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Pathway From Child Sexual and Physical Abuse to Risky Sex Among Emerging Adults: The Role of Trauma-Related Intrusions and Alcohol Problems

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 A B S T R A C T

Purpose: Some evidence suggests that risk reduction programming for sexual risk behaviors (SRB) has been minimally effective, which emphasized the need for research on etiological and mechanistic factors that can be addressed in prevention and intervention programming. Childhood sexual and physical abuse have been linked with SRB among older adolescents and emerging adults; however, pathways to SRB remain unclear. This study adds to the literature by testing a model specifying that traumatic intrusions after early abuse may increase risk for alcohol problems, which in turn may increase the likelihood of engaging in various types of SRB.

Methods: Participants were 1,169 racially diverse college students (72.9% female, 37.6% black/African-American, and 33.6% white) who completed anonymous questionnaires assessing child abuse, traumatic intrusions, alcohol problems, and sexual risk behavior.

Results: The hypothesized path model specifying that traumatic intrusions and alcohol problems account for associations between child abuse and several aspects of SRB was a good fit for the data; however, for men, stronger associations emerged between physical abuse and traumatic intrusions and between traumatic intrusions and alcohol problems, whereas for women, alcohol problems were more strongly associated with intent to engage in risky sex.

Conclusions: Findings highlight the role of traumatic intrusions and alcohol problems in explaining paths from childhood abuse to SRB in emerging adulthood, and suggest that risk reduction programs may benefit from an integrated focus on traumatic intrusions, alcohol problems, and SRB for individuals with abuse experiences.

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 IMPLICATIONS AND
 CONTRIBUTION

This study provides support for a pathway from childhood abuse to risky sexual behavior in emerging adulthood that operates through traumatic intrusions and alcohol problems. Risk reduction programs that employ an integrated focus on traumatic intrusions, alcohol problems, and risky sexual behavior may be particularly effective for individuals with abuse histories.

Reducing sexually transmitted infections (STIs) and unintended pregnancies among adolescents and young adults in the United States is a top priority for *Healthy People 2020* [1]. Adolescents and emerging adults are especially likely to report sexual risk behavior (SRB) including sex with multiple

partners, sex while using substances, and inconsistent condom use [2]. Such behaviors are associated with human immunodeficiency virus (HIV) infection, other STIs, and unintended pregnancy [2,3]. Nearly half of the 19 million new STIs each year are among young people aged 15–24 years [3]. Understanding factors that may increase the likelihood of SRB during emerging adulthood is an important public health goal.

Adverse childhood experiences, including a history of child sexual and physical abuse, may increase the likelihood of engaging in SRB among emerging adults [4–7]. Most studies examining associations between child abuse and adolescent/

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emerging adult sexual behavior have focused on the long-term effects of child sexual abuse (CSA) in female samples [4–6] and found that those with CSA histories report more lifetime sexual partners [4,6] and more episodes of unprotected sex [6] compared with women without such histories. Furthermore, among children with documented maltreatment histories who were observed into adulthood, the odds of prostitution and HIV were more than twice the odds of prostitution and HIV among non-abused matched controls [7]. Increased exposure to adverse childhood experiences (including sexual and physical abuse) have been associated with increased risk of STIs [8]. Although factors such as emotion dysregulation [4] and traumagenic dynamics [6,9] have been posited to explain associations between child abuse and SRB, these explanations often do not consider contextual factors, such as alcohol use, that may increase risk for SRB.

Alcohol use and problems, which are highly prevalent among college students [10], have been linked with both childhood adversity [5] and SRB [11]. Researchers have suggested that alcohol use among adult victims of child abuse may set the stage for SRB [12], perhaps by aiding victims to overcome sexual inhibition and increasing comfort in sexual situations [13]. As reviewed by Cooper [11], alcohol myopia theory suggests that alcohol may increase SRB in ambivalent situations in which there are strong reasons for and against having sex (e.g., increase positive affect vs. avoid STIs). In naturalistic settings, acute alcohol intoxication has been associated with increased intentions to engage in SRB [14] and reduced assertiveness in response to requests for unprotected sex [15]. In clinical settings, alcohol and drug dependence symptoms have been shown to mediate associations between child abuse and both intoxicated and unprotected sex [16]. Furthermore, one study found that 41% of college women and 36% of college men report negative alcohol-related sexual consequences including unprotected sex, having sex with someone they would not have if sober, and unwanted sex [17]. However, stable individual differences in drinking have not been found to fully explain SRB (for review, see [11]), and risk reduction programs targeting alcohol use or problems and SRB have been minimally effective in reducing SRB [18]. Thus, there may be value in continued research on etiological and mechanistic factors that may increase risk for alcohol problems and SRB.

A significant period of time may have elapsed between child abuse and more temporally proximal alcohol problems and SRB, which raises questions about whether other processes occurring in the interim may contribute to the development of risk behaviors and serve as an effective target for interventions. A number of theories have been proposed to explicate how early sexual and physical abuse may lead to adult risk behaviors, including the development of traumagenic dynamics [9] and emotion dysregulation [4]. Traumagenic dynamics theory postulates that sexual abuse shapes beliefs that sex can be used for affection or rewards [9], whereas emotion regulation theory suggests that sex may briefly relieve negative affect by increasing positive emotions and feelings of intimacy [4]. Although post-traumatic stress disorder (PTSD) is one of the most common and impairing conditions associated with early physical and sexual abuse [19], surprisingly few studies have examined whether trauma symptoms explain the relationship between early abuse and alcohol problems and SRB in early adulthood. Those with abuse histories may use alcohol to cope with distressing trauma symptoms or the traumagenic

outcomes of abuse (e.g., feelings of betrayal or powerlessness). Some studies have found that trauma symptoms mediate the association between childhood sexual abuse and alcohol use among adult women [20] without considering the role of SRB or other types of child abuse. Other studies of highly trauma-exposed and socioeconomically disadvantaged women have documented associations between PTSD and SRB [21] without considering the role of alcohol use/problems or child abuse.

Although emerging adulthood is a period in which alcohol use/problems and SRB peak [22], and there is evidence that early child abuse may increase risk for both outcomes [6], there is a dearth of information on associations between child abuse, traumatic intrusions, alcohol problems, and SRB among male and female college students. The current study used data from a large sample of ethnically diverse male and female college students to test a path model from child physical or sexual abuse to various types of SRB that operates through traumatic intrusions and alcohol problems. Because numerous studies have suggested that alcohol use or problems may increase the likelihood of SRB [12], the authors hypothesized a directional relationship between these variables such that alcohol problems preceded SRB in the path model. To examine whether this temporal sequence best fit the data, the researchers tested two alternate models: The first specified concurrent alcohol problems and SRB, and the second specified SRB leading to alcohol problems. Because much of the research to date on child abuse and risky sexual behavior has focused on women [4–6], the authors examined whether the hypothesized path model fit the data well for both men and women.

Method

Participants

Participants were 1,169 racially diverse college students (72.9% female) at a large, public, urban Southeastern university where most of the student body (64%) is ethnic minority. More than 90% of students receive some financial aid and more than 50% receive needs-based grants or scholarships. The average age was 20.7 (standard deviation, 4.65). Of the sample, 37.6% ($n = 439$) were black/African-American, 33.6% ($n = 393$) were white, and 14.5% ($n = 169$) were Asian/Asian-American.

Measures

Childhood Trauma Questionnaire. The Childhood Trauma Questionnaire (CTQ) [23] is a 28-item measure of Likert-type questions designed to screen for child physical, sexual, and emotional abuse as well as physical and emotional neglect while growing up. The physical (five items) and sexual (five items) abuse subscales were the focus of the present study. A sample physical abuse item is “I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor,” and a sample sexual abuse item is “Someone tried to touch me in a sexual way or tried to make me touch them.” Response options range from 1 = “never true” to 5 = “very often true,” and are summed to create continuous physical and sexual abuse severity scores, which were used in path analyses. Cut scores of ≥ 6 for CSA and ≥ 8 for CPA were used to estimate the prevalence of low to moderate abuse [23]. Numerous investigations attest to the reliability and validity of scores on this measure [24]. Cronbach alpha was .94

for the sexual abuse subscale and .82 for the physical abuse subscale.

Inventory of Depression and Anxiety Symptoms. The Inventory of Depression and Anxiety Symptoms (IDAS) [25] is a 64-item measure of depression and anxiety symptoms experienced during the previous 2 weeks. Participants respond to each Likert-type item on a 5-point scale ranging from “not at all” to “extremely.” The IDAS has excellent internal consistency and reliability and good psychometric properties [26]. The four-item Traumatic Intrusions scale (e.g., “I had disturbing thoughts about something bad that happened to me”), which correlates strongly with clinical diagnoses of PTSD [26], was used here. Cronbach alpha for the Traumatic Intrusions scale was .86.

Rutgers Alcohol Problem Index. The Rutgers alcohol problem Index (RAPI) [27] is a 23-item measure of problems experienced because of alcohol use in the past 6 months. A sample item is “I went to work or school high or drunk.” Participants respond to each Likert-type item on a 5-point scale ranging from 0 (“never”) to 4 (“more than 10 times”). The RAPI has shown good reliability, internal consistency, and validity with young adults [27]. Cronbach alpha for the scale was .96.

Sexual Risk Survey. The Sexual Risk Survey (SRS) [28] is a 23-item self-report scale that measures the number of times participants engaged in various types of SRB (e.g., sex with someone they just met, unprotected sex) and the number of partners with whom they engaged in such behaviors over the previous 6 months. The SRS contains five subscales assessing risky sex with uncommitted partners (eight items; e.g., “Had sex with a partner I didn’t trust”), risky sex acts (five items; e.g., “Had vaginal sex without a condom”), impulsive sex (five items; e.g., “Had sex with an acquaintance”), intent to engage in risky sex (two items; e.g., “Intended to engage in sex”), and risky anal sex acts (three items; e.g., “Had anal sex without a condom”). Responses are summed to create subscale scores. In the initial validation study with a college student sample, scores on the SRS were internally consistent ($\alpha = .88$) and stable over a 2-week period ($r = .93$) [28]. Cronbach alphas were .90 for risky sex with uncommitted partners, .84 for risky sex acts, .78 for impulsive sex, .79 for intent to engage in risky sex, and .72 for risky anal sex acts.

Procedures

All procedures and materials for the study were approved by the institutional review board for human subjects research. Participants were recruited from an online departmental research participation pool for a study of “personality and behavior” and received credit in partial fulfillment of a research requirement for an introductory psychology class. All questionnaires were completed electronically.

Analytic plan

The authors initially examined descriptive information and bivariate correlations and then fit a path model in Mplus, version 6.0 [29]. They fit a model specifying that traumatic intrusions and alcohol problems serve as mediators in the path from child abuse to various types of SRB. The final path model included two exogenous variables, child sexual abuse and child physical abuse, and seven endogenous variables: traumatic intrusions, alcohol

problems, sex with uncommitted partners, risky sex acts, impulsive sex, intent to engage in risky sex, and risky anal sex. Model fit was evaluated using Kline’s [30] recommendation that the model chi-square statistic be nonsignificant and Hu and Bentler’s [31] recommendations that the Comparative Fit Index (CFI) be $>.95$, the root mean square error of approximation (RMSEA) be $\leq .06$, and the standardized root mean square residual (SRMR) be $<.08$. The authors also examined the significance of the indirect path from child abuse through traumatic intrusions and alcohol problems to each form of SRB using the MODEL INDIRECT command in Mplus. They tested model invariance across men and women using multi-group analyses that first tested the fit of an unconstrained model across gender and then tested the fit of a constrained model, and used the chi-square difference test to examine whether model fit significantly worsened. To examine whether the hypothesized temporal ordering provided the best fit to these data, the researchers conducted sensitivity analyses examining the fit of two alternate models: The first tested a model with alcohol problems and SRB co-occurring, and the second tested a model with alcohol problems resulting from SRB. Finally, because the sample contained a large proportion of African-American students, the authors examined African-American race (vs. other) as a covariate in models.

Results

Table 1 presents descriptive information overall and by gender. Skewness for the SRB variables ranged from 1.1 to 3.8; a base-10 log transformation was applied to the four subscales with skewness between 1.1 and 2.9; an inverse transformation was applied to the fifth subscale, which had a skewness value of 3.8. Approximately 32% ($n = 374$) of participants screened positive for CSA and 41.5% ($n = 483$) screened positive for physical abuse. The sexual abuse item “Someone tried to touch me in a sexual way, or tried to make me touch them” and the physical abuse item “I was punished with a belt, a board, a cord, or some other hard object” (corporal punishment) were the most frequently endorsed for each type of abuse. Men had more physical abuse, alcohol problems, sex with uncommitted partners, impulsive sex, intent to engage in risky sex, and risky anal sex compared with women. Correlations among the study variables are presented for women and men in Table 2. Significant, positive bivariate associations emerged between both forms of child abuse, traumatic intrusions, alcohol problems, and most aspects of SRB; there was no association between CSA and risky sex acts or risky anal sex for men and no association between CPA

Table 1
Means (standard deviations) of study variables overall and by gender

	Overall	Men	Women	<i>p</i>
CSA	7.30 (4.4)	7.45 (4.19)	7.24 (4.4)	.45
CPA	8.16 (3.9)	8.83 (4.1)	7.92 (3.8)	<.001
Traumatic intrusions	7.70 (3.7)	7.56 (3.5)	7.76 (3.8)	.55
Alcohol problems	30.1 (11.3)	32.5 (12.7)	29.22 (10.6)	<.001
Sex with uncommitted partners	4.84 (6.50)	5.85 (7.79)	4.46 (5.91)	<.001
Risky sex acts	4.0 (4.3)	3.73 (4.30)	3.96 (4.31)	.41
Impulsive sex	2.69 (3.25)	3.92 (4.09)	2.23 (2.74)	<.001
Intent of risky sex	.57 (1.36)	1.40 (2.04)	.27 (.82)	<.001
Risky anal sex	.57 (1.59)	.78 (1.93)	.50 (1.43)	<.01

CPA = child physical abuse; CSA = child sexual abuse.

Table 2
Correlations among study variables for women/men

	1	2	3	4	5	6	7	8	9
1. CSA		.53***/.77***	.31***/.45***	.31***/.48**	.09**/.15**	.12***/.07	.08**/.21***	.05/.23***	.10**/.10
2. CPA			.36***/.40***	.40***/.46***	.13***/.19***	.05/.07	.09**/.17***	.03/.19**	.12***/.12*
3. Traumatic intrusions				.43***/.54***	.20***/.32***	.13**/.16***	.16***/.31***	.09/.28***	.04/.03
4. Alcohol problems					.25***/.32***	.14***/.24***	.29***/.33***	.25***/.34***	.11***/.17**
5. Uncommitted partners						.52***/.59***	.62***/.70***	.32***/.59***	.21***/.34***
6. Risky sex acts							.31***/.45***	.16***/.39***	.21***/.27***
7. Impulsive sex								.45***/.67***	.15***/.21***
8. Intent of risky sex									.05/.12*
9. Risky anal sex									

CPA = child physical abuse; CSA = child sexual abuse.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

and risky sex acts for either gender. Furthermore, traumatic intrusions were not associated with risky anal sex for either gender.

The unconstrained path model specifying relationships among CSA, CPA, traumatic intrusions, alcohol problems, and each of the five risky sex subscales was an excellent fit for these data, $\chi^2[2] = .39$; $p = .82$; RMSEA = .001; SRMR = .003; CFI = 1.0. A model constraining paths across men and women also fit the data well, $\chi^2[26] = 58.4$; $p < .001$; RMSEA = .046; SRMR = .05; CFI = .98, but was a significantly worse fit, $\chi^2\Delta = 58.01$, $df\Delta = 24$. Figures 1 and 2 present standardized path coefficients for women and men, respectively; all hypothesized paths were significant and positive. All direct and indirect effect estimates and standard errors are presented in Table 3. As noted in the last column of Table 3, there were significant differences between women and men in the direct paths from CPA to traumatic intrusions, traumatic intrusions to alcohol problems, and alcohol problems to intent to engage in risky sex. As noted at the bottom of Table 3, the indirect paths from both forms of abuse through

traumatic intrusions and alcohol problems to each form of SRB were significant for men and women.

Sensitivity analyses

A model specifying co-occurring alcohol problems and SRB rather than a directional relationship between alcohol problems and SRB was a poorer fit for these data, $\chi^2(12) = 139.6$; $p < .001$, RMSEA = .09; SRMR = .05; CFI = .94. A model specifying alcohol problems after SRB was an unacceptable fit for these data, $\chi^2(26) = 1,490.4$; $p < .001$; RMSEA = .31; SRMR = .17; CFI = .29. The authors also added African-American race to the model as a predictor of sexual and physical abuse; model fit declined minimally, $\chi^2(42) = 139.3$; $p < .001$, RMSEA = .06; SRMR = .056; CFI = .96, and African-American race (vs. other) was positively associated with CSA (women = .10, $p < .001$; men = .11, $p < .001$) and CPA (women = .15, $p < .001$; men = .14, $p < .001$) in men.

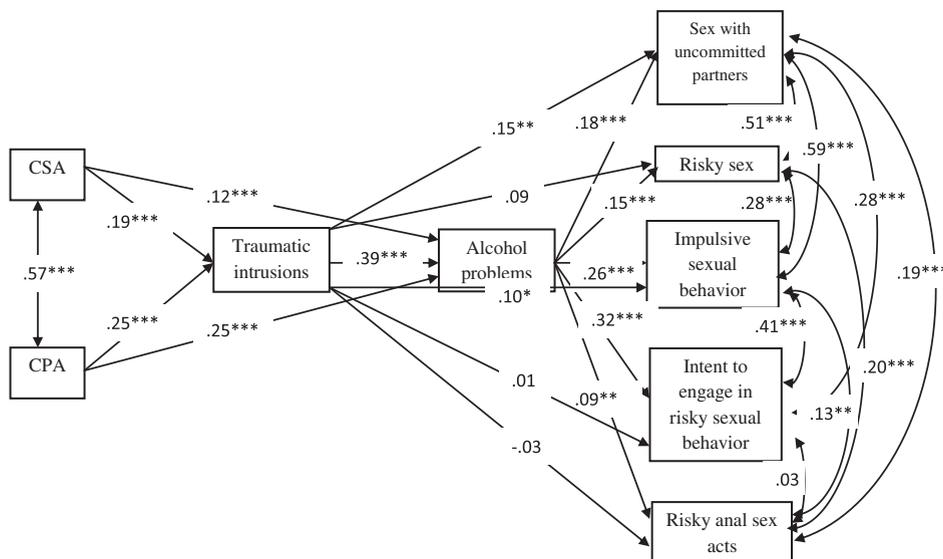


Figure 1. Path model predicting alcohol problems and risky sexual behavior for women.

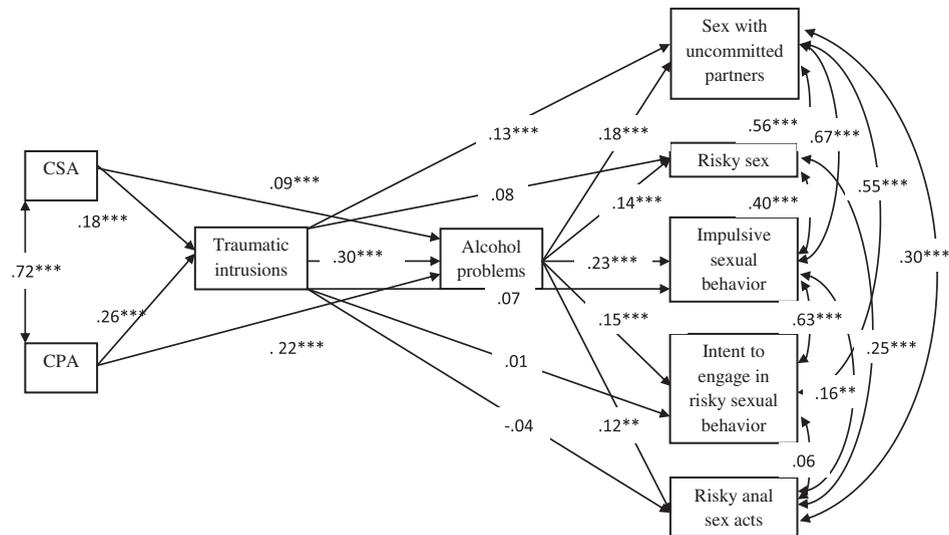


Figure 2. Path model predicting alcohol problems and risky sexual behavior for men.

Discussion

The current study is the first, of which the authors are aware, to test a path model specifying that traumatic intrusions and alcohol problems help to explain relationships between child physical and sexual abuse and various forms of SRB in a sample of male and female college students. Unique aspects of this study included a racially diverse sample of male and female college students and assessment of sexual and physical abuse experiences, as well as a variety of SRB in relation to both traumatic intrusions and alcohol problems. The hypothesized model fit the data well and findings suggested that traumatic intrusions and (past 6-month) alcohol problems may explain the link between child abuse and SRB. More specifically, child abuse victims with traumatic intrusions who had higher levels of alcohol problems were more likely to report engaging in various types of SRB, including sex with uncommitted partners, risky sex acts, impulsive sex, intentions to engage in risky sex, and risky anal sex. Results of constrained models suggested gender differences in the strength of relationships such that men had stronger associations between CPA and traumatic intrusions and between traumatic intrusions and alcohol problems, whereas women had stronger associations between alcohol problems and intent to engage in risky sex.

Rates of reported child sexual abuse in this sample (32%), although high, fall within the range reported in the literature for college student samples (for a review, see [32]). However, the prevalence of reported child physical abuse (41.5%) is higher than the prevalence typically reported with college samples [33]. It is possible that higher rates of childhood physical abuse were partly the result of characteristics of the sample. The most commonly endorsed item on the physical abuse subscale relates to corporal punishment (“I was punished with a belt, a board, a cord, or some other hard object”), and research indicates that African-American race and low socioeconomic status are risk factors for corporal punishment [34]. Findings are consistent with research suggesting that child abuse victims are more likely to have alcohol problems

and engage in SRB [4] but suggest that these relationships are not specific to sexual abuse, as some prior work suggests [6]. Findings also support research from the Adverse Childhood Experiences study suggesting that the long-term health consequences of childhood sexual abuse are similar for men and women [35]. However, in the current study, physical abuse had more of an impact on traumatic intrusions and traumatic intrusions had a stronger impact on alcohol problems for men than for women. Alcohol problems were more strongly associated with intent to engage in risky sex for women than for men. Additional research is necessary to better understand the observed gender differences; if findings are replicated, it may be important to consider gender differences when developing prevention and intervention programming for college students.

Results highlight the role of traumatic intrusions in predicting alcohol problems, which is consistent with research suggesting that alcohol may serve to self-medicate distress among trauma-exposed individuals [36]. Findings also converge with research suggesting that individuals with a history of child abuse and alcohol problems may have a greater likelihood of engaging in SRB [12]. Drinking to the point of experiencing alcohol problems may increase SRB by diminishing sexual inhibitions [13] or increasing problems with sexual assertiveness [15]. Per alcohol myopia theory, results suggest that college students with problematic alcohol use may be more likely to focus on the short-term benefits of sexual behavior and overlook the potential for negative consequences (for review, see [37]).

Findings from the current study should be considered in the context of limitations. Although the hypothesized model was supported in the present study and alternate models were a worse fit, data were cross-sectional, which precludes definitive statements about the temporal ordering of the study variables. Longitudinal studies are needed to draw more definitive conclusions regarding temporal relations among these variables. In addition, trauma symptoms were assessed in the form of traumatic intrusions, rather than assessing post-traumatic symptoms more generally or those stemming specifically from sexual

Table 3

Direct and indirect estimates for final model

	Women	Men	Difference
	Estimate (SE)	Estimate (SE)	Estimate (SE)
Direct			
CSA → traumatic intrusions	.19 (.05)***	.18 (.05)***	.19 (.12)
CPA → traumatic intrusions	.25 (.04)***	.26 (.05)***	.25 (.13)*
CSA → alcohol problems	.12 (.04)***	.09 (.03)***	.24 (.28)
CPA → alcohol problems	.25 (.04)***	.22 (.03)***	-.04 (.28)
CSA → sex with uncommitted partners	-.05 (.04)	-.04 (.03)	-.01 (.02)
CSA → risky sex acts	.06 (.04)	.05 (.03)	-.02 (.01)
CSA → impulsive sex	-.01 (.04)	-.01 (.03)	.007 (.009)
CSA → intent of risky sex	.02 (.04)	.01 (.02)	.008 (.006)
CSA → risky anal sex	.03 (.04)	.03 (.04)	.004 (.005)
CPA → sex with uncommitted partners	.02 (.04)	.02 (.03)	.01 (.01)
CPA → risky sex acts	-.08 (.04)*	-.08 (.04)	.007 (.01)
CPA → impulsive sex	-.04 (.04)	-.03 (.03)	.001 (.009)
CPA → intent of risky sex	-.08 (.04)*	-.04 (.02)	.01 (.006)
CPA → risky anal sex	.06 (.04)	.07 (.04)	-.001 (.005)
Tr. int → alcohol problems	.30 (.05)***	.39 (.06)***	.57 (.27)*
Tr. int → sex with uncommitted partners	.15 (.05)**	.13 (.04)**	.01 (.02)
Tr. int → risky sex acts	.09 (.05)	.08 (.05)	-.005 (.01)
Tr. int → impulsive sex	.10 (.05)	.07 (.04)	.004 (.01)
Tr. int → intent of risky sex	.01 (.05)	.01 (.02)	.001 (.008)
Tr. int → risky anal sex	-.03 (.05)	-.04 (.05)	.001 (.007)
Alc. prob → sex with uncommitted partners	.18 (.04)***	.18 (.04)***	.001 (.003)
Alc. prob → risky sex acts	.12 (.05)***	.14 (.04)**	.004 (.003)
Alc. prob → impulsive sex	.26 (.04)***	.23 (.03)***	.001 (.003)
Alc. prob → intent of risky sex	.32 (.04)***	.15 (.02)***	.003 (.002)*
Alc. prob → risky anal sex	.09 (.01)**	.12 (.04)**	.001 (.002)
Indirect			
CSA → Tr. int → Alc. prob → sex with uncommitted partners	.024 (.008)**	.018 (.006)**	
CSA → Tr. int → Alc. prob → risky sex acts	.016 (.006)	.013 (.005)*	
CSA → Tr. int → Alc. prob → impulsive sex	.030 (.01)***	.023 (.007)**	
CSA → Tr. int → Alc. prob → intent of risky sex	.040 (.013)***	.015 (.005)**	
CSA → Tr. int → Alc. prob → risky anal sex	.011 (.03)*	.011 (.005)*	
CPA → Tr. int → Alc. prob → sex with uncommitted partners	.030 (.009)***	.026 (.008)***	
CPA → Tr. int → Alc. prob → risky sex acts	.020 (.007)**	.020 (.007)**	
CPA → Tr. int → Alc. prob → impulsive sex	.040 (.011)***	.034 (.009)***	
CPA → Tr. int → Alc. prob → intent of risky sex	.052 (.013)***	.022 (.006)***	
CPA → Tr. int → Alc. prob → risky anal sex	.015 (.006)*	.017 (.007)*	
Variance (R²)			
Traumatic intrusions	.16 (.03)***	.19 (.05)***	
Alcohol problems	.25 (.03)***	.37 (.05)***	
Sex with uncommitted partners	.08 (.02)***	.13 (.04)***	
Risky sex acts	.04 (.02)**	.06 (.03)*	
Impulsive sex	.09 (.02)***	.12 (.04)***	
Intent of risky sex	.07 (.02)***	.12 (.03)***	
Risky anal sex	.02 (.009)*	.03 (.02)*	

Alc. prob = alcohol problems; CPA = child physical abuse; CSA = child sexual abuse; SE = standard error; Tr. int = Traumatic intrusions.

* $p < .05$.** $p < .01$.*** $p < .001$.

or physical abuse. Although the approach used in the current study captures an aspect of psychopathology that is unique to post-traumatic sequelae, alcohol problems could also develop in relation to other trauma symptoms (e.g., sleep problems, hyperarousal); thus, it would be interesting to investigate the role of trauma symptoms more generally in future studies. The use of an undergraduate sample may also limit the generalizability of these findings, because participants may not be representative of all emerging adults. Future studies should extend these findings to more diverse populations, including those with less education, clinical levels of symptomatology, and a greater proportion of men. Nonetheless, the racially diverse sample represents a significant strength of the current study. Finally, models only accounted for 2% to 13% of the variance in different SRBs, which underscores the notion that SRB is influenced by

factors at multiple levels ranging from individual to societal. However, understanding even a small proportion of the variance in high-risk sexual behavior has public health relevance and can guide the development of more effective prevention efforts. Although this study focused on individual-level factors, it will be important for future studies to consider interactions between individual-level and contextual variables to account for a greater proportion of the variance in SRB [38].

Despite these limitations, the findings have potentially important implications. Some work indicates that alcohol and SRB-focused interventions are minimally effective in reducing SRB [18], and programming implemented on college campuses to address alcohol consumption and binge drinking often fails to discuss the risk for SRB that can occur in the context of alcohol use [39]. Thus, there may be value in evaluating the effectiveness

of integrated interventions targeting alcohol problems, SRB, and traumatic intrusions concomitantly, when appropriate, rather than treating these behaviors and symptoms as unrelated entities. Furthermore, the gender differences observed here suggest that gender may be a key variable for which to tailor risk reduction programs for drinking problems or SRB.

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