

Linking Childhood Sexual Abuse and Early Adolescent Risk Behavior: The Intervening Role of Internalizing and Externalizing Problems

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Abstract A robust literature links childhood sexual abuse (CSA) to later substance use and sexual risk behavior; yet, relatively little empirical attention has been devoted to identifying the mechanisms linking CSA to risky behavior among youth, with even less work examining such processes in boys. With the aim of addressing this gap in the literature, the current study examined the indirect effect of childhood sexual abuse (CSA; from age 2 to 12) trajectory group on risky behavior at age 14 (alcohol use & sexual

intercourse) via the intervening role of caregiver-reported internalizing and externalizing problems at age 12. Analyses were conducted with a subsample of youth ($n=657$ sexual intercourse; $n=667$ alcohol use) from the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN), a multisite prospective study of youth at risk for maltreatment. For boys *and* girls, there was an indirect effect from CSA to sexual intercourse through externalizing problems. The same pattern emerged for alcohol use, but only for girls.

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Findings did not support an indirect path through internalizing problems for either boys or girls for either outcome. Findings suggest more focal targets for prevention efforts aimed at maintaining the health and safety of maltreated boys and girls during the adolescent transition.

Keywords Childhood sexual abuse · Adolescence · Risk behavior · Internalizing problems · Externalizing problems · Gender

By some estimates, childhood sexual abuse (CSA) is reported almost 80,000 times a year in the United States (American Academy of Child & Adolescent Psychiatry 2004); yet, these numbers clearly underestimate the actual occurrence given children's disclosure fear, as well as difficulties in the legal procedure inherent in validating an episode. Individuals with CSA histories are at an increased risk for a range of adverse outcomes, including increased engagement in risky behaviors (e.g., Brown et al. 2010; Senn et al. 2008; Senn and Carey 2010).

CSA may co-occur with other types of maltreatment; however, the link between other maltreatment types and risky behavior has received far less attention in both the theoretical and empirical literature and the findings are more mixed (see Senn et al. 2008 for a review). In contrast, a robust literature suggests that individuals with CSA histories initiate sexual behavior earlier, are more likely to engage in risky sexual behaviors once they initiate sexual activity (e.g., lack of/inconsistent condom use, sex with multiple partners), and to continue to engage in risky behavior into adulthood (see Beitchman et al. 1992; Kendall-Tackett et al. 1993; Senn et al. 2008; Trickett and Putnam 1998, for reviews). In turn, those with CSA histories are more likely to experience the consequences of risky sexual behavior, including unplanned pregnancy, HIV/AIDS, and other sexually transmitted diseases (e.g., Clum et al. 2009; Mugavero et al. 2007; also see Senn et al. 2008 for a review).

Importantly, some work suggests that those with CSA histories may be uniquely vulnerable to sexual risk taking behavior in particular, relative to those with other types of maltreatment histories and/or relative to other risk behavior outcomes (e.g., Kendall-Tackett et al. 1993; Senn et al. 2008; Senn and Carey 2010). Other work, however, suggests that individuals with CSA histories are, in fact, also more likely to use substances in adolescence and into adulthood, a pattern of comorbid behavior that is thought to increase their vulnerability for sexual and physical revictimization (e.g., Barnes et al. 2009; also see Classen et al. 2005 for a review). Accordingly, programs for adults have shifted to focus on the overrepresentation of individuals with CSA histories among both the substance abusing and the HIV positive with the aim of ameliorating the psychosocial vulnerabilities linking CSA history to ongoing risk behavior (Clum et al. 2011; Hien et al. 2010; Sikkema et

al. 2007, 2008; Wilson and Widom 2011). Given that approximately one-third (34 %) of all CSA victims are under the age of 12 (Bureau of Justice Statistics 2000), the development of similar programs for youth is critical (Danielson et al. 2010); yet, such targeted programming depends on a better understanding of the mechanisms linking CSA to risk behavior, as well as whether risk is unique to sexual behavior or more generalized to substance use as well.

Although much theoretical attention has been devoted to explaining the mechanisms linking CSA to risky behavior (e.g., Briere 2004; Finkelhor and Browne 1985; Quina et al. 2003), extant empirical work in this area is “sparse” (Senn et al. 2008, p. 730). Research examining such mechanisms among adults with CSA histories has focused in large part on post-traumatic stress disorder (PTSD) (see Senn et al. 2008; Walker et al. 2004 for reviews); however, a narrow focus on PTSD alone with youth may not be optimal given the preliminary state of the literature for several reasons. First, some disagreement exists regarding the measurement and, in turn, the predictive power, of PTSD in youth (e.g., Pynoos et al. 2009; Ruggiero and McLeer 2000; also see Kearney et al. 2010 for a review). Moreover, PTSD is typically comorbid with other anxiety, mood, and disruptive behavior disorders (Kearney et al. 2010), suggesting that an exclusive focus on PTSD may underestimate the extent of youth distress or the extent to which such distress links CSA to early risk behavior among youth. In contrast, the merits of utilizing a dimensional approach to examine child adjustment problems have been discussed extensively, with a primary focus on the capacity of such an approach to better capture subthreshold symptomatology and, in turn, to increase predictive power (e.g., Achenbach 2009; Haapasalo et al. 2000; Lahey et al. 2004).

Capitalizing on advances in research design and quantitative methods (e.g., Jones et al. 2010; Noll et al. 2003; Wilson and Widom 2011), this study utilizes group-based trajectory modeling to examine internalizing and externalizing problems (age 12) as mechanisms linking CSA trajectories (ages 2–12 years old) to early risk behavior at age 14, a particularly vulnerable period for alcohol use and sex (e.g., NIAAA 2003; US DHHS 2007; Zimmer-Gembeck and Helfand 2008). At the most basic level, early risk behavior may be conceptualized in at least two ways: 1). Consistent with Problem Behavior Theory, early risk behavior may reflect a broader constellation of acting out behaviors, fueled by the anger associated with CSA and its effects, in youth with externalizing problems; and/or 2). Early risk behavior may function as a way to numb negative feelings about the self and/or a strategy to induce feelings that have been numbed by the trauma among youth with internalizing problems (e.g., Donovan and Jessor 1985; Jessor et al. 1995; Schofield et al. 2008). As such, it is predicted that CSA history will be linked to early risk behavior via increases in internalizing and externalizing problems.

In addition, whether the mechanisms linking CSA to risky behavior differed for girls and boys was also examined. Research on CSA and risky behavior has focused primarily on females and in particular women, with fewer prospective accounts examining girls and far less attention to boys or men (see Kearney et al. 2010; Senn et al. 2008; Walker et al. 2004 for reviews). The dearth of attention to gender remains despite growing attention to gender as a moderator of developmental pathways in the field more broadly (e.g., Mash and Barkley 2003; Bell-Dolan et al. 2005; also see Zimmer-Gembeck and Helfand 2008 for a review). Among youth with CSA histories, research on the link between gender and internalizing and externalizing problems is mixed (e.g., Coohy 2010; Maikovitch-Fong et al. 2010; Rind et al. 1998). Moreover, prior work on CSA focuses primarily on the main effects of gender on internalizing and externalizing problems; however, prevention and intervention programming depends on establishing a better understanding of the extent to which the intervening role of internalizing or externalizing problems operates differently (or similarly) by gender (e.g., Bagley et al. 1995; Coohy 2010; Garnefski and Diekstra 1990).

As noted above, findings are mixed regarding whether CSA is uniquely a vulnerability for sexual risk taking or whether the vulnerability generalizes to other risk behaviors, including alcohol (e.g., Kendall-Tackett et al. 1993; Senn et al. 2008; Senn and Carey 2010). Thus, although prior work with the same sample combined sexual intercourse and alcohol use into a single risk behavior index and demonstrated a significant link with CSA history (Jones et al. 2010), this study examined sexual intercourse and alcohol use separately. Moreover, alcohol use in particular was the focus of the current study given its relatively wide availability to youth in this age range (e.g., Johnston et al. 2009; SAMSHA 2005).

Ethnic minority youth are overrepresented in statistics on sexual risk behavior in particular (CDC 2009) and its consequences, including HIV, other sexually transmitted diseases, and teen pregnancy (CDC, 2011a, b, c). However, we are not aware of any theoretical or empirical literature suggesting that the link between CSA and sexual or other risk behavior via internalizing or externalizing problems would operate differently by race/ethnicity. Accordingly, we controlled for race, rather than examine racial differences, in the proposed model (Baumeister 1988; Cole and Stewart 2001; Hare-Mustin and Marecek 1994; Phinney 1996).

Method

Overview

The sample used in the current analyses was taken from the Longitudinal Studies of Child Abuse and Neglect (LONG-SCAN), a consortium of studies using common instruments

and interview protocols, located at five different sites across the United States (see Runyan et al. 1998 for more detail on study design and procedures). Primary caregivers whose primary language was English or Spanish were included. One site included children who were at high risk for maltreatment (based on attendance at pediatric clinics serving high risk populations), two sites included children who had been reported for maltreatment, and two sites included both children who had been reported as maltreated and children who were identified as at risk, based on demographic risk factors. In turn, maltreatment status varied at recruitment: 65.3 % history of maltreatment; 17.8 % at-risk for maltreatment; and 16.9 % without risk factors for or history of maltreatment. All sites used common protocols approved by their Institutional Review Boards. The baseline sample included 1,354 youth, with data collected at ages 6, 8, 12, 14, 16, and 18.

Participants

Participants included in the current analyses were youth who had maltreatment data from at least three time points (2–12 years old) ($n=832$), as well as complete data for the intervening variables (age 12) and risk behavior outcomes (age 14), yielding an analysis sample of 657 for sexual intercourse and 667 for alcohol use. The subsamples were evenly split by gender and girls and boys evidenced similar levels of internalizing and externalizing problems and were equally likely to report alcohol use (see Table 1); however, girls were significantly less likely to endorse sexual intercourse. Approximately half of the youth in each subsample were African American (55 % in alcohol use subsample; 54 % in sexual intercourse subsample). African American and Caucasian youth were more likely to report alcohol use than youth classified as “Other” due to relatively small sample sizes. African American youth were also more likely to endorse sexual intercourse than Caucasian or Other youth. Accordingly, we statistically controlled for race in the primary analyses, as noted earlier. Youth excluded from the final subsamples did not differ from youth in the larger sample on CSA status, risky behavior, gender, or race.

Procedure

All interviews were conducted by project-trained interviewers after consent was obtained from the primary caregivers and youth assented to be interviewed. The interviews were approximately 2 h in duration, after which caregivers and children were compensated for their time. Children were included in data collection as early as the age 4 interviews; with increasing inclusion of self-report measures as the children aged. Beginning at age 12, children and caregivers were interviewed using an Audio-Computer Assisted Self-Interview (A-CASI), a program which both shows and

Table 1 Descriptive statistics for proposed intervening and outcome variables

	Full		Boys		Girls	
	%	<i>M (SD)</i>	%	<i>M (SD)</i>	%	<i>M (SD)</i>
Sexual Intercourse (<i>n</i> =657)						
Sex (% yes) ^a	20.7		26.0		15.8	
Externalizing Problems ^b		54.3 (11.9)		54.5 (11.1)		54.7 (11.0)
Internalizing Problems ^b		51.1 (11.1)		51.9 (11.1)		49.9 (11.1)
Alcohol Use (<i>n</i> =667)						
Externalizing Problems ^b		54.3 (11.9)		54.6 (11.4)		54.9 (11.0)
Internalizing Problems ^b		51.1 (11.1)		52.0 (11.1)		50.0 (11.0)
Alcohol Use (% yes) ^b	25.9		24.5		27.0	

^aGirls were significantly less likely to endorse sexual intercourse than boys, $\chi^2=11.8$, $p<0.001$

^bNo significant gender difference

reads the self-report questions aloud and allows participants to select the response on the computer keyboard that corresponds to their answer, maximizing confidentiality and reducing the potential for biased responses. Maltreatment data were collected from lifetime reviews of CPS records, which were collected and coded on regular intervals at each site (for a more complete description of LONGSCAN, see Runyan et al. 1998).

Measures

In order to decrease the likelihood of a common reporter inflating associations, the current study utilized different reporter/methods for each of the study variables: CSA (CPS records), internalizing and externalizing problems (caregiver-report), and risky behavior (youth-report).

CSA Official CPS records, including both allegations and substantiations, of child sexual abuse were coded using a LONGSCAN modified version of Barnett et al.'s (1993) Maltreatment Classification System (*MMCS*; English & the LONGSCAN Investigators, 1997; as modified from Barnett et al. 1993). Narrative reports made to CPS for maltreatment from birth to age 12 were reviewed, abstracted, and coded. The *MMCS* has been used extensively in coding maltreatment data across studies and is accepted as a reliable classification of maltreatment experiences based on CPS records (e.g., Dubowitz et al. 2005; English et al. 2005; Litrownik et al. 2005). LONGSCAN coders across sites were trained to 90 % agreement with a gold standard coder, and a subsequent reliability assessment utilizing a sample of reports from all the sites indicated good overall agreement on the coding of type (all kappas >0.7). Prior work with LONGSCAN data (Hussey et al. 2005), as well as other reports (e.g., Kohl et al. 2009; also see Senn et al. 2008 for a review), suggest that allegations may be a better indicator of actual experience. Based on these findings, CSA allegations codes (0 = no; 1 = yes) for each 2-year interval (baseline to age 12) were utilized.

Internalizing and Externalizing Problems To assess internalizing and externalizing problems, the proposed intervening variables, the youth's primary caregiver completed the Child Behavior Checklist/4-18 (CBCL; Achenbach and Edelbrock 1991) at the age 12 visit. The CBCL includes 113 problem items that range from not true = 0 to true = 2. The CBCL includes broadband scales for internalizing problems, composed of three syndromes (withdrawn, somatic complaints, anxious/depressed), and externalizing problems, compromised of attention problems, rule-breaking behavior, and aggressive behavior. Although raw scores have been suggested for research because the standardized scores are truncated at the low-end, this problem is less of an issue in high-risk and clinical samples, including youth with maltreatment histories, for which scores at the lower end of the continuum are less expected and of less interest (Achenbach and Edelbrock 1991; also see Heflinger et al. 2000, for a review). Accordingly, T-scores were used in this investigation with higher T-scores reflecting more internalizing and externalizing problems. The CBCL has very good test-retest reliability, internal consistency, reliability, and construct validity (Achenbach and Edelbrock 1991).

Some authors have cautioned that caregivers frequently underreport symptoms of their children (e.g., Angold 1988; Kamphaus and Frick 1996; March, 1999). Such caution may be particularly notable for internalizing symptoms, given that there may be fewer observable symptoms. That said, prior research with families of youth with trauma histories suggests that caregiver-reports on the CBCL for both internalizing and externalizing symptoms are consistent with clinical interviews (Saigh et al. 2002)

Alcohol Use and Sexual Intercourse The age 14 A-CASI interview is the first assessment at which adolescents reported on their history of alcohol use and sexual intercourse. Of note, early alcohol use, defined elsewhere as ranging from 9 to 15 years of age (e.g., NIAAA 2003; US DHHS 2007), as well as use by middle school age adolescents (which includes 14 y.o.), is considered particularly

problematic because it is associated with later use, problem use, and associated consequences (e.g., D’Amico and McCarthy 2006; Johnston et al. 2009; Simoes et al. 2008). For the current study, the item on alcohol use was taken from the Alcohol Module of the Computerized Diagnostic Interview Schedule for Children (C-DISC; Shaffer et al. 2000). The question used in the current study to assess alcohol use was preceded by the instruction “The next questions are about your use of alcohol—beer, wine, wine coolers, or hard liquors like vodka, gin, or whiskey. Each can or bottle of beer, glass of wine or wine cooler, shots of liquor, or mixed drink with liquor in it counts as one drink”. Then, youth were asked “Not including sips from another person’s drink, have you ever, in your whole life, even once, had a drink?” Responses were coded as either “yes” or “no”. Assessment of lifetime use is typical in the literature, given the relatively low rates of use by most youth of this age, even in high-risk samples (e.g., Schofield et al. 2008; Mrug and Windle 2009; Taylor and Kliewer 2006).

The item assessing intercourse (“Have you ever had sex?”) was taken from the Adolescent Sexual Experiences Measure (Runyan et al. 1998). This item was introduced by a statement defining sex as sexual intercourse. Qualitative analyses in prior work suggest that youth interpret this question as indicating vaginal intercourse (Stanton et al. 1995). Although the specific cut-point at which the initiation of sexual intercourse is considered risky typically ranges from 13 to 15 y.o. (or younger), sexual intercourse by age 14 has been defined as “early initiation” and, therefore, by definition any sex in this age range has been considered risky (e.g., Schofield et al. 2008; Wilson and Widom 2008; Zimmer-Gembeck and Helfand 2008). Sexual intercourse was also coded as “yes” or “no”, due to insufficient variability on other items (e.g., condom use).

Results

Plan of Analyses

The group-based trajectory analyses describing the pattern of CSA over the course of childhood (2–12 years old) yielded the same pattern of findings regardless of gender or subsample (i.e., % belonging to each trajectory; posterior probability; and the shape of the model); therefore, trajectory analyses for boys and girls together are described first. Then, subsequent path analytic models, covarying race and examining the primary study hypotheses, are presented (i.e., CSA group-based trajectories as the independent variable, internalizing and externalizing problems as the proposed intervening variables, and, sexual intercourse or alcohol use as the outcome of interest). Finally, the moderating role of gender was examined.

CSA Trajectories

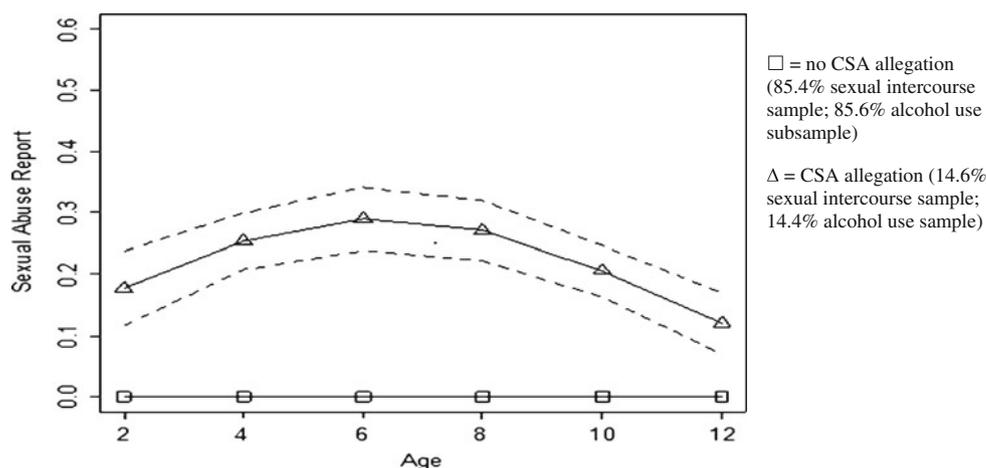
Our aim in utilizing group-based trajectory analyses to examine CSA history over the course of childhood was to afford an empirical means of identifying clusters of individuals following different courses of development. The developmental trajectories for CSA were estimated using group-based trajectory modeling, covarying for site (PROC TRAJ; Jones et al. 2001; Nagin 2005; see also Jones et al. 2010 in which trajectories for CSA in LONGSCAN were initially reported). Given the dichotomous nature of the allegations variable (i.e., presence or absence of CPS allegation of CSA at each time point), the logistic (LOGIT) model was used to model the conditional distribution of data given group membership. For each child, the model’s coefficient estimates were used to calculate the probability that the child belongs to each group. Following the recommendations of Nagin et al. (e.g., Jones et al. 2001; Nagin 2005), the model with the fewest groups and the largest Bayesian Information Criterion (BIC) was selected.

In turn, a two-group model yielded the maximum BIC (i.e., least negative) (BIC=−378.44) (see Fig. 1). The “no allegations” trajectory reflected youth for whom there was no allegation of CSA (85.4 % of the sexual intercourse subsample, 85.6 % of the alcohol use subsample). The remaining youth were best described by a single curvilinear “allegations” trajectory, with the most allegations occurring between 4 and 8 y.o., with fewer allegations at relatively younger and older ages (14.6 % of sexual intercourse subsample; 14.4 % of alcohol use subsample). Consistent with data suggesting that CSA cuts across racial and ethnic groups (Finkelhor et al. 2004; Sedlak and Broadhurst 1996), youth in the CSA trajectory group were racially diverse (e.g., 30 % African American).

Path Model Linking CSA to Risky Behavior via Internalizing and Externalizing Problems

The CSA trajectories were then used in a series of path analyses, an extension of the regression model, using MPlus software (Muthen and Muthen 2008), which allows for the simultaneous testing of multiple relationships. The guidelines set forth by Preacher et al. (2007) were utilized to test the proposed indirect effects (i.e., whether the CSA trajectory groups operated through internalizing and externalizing problems to influence risk behavior outcome), as well as the proposed conditional indirect effects (i.e., whether the indirect effects via internalizing &/or externalizing problems varied by gender), covarying child race (see Fig. 2). Consistent with Model 5 in the discussion of moderated mediation by Preacher et al. (2007), we tested the moderated effect of gender on (a) the effect of CSA on internalizing and externalizing problems *and* on (b) the effects of internalizing and externalizing problems on risky behavior (also see Baron and Kenny 1986; Muller et al. 2005).

Fig. 1 Trajectories for childhood sexual abuse



As noted elsewhere, indirect effects no longer require a main or direct effect of the independent variable on the dependent variable (i.e., CSA trajectory group on risky behavior) (see Hayes 2009 for a review). However, Hayes suggests referring to indirect effects that occur without direct effects as “intervening variables”, rather than “mediators”. Indirect effects are significant if the 95 % Bias Corrected and accelerated confidence intervals do not include 0 (Preacher and Hayes 2004; Preacher et al. 2007). Although prior work with this sample combined sexual intercourse and alcohol use into a single risk behavior index (Jones et al. 2010), as noted previously, the risk behavior outcomes were examined separately in this investigation.

After controlling for race ($\beta=0.27$; 95 % CI: 0.039 to 0.500), path analyses failed to reveal a significant direct effect of CSA trajectory group on youth-reported alcohol use at age 14 for boys ($\beta=0.33$, n.s.) or girls ($\beta=0.31$, n.s.) (path c in Fig. 2). However, the link from CSA to alcohol use via caregiver-reported externalizing problems (i.e., the indirect effect; path w2) was significant for girls (95 % CI: 0.005 to 0.335), but not for boys (95 % CI: -0.134 to 0.308). For girls, the CSA allegations trajectory group, but not the no allegations trajectory, operated through externalizing problems at age 12 to influence lifetime alcohol use reported at age 14. In contrast, the indirect path via internalizing problems was non-significant for boys (95 % CI: -0.112 to 0.293) and for girls (95 % CI: -0.250 to 0.002)

There was also not a direct effect of CSA trajectory on youth-reported sexual intercourse for boys ($\beta=0.20$, n.s.) or girls ($\beta=0.47$, n.s.) (path c in Fig. 2), after controlling for race ($\beta=-0.55$; 95 % CI: -0.846 to -0.275). However, the link from CSA trajectory group to sexual intercourse via caregiver-reported externalizing problems (i.e., the indirect effect; path w2) was significant for both boys (95 % CI: 0.006 to 0.494) and girls (95 % CI: 0.054 to 0.613). The allegations trajectory, but not the no allegations trajectory, operated through externalizing problems to influence sexual intercourse. The indirect path via internalizing problems for sexual intercourse was

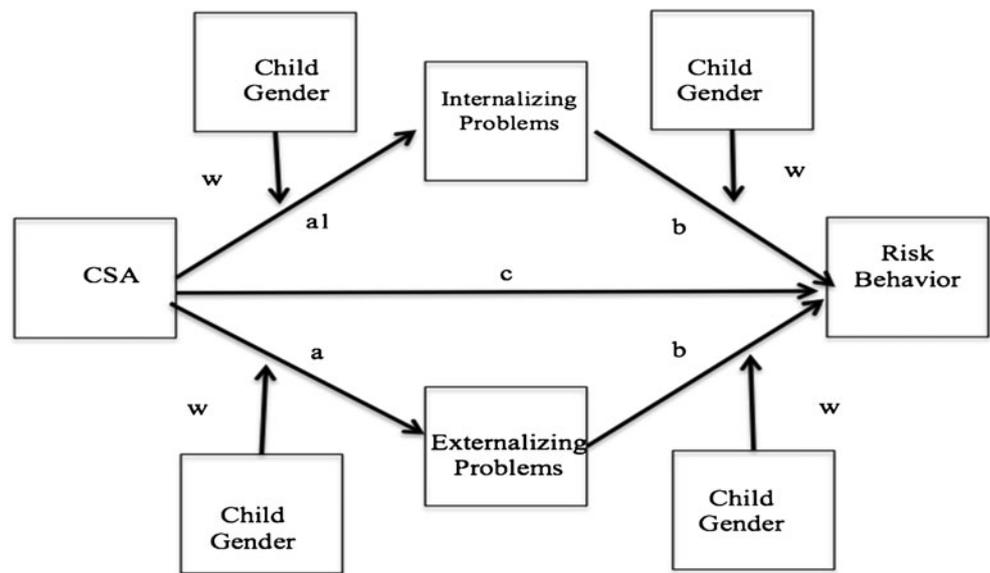
non-significant for boys (95 % CI: -0.422 to 0.018) and girls (95 % CI: -0.169 to 0.106)

Discussion

A robust and consistent literature links CSA in particular, relative to other forms of maltreatment, to later risk behavior, with the bulk of this work to date examining adult women and much of it retrospective. Relatively less attention has been devoted to examining the mechanisms accounting for this link (Senn et al. 2008). With the aim of moving toward the identification of potential targets for prevention and intervention programming, this prospective study examined whether CSA trajectories operated through internalizing and/or externalizing problems to influence adolescent risk behavior at age 14, a vulnerable period of development for risk behavior onset (e.g., NIAAA 2003; US DHHS 2007; Zimmer-Gembeck and Helfand 2008). Of note, findings varied by gender, intervening variable, and risk behavior outcome.

First, it was predicted that CSA allegation group would be linked to risky behavior in early adolescence via increases in internalizing and externalizing problems. Although CSA was not directly associated with either alcohol use or sexual intercourse in the current study, findings revealed an indirect effect via externalizing problems for boys (sexual intercourse) and girls (alcohol use & sexual intercourse). This pattern is consistent with Problem Behavior Theory, which asserts that delinquency and risky behaviors form a syndrome of problematic behavior, which at its core reflects a detachment from convention (e.g., Donovan and Jessor 1985; Jessor et al. 1995; Schofield et al. 2008). Youth with CSA histories may be especially vulnerable to this sense of detachment given the potential betrayal and stigma associated with CSA, as well as caregiver responses to the CSA and its disclosure (e.g., Finkelhor and Browne 1985; Spaccarelli’s 1994; Quina et al. 2003). Specific

Fig. 2 Child gender as a moderator of the intervening pathway from CSA to risk behavior outcomes



aspects of externalizing problems, particularly impulsivity and inattention, may also exacerbate the potential for risk behavior by inhibiting control, planning, and decision-making (e.g., Crockett et al. 2006; McLeod and Knight 2010; Zimmer-Gembeck 2008), especially during early adolescence when spending time with peers is normative (e.g., Cicchetti and Rizley 1981; Cicchetti and Toth 1995).

Yet, although CSA influenced both risk behaviors via externalizing problems for girls, among boys the intervening role of externalizing problems was *specific* to sexual intercourse. As noted earlier, this idea of the specificity of the link between CSA and sexual intercourse in particular has been raised elsewhere, although the findings are mixed (e.g., Kendall-Tackett et al. 1993; Senn et al. 2008; Senn and Carey 2010). Given that our findings regarding specificity are unique to boys, it is possible that inconsistencies in the prior literature is a result of a predominant focus on women and girls in this literature, with fewer investigations of boys or men and even fewer studies examining vulnerabilities by gender within the same analyses. In addition, CSA may operate through externalizing problems to influence the escalation (e.g., getting drunk), rather than lifetime use, in boys. As noted earlier, the current study did not have enough variability in risk behavior outcomes to examine more nuanced risk behavior outcomes. Third, CSA may operate indirectly on the initiation and/or escalation alcohol use for boys through more specific diagnoses (e.g., conduct disorder) or more specific aspects of externalizing problems (e.g., problems with effortful control) more common among boys (see Else-Quest et al. 2006; Zimmer-Gembeck and Helfand 2008 for reviews). Finally, it may be that other intervening variables link CSA to alcohol use in boys (e.g., deviant peer group). These potential explanations are merely hypotheses meriting future studies among youth with CSA histories.

In addition to externalizing problems, we predicted that CSA group would also operate through internalizing problems to influence early risk behavior. This hypothesis stems from the conceptualization of risk behavior as a strategy to numb negative feelings about the self and/or a strategy to induce feelings that have been numbed by the trauma. Prior research suggests that both youth and adults with CSA histories evidence a vulnerability for internalizing problems (e.g., Coohy 2010; Garnefski and Arends 1998; Senn et al. 2008). Findings linking internalizing problems to risk behavior, however, have been less consistent in the broader literature than findings for externalizing problems (e.g., Abrantes et al. 2006; Brown et al. 2010).

With regard to youth with CSA histories in the age range of focus in this investigation, several explanations may help to explain the null findings regarding the indirect effect via internalizing problems. First, internalizing problems typically lead to behavioral deactivation rather than activation, decreasing the number and range of activities of youth and opportunities for risky behavior involvement. In addition, depending on the severity of the internalizing symptoms (e.g., suicidal ideation), youth with internalizing symptoms may be more closely monitored by caretakers, precluding the opportunity to engage in risky behavior. Third, internalizing and externalizing problems were both reported by caregivers; however, sensitivity to internalizing symptoms in particular suggests a level of involvement and awareness on the part of caregivers that may be a marker of a positive parenting style that also includes knowledge of the youth’s activities, decreasing the opportunity for alcohol use or sexual intercourse. That said, a re-analysis of our model with youth-report, rather than caregiver-report, of internalizing symptoms yielded the same pattern of findings [i.e., CSA did not operate through youth-reported internalizing symptoms to influence sexual intercourse (girls CI: -0.17 to 0.11; boys CI:

–0.42 to 0.02) or alcohol use (girls CI: –0.25 to 0.01; boys CI: –0.11 to 0.29). Fifth, youth whose internalizing problems stem from a sense of betrayal or stigmatization associated with the CSA experience may be less likely to risk the involvement and relationships with peers associated with increased opportunity for alcohol use and sexual intercourse (Finkelhor and Browne 1985). Sixth, some work suggests that internalizing problems may lead to escalation (e.g., heavy or problematic alcohol use), but not the initiation, of risk behavior, as well as other substance use (e.g., tobacco) (Lewis et al. 2011; also see Colder et al. 2010 for a review). Finally, internalizing problems are more likely than externalizing problems to onset in adolescence and are more common in girls (see Zahn-Waxler et al. 2008). Thus, internalizing problems may play an intervening role later in adolescence, particularly for girls.

Before moving on, it must be mentioned that there may also be a methodological explanation for the inconsistent pattern of findings between internalizing and externalizing problems. Consistent with Problem Behavior Theory, the CBCL externalizing problems scale includes items that assess impulsivity, inattention, and aggression, but also includes items that assess rule-breaking, including alcohol and other substance use, as well as problems with and thoughts about sex. Accordingly, the indirect effect of CSA on risky behavior through externalizing problems could be a function of overlapping constructs inherent in the age 12 caregiver-report on the CBCL and the youth report of risky behavior at age 14. Although certainly worthy of future study (e.g., utilizing raw scores, rather than T-Scores, on CBCL and conducting analyses both with and without these items; utilizing another problem behavior scale that does not include risk behaviors), item overlap alone is unlikely to have accounted for the link between externalizing and risk behavior in the current study for two reasons: 1). The frequency of boys endorsing sex and alcohol was not statistically different (and T-Scores for externalizing problems was the same in both the sex and alcohol use subsamples), yet externalizing was associated with sex but not alcohol use for boys; 2). Boys and girls reported statistically similar rates of alcohol use, yet externalizing problems were associated with alcohol use for girls but not boys.

Building upon the methodological considerations noted above, several other potential limitations of the study should be noted. First, the sexual intercourse item did not explicitly ask youth to exclude penetration that occurred in the context of the CSA experience; however, a review of the CPS records suggest that only one of the youth whose CSA allegation included penetration endorsed sexual intercourse at age 14 and chi-square analyses revealed no differences on the sexual intercourse item between youth whose allegation(s) ever included penetration and those whose allegation(s) never included penetration. In addition, an examination of intervening variables would ideally occur at age 13 in this investigation (i.e., the midpoint between CSA trajectories from 2 to 14 y.o.

& risk behavior at 14 y.o.); however, LONGSCAN did not conduct an age 13 assessment of internalizing and externalizing problems. That said, trajectory analyses revealed that the typical ages at which CSA experiences occurred fell before the age 12 assessment, suggesting that age 12 may be a reasonable assessment point at which to examine intervening variables. Similarly, it is also plausible that new CSA allegations at age 14, rather than the earlier allegations that were the focus of this investigation, would have a greater impact on risk behavior at age 14. However, only 4 youth in the CSA group had a new CSA allegation at age 14, decreasing the likelihood that the association is better accounted for by CSA at age 14. Fourth, this study examined one moderator, but other moderators should be considered in future work. For example, protective factors, such as history of therapy, as well as risk factors, such as deviant peer involvement, may interrupt or intensify, respectively, the cognitive, affective, and/or behavioral vulnerabilities linking CSA to externalizing problems to risk behavior. Fifth, with regard to substance use, the focus of the current study was on alcohol given its wider availability to 14 year olds than other substances (e.g., Johnston et al. 2009; SAMSHA 2005); however, future work should examine the mechanisms that link CSA to other substances as well, particularly as opportunities for exposure increase.

Finally, as noted earlier, prior work with the LONGSCAN sample found a significant association between CSA and a combined alcohol and sexual intercourse index (Jones et al. 2010). It is plausible then that the resultant loss of variability in our outcomes due to our theoretical decision to examine sex and alcohol separately compromised our ability to detect significant direct effects. Although insufficient variability in sexual intercourse (e.g., sex with multiple partners, condom use) and alcohol use (e.g., frequency of use, getting drunk) existed in the age 14 data, it may be the case that as youth with CSA histories engage in more risk behaviors with age analyses reveal direct effects on these separate risk behaviors as well.

This study also has several strengths. Perhaps most notably, this prospective study represents an initial, but important, step toward examining the mechanisms linking CSA to early onset risky behavior in both boys and girls. Although mechanisms have been a primary focus of theoretical work in this area, far less empirical attention has followed (Senn et al. 2008). In addition, the current study is prospective, affording a previously unparalleled opportunity to follow youth forward across childhood and into adolescence to determine if CSA is associated with the onset of risk behavior at an age of vulnerability. In turn, the current study's findings identify a potential target (externalizing problems) for preventive efforts aimed at ameliorating or delaying the onset of risk behavior among youth with CSA histories.

This study also included boys who have been relatively overlooked in this literature (see Kearney et al. 2010; Senn et al. 2008; Walker et al. 2004 for reviews). Importantly, our

prospective study of boys and girls and our examination of alcohol use and sexual intercourse separately afforded the opportunity to contribute to the growing literature on gender as a moderator of developmental pathways in the field more broadly (e.g., Mash and Barkley 2003; Bell-Dolan et al. 2005; also see Zimmer-Gembeck and Helfand 2008 for a review).

Fourth, confidence in the current findings is strengthened by the use of different sources for each study variable, decreasing the likelihood that associations between maltreatment (CPS report of allegations), internalizing and externalizing problems (caregiver), and risky behavior (adolescent report) were due to a common reporter. Fifth, given the problems associated with the narrow reliance on substantiated cases alone (Hussey et al. 2005; Kohl et al. 2009; Senn et al. 2008), allegations of CSA were included in the current analyses. It is true that some data reveal that even a broader focus on allegations may still yield lower estimates of maltreatment relative to behaviorally specific and self-report measures (Everson et al. 2008; also see Senn et al. 2008 for a review); however, self-reports were not feasible for youth at the age of entry for LONGSCAN, making allegations a reasonable middle ground approach. Finally, more variability in the developmental trajectories among youth with CSA histories may have been expected (e.g., based on duration, frequency, or age of onset of CSA). However, the age of the child victim is also associated with the identity of the perpetrator, duration of the CSA, and use of force, making disentangling these correlates very difficult (see Putnam 2003 for a review). As such, our group-based trajectory modeling approach afforded the capacity to identify qualitatively distinct developmental progressions among youth with CSA histories that may not have been readily identifiable using ad hoc classification rules (Nagin and Odgers 2010).

In summary, our findings have implications both for future research and prevention. With regard to prevention, our findings highlight the role of externalizing problems in the association between CSA and early onset risk behavior and, in turn, a potential more proximal target for prevention. Approaches such as Trauma-Focused Cognitive Behavioral Therapy (TF-CBT; Cohen et al. 2006) afford an evidence-based treatment approach for maltreated youth; however, TF-CBT appears to have benefits for reducing PTSD and depressive symptoms in particular, with less evidence to support reductions in externalizing problems or risk behavior (see Lang et al. 2010 for a review). Thus, our findings highlight the need for risk reduction and prevention programs targeting the unique vulnerabilities for sexual intercourse among girls and boys with CSA histories, as well as alcohol use for girls; however, future work should replicate our gender findings before such distinctions should be pursued.

Finally, this study did not focus on race differences; however, as this work evolves theoretically-driven, culturally-specific models linking CSA to risk-behavior will be critical. For

example, prior work with African American girls has highlighted vulnerabilities associated with marijuana use (e.g., Liao et al. 2002). Future work may consider the unique vulnerabilities associated with marijuana use among African American female CSA survivors in particular.

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