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A national study of risk and protective factors for substance use among youth in the child welfare system

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Abstract

While child welfare services are intended, in part, to diminish maltreatment's negative impact on adolescents' development, there is evidence that receiving child welfare services affects adolescents' substance use adversely. The literature on the extent and correlates of this problem is still emerging. The present study aims to fill part of this gap by examining the association between baseline psychosocial risk and protective factors on engagement in substance use behavior over a period of 36 months for child welfare involved youth. It further compares substance use behavior between youth placed in out-of-home care and those who remained with their biological families. Data come from the National Survey of Child and Adolescent Well-Being (NSCAW), a national probability study of children and adolescents undergoing investigation for abuse or neglect. The sample for this analysis was restricted to 827 youth who were 11 years or older at baseline data collection. Key findings include a high rate of social substance use (47.7%) and illicit substance use (17.4%). There was a limited role of protective factors in mitigating risk behavior for social substance use (caregiver connectedness; OR=0.51, $p<0.05$). Avoiding foster care placement was a protective factor for illicit substance use (OR=0.43, $p<0.05$). Delinquency was a risk factor associated with both social substance use (OR=1.06, $p<0.01$) and hard substance use (OR=1.10, $p<0.001$). Given the high prevalence of substance use among child welfare involved youth, prevention efforts for this population require a better understanding of biological, psychological, and social protective factors. The child welfare system is an untapped resource that has the potential to be a gateway to and a platform for substance abuse prevention services that should be incorporated into child welfare safety and permanency interventions.

Keywords

Substance use disorders; Foster home care; Child welfare; Juvenile delinquency; Adolescence

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Conflict of interest

All other authors declare that they have no conflicts of interest.

Contributors

Dorian Traube and Sigrid James designed the study conducted literature searches, provided summaries of previous research studies, and wrote the first draft of the manuscript. Jinjin Zhang conducted the statistical analysis. John Landsverk provided editorial and statistical support. All authors contributed to and have approved the final manuscript.

1. Introduction

In the U.S. some 8.3 million children dependent on drugs reside with substance-abusing parents who were maltreated as children (Young, Boles, & Otero, 2007). The child welfare system may be the locus of a vicious circle of intergenerational substance use. Maltreated children of parents who abuse substances will themselves be comparatively likely to abuse substances in adulthood (Schuck & Widom, 2001). While studies suggest that a majority of families involved in the child welfare system (CWS) are affected by substance use, estimates of prevalence among both parents and children are inconsistent with widely varying rates reported across studies. The U.S. Department of Health and Human Services in its Report to Congress in 1999 stated that between one third and two thirds of children in CWS were affected by substance abuse (U.S. Department of Health and Human Services, 1999). To date, this is the only federally documented statistic related to substance use and CWS. While evidence indicates that the receipt of child welfare services may increase rates of substance use (Pilowsky & Wu, 2006), the risk factors for initiation and sustained substance use among child welfare involved youth are unclear. Previous studies have identified demographic, psychosocial, and contextual risk factors for substance use among youth in child welfare including gender, age, history of abuse, and mental health difficulties (Aarons et al., 2008; Vaughn, Ollie, McMillen, Scott, & Munson, 2007); lower levels of caregiver monitoring (Wall & Kohl, 2007); and deviant peer networks (Thompson & Auslander, 2007). Despite evidence of elevated risk among children with a history of maltreatment, relatively little empirical attention has been devoted to this population in the extant literature. The literature on the scope of this problem and correlates of substance abuse among CWS involved teens is still emerging. Employing data from the first national probability study of youth referred to child welfare, the National Survey of Child and Adolescent Well-Being (NSCAW), the aim of the present study is to examine the association between baseline psychosocial risk and protective factors on engagement in substance use behavior over a 36 month period for child welfare involved adolescents.

1.1. Prior estimates of substance use among CWS involved teens

Estimates of substance use among child welfare involved adolescents vary depending on how use is measured as well as by sample age. A previous report from the National Survey of Child and Adolescent Well Being (NSCAW) revealed concerning rates of lifetime substance use with 38% of 11–15 year olds reporting drinking alcohol at some time in their life; 17% reporting marijuana use; 10% reporting inhalant use; and 6% reporting crack, cocaine, or heroin use (U.S. Department of Health and Human Services, Administration for Children, Youth, and Families, 2005). Other NSCAW studies report 20% of youth exhibiting low levels of substance use, 3% exhibiting moderate levels of use, and 6% exhibiting high levels of use (Wall & Kohl, 2007). Other regional studies have reported 50% of maltreated adolescents used alcohol (Moran, Vuchinich, & Hall, 2004), a rate exceeding 30-day alcohol-use rates for community samples of 8th (16%), 10th (33%), and 12th graders (44%) (Johnston, 2007). Diagnosable substance use disorders have consistently been found to be higher among youth in child welfare than in the general population (Aarons, Brown, Hough, Garland, & Wood, 2001; Aarons et al., 2008; Courtney, Terao, & Bost, 2004; Pilowsky & Wu, 2006; Vaughn et al., 2007; Wall & Kohl, 2007). In a study of adolescents in the child welfare system in San Diego, Aarons et al. (2001) found that 11% had met criteria for a substance use disorder in the past year and 19.2% had met criteria for a substance use disorder in their lifetime. Vaughn et al. (2007) found that 35% of 17 year old respondents in a sample from Missouri met criteria for a substance use disorder in their lifetime. In a report from the Midwest Evaluation of Former Foster Youth Study, 14% of 17 year old youth had met criteria for alcohol use disorder in their lifetime and 7.3% had met criteria for a substance use disorder (Courtney et al., 2004). Rates of alcohol and substance

use disorders in the general population as reported in the National Epidemiological Survey of Alcohol and Related Disorders (NESARC) were 9.35% (Grant et al., 2004). Therefore, while estimates are not exact and could benefit from better reliability, a clear burden of illness and health disparity exists for adolescents involved in CWS.

1.2. Risk and protective factors for substance use among CWS involved teens

1.2.1. Theoretical model—This study is informed by the social development model. The social development model is a theory of human behavior that is used to explain the origins and development of delinquent behavior during childhood and adolescence (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Hawkins, Catalano, & Miller, 1992). By taking into account risk factors as well as protective influences, the social development model predicts whether children will develop prosocial or antisocial behavioral patterns as they age. There is considerable empirical evidence that biological, psychological and social factors at multiple levels in different social domains (individual, family, school, peer group and community) contribute to varying degrees to the development of health-risking behaviors.

1.2.2. History with CWS—While child welfare services are intended, in part, to diminish maltreatment's negative impact on adolescents' alcohol use, there is evidence that receiving child welfare services affects adolescents' alcohol use adversely. For example, children who had lived in foster homes were five times likelier, in one study, to abuse substances than were their peers with no history of removal (Pilowsky & Wu, 2006). Furthermore, experience in foster care or other out-of home placement has been associated with substance abuse in adulthood (Grella & Greenwell, 2006; Gutierres, Russo, & Urbanski, 1994; Zlotnick, Tam, & Robertson, 2004).

1.2.3. Risk factors—The risk factors for teen substance abuse among child welfare involved youth are largely unknown. Previous studies have identified demographic, psychosocial, and contextual risk factors for substance use among youth in child welfare. In a study of youth ages 13–18 in California, Aarons et al. (2008) found that male gender, history of abuse, presence of internalizing or externalizing disorders, peer or sibling substance use, and older age at entry into child welfare were significantly related to increased risk for substance use and substance use disorders. Analysis of baseline data from 11 to 15 year olds in the National Survey of Child and Adolescent Well-being found that conduct disorder, history of physical abuse, and lower level of caregiver monitoring were associated with increased odds of substance use (Wall & Kohl, 2007). Two studies of older youth in foster care in Midwestern states provide information on risk factors for substance use specific to the older youth population. Vaughn et al. (2007) found that white race, history of physical neglect, history of conduct disorder or post traumatic stress disorder, and being in a more independent living situation were associated with increased odds of substance use and disorders in 17 year old foster youth. Having friends that used substances and skipping school were associated with increased odds of substance use in Thompson and Auslander's (2007) study of 15–18 year old youth in care.

1.2.4. Protective factors—The social development model also incorporates "protective factors," which are hypothesized to mediate or moderate the effects of risk exposure. Common protective factors identified in the literature are parental monitoring, connectedness to a parent or adult, school engagement, and future expectations (Cleveland, Feinberg, Bontempo, & Greenberg, 2007; Hawkins et al., 2008).

The current study extends the limited body of research in this area in several ways: (1) it uses data from the National Survey of Child and Adolescent Well-Being, the first

probability study of children and families referred for child welfare services, to examine the association between psychosocial risk and protective factors on engagement in social and illicit substance use behavior for child welfare involved adolescents. The NSCAW sample is larger and more geographically representative than any other existing child welfare dataset. Only three papers have been published on the national prevalence of substance use among CWS involved youth and both have only considered cross sectional analysis (Leslie et al., 2010; Orton, Riggs, & Libby, 2009; Wall & Kohl, 2007). (2) The NSCAW data also enable us to examine the temporal association between a range of psychosocial risk and protective factors and substance use behaviors. Specifically we can examine the association between psychosocial stressors experienced in early adolescence play on the emergence of substance use in later adolescence. Identification of risk factors present in the early adolescence can help isolate targets for substance use prevention intervention. Adolescence is crucial time for the prevention of substance use disorders because substance use increases throughout adolescence until it peaks in young adulthood (Brown et al., 2008). (3) Finally, the NSCAW sample includes youth in out-of-home placement as well as those who had involvement with the child welfare system but remained in the home following investigation of maltreatment. This provides a unique opportunity to examine the relationship between placement history, caregiver connectedness and engagement in social and hard substance use.

2. Method

Data for the current research come from National Survey on Child and Adolescent Well-Being (NSCAW), the first national longitudinal probability study of child welfare to collect extensive data from children, caregivers, teachers, and child welfare workers. NSCAW used a stratified two-stage cluster sampling strategy to select 100 primary sampling units (PSUs) from a national sampling frame, the probability of PSU selection proportional to the size of the PSU's service population. Of the 100 PSUs identified by the sampling strategy, the NSCAW study ultimately collected child-level data in 92 PSUs representing 96 counties and 36 states. In participating counties, children were randomly selected from among the population of children, age 0–14, for whom an investigation of abuse or neglect had been opened by the child welfare system during a 15-month period beginning in October 1999. Data were collected from late 1999 through 2002. The final NSCAW sample included 5501 children. The NSCAW sampling strategy generates national estimates for the full population of children and families referred for child welfare services. The current analysis reports on a subset of pre-adolescent and adolescent youth who (1) were 11–14 years or older at baseline (n=1180); (2) were interviewed at waves 1, 3, and 4 (n=1030); and (3) for whom substance use behavior data were available (n=827). The final study sample included 827 youth.

Field representatives conducted face-to-face interviews with youth, biological parents and/or caregivers, and caseworkers over a 36 month period at four waves (baseline, 12 months, 18 months, and 36 months). Wave 2 data only includes telephone interviews conducted with caregivers and child welfare workers and is therefore excluded from this study. For a more detailed description of NSCAW, including information about sampling, weighting, item non response, and informed consent, refer to the NSCAW Research Group (2002) and USDHHS-ACF (2005).

2.1. Current study design

For the current analysis, we examined engagement in substance use behavior within the last 30 days at Waves 1 (baseline), 3, (18 months), and 4 (36 months). The design of the study allowed us to examine the relationship between baseline risk and protective factors on subsequent substance use over a period of 36 months. We employed measurement and analysis approaches that have previously been used to successfully investigate risk and

protective factors for sexual risk behavior among youth in the NSCAW sample (James, Montgomery, Leslie, & Zhang, 2009).

2.2. Measures

2.2.1. Substance use—Substance use was measured for each wave of data through the Drug-Free Schools and Communities Act (DFSCA) adapted for NSCAW. Substance use was assessed as a dichotomous variable indicating whether or not the youth reported having used alcohol or tobacco (social drugs) in the last thirty days or sniffed glue, gasoline or other liquids and gases, used marijuana, cocaine, crack, heroin, pain killers, tranquilizers, stimulants, and sedatives when they weren't prescribed (hard drugs) in the last 30 days. Alcohol and tobacco are referred to as social drugs as they are widely available in teen social circles. All other drugs are referred to as hard drugs in keeping with labels used in other adolescent substance use literature (Sussman, Sun, Rohrbach, & Spruijt-Metz, 2011). Substance use was indicated if present at any point in Waves 1, 3, or 4 of data collection. The time frame of "last 30 days" was chosen as opposed to life-time substance use as changes in lifetime substance use would only reflect new initiation by youth who never used before at each time point.

2.2.2. Risk and protective factors—As previously stated, considerable theoretical and empirical works have shown that biological, psychological and social factors at multiple levels in different social domains (individual, family, school, peer group and community) contribute to varying degrees to the development of adolescent substance use behaviors. Common psychosocial risk factors and "protective factors" hypothesized to offset the effects of risk exposure for substance use were selected for this analysis based on findings from the social development model (Catalano et al., 1996; Hawkins et al., 1992). Table 1 presents a detailed overview of all our variables, their conceptual and operational definitions, as well as the data sources and measures used. Information on sociodemographic characteristics (age, gender, race/ethnicity) and case status-related risk factors (primary type of maltreatment, initial risk assessment) was collected from caseworkers at Wave 1. Information on most psychosocial risk factors (behavior problems, substance use, delinquency, peer deviancy, abusive caregiver behavior) and baseline protective factors (school engagement, future expectations, religiosity, caregiver monitoring, caregiver connectedness) were obtained from the youth themselves. Caseworkers provided placement history data. Most of the variables used are based on standardized measures or involve items that were adapted for the NSCAW study from national studies involving adolescents and have been described previously (U.S. Department of Health and Human Services, Administration for Children, Youth, and Families, 2005). Consequently, only a brief description of the outcome variable, risk factors, and protective factors is provided.

2.3. Analysis

Descriptive analyses were conducted for each of the dependent variables to derive estimates of social substance use and hard substance use behavior behaviors. Logistic regressions were performed for each dependent variable to estimate the odds of having engaged in substance use behavior. In logistic regression, predictor variables do not have to be normally distributed, linearly related, or of equal variance within each group, thereby making logistic regression a very flexible and robust statistical method (Menard, 2002). Two sets of logistic regressions were calculated. First bivariate logistic regressions were performed for each risk or protective factor and each dependent variable (social substance use and hard substance). Then blocks of variable groups (case-status related risk factors, psychosocial risk factors, and current and past protective factors) were entered into a multivariate logistic regression model while controlling for baseline sociodemographic factors. Logistic regression diagnostics were performed to assure models are appropriately fitted. Sample weights and

the two-stage cluster sample design were accounted for in all analyses using the statistical software SUDAAN (version 9.0). Waves 3 and 4 weights adjusted for attrition between Waves 1, 3, and 4 and were constructed to represent the original target population-based on data from study participants present at Waves 3 and 4. Standard errors for percentages and other parameter estimates reflect the clustering of cases within counties. All data in text, tables and figures provided in this article are weighted.

2.4. Missing data

As with many longitudinal survey studies, NSCAW contains a considerable amount of missing data, and final multivariate models were performed on reduced sample sizes. Given that non-response analyses have suggested that missing data in NSCAW "is unlikely to be consequential for most types of analyses" (U.S. Department of Health and Human Services, Administration for Children, Youth, and Families, 2005, p. 2–12), and problems inherent to data imputations (Brick & Kalton, 1996), we used listwise deletion, but conducted sensitivity analyses to explore patterns of missing data. No statistically significant differences were found for any of the covariates when comparing the eligible sample sizes with the final sample sizes. There were two variables that contributed the most to the missing data: primary abuse type (n=70) and risk assessment (n=69). Both variables were considered too important conceptually to simply exclude from the analysis. The resulting sample size used in all logistic regressions was (n=769).

3. Results

3.1. Univariate findings

3.1.1. Sociodemographic characteristics—The sample of 827 youth was 12.7 years old on average. Forty-two percent of the sample was female. Close to half of the youth were white, 29.8% were African American, 16.1% Hispanic, and 6.2% fell into the category "other" racial/ethnic background.

3.1.2. Placement history—Seventy-six percent of youth in this child welfare sample had never been placed in out-of-home care over the course of the 36-month study period. Episodes in out-of-home placement, which were experienced by 23.8% of the youth, included episodes in relative or nonrelative foster care, treatment foster care, group homes, residential treatment or inpatient psychiatric care.

3.1.3. Case status-related risk factors—In 40.4% of the cases, neglect and/or caregiver absence were cited as the primary reason for referral to child welfare, followed by physical abuse (31.6%), other types of abuse or reasons (14.3%) and sexual abuse (13.7%). Family risk assessments conducted by caseworkers at baseline indicated an average risk rate level of 0.3 (SE=0.01), which means that on average 6–7 risk factors were reported.

3.1.4. Baseline psychosocial risk factors—Slightly more than one-half of youth (53.7%) exhibited behavior problems in the clinical range (a score of ≥64). The sample reported an average of 6.3 (SE=1.5) delinquent acts during the past 6 months. Sixty-two percent of youth indicated ever spending time with peers who got into trouble. Youth reported experiencing on average 10.2 (SE=1.1) punitive or abusive acts by caregivers during the past 12 months, which included behaviors such as yelling, hitting, cursing or slapping.

3.1.5. Baseline protective factors—Youth reported being engaged in school "often" (Mean=3.0, SE=0.03). Future expectations were high with most youth reporting it as "pretty likely" (Mean=4.0, SE=0.03) that good things would happen to them in the future (i.e.,

graduate from high school, have a family). Youth also reported being monitored "pretty often" by their caregivers (Mean=4.1; SE=0.1) and stated that being close to one caregiver during the 36-month study period was "sort of true" (Mean=3.3; SE=0.03).

3.1.6. Estimates of substance use behavior—About half of the sample (47.7%) reported having consumed social drugs within the last thirty days at baseline, 18 months, and/or 36 months into the NSCAW study. Less than a quarter of the sample (17.4%) reported having consumed harddrugs within the last thirty days at baseline, 18 months, and/or 36 months into the NSCAW study.

3.2. Bivariate findings

The odds of engaging in social and hard substance use were first examined for each of the risk and protective factors individually. Several baseline risk factors were related to the use of social drugs within the last 30 days at baseline, 18 months, and 36 months: older age (OR=1.38, $p<0.001$), presence of clinically significant behavior problems (OR=1.66, $p<0.05$), a higher rate of delinquent behavior (OR=1.08, $p<0.001$), hanging out with deviant peers (OR=2.56, $p<0.001$), experiencing more acts of abusive caregiver behavior (OR=1.01 $p<0.05$), and higher rates of depressive symptoms (OR=1.03, $p<0.01$). With regard to baseline protective factors, youth who engaged in social substance use had lower scores on school engagement (OR=0.34, $p<0.001$), future expectations (OR= 0.66, $p<0.05$), caregiver monitoring (OR=0.59, $p<0.01$), and caregiver connectedness (OR=0.41, $p<0.001$). Having experienced abuse was hypothesized to be a risk factor for substance use. However, youth who had experienced "other" types of abuse (i.e. emotional maltreatment, abandonment, legal maltreatment, educational neglect, or exploitation) were less likely to be engaged in substance abuse 18 and 36 months later (OR=0.32, $p<0.05$).

Few baseline risk factors provided an explanation for increased odds of engaging in hard substance at follow up points in the NSCAW study including a higher rate of delinquent behavior (OR=1.08, $p<0.001$) and higher rates of depressive symptoms (OR=1.04, $p<0.01$). With regard to protective factors, youth who engaged in hard substance use in the past 30 days had lower scores on school engagement (OR=0.34, $p<0.001$), future expectations (OR=0.56, $p<0.05$), caregiver monitoring (OR=0.64, $p<0.01$), and caregiver connectedness (OR=0.48, $p<0.001$). Two factors that were hypothesized to be risks for substance use were actually related to abstinence from hard substance use at 19 and 36 month follow up. These included having experienced sexual abuse as one's primary abuse (OR=0.35, $p<0.05$) and having been retained in their home of origin during their involvement with the child welfare system (OR=0.35, $p<0.05$). Table 2 displays descriptive and bivariate findings of sexual risk behaviors by Wave 1 risk and protective factors.

3.3. Multivariate findings

Multivariate findings of final logistic regression results for both dependent variables are shown in Table 3. As mentioned in the analysis section, each model controlled for sociodemographic characteristics (age, race/ethnicity, and gender where applicable), after which all other variables were entered in blocks of variable groups. Results are presented for the final model for each dependent variable, with each block of variables having been entered. The size of effects should be interpreted with caution as small cell sizes for some variables affected the stability of parameters for these variables.

The risk of engaging in social and hard substance use over the course of the NSCAW study was only associated with baseline youth delinquency. A 1-unit increase in the 'delinquent behavior' score increased odds of social substance use by 6% (OR=1.06, $p<.01$) and hard substance use by 10% (OR=1.10, $p<0.001$). Likewise, only one baseline protective factor,

caregiver connectedness, was significantly associated with a decrease in the odds of social substance use over the study period. Youth who reported not having used social drugs in the last 30 days were more likely to report higher rates of caregiver connectedness by 49% (OR=0.51, $p<0.05$). No hypothesized protective factors were significantly related to the odds of engaging in hard substance use in the last 30 days at baseline, 18 month, or 36 month time points in the study. However, placement history, which had been hypothesized as a risk factor, was protective for hard substance use. Adolescents who remained in their home of origin during their child welfare involvement were less likely to have engaged in hard substance use during the course of the NSCAW study (OR=0.43, $p<0.05$).

4. Discussion

This study employed data from the National Survey of Child and Adolescent Well-Being (NSCAW) to examine the association between baseline psychosocial risk and protective factors on engagement in substance use behavior in later adolescence for child welfare involved teens. The study further investigated variation in social and hard substance use behaviors by baseline sociodemographic and case status-related variables. Special attention was paid to the role that placement in out-of-home care may play in initiation of social and hard substance use. Overall, multivariate findings were sparse. This is remarkable given that this study followed similar methods to a recent investigation into risk and protective factors for sexual risk behaviors of CWS involved teens (James et al., 2009) that yielded more robust findings. We suspect that given the importance of this developmental phase and the many events that occur for this population during the study period, baseline risk and protective factors may be of limited value in predicting engagement in substance use behaviors over a 3 year period. Given the dearth of knowledge, nationally representative samples, and panel studies in this area findings nonetheless contribute to the knowledge base of substance use issues for adolescents involved in CWS.

4.1. Prevalence of substance use

It is difficult to make exact comparisons between the rates of social and hard substance use behaviors in our study and other investigations into national prevalence estimates of substance use among adolescents in child welfare. In this study we found that close to half (47.7%) of the sample of youth ages 11 or older had engaged in social substance use (i.e. alcohol and tobacco) over the course of three years of the NSCAW study. A much smaller percentage (17.4%) had engaged in hard substance use. The rates of social substance use are comparable to national averages (51%) but estimates of hard use are much higher than the national average of 8% for the general teen population (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2008). It should be noted that our sample is younger than other national adolescent samples and our findings are not comparable to cross-sectional findings of baseline NSCAW results that have been reported in the literature. While direct comparison is difficult, these results do suggest that the problem with hard substance use is more pronounced in this population. Comparison to other child welfare samples is also complicated given that estimates of substance use among child welfare involved adolescents likely vary depending on how use is measured as well as by sample age. Measurement issues have plagued investigations on the co-occurrence of child maltreatment and substance use. Variance in estimates have been attributed to several factors, including the population studied (e.g., in-home vs. out-of-home cases, urban vs. nonurban populations, foster care vs. investigations), the definition of substance abuse used in the study (e.g., different criteria from the spectrum of use, abuse, and dependence may be used; a specific substance may be included in one study and excluded in another), the method used to determine substance involvement (e.g., risk assessment measures, prospective assessment tools, workers' perceptions, retrospective case reviews), whether the substance use is a primary or secondary contributing factor in the child welfare case, and the

method of analysis (Young et al., 2007). Given these difficulties in estimation of incidence and prevalence, the broad approximation that one third and two thirds of children in CWS are affected by substance abuse (U.S. Department of Health and Human Services, 1999), and the profound impact that substance use and abuse plays on the development of some of the most vulnerable members of society, further and more precise investigation into this topic is warranted in both the child welfare and substance abuse literature.

4.2. Risk and protective factors for substance use among CWS involved teens

4.2.1. Demographic risk factors—Findings regarding risk and protective factors for social and hard substance use for this sample were generally sparse. At the bivariate level, findings did not converge with those reported by other studies. While older age of the youth was a significant predictor for social substance use, as it is in the general adolescent population (Centers for Disease Control and Prevention, 2010), it was not predictive of hard substance use. In other nationally representative studies of age-of-onset distributions for substance abuse, older participants have exhibited higher levels of hard substance use (Kessler et al., 2005). Further research into age-of-onset distributions for hard substance use specific to the child welfare population should be considered to better explain this discrepancy. Additionally, ethnicity was not related to subsequent substance use in the NSCAW sample which is unusual given that national estimates of the general teen population indicate that African American and Hispanic teens are more likely to use hard drugs and alcohol and White teens are more likely to use tobacco over the course of adolescence (Centers for Disease Control and Prevention, 2010). Previous cross-sectional investigations with the NSCAW data set have found African American adolescents have higher rates of abstinence of substance use than their Hispanic and White counterparts (Wall & Kohl, 2007).

4.2.2. Child welfare risk factors—In keeping with the social development model and other literature on substance use in maltreated youth, we hypothesized that child welfare case related factors including type of primary abuse, level of risk within the family during the child welfare investigation, and history of out-of-home placement would serve as significant risk factors for both social and hard substance use. However, none of these factors increased the odds of engaging in substance use over the course of the study and some factors actually conferred a protective effect at the bivariate level. Having been referred to CWS due to “other” forms of abuse was related to a decreasing risk of using alcohol or tobacco, which is a finding that is both puzzling and difficult to explain. These children had experienced emotional maltreatment, abandonment, legal maltreatment, educational neglect, or exploitation. Similarly, children who had been referred to CWS due to sexual abuse were less likely to engage in hard substance use. However, when included in a multivariate analysis the impact of these findings did not persist. Both of these findings are novel and not previously reported in the child welfare literature. Wall and Kohl (2007) found in baseline NSCAW analysis that being neglected was associated with lesser odds of substance use compared to being physically abused. Taussig (2002) found that neglect, rather than physical abuse, was associated with substance use for foster care in Southern California. Moran et al. (2004) found that both physical and sexual abuse increased the odds of alcohol and hard substance use. Maltreatment is a known contributing factor to adolescent substance use but the most influential maltreatment type varies by study as it most likely does by individual youth (Wall & Kohl, 2007).

Finally, having not experienced out-of-home placement was the only case related risk factor that demonstrated impact at both the bivariate and multivariate levels. Being retained in one’s home of origin reduced the likelihood of engaging in hard substance use. This is an important finding as it differs from cross-sectional, baseline NSCAW results (Wall & Kohl,

2007). Evidence suggests that, on average, children of substance abusing parents are more likely to be placed in foster care and, once there, to remain in care longer and experience greater numbers of placements (Barth, Gibbons, & Guo, 2006; Connell, Bergeron, Katz, Saunders, & Tebes, 2007; Vanderploeg et al., 2007). The long term protective effect conferred by remaining in one's home of origin may be cause for reevaluation of policies related to the removal of children from homes with substance abusing parents. Increase in substance abuse rehabilitative services, service linkages, and greater acceptance of medically assisted treatment for caregivers may facilitate the caregiver's ability to care for their children while completing their CWS case involvement.

4.2.3. Psychosocial risk factors—With regard to psychosocial risk factors, the pattern of association was somewhat inconsistent, demonstrating that the relationship between risk factors and risk behavior is rarely simple and direct (James et al., 2009). In bivariate analysis, behavior problems in the clinical range increased the odds of social substance use as did delinquency, associating with deviant peers, high levels of caregiver punitive behavior, and child depression. Hard substance use was only associated with delinquency and child depression over the three waves of the study data. Past research with maltreated and non-maltreated samples has reported a similar association between substance use and problem behavior. Substance use and concurrent mental health difficulties, violence, theft, and nuisance behaviors have been widely reported in the literature (Teplin, Abram, McClelland, Dulcan, & Mericle, 2002; Wade & Pevalin, 2005). Given the common prevalence of these factors, Wall and Kohl (2007) called for verification of the sequential association between substance use and delinquent behavior for maltreated youth. Our multivariate findings support the predictive relationship between youth delinquency and social and hard substance use over time. In fact, youth delinquency was the only baseline risk factor predictive of both types of substance use at the multivariate level. Growing bodies of research document the overlap between criminal justice and child welfare populations (Colman, Mitchell-Herzfeld, Kim, & Shady, 2010), juvenile justice and substance abusing populations (Ford, Hartman, Hawke, & Chapman, 2008), and child welfare and substance abusing populations (Leslie et al., 2010). It is unrealistic to propose a single causal link between substance use, delinquency, and child welfare. Such a link must encompass many factors, such as pharmacological, psychological, environmental and cultural and efforts to understand it would benefit from attention to research and theory from all of these disciplines (Leigh, 1999).

4.2.4. Protective factors—One of the more notable findings was the limited role of protective factors on the continuing course of substance use and abuse. Caregiver connectedness was the only factor that impacted social substance use at the multivariate level. Caregiver connectedness is an important factor in general child and adolescent development. Youth involved in CWS may have multiple caregivers and have to establish trusting relationships with adults multiple times. Many youth involved with CWS have experienced abuse or neglect at the hand of a parent. Close to one-fifth are placed in out-of-home care, with many children experiencing changes in caregivers over time (U.S. Department of Health and Human Services, Administration on Children, Youth, and Families, 2007). No protective factors impacted the future occurrence of hard substance use. This is particularly worrisome given that in a similar study James et al. (2009) found future orientation, caregiver monitoring, and caregiver connectedness predictive of various sexual risk behaviors. The lack of protective factors for hard substance use warrants further investigation as the potential consequences for hard substance use are severe.

4.3. Implications for child welfare policy and prevention

The three guiding principles of the child welfare system include the assurance of safety, the provision of permanency, in order for children to obtain optimal levels of well-being (Children's Bureau, 2011). The relatively high rates of social substance use and reports of hard substance use that are higher than the national average indicate that issues of substance use and abuse are a big obstacle to well-being for CWS involved youth. CWS has the potential to serve as a gateway to substance abuse prevention and treatment services. An estimated $258 million is spent per day on child maltreatment services (U.S. Department of Health and Human Services, Administration on Children, Youth, and Families, 2007), with 60% directed toward neglect, 70% of which is linked to substance abuse (Gaudin, 1993). A primary goal of the coordination of child welfare and substance abuse services is to ensure that individuals have access to treatment and prevention programs. From a child welfare perspective, integration of services should encourage the safety, permanency, and well-being of the child, and from a substance abuse treatment perspective, this approach should maximize the likelihood of providing individuals the opportunity for recovery (Barth et al., 2006). A shortage of publicly subsidized substance treatment programs means that many individuals in need never receive services (Child Welfare League of America, 1997). Furthermore, those substance-abusing teens in the child welfare system that do begin treatment tend not to complete it satisfactorily (Choi & Ryan, 2006). There is a paucity of information about the characteristics associated with receipt of substance abuse treatment among CWS involved youth. Obstacles to treatment for CWS involved individuals include poor substance abuse detection within CWS, the use of basic substance abuse treatment approaches with a weak evidence base, and poor coordination of substance abuse, child welfare, and mental health services (Barth et al., 2006). At the intervention level, issues of referral and treatment must be addressed for CWS involved teens who also exhibit substance abuse behavior.

Findings from this study also have implications for prevention efforts with the CWS involved adolescent population. We could not identify any literature on effective substance abuse prevention programs for CWS involved youth. Studies on other externalizing behaviors have suggested that existing cognitive-behavioral and skill-based risk reduction interventions, which are effective with other adolescent populations, might not have the same effect with CWS involved youth (Becker & Barth, 2000; Slonim-Nevo & Auslander, 1996). Factors such as significant mental health problems, the absence of a dependable family or social network, exposure to sexual abuse and violence, and educational deficits are believed to undermine foster youths' problem-solving abilities and compromise the effectiveness of preventive approaches that might otherwise be effective (McMillen et al., 2005). Our findings regarding the absence of protective relational factors suggest that interventions for youth involved with the child welfare system might have to integrate components that focus on helping build such protective factors as supportive and stable relationships (e.g., care-giver relationships and staying in one's home of origin). Overall, our study illustrates that there is need and justification in examining substance use behavior among youth involved with the child welfare system. There is particular urgency to investigate the high rates of hard substance use among this population and to determine whether prevalent explanatory models of youth risk behavior need to be adapted for this population in effort to promote better prevention and treatment.

4.4. Study limitations and strengths

Results of this study have to be interpreted within the context of NSCAW's limitations and strengths. NSCAW is a clinical survey, which measures psychosocial functioning across multiple domains, and does not specifically target substance use behavior. This might be considered a significant limitation by substance abuse researchers who are used to more

specific and comprehensive measures of social and hard substance use behavior. The robustness of our findings may additionally be limited by the use of a dichotomous measure of social and hard substance use. Finally, factors such as delinquency, peer deviance, depression, and school engagement can vary greatly over the course of an adolescent's life. The temporal distance of 18 and 36 months between baseline and follow-ups in our study may account for the relatively weak effects observed. However, the absence of longitudinal, nationwide data about the risk and protective factors for social and hard substance use among youth involved with the child welfare system nevertheless warrants investigation of this topic in the only nationally representative sample currently available. While limited in the choice of outcomes, this study does provide a within-group perspective about social and hard substance use behavior in this sample of maltreated youth.

Study data were collected from multiple sources including adolescents and caseworkers. The NSCAW instrumentation team has reported that they purposefully triangulated their measurement as a means of verifying sensitive information related to child maltreatment (National Survey of Child and Adolescent Well-Being (NSCAW) Research Group, 2002; U.S. Department of Health and Human Services, Administration for Children, Youth, and Families, 2005). Secondary analysis of this extant sample could be constrained by this triangulation. However, caseworker reports were only used to gather demographic data about gender, ethnicity, age, and maltreatment history. These areas not subjective report, but rather verified in the child's case record. Therefore these reports should have limited impact on the outcome variables of interest which were assessed through child report. In addition to study data being triangulated, results may be impacted by the fact that data was collected from 1999 to 2002. Current reports indicate that the child welfare system has not significantly changed over the last ten years and that NSCAW data still produces the most reliable, nationally representative, longitudinal findings about individuals in the child welfare system (Dolan, Smith, Casanueva, & Ringeisen, 2011).

Like most studies in this area of research, this study is also plagued by questions about the validity and reliability of data obtained from youth about their substance use. Fear of loss of privacy, concerns about repercussions and issues of social desirability may undermine accurate reporting on sensitive personal behaviors (Tourangeau & Smith, 1996; Turner et al., 1998). Such concerns might be amplified for youth involved with the child welfare system that may have experienced first-hand that revelation of personal events can have significant consequences, namely intervention by a public institution in the form of continued monitoring and supervision, and in some cases removal from the biological family. Youth that experienced multiple placement disruptions in out-of-home placement may also be concerned about loss of another placement if their reported behaviors violate rules set forth by their foster caregiver. These methodological concerns warrant further investigation specifically with this population.

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Table 1

Substance use behaviors and independent variables examined in subsample (n=1025) of youth aged >11 years in the NSCAW study.

Variable	Operationalization	Measure	Respondent/wave
Youth sociodemographic risk factors			
Gender	Male/female	Collected as part of the initial case identification procedures	Caseworker: W1
Ethnicity	Caucasian, African American, Hispanic, Other		Caseworker: W1
Age	Age at Wave 4		Caseworker: W1
Case status-related risk factors			
Type of maltreatment	Primary maltreatment reports (1) sexual abuse; (2) physical abuse; (3) neglect; (4) other	Modified Maltreatment Classification Scale (Manly, Cicchetti, & Barnett, 1994); inter rater reliability for different maltreatment subtypes ranges from .89 to . 98 (Price & Glad, 2003).	Caseworker: W1
Risk assessment	Family risk rate	Project developed, α=n/a	Caseworker: W1
Placement history	Dichotomous variable capturing whether youth ever experienced out-of-home placement during the course of the study	Caseworkers review of case record. α=n/a	Caseworker: W1, 3, 4
Psychosocial risk factors			
Behavior problems	Categorical variable indicating which youth ever fell at or above the clinical cut-point (T≥64) on internalizing, externalizing or total problems	Child Behavior Check List (CBCL) Youth self report (Achenbach, 1991); Test–retest reliability: r=.79 (total problems), r=.80 (internalizing), r=.81 (externalizing); construct validity: problem items cluster into meaningful scales; problem scales correlate highly with similar scales from other checklists and with corresponding DSM diagnoses; criterion-related validity: in research studies, the problem scales have discriminated between a number of different childhood problem groups and their respective comparison groups	Youth: W1
Delinquency	Total delinquency score	CBCL youth self report — modified self-report of delinquency (Achenbach, 1991); general psychometric information for YSR (see above 'behavior problems')	Youth: W1
Peer deviance	Dichotomous variable, indicating any peer deviancy as reported by youth or caretaker in response to the question/item whether youth 'hangs around others who get in trouble.'	CBCL Youth self report (Achenbach, 1991); general psychometric information for YSR (see above 'behavior problems')	Youth or caregiver: W1
Caregiver punitive behavior	Parent–Child Confiict Tactics Scale; 22-item capturing how many times during the past 12 months, caregivers have engaged in punitive or abusive acts toward the youth, e.g., hitting with a fist, yelling, slapping, shaking, cursing, etc. 1=1 time; 2=2 times; 3=3–5 times; 4=6–10 times; 5=11–20 times; 6=more than 20 times; 7=not in the past 12 months, but happened before; 0=never happened	Adaptation of Parent–Child Confiict Tactics Scale (Straus, Hamby, Finkelhor, Moore, & Runyan, 1990); alpha reliability: r=−.02 (severe physical assault); the low internal consistency reliability of the severe assault scale is because the items measure rare events	Youth: W1
Depression	Child depression inventory	Kovacs (1992). A brief self-report test that helps assess cognitive, affective and behavioral signs of depression in children and adolescents 7 to 17 years old	Youth: W1
Psychosocial protective factors			
School engagement	DFSCA Average of 11 items; 4-point scale (1 = never; 2 = sometimes; 3 = often; 4 = almost always)	Outcomes of the Drug-Free Schools and Communities Act (DFSCA) (sponsor:	Youth: W1

Variable	Operationalization	Measure	Respondent/wave
		U.S. Department of Education, 1996); adapted for NSCAW	
Future expectations	Expectations about employment, education, and life span; Average of 6 items; 5-point scale (1 = no chance; 2 = some chance; 3 = about 50–50; 4 = pretty likely; 5 = it will happen)	Adapted for NSCAW from Expectations About Employment, Education, and Life Span section from National Longitudinal Study of Adolescent Health (AddHealth, n.d.).	Youth: W1
Caregiver monitoring	UNOCCAP; Average of 6 items; 5-point scale (1 = never; 2 = almost never; 3 = once in a while; 4 = pretty often; 5 = very often)	UNOCCAP: use, need, outcomes, and costs in child and adolescent populations (sponsor: NIMH, 1996–1999). Nationwide household survey; parental monitoring measure adapted for NSCAW	Youth: W1
Closeness to caregiver	AddHealth; Average of 12 items; 4-point scale (1 = not at all true; 2 = not very true; 3 = sort of true; 4 = very true)	National Longitudinal Study of Adolescent Health (AddHealth n.d.)	Youth: W1
Outcomes			
Use of hard drugs	DFSCA; Last 30 day use of ‘sniffing’ or ‘hard drugs,’ such as heroin, cocaine, or crack (yes/no)	Outcomes of the Drug-Free Schools and Communities Act (DFSCA) (sponsor: U.S. Department of Education); adapted for NSCAW	Youth: W1, 3, 4
Use of social drugs	DFSCA; Last 30 day use of alcohol and marijuana during the last (yes/no)	Outcomes of the Drug-Free Schools and Communities Act (DFSCA) (sponsor: U.S. Department of Education); adapted for NSCAW	Youth: W1, 3, 4

Table 2

Weighted percentages and bivariate results of Waves 1, 3, and 4 drug use (past 30 days) by risk and protective factors at wave 1.

	Social drugs (30 days)		Hard drugs (30 days)		Total
(Age>=11, n=1025)	**Yes**	**No**	**Yes**	**No**	
Total sample	**47.7**	**52.3**	**17.4**	**82.6**	
Youth sociodemographic factors (W1)					
Gender					
Male	45.8	54.2	16.7	83.3	42.8
Female	49.7	50.9	18.0	82.0	57.2
Race/ethnicity					
African American	42.6	57.4	15.8	84.2	29.8
Caucasian	46.6	53.4	17.7	82.3	47.9
Hispanic	57.0	43.0	20.2	79.8	16.1
Other	48.9	51.1	18.5	81.5	6.2
Age (mean)	13.0**	12.6	12.9	12.7	12.7
Case-status related risk factors (W1)					
Primary abuse					
Physical abuse	55.7	44.3	24.7	75.3	31.6
Sexual abuse	47.3	52.7	10.4*	89.6	13.7
Neglect	47.5	52.5	17.8	82.2	40.4
Other	28.3*	71.7	12.2	87.8	14.3
Risk assessment (mean)	0.3	0.3	0.3*	0.3	0.3
Placement history					
IH only	46.6	53.4	14.7*	85.3	76.2
Ever in out-of-home care (W1, 3, 4)	51.1	48.9	26.5	73.5	23.8
Psychosocial risk factors (W1)					
Behavior problems	*				
>=64	53.2	46.8	19.6	80.4	53.7
<64	40.8	59.2	15.4	84.6	46.3
Delinquency (mean)	10.9**	1.8	22.0**	2.7	6.3

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(Age>=11, n=1025)	Social drugs (30 days) Yes	Social drugs (30 days) No	Hard drugs (30 days) Yes	Hard drugs (30 days) No	Total
Total sample	**47.7**	**52.3**	**17.4**	**82.6**	
Peer deviance	***		*		
Yes	56.5	43.5	20.7	79.3	62.3
No	33.6	66.4	12.2	87.8	37.7
Caregiver punitive behavior	14.4*	6.2	19.2**	8.2	10.2
Child depression	52.6**	48.1	55.5**	49.2	50.3
Current and past protective factors (W1)					
School engagement (mean, range 1–4)	2.9**	3.2	2.8**	3.1	3.0
Future expectations (mean, range 1–5)	3.9*	4.1	3.8	4.1	4.0
Caregiver monitoring (mean, range 1–5)	3.9**	4.2	3.9	4.1	4.1
Caregiver connectedness (mean, range 1–4)	3.1**	3.5	3.0*	3.3	3.3

Note. All figures represent weighted percentages.

* p<.05.

** p<.01.

*** p<.001.

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Table 3

Multivariate logistic regression for Waves 1, 3, and 4 drug use by Wave 1 risk and protective factors.

	Social drug use Last 30 days OR (95% CI)	Hard drug use Last 30 days OR (95% CI)
Youth sociodemographic factors (W1)		
Gender/male	0.81 (0.45, 1.48)	0.47 (0.22, 1.02)
Race/Caucasian		
African American	0.88 (0.45, 1.71)	0.48 (0.22, 1.02)
Hispanic	1.54 (0.65, 3.66)	0.67 (0.22, 2.00)
Other	1.08 (0.37, 3.16)	1.01 (0.30, 3.46)
Age	1.11 (0.89, 1.40)	0.93 (0.70, 1.23)
Case-status related risk factors (W1)		
Primary abuse/physical		
Sexual abuse	0.79 (0.21, 2.98)	0.44 (0.14, 1.45)
Neglect	0.84 (0.42, 1.70)	1.80 (0.83, 3.91)
Other	0.67 (0.22, 2.05)	0.66 (0.17, 2.61)
Risk assessment (mean)	2.30 (0.82, 6.40)	2.19 (0.60, 8.06)
Placement history/out of home		
IH only	0.86 (0.46, 1.58)	0.43 (0.20, 0.93) *
Psychosocial risk factors (W1)		
Behavior problems<64		
>=64	1.01 (0.53, 1.93)	1.07 (0.50, 2.29)
Delinquency	1.06 (1.02, 1.09) **	1.10 (1.05, 1.14) ***
Peer deviance/no		
Yes	1.27 (0.69. 2.33)	0.84 (0.39, 1.80)
Caregiver punitive behavior	1.01 (0.99, 1.02)	1.01 (1.00, 1.02)
Depression	0.97 (0.93, 1.01)	0.99 (0.95, 1.03)
Current and past protective factors (W1)		
School engagement (Mean, range 1–4)	0.48 (0.21, 1.08)	0.82 (0.35, 1.91)
Future expectations (mean, range 1–5)	1.03 (0.62, 1.73)	1.19 (0.53, 2.70)
Caregiver monitoring (mean, range 1–5)	0.88 (0.55, 1.42)	0.88 (0.54, 1.44)
Caregiver connectedness	0.51 (0.27, 0.99) *	0.45 (0.19, 1.03)

* p<.05.

** p<.01.

*** p<.001.