with current reduced use are expected to have 64% less instances of maltreatment during a year compared to parents with current SUD. Figure 1 shows predicted margins for annual child maltreatment frequency for Model 5.

<INSERT TABLE 4 & FIGURE 1 ABOUT HERE>

Discussion

Risk in chronicity of child maltreatment behaviors is likely conditional on the extent of the parent's current substance use. As a result, dichotomous approaches likely obscure unique contributions of specific substance use behaviors. The findings support previous literature that observed the highest child maltreatment risk exists for parents reporting SUD (Dunn et al., 2002). Differences in child maltreatment frequency observed across substance use categories may be arising due to a variety of reasons. First, it is possible that differences in acute and chronic neuropsychological effects associated with specific substance use behaviors (Fernández-Serrano, Pérez-García, & Verdejo-García, 2011) could be differentially impairing parents' ability to process and appropriately respond to children's behaviors (Crittenden, 1993; Milner, 1993, 2000). That being said, these findings may also be due to differences in the frequency of acute intoxication and withdrawal across categories that are not measured by this study. Alternatively, differences may be associated with unmeasured social norms and contexts arising from parent substance use that place children at risk for harm (Zinberg, 1984).

Findings should be interpreted with caution based on the study limitations. Due to sampling and selection criteria, generalizability of the findings are most relevant to biological mothers and/or families where child safety concerns were indicated by a child protective services report but did not require child removal; however, no baseline differences in parent substance use were observed between the study and attrition samples. The cross-sectional nature also can only indicate significant correlations which may not be causal. Finally, use of secondary data also limits the precision of substance use and child maltreatment measures used within the study. For example, the *prior SUD with reduced use* category include parent behaviors ranging from 1.5 to 4 years prior to Wave 4 and combined a wide range of current use behaviors to obtain sufficient power. Also, parent self-reports of child maltreatment behaviors may not have been

fully mitigated by automated computer-assisted self-interviewing (ACASI) procedures resulting in an underestimation of the most severe maltreatment behaviors (Straus & Field, 2003).

Future studies would benefit from collecting more precise measures of substance use (i.e., frequency, severity, duration, & type). Studies designed to directly measure neuropsychological impairment could test its potential mediating role between parental substance use and child maltreatment. Finally, findings highlight that substance-using families could benefit from more tailored interventions. For example, Screening, Brief Intervention, and Referral to Treatment (SBIRT) may be helpful for parents with harmful/risky use to potentially reduce the higher likelihood of involvement in the child welfare system (Young, Boles, & Otero, 2007).

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Table 1

Weighted Descriptive Statistics for Study Sample ($n = 2,100$ Parents at Wave 4)

| | <i>n</i> | <i>Weighted %</i> |
|--------------------------------------|----------|-------------------|
| <i>Sampled child characteristics</i> | | |
| Child age (years) | | |
| 2–5 | 764 | 20.3 |
| 6–10 | 607 | 37.4 |
| 11–16 | 729 | 42.3 |
| Child gender | | |
| Male | 1,029 | 51.0 |
| Female | 1,071 | 49.0 |
| <i>Parent characteristic</i> | | |
| Age (years) | | |
| < 35 | 1,240 | 53.4 |
| 35–44 | 649 | 35.2 |
| ≥ 45 | 211 | 11.4 |
| Gender | | |
| Male | 111 | 6.0 |
| Female | 1,989 | 94.0 |
| Race/Ethnicity | | |
| Non-Hispanic White | 1,093 | 52.8 |
| Non-Hispanic Black | 559 | 23.9 |
| Hispanic | 334 | 16.8 |
| Other | 114 | 6.4 |
| Partnership status | | |
| Married / Co-habit | 1,021 | 52.8 |
| Other | 1,079 | 47.2 |
| Relationship to child | | |
| Biological parent | 2,016 | 97.0 |
| Other | 84 | 3.0 |
| Education completed | | |
| Less than high school | 606 | 27.6 |
| High school or more | 1,494 | 72.4 |
| Employment Status | | |
| Employed | 1,095 | 55.4 |
| Unemployed | 312 | 11.2 |
| Other | 693 | 33.4 |
| <i>Household characteristics</i> | | |
| Receipt of govt aid | | |
| No | 720 | 38.4 |
| Yes | 1,380 | 61.6 |

Table 2

Operationalization of Substance Use Variables with Associated Frequencies & Weighted Percent

| Variable | Operationalization | n (weighted %) |
|--|--|----------------|
| <i>Any Use</i> | | |
| No | No Wave 4 (W4) alcohol or illicit drug use. | 1142 (52.0) |
| Yes | Any W4 alcohol or illicit drug use. | 958 (48.0) |
| <i>Any Harmful/Risky Use</i> | | |
| No | No W4 heavy drinking (4+ drinks at one time) or illicit drug use. | 1630 (76.0) |
| Yes | Any W4 heavy drinking or illicit drug use. | 470 (24.0) |
| <i>Substance Use Disorder (SUD)</i> | | |
| No | Does not meet criteria for SUD at W4. | 2025 (95.8) |
| Yes | Meets criteria for SUD at W4. | 75 (4.2) |
| <i>Current Substance Use Behaviors</i> | | |
| Non-use | No W4 alcohol or illicit drug use. | 1142 (52.0) |
| Light to Moderate Drinking | W4 light to moderate drinking (1-3 drinks max) with no W4 illicit drug use. | 488 (24.0) |
| Harmful/Risky Use | W4 heavy drinking and/or illicit drug use <i>and</i> does not meet criteria for SUD at W4. | 395 (19.8) |
| SUD | Meets criteria for SUD at W4. | 75 (4.2) |
| <i>Recent Substance Use Behaviors</i> | | |
| Non-use | No W4 alcohol or illicit drug use <i>and</i> does not meet criteria for SUD at Wave 1 (W1), Wave 3 (W4), and W4. | 1099 (50.6) |
| Light to Moderate Drinking | W4 light to moderate drinking with no W4 illicit drug use <i>and</i> does not meet criteria for SUD at W1, W3, and W4. | 455 (22.6) |
| Harmful/Risky Use | W4 heavy drinking and/or illicit drug use <i>and</i> did not meet criteria for SUD at W1, W3, and W4. | 340 (17.8) |
| SUD | Meets criteria for SUD at W4. | 75 (4.2) |
| Prior SUD w/ Reduced Use | Does not meet criteria for SUD at W4 <i>and</i> meets criteria for SUD at W1 or W3. | 131 (4.8) |

Table 3

Weighted NBRM for Child Maltreatment Counts Regressed on Different Approaches to Operationalizing Parent Substance Use ($n = 2,100$)

| | Model 1: W4 Any Use | | Model 2: W4 Any Problematic Use | | Model 3: W4 Any SUD | | Model 4: W4 Substance Use Behaviors | | Model 5: W1-W4 Substance Use Behaviors | | | |
|--|------------------------|--------------|------------------------------------|--------------|------------------------|--------------|--|--------------|---|--------------|--------------|-----|
| | IRR | 95% CI | IRR | 95% CI | IRR | 95% CI | IRR | 95% CI | IRR | 95% CI | | |
| Any Current Use | 1.46 | [1.11, 1.92] | ** | | | | | | | | | |
| Any Current Harmful/ Risky Use | | | 1.76 | [1.34, 2.31] | *** | | | | | | | |
| Any Current Substance Use Disorder (SUD) | | | | | 2.53 | [1.82, 3.52] | *** | | | | | |
| Substance use pattern (ref: Non-use) | | | | | | | | | | | | |
| Light-Mod Drinking | | | | | | | 1.15 | [0.82, 1.60] | | 1.14 | [0.84, 1.55] | |
| Harmful/Risky Use | | | | | | | 1.60 | [1.16, 2.21] | ** | 1.59 | [1.13, 2.23] | ** |
| SUD | | | | | | | 3.09 | [2.13, 4.48] | *** | 3.03 | [2.07, 4.42] | *** |
| Prior SUD w/ Reduced Use | | | | | | | -- | -- | | 1.09 | [0.62, 1.90] | |
| Alpha | 2.83 | [2.37, 3.37] | 2.80 | [2.34, 3.34] | 2.81 | [2.36, 3.35] | 2.77 | [2.33, 3.30] | 2.78 | [2.33, 3.31] | | |
| F | 9.35 | *** | 10.24 | *** | 14.28 | *** | 13.74 | *** | 12.50 | *** | | |
| Adjusted Wald Test F | 7.54 | ** | 16.76 | *** | 31.62 | *** | 15.05 | *** | 11.29 | *** | | |
| <i>[Substance Use Var]</i> | | | | | | | | | | | | |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: All models are reflective of full models controlling for parent risk factors, parent service history, and demographic controls.

Note: Among problematic users, 43% reported using multiple substance. Among parents reporting recent SUD, 77% reported using multiple substances.

Table 4

Multiple Comparisons of Substance Use Behavior Categories ($n = 2,100$)

| Comparisons* | Current Substance Use Behaviors (W4) | | | Recent Substance Use Behaviors (W1, W3, & W4) | | |
|--|--------------------------------------|----------|-----------------|---|----------|-----------------|
| | <i>t</i> | <i>p</i> | Holm's <i>p</i> | <i>t</i> | <i>p</i> | Holm's <i>p</i> |
| Light to Moderate Drinking vs. Non-use | 0.85 | .396 | ns | 0.86 | .393 | ns |
| Harmful/Risky Use vs. Non-use | 2.90 | .005 | .015 | 2.71 | .008 | .049 |
| Light to Moderate Drinking | 1.78 | .079 | ns | 1.91 | .060 | ns |
| Substance Use Disorder (SUD) vs. Non-use | 6.04 | < .001 | < .001 | 5.80 | < .001 | < 0.001 |
| Light to Moderate Drinking | 5.74 | < .001 | < .001 | 5.80 | < .001 | < 0.001 |
| Harmful/Risky Use | 3.30 | .001 | .005 | 3.12 | .003 | .018 |
| Prior SUD w/ Reduced Use vs. Non-use | -- | | | 0.30 | .766 | ns |
| Light to Moderate Drinking | -- | | | -0.18 | .859 | ns |
| Harmful/Risky Use | -- | | | -1.27 | .208 | ns |
| SUD | -- | | | -3.76 | < .001 | .002 |

* Controlling for parent confounders, parent services, and demographics variables.

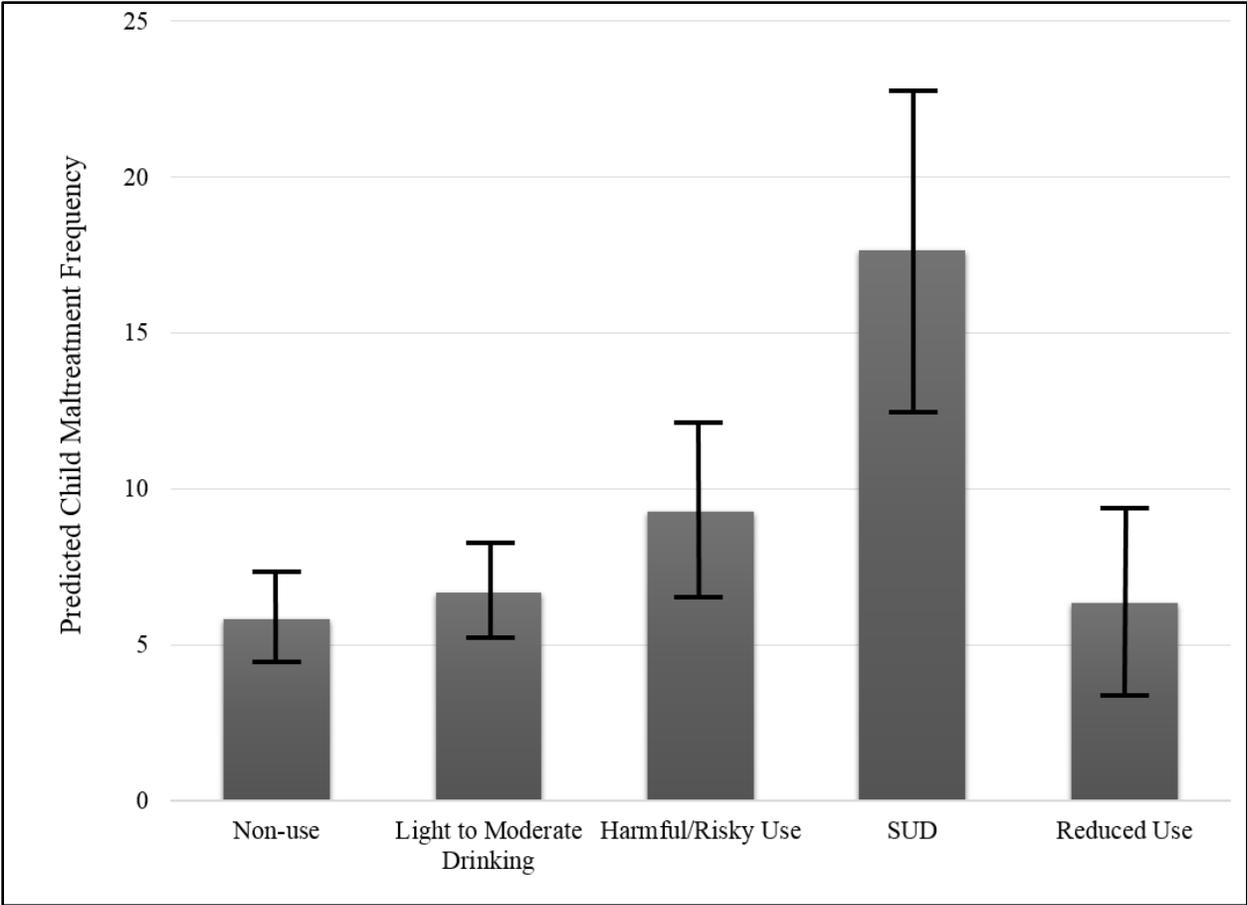


Figure 1. Predictive margins for maltreatment frequency by recent history of parent substance use. All error bars represent 95% confidence intervals.