Published in final edited form as:

Child Abuse Negl. 2021 August ; 118: 105130. doi:10.1016/j.chiabu.2021.105130.

The Roles of Child Maltreatment and Fathers in the Development of Substance Use in an At-Risk Sample of Youth: A Longitudinal Study

Susan Yoon,

The Ohio State University, College of Social Work, 1947 N. College Rd., Columbus, OH 43210, USA

Julia M. Kobulsky,

Temple University, College of Public Health School of Social Work, 1101 W. Montgomery Ave, Philadelphia, PA 19122, USA.

Sunny H Shin,

Virginia Commonwealth University, School of Social Work, School of Medicine, 1000 Floyd Avenue, Richmond, VA 23284, USA.

Kathryn Cox

The Ohio State University, College of Social Work, 1947 N. College Rd., Columbus, OH 43210, USA

Abstract

Background: Despite ample cross-sectional evidence linking child maltreatment and father involvement to adolescent substance use, little is known about the longitudinal impact of child maltreatment and father involvement in the developmental course of substance use from early adolescence to late adolescence.

Objective: The primary aim of the study was to examine the long-term effects of childhood maltreatment (i.e., maltreatment type, perpetrator identity) and the quality and quantity of father involvement on developmental trajectories of substance use among high-risk youth.

Participants and Setting: Data were drawn from the Longitudinal Studies of Child Abuse and Neglect. Study participants included 681 U.S. adolescents who had experienced or were at risk for child maltreatment.

Methods: Latent Growth Poisson Modeling was conducted to examine developmental trajectories of substance use at ages 12, 14, 16, and 18.

Results: Child emotional abuse and greater quantity of father involvement were associated with a higher initial number of substances used, while higher quality of father-child relationships was associated with a lower initial number of substances used. Emotional abuse and greater quantity of father involvement were associated with slower increases in the number of substances used over time.

Conclusions: The findings suggest that engaging fathers and promoting nurturing parenting and positive parent-adolescent interactions may be important for programs and policies aimed to prevent early adolescent substance use initiation. Furthermore, early identification of emotional abuse among adolescents could help to prevent initial polysubstance use onset.

Substance use in adolescence is associated with a host of negative outcomes, including altered brain development, physical and mental health problems, risky sexual behavior, unintentional injuries, attempted suicide, and death (Gray & Squeglia, 2018; Marshall, 2014; Schulte & Hser, 2013; Spear, 2018; Thompson et al., 2017). Some studies have suggested that adolescents using a higher number of different types of substances (e.g., polysubstance use) show more adverse health outcomes than those not using substances or using one substance (Jones et al., 2017; Kelly et al., 2015; Kokkevi et al., 2014). Considering the poor outcomes associated with the higher levels of polysubstance use, it is vital to understand the developmental trajectory of substance use, including the initial level and growth rates of the number of substances used, among adolescents.

Child Maltreatment and Substance Use

Addiction research has identified a variety of correlates of adolescent substance use, including genetic, neurobiological, psychological, environmental, and cultural determinants (Hussong et al., 2017; Trucco, 2020; Vrieze et al., 2012). Notably, existing scientific evidence points to exposure to childhood adversity, including child maltreatment, as a significant susceptibility factor for substance use in adolescence (Lansford et al., 2010; Tonmyr et al., 2010; Shin et al., 2012; Yoon et al., 2017). Adolescents with a history of child maltreatment have been found to be at heightened risk for heavy polysubstance use (Shin et al., 2010), the development of substance use disorders (De Sanctis et al., 2008), and early initiation of substance use (Proctor et al., 2017).

Although empirical evidence suggests an elevated risk for substance use among youth who have experienced maltreatment in childhood, it remains unclear which specific maltreatment characteristics, such as the type and perpetrator of maltreatment, more precisely predict substance use trajectories in adolescence. There have been mixed results on the long-term effects of different types of child maltreatment on adolescent substance use. For example, one study found that child neglect and physical abuse were associated with faster increases in binge drinking and persistently elevated binge drinking in adolescence whereas child sexual abuse was not related to the course of adolescent binge drinking (Shin et al., 2012). In contrast, in a longitudinal study of 7,214 adolescents, emotional abuse and neglect, but not physical and sexual abuse, were related to cannabis misuse and heavy drinking by age 21 (Stranthearn et al., 2020). Another longitudinal study, which focused on trajectories of substance use among child welfare-involved youth, found that the high-stable substance use trajectory class, neglect, was related to increase in substance use over time whereas physical abuse was not significantly related to increases in substance use over time (Yampolskaya et al., 2019). Taken together, emotional abuse and neglect appear to have been most consistently associated with increasing substance use over time in adolescents.

Research is scarce on perpetrator identity (e.g., maltreatment perpetrated by fathers vs. mothers) and its influence on adolescent substance use. This represents a critical knowledge gap, given that nearly 50% of reported child maltreatment cases are perpetrated by fathers, either alone or with a mother or other individual (US DHHS, 2020). Further, fathers are overrepresented as perpetrators in severe physical abuse cases that result in detrimental outcomes, such as abusive head injuries and child fatalities (Schnitzer & Ewigman, 2005; Scribano et al., 2013), thus warranting more research on the impact of father-perpetrated maltreatment on adolescent development.

The Role of Fathers in the Development of Substance Use Over Time

Understanding a protective role fathers can play in adolescent development is equally important. It is well documented that fathers make an important contribution to children's development, beyond the mothers' contribution (Fosco et al., 2012; Yoon et al., 2018a). Emerging evidence suggests that father involvement is associated with resilience to substance use among adolescents (Fosco et al., 2012; Luk et al., 2017; Weymouth et al., 2019), though some studies have suggested that different aspects of father involvement may have differential impact on adolescent substance use (Henry et al., 2018). For example, one study found that it was the shared communication with and emotional closeness to fathers, not the simple participation in a shared activity, that had protective effects on adolescent alcohol use (Goncy & van Dulmen, 2010). These findings underscore the importance of examining various dimensions of father involvement, including both quality and quantity of father-child interactions.

Despite solid empirical evidence supporting the positive and protective effects of father involvement on substance use among general youth populations, such effects have not yet been comprehensively examined in a high-risk group of adolescents, such as those with a history of child maltreatment. Thus, it is unclear if the protective role played by fathers will hold true for adolescents who have experienced maltreatment by fathers. Father involvement may have different meaning or impact for adolescents with a history of child maltreatment due to unique challenges and complex family dynamics they face, such as father-perpetrated child maltreatment and father-perpetrated violence against the mother (Cavanagh et al., 2007; Dixon et al., 2007; Dubowitz et al., 2000). The few existing studies suggest preliminary evidence that positive father-child relationships serve as a protective factor for substance use among high-risk youths (Dubowitz et al., 2019a; Yoon et al., 2018b), yet more research—longitudinal research in particular—is needed to understand the influence of father involvement on substance use trajectories among adolescents with a history of child maltreatment.

The Current Study

Taken together, little is known about the long-term influence of maltreatment characteristics and father involvement in the developmental course of substance use from early adolescence to late adolescence. Substance use is a developmental phenomenon, with initiation of substance use usually occurring between ages 14 and 18, peaking in emerging adulthood, and declining thereafter (Johnston et al., 2020). Thus, it is critical to understand the

developmental processes underlying the initiation and progress in substance use behaviors among adolescents. This study sought to investigate the longitudinal impacts of child maltreatment and father involvement on the developmental trajectory of substance use among high-risk youth. Based on prior studies (Schnitzer & Ewigman, 2005; Scribano et al., 2013; Shin et al., 2012; Strantheart et al., 2020; Yampolskaya et al., 2019), we hypothesized that maltreatment perpetrated by fathers (alone or together with mother) and emotional abuse and neglect would be associated with a higher initial number and faster increase in the number of substances used over time. We also hypothesized that higher quality of father-child relationships would predict lower initial number and slower increase in the number of substances used over time among adolescents.

Methods

Participants and Procedure

This study used data from the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN). LONGSCAN is a consortium of five studies that share the common goal of examining the causes and consequences of child abuse and neglect (Larrabee & Lewis, 2016). Data were collected longitudinally from 1991 to 2012, by following the participants from baseline (age 4) through the age of 18. The primary data collection included face-to-face interviews with the focal child and the primary caregiver at child ages 4, 6, 8, 12, 14, 16, and 18. The current study used data collected at child ages 12, 14, 16, and 18 (referred to as Time 1 [T1], Time 2 [T2], Time 3 [T3], and Time 4 [T4], respectively, in this paper). The original LONGSCAN sample included 1,354 U.S. children who have experienced or were identified to be at high risk for child maltreatment. As fathering was a key variable of interest, the current sample was limited to 681 youths who reported having a father or father figure at age 12.

Measures

Substance Use—Adolescent substance use was measured using youth self-reports of alcohol, cigarette, marijuana, and other drugs at ages 12 (T1), 14 (T2), 16 (T3), and 18 (T4). At each time point, adolescents were asked if they have ever used the following substances in the past year: alcohol, cigarettes, marijuana, and other drugs (e.g., powdered cocaine, crack cocaine, methamphetamine, ecstasy, lysergic acid diethylamide (LSD) or other hallucinogens, heroin, inhalants, and any other drugs to get high). For each of the four substance categories (alcohol, cigarettes, marijuana, and other drugs), adolescents reported their use in the past year (0 = no, 1 = yes). Count variables were created at each time point (i.e., T1 –T4) to indicate the number of substances used in the past year (possible range 0 – 4).

Child Maltreatment

Maltreatment Type. The type of maltreatment experienced was measured using Child Protective Services (CPS) records and youth self-reports. Although official child maltreatment data (i.e., CPS records) only captures maltreatment severe enough to be reported to CPS, self-report measures are subject to social desirability and recall bias. Also, there is generally low concordance between youth self-reports of maltreatment and CPS

determinations (Kobulsky et al., 2018a). Therefore, it is considered best practice to rely on a variety of maltreatment measures from different sources of information to assess maltreatment (Everson et al., 2008). A total of four dichotomous maltreatment type variables (i.e., physical abuse, emotional abuse, sexual abuse, neglect) were created and included in the analysis. For each type of maltreatment, it was coded yes (= 1) if either informant indicated its presence.

CPS Records.: Maltreatment allegation and investigation narratives were coded by LONGSCAN coders using the Modified Maltreatment Classification System (MMCS; English & the LONSCAN Investigators, 1997). The MMCS is based on Barnett et al.'s (1993) typology of maltreatment and demonstrated moderate to perfect internal reliability (Longscan Coordinating Center 2009). Dichotomous variables of physical abuse, emotional abuse, sexual abuse, and neglect were created (0=no, 1= yes) using the youth's CPS records from birth to age 12.

Youth Self-report Maltreatment Scales.: Adolescents' lifetime (birth to age 12) history of physical, emotional, and sexual abuse were assessed at age 12, using the Self-Report of Physical Abuse and Assault (15 items; e.g., have been bitten, have been stabbed with a knife; $\alpha = .89$), Self-Report of Psychological Maltreatment (18 items; e.g., have been threatened to be abandoned; $\alpha = .83$), and Self-Report of Sexual Abuse and Assault (11 items; e.g., have been forced to look at something sexual; $\alpha = .83$), respectively. The instruments were developed based on definitions of abuse by the American Professional Society on the Abuse of Children (Hart, Brassard, & Karlson, 1996) and Barnett et al. (1993). Dichotomous variables were created for each abuse type (1= *any endorsement*, 0 = *no abuse*). Adolescent exposure to neglect was measured using the About My Parents Scale which was adapted from the Neglect Scale (Straus et al., 1997). The instrument has demonstrated convergent validity, internal reliability and consistency across time (Dubowitz et al., 2011). Cronbach's alpha value in this sample was acceptable ($\alpha = .76$). Adolescents rated (0 = *never*, 1 = *almost never*, 2 = *sometimes*, 3 = *a lot*) their parents' neglectful behaviors on meeting the child's physical/basic needs (7 items; e.g., gave you enough food to eat) and parental supervision (5 items; e.g., made sure you had somewhere safe to play) during elementary school. A dichotomous neglect variable was created by coding *never* and *almost never* on any items as an incidence of child neglect (0 = no neglect, 1 = any self-reported neglect).

Perpetrator of Maltreatment.: Perpetrator gender was assessed from the youth's lifetime CPS records, which were coded using the MMCS. Three maltreatment categories were created reflecting the gender of the perpetrator: maltreatment perpetrated by mother alone, maltreatment perpetrated by father (with or without mother), and no maltreatment by parents. Due to the low percentage (< 4%) of father alone perpetration, maltreatment by father alone and maltreatment by father and mother together were combined to represent maltreatment involving fathers (alone or with mothers) as perpetrators.

Fathering

The Quality of Father Involvement.: The quality of father involvement was measured at age 12, using a 6-item scale (e.g., youth feels close to the father, father cares about the youth) that was developed using the items adapted from the National Longitudinal Study on Adolescent Health (Add Health; Resnick et al., 1997). Adolescents rated the extent to which each item described the overall quality of the relationship with their father (ranging from 1 = *not at all/never* to 5 = *very much/always*). Items were summed for a total quality of father involvement score, with higher scores indicating higher quality father involvement (i.e., better quality father-child relationships). Cronbach's alpha value in this sample was acceptable ($\alpha = .83$).

The Quantity of Father Involvement.: The quantity of father involvement was assessed at age 12, using 9 items adapted from the Add Health study (Resnick et al., 1997). Adolescents reported recent shared activities (e.g., going shopping, playing a sport) with the father in the past four weeks (0 = *no*, 1 = *yes*). Items were summed for a total frequency score (possible range 0 – 9), with higher scores indicating greater quantity of father involvement. Cronbach's alpha value in this sample was acceptable ($\alpha = .76$).

Control Variables—The adolescent's sex (0 = *male*, 1 = *female*) and race/ethnicity was reported by the caregiver at baseline. The race variable was dummy coded into the following four variables, using non-Hispanic Black as the reference group: non-Hispanic White, non-Hispanic Black, Hispanic, Other. Family substance use was measured at age 12 using the youth's responses (0 = *no*, 1 = *yes*) on the 9 items that asked about the types of substances used by household members. Family substance use variable was computed by summing the responses to indicate the number of substances used by family members. The quality and quantity of mother involvement was measured at age 12, using analogous measures of father involvement. Internal reliabilities in this sample were acceptable (quality: $\alpha = .80$, quantity: $\alpha = .69$).

Analysis Plan

To examine the development of substance use (i.e., number of substances used) over time (from T1 to T4), a latent growth Poisson model was estimated using Mplus v.7.4. The intraclass correlation coefficient was .177, indicating that a significant amount of variation in the number of substances used was explained by clustering (i.e., measurement time points nested within individuals). Latent growth curve modeling within the structural equation modeling (SEM) framework, which captures both inter- and intra- individual influences through the fixed and random effects, was deemed appropriate for this study as it allows for the nesting of multiple repeated measures within each individual while effectively estimating and removing the effects of measurement error (Curran et al., 2010).

A latent growth Poisson model was chosen over a latent growth zero-inflated Poisson model because the Poisson model had a lower Bayesian Information Criterion (BIC) value (3756.45 vs 3845.40), indicating a better fit for the data (Schwarz, 1978). First, unconditional latent growth Poisson model was estimated to examine the general shape of the developmental trajectory of the number of substances used across the four time points.

Next, conditional latent growth Poisson model was estimated to examine the effects of child maltreatment and father involvement on the initial level and growth of the number of substances used among adolescents, while controlling for covariates, including demographics, mother involvement, and family substance use. Covariates were selected a priori based on their previously observed and known relationships with adolescent substance use and focal predictors (i.e., child maltreatment, father involvement) in the literature.

As with any longitudinal study, attrition occurred and there were missing values for some variables. Outcome variables had 0.6%, 21.6%, 28.9%, and 21.7% missing cases at T1, T2, T3, and T4, respectively. All other study variables contained less than 3% missing cases. Little's MCAR test indicated that data were missing completely at random, $\chi^2(109) = 111.38, p = .419$. Missing data were handled using the full information maximum likelihood (FIML) method (Raykov, 2005).

Results

Sample Characteristics

Gender distribution was fairly equal, with females making up a little less than half of the sample (48.9%). Non-Hispanic Blacks (53.3%) represented the largest racial group, followed by non-Hispanic Whites (28.9%), Others (11.5%), and Hispanics (6.2%). The majority of mothers (77.0%) and fathers (88.0%) had at least a high school education. A little over half (55.0%) of mothers and three quarters (75.6%) of fathers were employed at T1 (i.e., at youth's age 12) and had a full-time or part-time job. With regard to child maltreatment experiences, about 18.1% of the sample did not experience child maltreatment, 18.5% experienced only one maltreatment type (single type maltreatment), and the remaining 63.4% experienced more than one type of maltreatment. Table 1 shows descriptive statistics of key study variables and Table 2 presents bivariate correlations among study variables.

Predictors of Substance Use Trajectory

The unconditional latent growth Poisson model indicated that the number of substances used increased significantly over time (unstandardized mean slope = 1.677, $p < .001$). Figure 1 visually displays the growth trajectory of adolescent substance use from age 12 to age 18. Table 3 summarizes the results of the conditional latent growth Poisson model that examined the roles of child maltreatment and fathering on the initial level and growth of substance use (i.e., the number of substances used) among adolescents. Perpetrator identity (i.e., perpetration by mother alone, perpetration by father alone or father and mother together) was not significantly associated with an initial number of substances used among adolescents at age 12. Child emotional abuse was associated with a higher initial number of substances used at age 12 ($\beta = .20, SE = .08, p = .011$). None of the other maltreatment types was significantly related to the initial number of substances used. Higher quality of father-child relationships was associated with a lower initial number of substances used ($\beta = -.14, SE = .09, p = .046$) whereas a greater quantity of father involvement was associated with a higher initial number of substances used ($\beta = .19, SE = .08, p = .016$). Non-Hispanic White race/ethnicity, compared to non-Hispanic Black race/ethnicity, ($\beta = .12, SE = .06, p$

= .044) and higher family substance use ($\beta = .31$, $SE = .05$, $p < .001$) were both associated with a higher initial number of substances used. Finally, higher quality mother-child relationships were associated with a lower initial number of substances used ($\beta = -.19$, $SE = .06$, $p = .001$).

In terms of the slope (i.e., rate of change) of the trajectory of substance use, emotional abuse was associated with a slower increase in the number of substances used over time ($\beta = -.23$, $SE = .11$, $p = .046$). Similarly, a greater quantity of father involvement was associated with a slower increase in the number of substances used over time ($\beta = -.30$, $SE = .12$, $p = .013$). Higher family substance use was also associated with a slower increase ($\beta = -.39$, $SE = .07$, $p < .001$), while higher quality mother-child relationships was associated with a steeper increase in the number of substance used over time ($\beta = .25$, $SE = .09$, $p = .006$).

Discussion

Findings from this study contribute knowledge to the relationships among maltreatment dimensions (i.e., maltreatment type and perpetrator), father-child relationship quality and developmental trajectories of substance use during adolescence. In contrast to our hypothesis, there was no significant association between father-perpetrated maltreatment (i.e., maltreatment by father alone or father and mother together) and the developmental trajectory of substance use in adolescents. This finding is somewhat counter to previous studies that reported more serious consequences and adverse outcomes (e.g., physical injuries, deaths, PTSD) of maltreatment perpetrated by fathers (Schnitzer & Ewigman, 2005; Scribano et al., 2013; Vallati et al., 2020). More research is needed to disentangle the complex relationships among perpetrator identity/gender— father-perpetrated maltreatment in particular— and developmental trajectories of adolescent substance use.

Our hypothesis that emotional abuse and neglect would be associated with a higher initial number and faster increase in the number of substances used over time was partially supported. We found that emotional abuse was significantly associated with a higher initial number of substances used in adolescents. This finding is consistent with the existing literature, most notably recent studies suggesting a prominent role of emotional abuse in predicting substance use (Rosenkranz, Muller, & Henderson, 2012; Strathearn et al., 2020; Yoon, Snyder, & Yoon, 2000). Specifically, our finding that points to emotional abuse as the only maltreatment type significantly associated with substance use in adolescence is in line with Rosenkranz et al.'s (2012) findings that only emotional abuse and emotional neglect predicted substance use problem severity when accounting for all forms of maltreatment. Adolescents with a history of emotional abuse may be prone to substance use in part because they struggle with emotional regulation under the influence of distress and use substances to cope with negative emotionality (Shin et al., 2015). Furthermore, findings have precedence in past literature identifying effects of sexual abuse on polysubstance use (Shin et al., 2010) and earlier onset of marijuana and alcohol use (Proctor et al., 2017). These findings are in line with theoretical models suggesting that early stress and trauma lead to dysregulations difficulties and associated risk for early onset substance use, with implications for later addiction (Anderson 2019; Cicchetti & Handley 2019).

Contrary to some past research (Kobulsky et al., 2016; Kobulsky et al., 2018b; Proctor et al. 2017; Snyder & Smith 2014), physical abuse, sexual abuse, and neglect were not associated with substance use initiation or its progression. Relationships between physical abuse and substance use appear to be more consistent in later than earlier adolescence (Strathearn et al., 2020) and to vary by substance type (Proctor et al., 2017; Strathearn et al., 2020) and gender (Kobulsky 2017; Strathearn et al., 2020); all are possible explanations for null findings. Likewise, for sexual abuse and neglect, inconsistencies have been observed in other studies based on neglect subtype, gender, the type of substances, and operational definitions of maltreatment and substance use (Norman et al., 2012; Snyder & Merritt 2016; Tonmyr et al., 2010; Vanderminden et al. 2019). Additionally, some research suggests neglect during adolescence, as opposed to during childhood, is most detrimental to substance use (Dubowitz et al., 2019b).

Consistent with our hypothesis and past research (Dubowitz et al., 2019a; Fosco et al., 2012; Luk et al., 2017; Weymouth et al., 2019; Yoon et al., 2017), high quality father-child relationships were associated with a lower initial number of substances used. Interestingly, however, a greater quantity of father involvement was associated with a higher initial number of substances used. In other words, the more shared activities that the youths had with their father, the more likely they reported a higher number of substances used at age 12. Similar trends have been reported in LONGSCAN studies, finding protective effects of father-child relationship quality but no or negative effects of quantity of father involvement on youth behavioral outcomes (Yoon et al., 2018a, 2018b). One possible explanation for this unexpected finding is that time with fathers could involve exposure to antisocial behaviors, including substance use, in this high-risk population. Prior research has shown that exposure to parental substance use is associated with increased risk for substance use in offspring, including early initiation of substance use in adolescence (Rubsy et al., 2018).

Additionally, non-Hispanic White race/ethnicity and family substance use emerged as significant predictors of a higher initial number of substances used at age 12. These findings are consistent with prior work that found higher risks and levels of polysubstance use among White adolescents and adolescents whose parents or other family members have substance use problems (Gilbert et al., 2020; Russell et al., 2015; Tomczyk et al., 2016). For example, a recent study found that White youth were more likely than Black youth to be tobacco-alcohol users, medium-frequency three-substance users, and high-frequency three-substance users compared with nonusers (Coulter et al., 2019). In contrast to these risk factors, we found that high quality mother-child relationships predicted a lower initial number of substances used. This finding highlights positive mother-child relationships as a potential promotive or protective factor for polysubstance use in early adolescence.

In trajectory analysis, youth emotional abuse, the quantity of father involvement, and family substance use predicted slower progression of polysubstance use. This may be because youths with a history of emotional abuse, higher father involvement, and/or greater family substance use had a higher initial number of substances used, and therefore had little room to grow in terms of the number of substances used (i.e., a ceiling effect). In support of this idea, the model estimation results indicated that higher initial levels of substance use were associated with less growth over time. Another counterintuitive result was that higher quality

mother-child relationships were associated with a steeper increase in the number of substances used over time. One possible explanation is that this is an artifact of the lower initial number of substances used among the youth with higher quality mother-child relationships. This finding is also consistent with the literature on parenting, which has shown stronger effects of parenting on school-aged and younger adolescent-aged children than older adolescents (Hoeve et al., 2009).

There were several limitations in this study. We broadly focused on the number of substances, an incomplete indicator of substance use severity, and did not specifically examine other dimensions of substance use, such as type, combination, and amount or frequency of use (Sadeh et al., 2020). Another limitation was that the study sample consisted of adolescents who had a history of child maltreatment or other risk factors for child maltreatment. While this population represents an important and vulnerable group of adolescents, the findings of the study may not be generalizable to all adolescents. Further, there were key risk factors such as intimate partner violence between mothers and fathers that were not accounted for in this study, and this may have confounded the results. Finally, we could not separate out father maltreatment alone from maltreatment perpetrated by father and mother together due to the very low percentage (3.7%) of father alone perpetration.

Results from this study have important implications for programs and policies aimed to prevent early adolescent substance use initiation and reduce adolescent polysubstance use after substance use onset. Our main results suggest that high-quality father involvement is protective against the initiation of adolescent polysubstance use. This suggests that educational and therapeutic programs that involve fathers and focus on nurturing parenting and positive parent-child interaction and communication could help to prevent substance use onset in adolescents (Das et al., 2016; Foxcroft & Tsertsvadze, 2011). Additionally, because of the salience of emotional abuse in predicting a higher initial number of substances used among adolescents, early identification of emotional abuse among adolescents could serve to prevent initial polysubstance use onset and the development of substance use disorders.

References

- Andersen SL (2019). Stress, sensitive periods, and substance abuse. *Neurobiology of Stress*, 10, 100140. [PubMed: 30569003]
- Barnett D, Manly J, & Cicchetti D (1993). Defining child maltreatment: The interface between policy and research, in Cicchetti D & Toth SL, *Advances in applied developmental psychology: Child abuse, child development and social policy*. Ablex Publishing Corp, Norwood, NJ.
- Cavanagh K, Dobash RE, & Dobash RP (2007). The murder of children by fathers in the context of child abuse. *Child Abuse & Neglect*, 31(7), 731–746. [PubMed: 17628666]
- Coulter RW, Ware D, Fish JN, & Plankey MW (2019). Latent classes of polysubstance use among adolescents in the United States: intersections of sexual identity with sex, age, and race/ethnicity. *LGBT health*, 6(3), 116–125. [PubMed: 30822259]
- Curran PJ, Obeidat K, & Losardo D (2010). Twelve frequently asked questions about growth curve modeling. *Journal of Cognition and Development*, 11(2), 121–136. [PubMed: 21743795]
- Das JK, Salam RA, Arshad A, Finkelstein Y, & Bhutta ZA (2016). Interventions for adolescent substance abuse: An overview of systematic reviews. *Journal of Adolescent Health*, 59(4 Suppl), S61–S75. 10.1016/j.jadohealth.2016.06.021
- De Sanctis VA, Trampush JW, Harty SC, Marks DJ, Newcorn JH, Miller CJ, & Halperin JM (2008). Childhood maltreatment and conduct disorder: independent predictors of adolescent substance use

- disorders in youth with attention deficit/hyperactivity disorder. *Journal of Clinical Child & Adolescent Psychology*, 37(4), 785–793. [PubMed: 18991129]
- Dixon L, Hamilton-Giachritsis C, Browne K, & Ostapuk E (2007). The co-occurrence of child and intimate partner maltreatment in the family: Characteristics of the violent perpetrators. *Journal of Family Violence*, 22(8), 675–689.
- Dubowitz H, Black MM, Kerr MA, Starr RH, & Harrington D (2000). Fathers and child neglect. *Archives of Pediatrics & Adolescent Medicine*, 154(2), 135–141. [PubMed: 10665599]
- Dubowitz H, Villodas MT, Litrownik AJ, Pitts SC, Hussey JM, Thompson R, Black MM, & Runyan D (2011). Psychometric properties of a youth self-report measure of neglectful behavior by parents. *Child Abuse and Neglect*, 35, 414–424. doi:10.1016/j.chiabu.2011.02.004 [PubMed: 21652070]
- Dubowitz H, Roesch S, Arria AM, Metzger R, Thompson R, Kotch JB, & Lewis T (2019a). Timing and chronicity of child neglect and substance use in early adulthood. *Child Abuse & Neglect*, 94. doi: 10.1016/j.chiabu.2019.104027
- Dubowitz H, Roesch S, Metzger R, Arria AM, Thompson R, & English D (2019b). Child maltreatment, relationship with father, peer substance use, and adolescent marijuana use. *Journal of Child & Adolescent Substance Abuse*, 28(3), 150–159. [PubMed: 31736614]
- English DJ, & the LONGSCAN Investigators. (1997). Modified Maltreatment Classification System. <http://www.iprc.unc.edu/longscan/>
- Everson M, Smith J, Hussey J, Dubowitz H, Litrownik A, English D, . . . Runyan D (2008). Concordance between adolescent reports of childhood abuse and child protective service determination sample of young adolescents. *Child Maltreatment*, 13, 14–26. [PubMed: 18174345]
- Fosco GM, Stormshak EA, Dishion TJ, & Winter CE (2012). Family relationships and parental monitoring during middle school as predictors of early adolescent problem behavior. *Journal of Clinical Child & Adolescent Psychology*, 41(2), 202–213. [PubMed: 22417193]
- Foxcroft DR, & Tsertsvadze A (2011). Universal family-based prevention programs for alcohol misuse in young people. *Cochrane Database of Systematic Reviews*, 9. 10.1002/14651858.CD009308
- Gilbert PA, Kava CM, & Afifi R (2020). High-school students rarely use e-cigarettes alone: A sociodemographic analysis of polysubstance use among adolescents in the United States. *Nicotine & Tobacco Research*, 23(3), 505–510.
- Goncy EA, & van Dulmen MH (2010). Fathers do make a difference: Parental involvement and adolescent alcohol use. *Fathering*, 8(1), 93.
- Gray KM, & Squeglia LM (2018). Research review: what have we learned about adolescent substance use?. *Journal of Child Psychology and Psychiatry*, 59(6), 618–627. [PubMed: 28714184]
- Haller M, Handley E, Chassin L, & Bountress K (2010). Developmental cascades: Linking adolescent substance use, affiliation with substance use promoting peers, and academic achievement to adult substance use disorders. *Development and Psychopathology*, 22(4), 899. [PubMed: 20883589]
- Hart SN, Brassard M, & Karlson (1996). Psychological maltreatment, in Briere J, Berliner L, Bulkley JA, Jenny C, & Reid T, *The APSAC handbook on child maltreatment*. Sage Publications, Thousand Oaks, CA.
- Henry CS, Bámaca-Colbert MY, Liu C, Plunkett SW, Kern BL, Behnke AO, & Washburn IJ (2018). Parenting behaviors, neighborhood quality, and substance use in 9th and 10th grade Latino males. *Journal of Child and Family Studies*, 27(12), 4103–4115.
- Hoeve M, Dubas JS, Eichelsheim VI, van der Laan PH, Smeenk W, & Gerris JR (2009). The relationship between parenting and delinquency: A meta-analysis. *Journal of Abnormal Child Psychology*, 37, 749–775. [PubMed: 19263213]
- Hussong AM, Ennett ST, Cox MJ, & Haroon M (2017). A systematic review of the unique prospective association of negative affect symptoms and adolescent substance use controlling for externalizing symptoms. *Psychology of Addictive Behaviors*, 31(2), 137. [PubMed: 28134539]
- Johnston LD, Miech RA, O'Malley PM, Bachman JE, & Patrick ME (2020). *Monitoring the Future National Survey Results on Drug Use, 1975–2019: Overview, Key Findings on Adolescent Drug Use*. Institute for Social Research.
- Johnston LD, Miech RA, O'Malley PM, Bachman JE, & Patrick ME (2020). *Monitoring the Future National Survey Results on Drug Use, 1975–2019: Overview, Key Findings on Adolescent Drug Use*. Institute for Social Research.

- Jones JD, Calkins ME, Scott JC, Bach EC, & Gur RE (2017). Cannabis use, polysubstance use, and psychosis spectrum symptoms in a community-based sample of US youth. *Journal of Adolescent Health*, 60(6), 653–659.
- Kelly AB, Evans-Whipp TJ, Smith R, Chan GC, Toumbourou JW, Patton GC, ... & Catalano RF (2015). A longitudinal study of the association of adolescent polydrug use, alcohol use and high school non-completion. *Addiction*, 110(4), 627–635. [PubMed: 25510264]
- Kobulsky JM (2017). Gender differences in pathways from physical and sexual abuse to early substance use. *Children and Youth Services Review*, 83: 25–32. doi: 10.1016/j.childyouth.2017.10.027
- Kobulsky JM, Holmes MR, Yoon S, & Perzynski AT (2016). Physical abuse after Child Protective Services Investigation and adolescent substance use. *Children and Youth Services Review* 71: 36–44. doi: 10.1016/j.childyouth.2016.10.033.
- Kobulsky JM, Kepple NJ, & Jedwab M (2018a). Abuse characteristics and the concordance of child protective service determinations and adolescent self-reports of abuse. *Child Maltreatment*, 23(3), 269–280. [PubMed: 29793350]
- Kobulsky JM, Yoon S, Bright CL, Lee G & Nam B (2018b). Gender moderated pathways from childhood abuse and neglect to late adolescent substance use. *Journal of Traumatic Stress* 31 (5): 654–664. doi: 10.1002/jts.22326 [PubMed: 30338572]
- Kokkevi A, Kanavou E, Richardson C, Fotiou A, Papadopoulou S, Monshouwer K, ... & Olszewski D (2014). Polydrug use by European adolescents in the context of other problem behaviours. *Nordic Studies on Alcohol and Drugs*, 31(4), 323–342.
- Lansford JE, Dodge KA, Pettit GS, & Bates JE (2010). Does physical abuse in early childhood predict substance use in adolescence and early adulthood?. *Child Maltreatment*, 15(2), 190–194. [PubMed: 20019026]
- Larabee HM, & Lewis T (2016). Longitudinal studies of child abuse and neglect (LONGSCAN) assessments 0–18 user guide. National Data Archive on Child Abuse and Neglect.
- LONGSCAN Coordinating Center. (2009). Longscan data dictionary, age 12.
- Luk JW, King KM, McCarty CA, McCauley E, & Stoep AV (2017). Prospective effects of parenting on substance use and problems across Asian/Pacific Islander and European American youth: tests of moderated mediation. *Journal of Studies on Alcohol and Drugs*, 78(4), 521–530. [PubMed: 28728634]
- Marshall EJ (2014). Adolescent alcohol use: risks and consequences. *Alcohol and Alcoholism*, 49(2), 160–164. [PubMed: 24402246]
- Norman RE, Byambaa M, De R, Butchart A, Scott J, & Vos T (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: A systematic review and meta-analysis. *PLoS Medicine*, 9(11), 1–31. doi:10.1371/journal.pmed.1001349
- Proctor LJ, Lewis T, Roesch S, Thompson R, Litrownik AJ, English D, ... & Dubowitz H (2017). Child maltreatment and age of alcohol and marijuana initiation in high-risk youth. *Addictive behaviors*, 75, 64–69. [PubMed: 28711745]
- Raykov T (2005). Analysis of longitudinal studies with missing data using covariance structure modeling with full-information maximum likelihood. *Structural Equation Modeling*, 12(3), 493–505.
- Rosenkranz SE, Muller RT, & Henderson JL (2012). Psychological maltreatment in relation to substance use problem severity among youth. *Child Abuse & Neglect*, 36(5), 438–448. [PubMed: 22622223]
- Rusby JC, Light JM, Crowley R, & Westling E (2018). Influence of parent–youth relationship, parental monitoring, and parent substance use on adolescent substance use onset. *Journal of Family Psychology*, 32(3), 310–320. [PubMed: 29300096]
- Russell BS, Trudeau JJ, & Leland AJ (2015). Social influence on adolescent polysubstance use: The escalation to opioid use. *Substance Use & Misuse*, 50(10), 1325–1331. [PubMed: 26442966]
- Sadeh N, Miglin R, Bounoua N, Beckford E, Estrada S, & Baskin-Sommers A (2020). Profiles of lifetime substance use are differentiated by substance of choice, affective motivations for use, and childhood maltreatment. *Addictive Behaviors*, 106710.

- Schulte MT, & Hser YI (2013). Substance use and associated health conditions throughout the lifespan. *Public Health Reviews*, 35(2), 3.
- Schwarz G (1978). Estimating the dimension of a model. *The Annals of Statistics*, 6(2), 461–464.
- Schnitzer PG, & Ewigman BG (2005). Child deaths resulting from inflicted injuries: household risk factors and perpetrator characteristics. *Pediatrics*, 116(5), e687–e693. doi: 10.1542/peds.2005-0296 [PubMed: 16263983]
- Scribano PV, Makoroff KL, Feldman KW, & Berger RP (2013). Association of perpetrator relationship to abusive head trauma clinical outcomes. *Child Abuse & Neglect*, 37(10), 771–777. [PubMed: 23735871]
- Shin SH, Hong HG, & Hazen AL (2010). Childhood sexual abuse and adolescent substance use: A latent class analysis. *Drug and Alcohol Dependence*, 109(1–3), 226–235. [PubMed: 20197217]
- Shin SH, Hong HG, & Wills TA (2012). An examination of pathways from childhood maltreatment to adolescent binge drinking. *The American Journal on Addictions*, 21(3), 202–209. [PubMed: 22494222]
- Shin SH, Lee S, Jeon SM, & Wills TA (2015). Childhood emotional abuse, negative emotion-driven impulsivity, and alcohol use in young adulthood. *Child Abuse & Neglect*, 50, 94–103. [PubMed: 25743371]
- Snyder SM, & Merritt DH (2016). The effect of childhood supervisory neglect on emerging adults' drinking. *Substance Use & Misuse*, 51(1), 1–14. doi:10.3109/10826084.2015.1073321 [PubMed: 26771736]
- Spear LP (2018). Effects of adolescent alcohol consumption on the brain and behaviour. *Nature Reviews Neuroscience*, 19(4), 197. [PubMed: 29467469]
- Strathearn L, Giannotti M, Mills R, Kisely S, Najman J, & Abajobir A (2020). Long-term cognitive, emotional, and health outcomes associated with child abuse and neglect. *Pediatrics*, 146(4).
- Straus MA, Kinard EM, & Williams LM (1995). *The Multidimensional Neglectful Behavior Scale, Form A: Adolescent and Adult-Recall Version*. Durham, NH: Family Research Laboratory.
- Tomczyk S, Isensee B, & Hanewinkel R (2016). Latent classes of polysubstance use among adolescents—a systematic review. *Drug and Alcohol Dependence*, 160, 12–29. [PubMed: 26794683]
- Thompson R, Lewis T, Neilson EC, English DJ, Litrownik AJ, Margolis B, ... & Dubowitz H (2017). Child maltreatment and risky sexual behavior: Indirect effects through trauma symptoms and substance use. *Child Maltreatment*, 22(1), 69–78. [PubMed: 27777330]
- Tonmyr L, Thornton T, Draca J, & Wekerle C (2010). A review of childhood maltreatment and adolescent substance use relationship. *Current Psychiatry Reviews*, 6(3), 223–234.
- Trucco EM (2020). A review of psychosocial factors linked to adolescent substance use. *Pharmacology Biochemistry and Behavior*, 172969.
- U.S. Department of Health & Human Services. (2020). *Child Maltreatment 2018*. <https://www.acf.hhs.gov/sites/default/files/cb/cm2018.pdf>
- Vallati M, Cunningham S, Mazurka R, Stewart JG, Larocque C, Milev RV, ... & Harkness KL (2020). Childhood maltreatment and the clinical characteristics of major depressive disorder in adolescence and adulthood. *Journal of Abnormal Psychology*.
- Vanderminde J, Hamby S, David-Ferdon C, Kacha-Ochana A, Merrick M, Simon TR, et al. (2019). Rates of neglect in a national sample: Child and family characteristics and emotional impact. *Child Abuse & Neglect*, 88, 256–265. [PubMed: 30544033]
- Vrieze SI, Hicks BM, Iacono WG, & McGue M (2012). Decline in genetic influence on the co-occurrence of alcohol, marijuana, and nicotine dependence symptoms from age 14 to 29. *American Journal of Psychiatry*, 169(10), 1073–1081.
- Weymouth BB, Fosco GM, & Feinberg ME (2019). Nurturant-involved parenting and adolescent substance use: Examining an internalizing pathway through adolescent social anxiety symptoms and substance refusal efficacy. *Development and psychopathology*, 31(1), 247. [PubMed: 29212564]
- Yampolskaya S, Chuang E, & Walker C (2019). Trajectories of substance use among child welfare-involved youth: longitudinal associations with child maltreatment history and emotional/behavior problems. *Substance Use & Misuse*, 54(3), 437–448. [PubMed: 30658541]

- Yoon D, Snyder SM, & Yoon S (2020). Child maltreatment types and adolescent substance use: The role of deviant peer affiliation. *Child & Family Social Work*, 25(2), 355–363.
- Yoon S, Bellamy JL, Kim W, & Yoon D (2018a). Father involvement and behavior problems among preadolescents at risk of maltreatment. *Journal of Child and Family Studies*, 27(2), 494–504. [PubMed: 29491703]
- Yoon S, Kobulsky JM, Yoon D, & Kim W (2017). Developmental pathways from child maltreatment to adolescent substance use: The roles of posttraumatic stress symptoms and mother-child relationships. *Children and Youth Services Review*, 82, 271–279. [PubMed: 29503490]
- Yoon S, Pei F, Wang X, Yoon D, Lee G, McCarthy KS, & Schoppe-Sullivan SJ (2018b). Vulnerability or resilience to early substance use among adolescents at risk: The roles of maltreatment and father involvement. *Child Abuse & Neglect*, 86, 206–216. [PubMed: 30336392]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Figure 1.
Developmental Trajectory of the Number of Substances Used in the Past Year

Table 1

Demographic Characteristics and Descriptive Statistics of Study Variables (N=681)

	%	<i>M (SD)</i>	Range
Gender (female)	48.90		
Race/ethnicity			
Non-Hispanic White	28.93		
Non-Hispanic Black	53.30		
Hispanic	6.32		
Other	11.45		
Mother's education, Less than high school	23.02		
Father's education, Less than high school	11.96		
Mother's employment status at T1, employed	55.01		
Father's employment status at T1, employed	75.62		
Maltreatment by parents			
Maltreatment by father alone or father and mother together	40.38		
Maltreatment by mother alone	25.26		
No maltreatment by parents	34.36		
Maltreatment type			
Physical abuse	20.50		
Emotional abuse	39.68		
Sexual abuse	15.28		
Neglect	24.82		
Number of maltreatment types experienced (co-occurrence)		2.03 (1.36)	0 -- 4
0	18.06		
1	18.50		
2	23.64		
3	21.88		
4	17.91		
Family substance use ^a		1.29 (1.21)	0 -- 7
Father-child relationship quality		24.48 (4.79)	4 -- 30
Quantity of father involvement		3.68 (2.49)	0 -- 9
Mother-child relationship quality		25.98 (3.76)	6 -- 30
Quantity of mother involvement		5.15 (2.18)	0 -- 9
Number of substances used in the past year at age 12		.14 (.49)	0 -- 4
Number of substances used in the past year at age 14		.27 (.69)	0 -- 4
Number of substances used in the past year at age 16		.76 (1.08)	0 -- 4
Number of substances used in the past year at age 18		1.18 (1.21)	0 -- 4

Note.

^aThe total number of substances used by members of the household at age 12

Table 2.

Correlations among Key Study Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Age 12 substance use	---										
2. Age 14 substance use	.22**	---									
3. Age 16 substance use	.18**	.37**	---								
4. Age 18 substance use	.15**	.28**	.53**	---							
5. Maltreatment by father alone or F + M together	.05	.12**	.15**	.19**	---						
6. Maltreatment by mother alone	.08*	-.05	.06	-.03	-.48**	---					
7. Physical abuse	.15**	.13**	.14**	.12**	.43**	.09*	---				
8. Emotional abuse	.13**	.12**	.23**	.10*	.27**	.14**	.44**	---			
9. Sexual abuse	.11**	.12**	.08	.05	.31**	-.01	.37**	.31**	---		
10. Neglect	.09*	.01	.08	.06	.25**	.44**	.34**	.37**	.25**	---	
11. Father-child relationship quality	-.15**	-.14**	-.13**	-.12**	-.09*	-.001	-.12**	-.19**	-.07	-.11**	---
12. Quantity of father involvement	-.01	-.01	-.06	-.05	-.03	.002	-.03	-.13**	-.01	-.09*	.49**

Note. F+M = father and mother

*
 $p < .05$.**
 $p < .01$.

Table 3.

Predictors of Substance Use Trajectory

	Intercept			Slope		
	β (SE)	95% CIs	<i>p</i>	β (SE)	95% CIs	<i>p</i>
Maltreatment variables						
Maltreatment by father alone or father and mother together	.16 (.10)	[-.04, .36]	.107	-.06 (.15)	[-.35, .22]	.662
Maltreatment by mothers alone	.15 (.11)	[-.06, .36]	.149	-.14 (.15)	[-.44, .15]	.340
Physical abuse	.05 (.07)	[-.09, .20]	.479	-.10 (.11)	[-.32, .12]	.366
Emotional abuse	.20 (.08)	[.05, .35]	.011	-.23 (.11)	[-.45, -.01]	.046
Sexual abuse	.09 (.06)	[-.04, .21]	.174	-.16 (.10)	[-.36, .03]	.094
Neglect	-.17 (.09)	[-.34, .01]	.069	-.18 (.13)	[-.08, .44]	.183
Fathering variables						
Father-child relationship quality	-.14 (.09)	[-.27, -.01]	.046	.19 (.10)	[.00, .38]	.050
Quantity of father involvement	.19 (.08)	[.04, .35]	.016	-.30 (.12)	[-.53, -.06]	.013
Control variables						
Gender (female)	-.03 (.06)	[-.14, .08]	.608	-.01 (.09)	[-.18, .15]	.867
Race/Ethnicity ^a						
Non-Hispanic White	.12 (.06)	[.01, .24]	.044	-.05 (.09)	[-.23, .13]	.586
Hispanic	.09 (.05)	[-.01, .18]	.070	-.09 (.07)	[-.23, .05]	.210
Other	.02 (.06)	[-.10, .14]	.790	.03 (.09)	[-.15, .21]	.748
Family substance use	.31 (.05)	[.21, .41]	<.001	-.39 (.07)	[-.53, -.24]	<.001
Mother-child relationship quality	-.19 (.06)	[-.30, -.07]	.001	.25 (.09)	[.07, .42]	.006
Quantity of mother involvement	-.09 (.07)	[-.23, .04]	.180	.11 (.11)	[-.10, .31]	.309

Note. Standardized parameter estimates are presented

^a reference group is non-Hispanic Black; SE = standard error; CI = Confidence Interval