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Complexity of Childhood Sexual Abuse: Predictors of Current Post-Traumatic Stress Disorder, Mood Disorders, Substance Use, and Sexual Risk Behavior Among Adult Men Who Have Sex with Men

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Abstract Men who have sex with men (MSM) are the group most at risk for HIV and represent the majority of new infections in the United States. Rates of childhood sexual abuse (CSA) among MSM have been estimated as high as 46 %. CSA is associated with increased risk of HIV and greater likelihood of HIV sexual risk behavior. The purpose of this study was to identify the relationships between CSA complexity indicators and mental health, substance use, sexually transmitted infections, and HIV sexual risk among MSM. MSM with CSA histories ($n = 162$) who were screened for an HIV prevention efficacy trial completed comprehensive psychosocial assessments. Five indicators of complex CSA experiences were created: CSA by family member, CSA with penetration, CSA with physical injury, CSA with intense fear, and first CSA in adolescence. Adjusted regression models were used to identify relationships between CSA complexity and outcomes. Participants reporting CSA by family member were at 2.6 odds of current alcohol use disorder (OR 2.64: CI 1.24–5.63), two times higher odds of substance use disorder (OR 2.1: CI 1.02–2.36), and 2.7 times higher odds of reporting an STI in the past year (OR 2.7: CI 1.04–7.1). CSA with penetration was associated with increased likelihood of current PTSD (OR 3.17: CI 1.56–6.43), recent HIV sexual risk behavior (OR 2.7: CI 1.16–6.36), and a greater number of casual sexual partners ($p = 0.02$). Both CSA with Physical Injury (OR 4.05: CI 1.9–8.7) and CSA with Intense Fear (OR 5.16: CI 2.5–10.7) were related to increased odds for current PTSD. First CSA in adolescence was related to increased odds of major depressive disorder. These findings suggest that CSA, with one or more complexities, creates patterns of vulnerabilities for MSM, including post-traumatic stress disorder, substance use, and sexual risk taking, and suggests the need for detailed assessment of CSA and the development of integrated HIV prevention programs that address mental health and substance use comorbidities.

Keywords Men who have sex with men (MSM) · Childhood sexual abuse (CSA) · PTSD · HIV · Sexual orientation

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Introduction

Childhood Sexual Abuse: Mental Health and Sexual Health Consequences

In the extant literature, childhood sexual abuse (CSA) has emerged as a non-specific risk factor for a range of negative health and mental health sequelae in adults. For instance, CSA has been associated with mental health problems such as depression and post-traumatic stress disorder (PTSD), as well as substance use disorders (e.g., Browne & Finkelhor, 1986; Maniglio, 2010; Neumann, Houskamp, Pollock, & Briere, 1996; Suvak, Brogan, & Shipherd, 2012). In addition to mental health and substance abuse problems, CSA has been associated with sexual risk behavior, sexual dysfunction, and interpersonal difficulties (i.e., impaired

social cognitions, emotional lability, and poor interpersonal relatedness) among adults (e.g., Neumann et al., 1996; Van Bruggen, Runtz, & Kadlec, 2006). Several studies have revealed an association between CSA and sexual risk variables including unprotected sex, sex with multiple partners, and engaging in sex trading among women (Arriola, Louden, Doldren, & Fortenberry, 2005; Fargo, 2009; Gidycz, Coble, Latham, & Layman, 1993; Kaltman, Krupnick, Stockton, Hooper, & Green, 2005; Suvak et al., 2012).

Childhood Sexual Abuse Among Gay, Bisexual, and Other Sexual Minority Men

Although much of the extant literature has focused on the victimization of women, estimates of CSA among gay and bisexual men reach as high as 47 % (Arreola, Neilands, Pollack, Paul, & Catania, 2008; Lenderking et al., 1997; Mimiaga et al., 2009; O'Cleirigh, Safren, & Mayer, 2012). As a group, gay and bisexual adults report more childhood psychological and physical abuse by parents and caretakers (i.e., family members) than their heterosexual siblings of the same sex, and more CSA (Balsam, Rothblum, & Beauchaine, 2005). In a study of young gay and bisexual men (ages 15–22), 68 % of the sample reported experiencing verbal and physical violence victimization from family members (Koblin et al., 2006). A growing body of research on gay and bisexual men's health has revealed correlates of CSA that parallel those first established among women. Specifically, gay and bisexual men with CSA histories are more likely to experience negative emotional, cognitive, and interpersonal outcomes as adults, including depression, suicidal ideation, substance abuse, and sexual risk-taking behavior compared to gay and bisexual men without CSA histories (Bartholow et al., 1994; Brennan, Hellerstedt, Ross, & Welles, 2007; Kalichman, Gore-Felton, Benotsch, Cage, & Rompa, 2004; Lloyd & Operario, 2012; Relf, 2001b; Stall et al., 2003). Further, these early experiences of victimization appear to put gay and bisexual men at increased risk for subsequent experiences of violence and abuse in adulthood, including increased risk of victimization in their adult romantic relationships (Balsam, Lehavot, & Beadnell, 2011; Balsam et al., 2005; Koblin et al., 2006; Lalor & McElvaney, 2010).

Childhood Sexual Abuse in the Context of HIV Risk and Prevention

Among gay, bisexual, and other men who have sex with men (herein MSM for each of these groups), CSA history has been consistently associated with increased risk for HIV acquisition (Lim et al., 2010; Lloyd & Operario, 2012; Mimiaga et al., 2009; O'Cleirigh et al., 2011; Stall et al., 2003). In addition, CSA has been linked to a variety of sexual risk behaviors among MSM including unprotected anal sex with a non-primary partner, serodiscordant unprotected anal sex, sex with multiple partners, and sex in exchange for money or drugs (Bartholow et al., 1994; Brennan et al., 2007; Carballo-Diéguez & Dolezal, 1995; Kalichman et al., 2004; Lenderking et al., 1997; O'Leary, Purcell, Remien, & Gomez, 2003; Paul, Catania, Pollack, & Stall, 2001; Relf, 2001a; Stall et al., 2003). The experience of violence in MSM's adult romantic relationships has also been associated with unprotected sex and HIV acquisition (Merrill & Wolfe, 2000; Nieves-Rosa, Carballo-Dieguez, & Dolezal, 2000; Relf, Huang, Campbell, & Catania, 2004). Thus, MSM are at increased risk of HIV acquisition both in primary and non-primary sexual relationships. In primary relationships, MSM with CSA histories are more likely to report feeling unsafe requesting that their abusive partners use barrier protection (Heintz & Melendez, 2006). Preliminary evidence from HIV prevention trials suggests that sexual risk reduction interventions may be less effective for MSM who have CSA histories (Crepaz et al., 2006; Mimiaga et al., 2009; Safren, Reisner, Herrick, Mimiaga, & Stall, 2010). These findings suggest the need for better understanding of those constructs linking CSA to sexual risk that may be achieved by more nuanced assessment of CSA.

Assessment of Childhood Sexual Abuse

The correlation between CSA and HIV risk is well established among MSM, although exact mechanisms remain unclear. One of the main limitations of the current literature is that the way in which CSA is operationalized (often as a binary indicator) discounts the within-group heterogeneity of experiences. Defining CSA in this way dilutes the lived experiences of victims for whom CSA can represent a single-event that is incongruent within a survivor's context ("an anomaly"); or, CSA may represent just one event in the context of pervasive interpersonal abuse and neglect ("the norm"). In support of a more nuanced conceptualization of CSA, previous researchers have highlighted the importance of abuse characteristics such as duration, age of first experience, use of threat or harm, and abuse involving penetration, in understanding post-traumatic adjustment, including coping style and risk for mental health and substance abuse problems (Cloitre & Rosenberg, 2006; Merrill, Guimond, Thomsen, & Milner, 2003).

In addition, recent research on the nuance of defining and characterizing CSA experiences among MSM suggests that there may be additional considerations when defining CSA for this population. For instance, some researchers have taken a closer examination of the consequences of childhood sexual experience with older partners (i.e., partners prior to the age of 13 who are at least four years older) among MSM (e.g., Arreola et al., 2008; Carballo-Dieguez, Balan, Dolezal, & Mello, 2012). Carballo-Dieguez et al. only define the subset of these experiences, namely, experiences where the child felt emotionally or physically hurt as a result of CSA. Carballo-Dieguez et al. suggest that not enough attention has been paid to the perceptions of survivors of the events, such as whether or not men choose to label these childhood sexual experiences as abuse (Carballo-Dieguez & Dolezal, 1995; see also Rind, Tromovitch, & Bauserman, 1998).

A few studies have found that only MSM who perceived force or coercion as part of their childhood sexual experiences reported poor adjustment, including depression and suicidal ideation (Arreola et al., 2008; Stanley, Bartholomew, & Oram, 2004). Importantly though, MSM who reported childhood sexual experiences with older partners (with and without force/coercion) were more likely to engage in HIV sexual risk behaviors compared to MSM without these experiences (Arreola et al., 2008). It is also important to note here that these authors rely on adult retrospective perceptions experiences from childhood, and do not adequately acknowledge how easily these perceptions can be distorted by post-traumatic sequelae, such as guilt or denial (for detailed summary of this argument, see Dallam et al., 2001; Ondersma, Chaffin, Berliners, Cordon, & Goodman, 1998). Although most adults who experienced CSA do not go on to have negative sequelae, this does not mean that adult–child sex is not harmful to children (Dallam et al., 2001; Ondersma et al., 1998). Further, a recent study on the labeling of CSA experiences, among HIV-positive MSM, suggests that negative mental health sequelae are present regardless of how the survivor labels the experience (Valentine & Pantalone, 2013). Despite wide disagreement in the field, these findings highlight that it is important to distinguish between forced/coercive sex and consensual sex when reporting findings regarding childhood sexual experiences, and this is particularly true when discussing the childhood sexual experiences of MSM.

These nuances and characteristics are thought to represent CSA complexities that warrant further study. Five dimensions, or complexity indicators, were investigated in this study because they may contribute to making the traumatic experience more difficult given their association with greater disturbance and impact upon functioning, and because they may predict distress or disturbance into adulthood complicating assessment and treatment. Thus, we define complexity indicators as those characteristics, supported by previous work, that influence negative health outcomes and complicate assessment and treatment of sexual trauma for MSM.

There is currently no gold standard for the measurement of CSA complexity, although researchers agree that frequency and intensity of abuse, current functioning, and context of CSA matters when attempting to characterize post-abuse adjustment (Casey & Nurius, 2005; Kaysen, Rosen, Bowman, & Resick, 2010; Loeb, Gaines, Wyatt, Zhang, & Liu, 2011; Zink, Klesges, Stevens, & Decker, 2009). Given the evidence demonstrated in the literature, we believe that the CSA complexity is significantly influential in risk for impaired mental health, substance use, and sexual risk taking. These outcomes are of particular interest because of their influence in the adult mental health and adult adjustment particularly among MSM with CSA histories. However, depression (Koblin et al., 2006; Mustanski, Newcomb, Du Bois, Garcia, & Grov, 2011; O'Cleirigh et al., 2013), PTSD (El-Bassel, Gilbert, Vinocur, Chang, & Wu, 2011; Ibañez, Purcell, Stall, Parsons, & Gómez, 2005; Reisner, Mimiaga, Safren, & Mayer, 2009), and substance use (e.g., Skeer et al., 2012) have each independently been identified as predictors of sexual risk for HIV among MSM regardless of CSA history.

The relationship between CSA complexity indicators, sexually transmitted infections, and HIV sexual risk behavior may also help to specify aspects of the CSA experience that serve as potentiators of the proximal risks for HIV infection among MSM. Thus, the current study examined the relationships between empirically derived indicators of CSA complexity (i.e., CSA by a family member, CSA with penetration, CSA with physical injury, CSA with intense fear, or first CSA in adolescence) and adult functioning, including mental health, substance use, and sexual risk taking with an expectation that the complexity of CSA will impact these outcomes among MSM.

Method

Participants

Data were collected as a part of a comprehensive assessment from a multi-site randomized clinical trial from HIV-uninfected MSM ($n = 162$) that reported sexual risk and had a history of CSA before age 17. The study sites were located in Boston, MA, and Miami, FL. The average age was $M = 39.4$, $SD = 11.8$ (range 19–67). The sample was 66.1 % Euro American, 22.6 % African American, 3.6 % Asian/Pacific Islander, 3.6 % Native American, with 27.8 % identifying as Latino distributed across racial categories. Sexual orientation was assessed resulting in a sample that identified as 61 % gay, 27 % bisexual, 9 % unsure, and 3 % heterosexual. The majority of the sample (81 %) experienced multiple episodes of CSA before age 13, while 51 % reported experiencing sexual abuse between ages 13 and 17. A significant minority (43 %) of participants reported CSA across both age ranges (see Table 1).

Procedure

Recruitment

Recruitment was accomplished via outreach including at bars, clubs, and cruising areas, community outreach, and advertising. Recruitment for the study was done in conjunction with recruitment for other, ongoing studies, and health promotion activities to decrease stigma and protect individuals who spoke with study staff from being identified by others in the venue as someone who experienced sexual abuse in childhood.

Study Procedure

Following recruiting procedures, prospective participants were screened by trained clinical staff via a structured questionnaire.

Table 1 Participant characteristics

		Participant sample ($N = 162$)	
		n	%
Race	Euro American	111	66.1
	African American	38	22.6
	Asian/Pacific Islander	6	3.6
	Native American	6	3.6
Ethnicity	Latino	45	27.8
Income	< $10,000 per year	50	30.2
	> $60,000 per year	30	18.6
Educational attainment	Some High School	10	6.2
	High School Diploma	40	24.7
	Some College	58	35.8
	College Graduate	27	16.7
	Some Graduate or above	27	16.7
Relational status	Partnered	50	30.4
	Single	112	69.6
Age *M* (SD)	39.4 (11.8)		

Those who self-identified as HIV-negative were considered for participation in the study, confirmed via rapid testing. All study participants completed a comprehensive baseline assessment that included a thorough psychiatric evaluation, HIV and other STI testing, and computer-based psychosocial assessments. Participants responded to survey questions directly into a computer because of the preponderance of studies that reveal that participants are more likely to disclosure sensitive information in this manner (Des Jarlais et al., 1999; Metzger et al., 2000; Millstein, 1987; Navaline et al., 1994; O'Reilly, Hubbard, Lessler, Biemer, & Turner, 1994; Turner et al., 1998; Wilson, Genco, & Yager, 1985). In order to be included in the study, participants had to (1) identify as a biological man who has sex with men age 18 or older, (2) report sexual contact before the age of 13 with an adult or a person 5 years older, or sexual contact between the ages of 13 and 16 inclusive with a person 10 years older (or any age with the threat of force or harm), (3) report more than one episode of unprotected anal or vaginal intercourse within the past three months, and (4) be HIV uninfected. Participants were excluded if all episodes of unprotected anal or vaginal intercourse occurred with only a single, primary, HIV-negative partner. All procedures were IRB-approved.

Measures

Demographics

These included self-reported age, race, ethnicity (independent of racial category), income, relationship/marital status, and educational attainment.

Assessment of Childhood Sexual Abuse

The parameters of CSA were assessed through a clinician-administered interview adapted from previous work in HIV treatment and prevention and used previously to assess sexual abuse in a variety of medical populations (Leserman et al., 1997; Leserman, Li, Drossman, & Hu, 1998) including those HIV infected (Lesserman, Ironson, & O'Cleirigh, 2006). The interview provided standardized questions that assessed sexual abuse history comprised of 20 closed-ended questions predominantly requiring yes/no answers. CSA was assessed across two age ranges 0–12 years old and 13–16 years old. CSA is indicated in the younger age range with any unwanted sexual contact reported with someone 5 or more years older. In the older age range, CSA was indicated if with any sexual contact reported with someone 10 years older or with some one of any age if there was the threat of force or harm. CSA was indicated if any of the following occurred: genital touching, being touched, or penetrative intercourse (i.e., vaginal or anal penetration). This measure of unwanted sexual contact was adapted from earlier research (Kilpatrick, 1992). All items on the measure asked about unwanted sexual contact. To meet criteria for sexual abuse, there must be clear force or threat of harm for adolescents with a perpetrator less than 10 years older; however, in children (<13 years), the threat of force or harm is implied by a 5-year age differential between the victim and perpetrator.

CSA Complexity Indicators

Each of these CSA characteristics was coded dichotomously indicating the presence or absence of the indicator.

CSA by Family Member Participants were asked to identify their relationship to the perpetrator(s), with a positive code in this category if the participant reported any CSA perpetrated by a parent, stepparent, guardian, brother, other family member, or other adult living in the family home.

CSA with Penetration was indicated if the participant reported that penetrative sex occurred as described above during either age range.

CSA with Physical Injury was assessed via one question that asked "during any of the abuse experiences did you suffer 'no physical injuries,' 'minor physical injuries' (scrapes and bruises), or 'major physical injuries' (injuries requiring medical attention)." CSA with physical injury was indicated if minor or major physical injury was reported.

CSA with Intense Fear was assessed through the question "During the worst episode were you afraid that you might be killed or seriously injured."

First CSA in Adolescence Participants' CSA experiences were assessed within two age ranges, one prior to their 13th birthday and the other from age 13 through age 16. Participants who reported their first CSA experience during the older age range were coded in this category.

Post-Traumatic Stress Symptom Assessment

Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-IV; Spitzer, Gibbon, & Williams, 1997)

Only the section on PTSD was used to provide an independent assessment of current PTSD diagnosis and symptoms.

Sexual Risk Assessment

HIV sexual risk behavior was defined as insertive or receptive anal or vaginal intercourse without a condom with any casual partner or with any primary partner who had not specifically disclosed that he/she was HIV uninfected and reported a recent (past 3 months) negative HIV test result. The number of HIV sexual risk acts in the previous 3 months as defined above was summed dichotomized at the mean to reflect high and low sexual risk. As recent sexual risk was one of the inclusion criteria in order to enroll in the study, this construct lacks variability in that no one reported zero risk episodes. The data were also heavily skewed at the upper end of the range. To account for these characteristics in the distribution, the distribution of sexual risk behavior was dichotomized at the mean to distinguish those with higher levels of recent sexual risk behaviors.

Sexually Transmitted Infections

As part of the self-report assessment, participants were asked if they had been diagnosed with an STI in the past 12 months. This generated a dichotomous variable.

Distress Assessment

The Mini-International Neuropsychiatric Interview (M.I.N.I.; Sheehan et al., 1998)

The MINI is a short structured diagnostic interview that has good reliability and validity that is comparable to the Structured Clinical Interview for DSM-IV (SCID-IV) (Sheehan et al., 1998). This assessment was completed with each participant by a trained Independent Assessor at the baseline evaluation to provide information on the presence of major mental illness (e.g., untreated severe mood disorders, psychotic disorders), which is one of the exclusion criteria, and assist with providing diagnosis of other mood or substance use disorders. Major Depressive Disorder was scored as present for anyone meeting diagnostic criteria for major depressive episode at any time up to 2 weeks prior to the baseline assessment. Any Substance Use Disorder was scored as present for those meeting diagnostic criteria for either substance abuse or dependence across any of the substance categories in the past 12 months. Similarly, any Alcohol Use Disorder was scored as present for each participant who met diagnostic criteria for either alcohol abuse or dependence in the past 12 months.

Data Analysis

The demographics and background information provided in Table 1 were generated through frequency counts, percentages, and the calculation of means and standard deviations. The interrelationships between the CSA complexity indicators were examined using unadjusted logistic regressions. The relationships between the CSA complexity indicators and the adult mental health, substance use, and sexual health outcomes were estimated using logistic regressions adjusted for age, race, education level, and the absence or presence of a diagnosis of current PTSD. Current PTSD was included as a covariate to identify the magnitude and significance of these relationships over and above what is contributed by PTSD. The magnitude and significance of these relationships are provided by the odds ratios and the associated 95 % confidence interval. In one instance, the outcome variable was continuous, i.e., number of casual sexual partners, and linear regressions models were used with the identical covariates used in the logistic regression models. For the continuous outcome, the t statistic, degrees of freedom, and the p value associated with the CSA complexity predictor are reported. For the models predicting current PTSD, PTSD was omitted from the list of covariates.

Results

Background Characteristics

The total number of sexual partners in the previous 3-month period was $M = 7.9$, Median = 5 (range 1–50), and the HIV status of male

and female sexual partners was often unknown. The majority of the sample reported male sexual partners exclusively (68.7 %), followed by both male and female partners (29.5 %), and just 1.8 % reported female sexual partners exclusively over the previous 3-month period.

Examination of Outcome Data

Each of the outcomes of interest was descriptively examined. Given the full sample, sexual risk behavior was $M = 7.52$, $SD = 12.43$ suggesting an average of 7–8 partners in the past 3 month period. For the other outcomes interest, a sizable number of participants had current PTSD (46 %), any mood disorder (40 %), or any alcohol use disorder (36 %). A smaller number of participants reported an STI (17 %).

Interrelationships Between CSA Complexity Indicators

The strongest relationships were observed between CSA with physical injury and CSA with penetration (OR 11.8: CI 4.4–31.8) and between CSA with physical injury and CSA with intense fear (OR 9.4: CI 4.3–20.5). First CSA in adolescence was significantly associated with increased odds of CSA with penetration (OR 4.1: CI 2.1–8.3), CSA with physical injury (OR 3.0: CI 1.4–6.6), and CSA with intense fear (OR 2.3: CI 1.2–4.7).

All but two of the indicators were significantly related to each other. CSA with penetration was not significantly related to CSA by family member and neither was first CSA in adolescence significantly related to CSA by family member. The complete matrix of these interrelationships is presented in Table 2.

Relationships between CSA Complexity Indicators and Psychological and Health/Risk in Adulthood

Those reporting CSA with physical injury had more than four times higher odds (OR 4.05: CI 1.90–8.70) to be diagnosed with current PTSD than those who reported no physical injury. CSA with injury was not significantly associated with any of the other outcomes under investigation (See Table 3a, b for full results). Similarly, CSA with penetration was significantly associated with more than three times higher odds of being diagnosed with current PTSD (OR 3.17: CI 1.56–6.43). CSA with penetration was also associated with nearly three times higher odds of reporting very high levels unprotected anal intercourse in the past 3 months (OR 2.72: CI. 1.16–6.36) and with a higher number of casual sexual partners in the past 3 months.

Those reporting CSA by family member had 2.6 times higher odds (OR 2.64: CI 1.24–5.63) of being diagnosed with an alcohol use disorder and more than twice the odds (OR 2.1: CI 1.02–4.36) of being diagnosed with a current substance use disorder. CSA by family member was not significantly associated with increased risk of current mood disorder, current PTSD, or increased sexual risk for HIV. Those reporting CSA with physical injury had nearly three times higher odds in reporting a sexually transmitted disease in the past year (OR 2.7: CI 1.04–7.10). Those who reported CSA with intense fear (i.e., fear of being killed or seriously injured) had more than five times higher odds in meeting diagnostic criteria for current PTSD than those who did not (OR 5.15: CI 2.5–10.7). CSA with intense fear was not significantly associated with any of the other adult outcomes. See Table 3a, b for full results.

Those who reported first CSA in adolescence were less likely to meet criteria for major depressive disorder compared to those who had first been abused during childhood. Despite its strong relationship to all but one of the other CSA complexity indicators first CSA in adolescence was not significantly related to any of the other adult outcomes.

The reference group for each of these analyses is gay, bisexual, other MSM with CSA histories, but who did not experience each of the complexity indicators.

Discussion

This is the first study, of which we are aware, to link indices of CSA complexity to increased risk for mental health, alcohol and substance use disorders, and to increased risk for sexually transmitted infections, and sexual risk for HIV, among adult MSM over and above what can be ascribed to diagnostic levels of PTSD. Both alcohol and other substance use disorders were predicted by a history of CSA by family member. This category was also significantly associated with a participant self-report of at least one sexually transmitted infection in the past year. Thus, the relational

Table 2 Interrelationships between CSA complexity indicators

CSA complexity indicators	% (*n*)	CSA with injury	CSA with penetration	CSA by family member	CSA with intense fear	First CSA in adolescence
CSA with physical injury	31.1 (52)	–	**11.8 (4.4–31.8)**	**2.0 (1.01–3.9)**	**9.4 (4.3–20.5)**	**3.0 (1.4–6.6)**
CSA with penetration	58.3 (98)		–	1.4 (0.97–2.0)	**6.1 (3.0–12.6)**	**4.1 (2.1–8.3)**
CSA by family member	31.5 (53)			–	**1.95 (1.01–3.8)**	0.6 (.30–1.2)
CSA with intense fear	41.7 (70)				–	**2.3 (1.2–4.7)**
First CSA in adolescence	61.3 (103)					–

Expressed as unadjusted Odds Ratio (95 % Confidence Interval)

Odds ratios that are significant at $p < .05$ or less are indicated in bold

Table 3 The relationship between (a) indices of CSA and psychological diagnoses and (b) indices of CSA and health/risk behaviors

(a) Indices of CSA and psychological diagnoses

CSA complexity measure	Mental health/substance use diagnoses							
	Lifetime MDD		Current PTSD[a]		Alcohol disorder		Substance use disorder	
	OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI
CSA with physical injury	1.42	0.39-1.93	**4.05**	**1.90–8.70**	1.55	0.70–3.44	0.84	0.38–1.87
CSA with penetration	0.87	0.41–1.84	**3.17**	**1.56–6.43**	0.91	0.43–1.95	0.79	0.37–1.65
CSA by family member	1.43	0.71–2.88	1.55	0.76–3.12	**2.64**	**1.24–5.63**	**2.10**	**1.02–4.36**
CSA with intense fear	1.83	0.83–4.07	**5.16**	**2.5–10.70**	1.06	0.48–2.29	0.52	0.24–1.15
First CSA in adolescence	**0.41**	**0.18–0.93**	1.38	0.70–2.85	0.94	0.43–2.04	0.86	0.40–1.85

(b) Indices of CSA and health/risk behaviors

CSA complexity measure	Sexual health/risk					
	Any STI past year		High sexual risk for HIV		# of casual sex partners[b]	
	OR	95 % CI	OR	95 % CI	t (df)	p
CSA with physical injury	1.50	0.51–4.42	1.02	0.45–2.30	1.18 (154)	0.24
CSA with penetration	1.49	0.53–4.11	**2.72**	**1.16–6.36**	**2.39 (155)**	**0.02**
CSA by family member	**2.7**	**1.04–7.10**	0.78	0.36–1.72	−0.39 (155)	0.70
CSA with intense fear	1.94	0.70–5.39	1.38	0.61–3.13	0.57 (155)	0.57
First CSA in adolescence	1.39	0.50–3.91	0.87	0.39–1.95	0.77 (155)	0.44

Odds ratios and 95 % confidence interval are reported for logistic regression models adjusted for covariates age, race, education, and the presence or absence of current PTSD

Odds ratios or t values that are significant at $p < .05$ or less are indicated in bold

[a] In the models predicting current post-traumatic stress disorder, PTSD was omitted from the list of covariates

[b] The relationship with number of sexual partners was examined using linear regression models with the same covariates as the logistic regression models

complexity of CSA is linked with sexual risk taking resulting in STIs. Because risk for the acquisition of HIV is increased while infected with another STI, assessment and intervention addressing this complexity would be beneficial to MSM with this history. Thus, evaluation of these CSA complexity indicators could serve two important functions. First, assessment of these indicators may prove to be key in adapting the most effective intervention, at the individual level, to bring about positive behavioral change associated with sexual risk reduction, moderation of substance use, and improved mental health. Second, at the population level, there is an impetus to address the public health crisis of HIV infection rates which may be reduced through the indirect treatment of past trauma given its role in current adult risk behaviors. Therefore, these findings support the notion that gay and bisexual men's mental health should be addressed with empirically supported assessment and interventions that need to be developed and tested to support MSM's sexual health with integrated programs that include elements of sexual risk reduction and trauma treatment.

Current PTSD was predicted by three CSA complexity indicators: CSA with penetration, CSA with physical injury, and CSA with intense fear. These findings are consistent with other studies that examined PTSD complexities (Gold, Feinstein, Skidmore, & Marx, 2011; Johnson, Pike, & Chard, 2001; Kendall-Tackett, Williams, & Finkelhor, 1993; McKibben, Bresnick, Wiechman-Askay, & Fauerbach, 2008). Together, current PTSD was predicted by CSA that included the complexities of penetration, injury, or intense fear. Only CSA by family member was not associated with current PTSD. The latter finding is unclear, but perhaps repeated exposure to a family member that perpetrated CSA reduces a variety of symptoms across the multiple clusters required for a diagnosis of PTSD. In addition, it is possible that those with family perpetration had lifetime PTSD but did not meet diagnostic criteria for current PTSD. Finally, the only complexity of the five to predict current alcohol or other substance use disorders was CSA by family member. This may be a marker for "self-medicating" and influential in explaining why those with this complexity did not have current PTSD.

Only first CSA in adolescence was related to less than half the likelihood of meeting diagnostic criteria for a major depressive disorder. It is plausible that men who are sexually abused at an older age are more resilient to the impact of the abuse on their mood over time compared to those who are first abuse during childhood. The lack of significant relationships between age of first abuse and the study outcomes is surprising given its strong relationship to the other complexity indicators. It is plausible

that the relationship between age of first CSA and impairment and dysfunction in adulthood is complex with suggestions from the broader literature that the proximity of CSA to puberty may be particularly relevant (Bifulco, Brown, & Adler, 1991; Briere & Runtz, 1990). Post hoc analyses examining age of first abuse as a continuous variable, or estimated time from puberty of first abuse did not generate additional significant relationships.

No other CSA complexity indicators were related to major depressive disorder. Although current PTSD was covaried in these models (PTSD was significantly related to major depressive disorder in every model), the relationship between these aspects of the CSA (with the exception of first CSA in adolescence) and major depressive disorder was not significant even when PTSD was omitted from the regression models. This suggests that among CSA victims who are MSM, the other complexities assessed here (CSA by a family member, CSA with penetration, CSA with physical injury, and CSA with intense fear) do not contribute to increased risk for a current mood disorder. Alternatively, the overlapping symptoms of MDD and PTSD may account for this finding particularly among those MSM with current PTSD where a similar symptom presentation is better accounted for by post-traumatic stress. Thus, one opportunity for improved psychological assessment among MSM would include improved differential diagnosis when an individual presents with mood problems, particularly when these are atypical and seemingly unrelated symptoms are present, e.g., those that are in the hypervigilance cluster of PTSD.

Given the overrepresentation of MSM among those with CSA histories, behavioral health care would improve if healthcare providers chose to conduct trauma screenings for MSM that present with mood problems, or provide appropriate referrals for a comprehensive mental health evaluation. It is also plausible that the adult mental health vulnerability realized because of a history of CSA may be more apparent among the anxiety disorders than mood disorders. Mood Disorders tend to be intermittent and are often, for many, a self-limiting illness that improves with or without treatment. Therefore, future investigations may endeavor to examine the role of lifetime mood disturbances rather than a current mood problem. Additional hypotheses to explain this finding should be a focus in future investigations. For example, perhaps a mood disorder, as a key outcome of interest, was not influenced by any of the included complexities because boys and men tend toward externalizing rather than internalizing diagnoses (Ackerman, Newton, McPherson, Jones, & Dykman, 1998).

In addition to being associated with current PTSD, CSA with penetration was also significantly associated with a proximal risk for HIV through its relationship with higher numbers of casual sexual partners and greater risk of unprotected anal intercourse, the latter of which is one of the most risky behaviors associated with seroconversion. This finding suggests that a detailed assessment of CSA history among MSM may identify proximal conduits to sexual risk for HIV than can be addressed through tailored HIV prevention interventions. Thus, simply identifying those MSM with a past CSA history may prove to be an insufficient level of data with which to conduct the most effective treatment of multiple psychiatric comorbidities as well as intervene at the level of behavioral health interventions to reduce sexual and substance risk taking. Instead, healthcare providers might use standardized structured assessments, such as those used in this study, in order to evaluate the nature of CSA experience and the potential impact these variables have on risk behaviors and treatment options.

Regardless of whether a current PTSD diagnosis was present, CSA complexity indicators improved the prediction of health risk behaviors including an STI over the past year, HIV sexual risk behavior, and the number of sexual partners. This finding provides further support for a thorough evaluation of CSA among MSM to include assessment of these, and perhaps other, CSA complexities. This information would possibly contribute to HIV prevention in the context of interactions between MSM and their health providers.

A history of CSA appears to create a broad base of vulnerabilities for MSM that are not accounted for by the clinical conceptualization of PTSD, and thus may be missed by traditional trauma-focused assessment. These problems endure into adulthood. This study examined mental health, substance use, and sexual health across five complexity indicators from a childhood traumatic event. Each of these was associated with at least one diagnosed impairment in adulthood and three proximal health risk behaviors in adulthood. These findings begin to provide a foundation for both public health initiatives, and psychosocial assessment and intervention, to address a cascade of negative physical and mental health problems in adulthood that stem from a childhood event. It is notable that across a variety of disorders, (e.g., substance use, alcohol, trauma history, or PTSD), each was independently related to sexual risk behavior and/or increased risk for seroconversion (Bedoya et al., 2012; Chesney et al., 2003; Mimiaga et al., 2009; Stall et al., 2003). With these additional burdens, MSM must also navigate a difficult course to deal with a history of CSA.

The consequent adult vulnerabilities that appear to be related to the contextual aspects of CSA reported here are perhaps most appropriately examined within the context of the theory of syndemic production (Stall et al., 2003) and the more recent examinations of these relationships (Dyer et al., 2012; Kurtz, Buttram, Surratt, & Stall, 2012; Mimiaga et al., 2015; Mustanski, Garofalo, Herrick, & Donenberg, 2007; Parsons, Grov, & Golub, 2012). This growing body of work suggests that developmental challenges associated with sexual minority status (including disproportionate rates of CSA) contribute to multiple psychosocial vulnerabilities in adulthood (depression, substance use, intimate partner violence, sexual compulsivity, and others) and combine and interact to generate health challenges for gay, bisexual, and other men who have sex with men. Traditionally, CSA has been included as one of the drivers of syndemic production (e.g., Stall et al., 2003).

Our findings, that characteristics (i.e., complexities) of CSA are strongly related to increased odds of meeting diagnostic criteria for current PTSD in adulthood and relationships between these characteristics and impairment, independent of PTSD, allow us to suggest that CSA-related PTSD is one of the mechanisms of syndemic production rather than CSA itself. More accurately, CSA represents a developmental vulnerability for gay, bisexual, and other men who have sex with men, which contributes to the mechanisms of syndemic production that may or may not include adult post-traumatic stress responses.

It is interesting within this syndemic framework to note that from a consideration of CSA alone, relationships to major psychological, substance use, and sexual health impairments emerge, without reference to other developmental challenges and independent of adult PTSD (which was covaried in these analyses). These findings underscore the enduring, damaging, and often devastating effects, across multiple areas of adult functioning, of sexual trauma perpetrated on gay and bisexual young boys and emerging adolescents.

The health of gay, bisexual, and other MSM is a public health crisis (Institute of Medicine, 2011). This is regardless of the HIV prevention efforts currently underway. Traditional HIV prevention interventions are have been shown ineffective with MSM with CSA histories (Mimiaga et al., 2009) and thus improving access to health care, referral for mental health care, and appropriate and evidence-based assessment and diagnosis resulting in integrated interventions are central goals for multiple health disciplines, the NIH, and the community being served.

Some of the limitations of this study include the use of self-report measures which have a variety of challenges. In order to mitigate this limitation, standardized clinician diagnostic assessments were used in addition to paper-and-pencil and computer-based assessments. Although we were looking to address longitudinal relationships, including predicting factors associated with childhood trauma and its impact on adult health and function, this was cross-section research. Our STI results were based on self-report at study entry and therefore are subject to recall bias. And finally, the data represent a restricted rage given that only men with CSA together with recent sexual risk-taking behaviors were included in the study. This may limit generalizability, and also may leave some relationships undetected.

These findings, however, provide additional support for and underscore the need for integrated behavioral health interventions to address HIV prevention for MSM in the context of CSA, and possibly other, trauma-related vulnerabilities. This includes, but is not limited to, current PTSD and substance use in the context of sexual risk taking. From a clinical practice point of view, a more detailed assessment of CSA is needed beyond the presence or absence of the diagnosis of PTSD. This is especially important among MSM. The benefits of a more detailed assessment include the identification of complexities that negatively influence both physical and mental health outcomes.

Future directions in this area of research include additional work in adaptive psychosocial and integrated prevention interventions to protect the physical and mental health of the MSM population. These interventions require studies using RCTs in order to demonstrate efficacy, acceptability, sustainability, and empirical support.

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