

Relationship Dynamics as Inconsistent Mediators of Traumatic Stress and Condomless Sex

Among Jail-detained Women

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Abstract

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Incarcerated women, especially women in jail, are at high risk for HIV and other sexually transmitted diseases. Research is needed to establish the key predictors of risk behavior, so that these can be targeted in interventions. Traumatic stress, substance use and intimate relationship dynamics likely influence infection and transmission risk among incarcerated women; however, these effects are not well understood. The author tested a model, based in Social Action Theory, of the effects of traumatic stress on condomless sex through the mediators of relational anxiety, relationship power, relationship closeness, and substance use. Jail-detained women who reported having a main sex partner in the three months prior to their arrest were interviewed ($N = 205$). The original model, accounting for 28% of the variance in condomless sex, had acceptable fit and found evidence for the effects of all factors except substance use. A better fitting model that re-specified effects of relationship power leading to substance use and substance use leading to relationship closeness was also supported, with all paths significant. Finally, a simplified model excluding substance use was tested and demonstrated almost identical fit and beta values. Results suggest that traumatic stress among jail-detained women impacts condom use within main

partnerships through divergent effects on closeness and power in the relationship. This may obscure the importance of traumatic stress on condomless sex when these pathways are omitted in statistical analyses. The results have compelling implications, but they require replication, especially given the limitations of cross-sectional data and retrospective reporting. Ultimately, interventions aimed at alleviating traumatic stress among women involved in the criminal justice system should consider evaluating relationship dynamics and sexual health practices.

Key Words: PTSD, sexual risk taking, intimate relationships, structural equation modeling, female offenders, HIV, substance use

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The proportion of AIDS cases among women in the U.S. has steadily risen over the years—from 8% in 1985 to 25% in 2011 (Centers for Disease Control and Prevention [CDC], 2014a). Incarcerated women are at particularly high risk of HIV infection with rates that are 15 times the rate for women outside the prison system (De Groot & Cu Uvin, 2005), and, in 1995, actually surpassed the rate among incarcerated men, despite the larger prevalence for men nationally (Maruschak, 2006).

Heterosexual contact is responsible for 84% of new infections among women in the U.S. (CDC, 2014a). The disproportionately high rates of HIV among incarcerated women are hypothesized to result from drug abuse, transmission during sex work (often to earn money for drugs), and intercourse with a man who injects drugs (De Groot & Cu Uvin, 2005; El-Bassel, Simoni, Cooper, Gilbert, & Schilling, 2001). These hypotheses make sense given the high proportion of women who become involved in the criminal justice system due to drug-related offenses. In 2013, the most serious offense committed by the majority of women in federal prison was a drug offense (58%); the next most common was a property offense (19%); and only 4% served time for a violent crime (Carson & Golinelli, 2013). Furthermore, women in State prison are more likely than men to have been on drugs at the time of their arrest, and to have used drugs in the month prior to their conviction (Mumola, 2000). Given the higher arrest rates and longer sentences meted out to African Americans and Hispanic Americans for drug crimes (Petersilia, 1985), in combination with the disproportionately high number of HIV/AIDS cases within minority communities (CDC, 2014a), elevated HIV rates among correctional populations are likely also related to the racial make-up of incarcerated samples (Golembeski & Fullilove,

2005). Finally, there is some evidence that involvement in the criminal justice system could lead to increased infection risk. Rather than rehabilitate drug offenders, incarceration has been shown to increase the likelihood of recidivism as compared with offenders on probation (Spohn & Holleran, 2002). In addition, incarceration has been shown to have unique affects (i.e. stressors) on relationships due to periods of separation and reunion challenges (Harman, Smith, & Egan, 2007; Travis, Cincotta, & Solomon, 2003). One study suggests that the process of incarceration and release, which disrupts intimate relationships, increases HIV risk through exposure to more sexual partners (Epperson, Khan, Miller, Perron, El-Bassel, & Gilbert, 2010).

Public Health Opportunity

Jails and prisons, in addition to housing women at disproportionately high risk of contracting HIV, may provide valuable settings for HIV-related behavior change. Given that women don't remain incarcerated for long—serving about a year on average in prison (Bonczar, 2010)—high infection rates among this population are a public health problem. Thus, intervention with women while they are involved in the criminal justice system is an important opportunity. This is especially true given that their sentences provide a hiatus from typically chaotic lives; while incarcerated, women's housing, food and healthcare needs are met and other interests are no longer accessible. Women may be more amenable to behavior change at a time when they are already forced to take a step back from their lives, their relationships, and their past behavior. Taken together, enacting comprehensive behavior change interventions within correctional settings and during the process of community reentry may be a profitable tactic for long term behavior change among this underserved and greatly at risk population. Furthermore, beyond reductions in HIV and other STI transmission, the potential benefits of behavior change may extend to the health of the next generation, given that the vast majority of female offenders

are mothers of young children (Sharp & Pain, 2010).

Lack of Efficacious Interventions

Despite the disproportionately high rates of infection among incarcerated women, and the potential opportunity that their time “inside” provides, very few prevention intervention studies have been conducted with women in the criminal justice system. In fact, none of the 84 studies included in a meta-analysis of HIV risk prevention interventions for women from 1990 to 2000 targeted current or former prisoners—although inclusion criteria requiring sexual behavior outcomes likely excluded some studies (Logan, Cole, & Leukefeld, 2002).

With wider inclusion, a review by Lichtenstein and Malow (2010) did find seven interventions conducted between 1994 and 2009 with incarcerated women in the United States. However, none of these studies was successful at demonstrating long-term efficacy on sexual or drug risk behaviors (Lichtenstein & Malow). One promising study, comparing group interventions conducted with jail-detained women, found modest increases in condom use at one-month follow up (El-Bassel, Ivanoff, Schilling, Borne, & Gilbert, 1997). Interestingly, participants living with or married to a significant other were significantly less likely to show improved prevention behavior after release, which supports the utility of research examining relationship-based targets for use in future interventions with this population. Similarly, a recently published study evaluating an intervention aimed at changing sexual relationship myths among incarcerated women showed significant efficacy on sexual risk-taking at three months post-release (Knudsen, Staton-Tindall, Oser, Havens, & Leukefeld, 2014). The development of this intervention was based on qualitative data collected from incarcerated women in focus groups, an expert panel and consultants, and Relational Theory, which posits that women’s substance dependence most often occurs in the context of a highly important relationship that

must be considered in the context of substance abuse treatment (Covington & Bloom, 2006). The intervention focused on exploring and debunking myths that women have about their relationships and risk behavior (e.g., “having sex without protection will strengthen my relationship”; and “I only think good things about myself when I am in a relationship, even if it is a risky relationship”) and also about HIV risks generally (Havens et al., 2009). The design of this study had a number of strengths and has the strongest support for its intervention; however, efficacy could only be shown after controlling for intervention site, which was a significant predictor of risky sexual behaviors (Knudsen et al.). Thus, it appears that its efficacy may not be generalizable to other correctional facilities in the U.S.

Looking at the current state of intervention research conducted with incarcerated women, one can draw several conclusions: 1. Not enough research has been conducted overall; 2. Most of the research does not provide evidence to support one particular intervention or another; and 3. Some evidence suggests that focusing on intimate relationships may be a valuable avenue for decreasing risk. Ultimately, further intervention development appears warranted.

Social Action Theory

One issue hampering research in this area is the lack of empirically supported theory to guide intervention development for women. Substantial evidence has been collected in support of a number of theoretical models that isolate individual-level cognitive factors to explain HIV risk behavior, and targeting these factors in interventions has been shown to impact behavior change in many populations (e.g., Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Fisher, Fisher, Misovich, Kimble, & Malloy, 1996; Sheeran, Abraham, & Orbell, 1999). However, specific intervention components work differently depending on the target population (Albarracín et al., 2005). Furthermore, the assumption in most cognitive models, that various

types of cognitions about risk and protective actions are enough to adequately predict behavior, may not hold for women. Prior intervention studies conducted with women have shown small effect sizes, been riddled with attrition, and resulted in mostly short-term effects on behavior in meta-analysis (Logan et al., 2002). In fact, research indicates substantial gender differences in sexual attitude-behavior consistency (Vohs, Catanese, & Baumeister, 2004). Specifically, although women have been shown to indicate greater intentions to engage in safe sex practices than men, they actually demonstrate the same rates of unsafe sex (Herold & Mewhinney, 1993). One possible explanation for these inconsistencies is that women show greater responsiveness to contextual, cultural, and situational forces (Baumeister, 2000), which predicts that women will be more likely to compromise previously held plans and beliefs about sex in the context of relationship demands (Vohs et al., 2004). Recently, there has been a movement to model women's sexual risk more accurately by including interpersonal factors (Harvey et al., 2006).

Social Action Theory (SAT; Ewart, 1991) is a particularly appropriate framework for incorporating contextual factors into a comprehensive model of risk behavior among criminally-involved women. SAT, which has been used previously in NIH-funded HIV-related research (Heckman, Kelly, & Somlai, 1998; Johnson, Carrico, Chesney, & Morin, 2008; Remien et al., 2006), conceptualizes health behavior within three interactive domains: contextual influences, self-change processes, and action states. According to SAT, intrapersonal, interpersonal, and environmental contexts all influence the self-change processes that are responsible for maintenance or change of an ongoing and dynamic action state. In this action state, habitual risk or protective behavior fluctuates according to outcomes of action taken and interdependence with close others who may have congruent or oppositional goals and action scripts (i.e. behavioral routines that fluctuate according to their own learning). The intrapersonal or internal context

includes developmental stage, biological conditions (genetics, temperament), as well as current emotions (mood, arousal) and cognitions (thought processes); the environmental context denotes physical settings, social and cultural norms and structures, and organizational systems. The self-change processes include social interaction, motivation (given expectations about outcome of behavior, self-efficacy for enacting such behavior, etc.), generative abilities (i.e. knowledge, attention, information processing, schemas), and problem-solving.

Particularly with regard to the concepts pertaining to generative abilities and motivation, SAT borrows research from and/or overlaps substantially with other known models depicting similar constructs (e.g. social cognitive theory, problem-solving, Information-Motivation-Behavioral Skills Model, and others). SAT is innovative, however, in that it (1) sees health behavior as an ongoing process of learning from the social, biological and cognitive consequences of actions taken that either protect or jeopardize one's health, and (2) models self-change processes and health actions as occurring within contextual forces, like social interactions, emotional states, and societal systems (Ewart, 1991). Indeed, HIV researchers have identified SAT as the ideal framework to improve theory development for HIV behavioral health research (Traube, Holloway & Smith, 2011). The full SAT model that incorporates all factors, which can be seen in Ewart's (1991) original publication, is beyond the scope of this project. However, specific components of the model have been carefully chosen to parsimoniously illustrate the risk behavior of incarcerated women and the contextual factors that increase their risk in particular. Conceptualizing an adapted SAT model is in keeping with the design strategies of other researchers using the SAT framework (Remien et al., 2006; Johnson et al., 2008; Chiao, Morisky, Ksobiech, & Malow, 2009; Traube, Holloway, Schrage, & Kipke, 2012).

Intimate Relationships

The pervasive influence of interpersonal relationships on health behavior is central to SAT (Ewart, 1991). Ewart proposes that as intimacy increases between two individuals, their scripts become interlinked, and serve increasingly mutual goals; when one person tries to change an established routine, it will disrupt the other's goals and likely lead to conflict and emotional distress. This conceptualization lends itself particularly well to sexual risk-taking, a behavior that requires interpersonal interacting. Indeed, a wealth of data among adult, adolescent, college student, heterosexual, homosexual, drug-using, sex worker, and even incarcerated samples suggests that people in close relationships report less frequent condom use, less concern for STI infection, and fewer intentions to use condoms than people in casual relationships (see Misovich, Fisher, & Fisher, 1997, for a review of studies). Furthermore, the studies reviewed by Misovich and colleagues showed a consistent pattern whereby couples that had initially used condoms, stopped using them as the relationship progressed. Furthermore, having condomless sex among adolescents in steady relationships has been associated with a need for expressing love through sex and a desire for intimacy (Gebhardt, Kuyper, & Greunsven, 2003). One study among female drug users found that consistent condom use was significantly negatively associated with several relationship factors including monogamy, living together, receiving emotional support from a partner, and financial interdependence (Sherman & Latkin, 2001). In fact, among romantic partners of injection drug users, those that lived with their partners were at even higher risk of HIV infection than those that engaged in prostitution (Iguchi, Donald, Kushner, & Lidz, 2001), which is remarkable given the obvious risks associated with sex work. Finally, incarcerated women have reported in focus groups that their reasons for risky behavior stemmed from trying to please their partners, fear of rejection if they asked to use a condom, and getting intoxicated with their partners (Staton-Tindall et al., 2007).

The dynamics of power and control within a sexual relationship are also associated with condom use: higher relationship power has been shown to account for 52% of consistent condom use among women in a community sample (Pulerwitz, Amaro, De Jong, Gortmaker, & Rudd, 2002). In some violent relationships, power may be a function of fear, whereby women who have experienced violence are less likely to assert their own opinions or preferences for fear of violent retaliation. Indeed, one study found that women who experienced intimate partner violence (IPV) were not only at higher HIV risk (i.e., more likely to report having multiple sex partners, past or current sexually transmitted infection, inconsistent use or nonuse of condoms, and a partner with known risk factors), but also reported being more worried about HIV infection, suggesting increased perceived risk (Wu, El-Bassel, Witte, Gilbert, & Chang, 2003). Physical abuse in an intimate relationship (compared with emotional abuse and no abuse) has also been shown to predict lower self-efficacy for condom use negotiation (Beadnell, Baker, Morrison, & Knox, 2000), which would contribute to heightened risk according to social-cognitive theory (Bandura, 1990). In that study, physical abuse also predicted having less say in safer sex, having sex when they didn't want to, and the partner having sex outside the relationship (Beadnell et al., 2000). IPV may also impact HIV risk among drug-users through needle-sharing practices, given that receptive syringe sharing has been associated with IPV (Wagner et al., 2009). Interestingly, this association was mediated by depression and self-esteem but not self-efficacy for safer needle use, which supports the supposition that women's emotional needs may be more influential than their health safety beliefs in the context of a violent drug-affected relationship.

The issues of relationship power and control are particularly important to consider with regard to the risk behavior of incarcerated women given the frequency of IPV victimization among them, with 75% of incarcerated women in one sample reporting physical violence by a

romantic partner (Browne, Miller, & Maguin, 1999). A recent study of previously incarcerated women found that IPV was positively correlated with substance use, sexual risk behavior, and sex work, in addition to anxiety and depression (Weir, Bard, O'Brien, Casciato, & Stark, 2008). Furthermore, one study looking at sexual relationship power in incarcerated women found that women with greater relationship control, in particular, were less likely to engage in all five types of risky sex assessed: (1) unprotected sex while high; (2) unprotected sex with a hard drug user; (3) unprotected sex during sex work; (4) unprotected vaginal sex; and (5) unprotected anal sex (Knudsen et al., 2008). Given the influence that relationships—particularly ones where women are lacking in power and control of their own safety—have on risk behavior, relationship characteristics should be incorporated into theoretical models of incarcerated women's risk behavior.

Traumatic Stress

Likely related to stressful relationships, incarcerated women cope with extreme levels of psychological distress, which has been shown to predict drug abuse and sexual risk-taking. With the number of prisoners with serious psychiatric disorders exceeding the number of patients in psychiatric hospitals, jails and prisons have become “America's new mental hospitals” (Torrey, 1995, p. 1612); and incarcerated women are particularly burdened: 73% of female state prisoners in the U.S. (compared with 55% of male inmates) had a mental health problem in one study (James & Glaze, 2006). As compared to the rates of drug abuse or dependence nationally (approximately 2%), 60% of women in state prison had drug dependency or abuse problems (Mumola, 2000), and one recent study found 85% of women in jail met criteria for a substance use disorder (DeHart, Lynch, Belknap, Dass-Brailsford, & Green, 2014). Evidence suggests that HIV rates are elevated in individuals with serious mental illness (Carey, Carey, & Kalichman,

1997), and that psychological distress may precipitate drug abuse and sexual risk-taking (Glaze & Maruschak, 2008; Brewer, Catalano, Haggerty, Gainey, & Fleming, 1998; Orcutt, Cooper, & Garcia, 2005). However, the specific mental disorders (or their underlying symptoms and processes) that might increase risk are not fully evident from the literature.

Traumatic stress is one area of mental illness that is particularly important in the lives of criminally-involved women given rates of posttraumatic stress disorder (PTSD) as high as 48% among women in prison and 51% among women in jail (Zlotnick, 1997; DeHart et al., 2014). PTSD is characterized by high levels of anxiety that manifest in intrusive re-experiencing of the event, avoidance of related stimuli, emotional numbing and hyper-arousal (Resick, Monson, & Rizvi, 2008). One study conducted with incarcerated women found that a lifetime occurrence of PTSD was associated with risky sexual practices prior to incarceration (Hutton et al., 2001). Furthermore, rates of PTSD among women living with HIV/AIDS were calculated in meta-analysis to be over five-times the rate for women nationally, and trauma exposure is widely conceptualized as a risk factor for HIV infection (Machtinger, Wilson, Haberer, & Weiss, 2012). Among African-American women in college, posttraumatic stress predicted more sexual partners, greater frequency of condomless sex, and sex under the influence of substances, with the effect of traumatic stress on condomless sex mediated by sexual control (Munroe, Kibler, Ma, Dollar, & Coleman, 2010). The high PTSD rates among incarcerated women are likely partially explained by the high proportion of them who report a history of sexual violence (i.e., 55% in one study: Abrams, Etkind, Burke, & Cram, 2008). Indeed, PTSD has been linked to HIV risk as a mediator between child sexual abuse and sexual risk behavior (Plotzker, Metzger, & Holmes, 2007).

Given how frequent interpersonal traumas are among women (Anders, Shallcross, &

Frazier, 2012), and among substance-abusing and incarcerated women specifically (Afful, Strickland, Cottler, & Bierut, 2010; Messina, Calhoun, & Braithwaite, 2014), the impact of these experiences on intimate relationship functioning may help to elucidate how traumatic stress impacts risk behavior. Childhood sexual abuse, in particular, has an array of interpersonal sequelae, including disturbed sexual functioning, increased likelihood of physical assault by an intimate partner, and difficulties with interpersonal trust and intimacy, according to a comprehensive literature review (DeLillo, 2001). One study conducted in New Zealand found that women survivors of child sexual abuse were also more likely to perceive their partners as highly controlling and uncaring, and less likely to confide in them (Mullen, Martin, Anderson, Romans, & Herbison, 1994), suggesting that traumatic stress from sexual abuse may decrease closeness and intimacy. Furthermore, in a recent meta-analysis of 31 studies, PTSD symptomatology had medium-sized associations with relationship discord and IPV (Taft, Watkins, Stafford, Street, & Monson, 2011).

Posttraumatic stress is also consistently associated with substance use, which may be one mechanism through which trauma impacts relationships and sexual risk among women (Simpson & Miller, 2002). Prospective studies suggest that early childhood traumas predict later life substance use (Hien, Cohen, & Campbell, 2005), which is often conceptualized as a way of self-medicating or coping with traumatic symptomatology (Chilcoat & Breslau, 1998; Khantzian, 1997), and is also commonly theorized to increase sexual risk-taking by way of its effects on decision-making, sexual desire, and inhibitions (George & Stoner, 2000; Ross & Williams, 2001; CDC, 2014b). Furthermore, prior research supports a pathway from sexual trauma to risky sexual behavior through increased substance use (Deliramich & Gray, 2008; Johnson & Johnson, 2013). Within this population in particular, substance use may also lead to greater risk-taking by

decreasing a woman's power in her sexual relationship. One longitudinal study showed that women's drug use (especially hard drug use) predicted future IPV victimization in both ongoing and new relationships after controlling for past victimization (Testa, Livingston, & Leonard, 2003). However, there is mixed evidence in this area, with one cross-lagged study not supportive of substance use as a predictor of later IPV victimization among women (Martino, Collins, & Ellickson, 2005), and one qualitative study showing that some women began excessive alcohol use as a result of relationship problems rather than the other way around (Lammers, Schippers, & van der Staak, 1995). One confounding factor is male partner substance use, which is likely to co-occur with female use and has been shown to predict male-to-female IPV as well (Lipsky, Caetano, Field, & Larkin, 2005). Furthermore, one study found that heavy substance use by either partner within newlywed couples was predictive of relationship discord, but not heavy substance use by both partners (Mudar, Leonard, & Soltysinski, 2001).

The effects of traumatic stress on sexual risk may also be a function of relational or attachment-related anxiety, or how much a person worries about being abandoned or rejected by a romantic partner. Adult romantic attachment, although based in an individual's global attachment style (Fraley, Heffernan, Vicary, & Brumbaugh, 2011), is measured in adulthood and captures cognitions specific to adult romantic relationships. Several studies show associations between attachment anxiety and traumatic stress (e.g., Elwood & Williams, 2007; Solomon, Dekel, & Mikulincer, 2008; Horesh, Cohen-Zrihen, Ein Dor, & Solomon, 2014); and attachment anxiety has been shown to fully mediate the relation between interpersonal traumas—child sexual abuse, adult sexual assault, and intimate partner violence—and trauma symptoms (Roche, Runtz, & Hunter, 1999; Sandberg, Suess, & Heaton, 2010), suggesting that it may be partially responsible for how a person copes with trauma. Alternatively, one prospective longitudinal

study using cross-lagged correlations found that the association of PTSD at time 1 with relational anxiety at time 2 was significantly stronger than the association of relational anxiety at time 1 with PTSD at time 2 among former prisoners of war (Solomon et al., 2008). Thus, conceptualizing traumatic stress as an antecedent of relational anxiety has empirical support.

Attachment-related anxiety also greatly impacts relationship characteristics like trust and intimacy (e.g., Mikulincer, 1998). One study found that college students classified as preoccupied on an adult attachment measure had both less intimacy and less commitment in their current romantic relationship (Tarabulsky et al., 2012). Another study showed that anxious attachment predicted both implicit and explicit measures of ambivalence in intimate relationships, including ambivalence towards closeness and distance, even when controlling for potential confounders (Mikulincer, Shaver, Bar-on, & Ein-dor, 2010). In addition, one way that attachment-related anxiety may impact sexual behavior is through relationship power dynamics, with one study showing that increased attachment anxiety was associated with lower satisfaction with relationship power and greater physical abuse (Rogers, Bidwell, & Wilson, 2005). Similarly, longitudinal research shows that insecure attachment may predict both sexual coercion and victimization in intimate relationships (Smallbone & Dadds, 2001; Davis, 2006). Although there is limited research looking at attachment predicting sexual risk, one study showed that romantic attachment anxiety predicted condom-related self-efficacy and beliefs, condom use, condomless sex with risky partners, and multiple partners among pregnant women (Kershaw et al., 2007). Given the trauma histories of incarcerated women, and the known effects of traumatic stress on relationship variables, models of their sexual risk behavior should include consideration of traumatic stress and its sequelae, including substance use, relationship power, and relational anxiety.

Conceptual Model

Intimate relationship dynamics, including closeness and power/control, in addition to substance use and traumatic stress appear to be important predictors of risky sexual behavior among criminally-involved women. The current study aims to test a model of these relationships, based in Social Action Theory, with traumatic stress as an antecedent of condomless sex, mediated by relationship closeness, relationship power, and substance use, and with relational anxiety as a mediator of traumatic stress on both relationship factors. This model, with hypothesized directions for all pathways, can be seen in Figure 1. Specifically, the model predicts that greater traumatic stress will predict greater substance use, greater relational anxiety and lower power in main partnerships. Relational anxiety is hypothesized to predict lower relationship closeness and power, and substance use is hypothesized to predict lower power. Finally, greater substance use, lower power, and greater closeness are modeled as leading to increased condomless sex. Hopefully, an adapted risk behavior model will serve as a resource for intervention developers in sexual health disparities research with this population.

Method

Participants and Sampling

Between August 2012 and August 2013, a convenience sample of female detainees ($N = 205$), at a direct supervision jail located in the Northwestern United States, were recruited to participate. To be eligible for participation, women needed to be (1) age 18 or older; (2) booked into a correctional facility (including women who were transferred from other facilities) within six weeks of the interview date; (3) reporting a main male sex partner in the 3 months prior to their booking date (even if concurrent with other partners); (4) able to demonstrate understanding

of the consent information through direct questioning; (5) able to verbally communicate in English; and (6) not exhibiting obvious psychosis or intoxication at the time of the interview.

Potential participants were recruited through fliers posted in the medical clinic, intake area, and the female housing unit, as well as through verbal announcements made on the housing unit. Women interested in participating were instructed to write a confidential medical appointment request or “kite”. Once the request was received at the medical clinic, it was placed in an envelope for study researchers. Women who had not yet been released and who had been in custody for six weeks or less were put on a call list to be brought to the medical clinic for an appointment with a study interviewer.

All screenings and interviews were conducted in private medical exam rooms and lasted less than 90 min. Potential participants were first screened for eligibility. If eligible, the woman was handed consent paperwork, the details of which were verbally explained by the interviewer. Comprehension of the material was evaluated through direct questioning and any confusion was clarified. If she was still interested in participating, she signed consent and the survey interview began immediately.

Procedures

The interviewer asked each of the survey questions and the participant verbally responded with her answers, which the interviewer recorded on a paper questionnaire. Upon completion of the interview, participants had the option of selecting four snack items (i.e. candy bars, popcorn, ramen noodles) that had been purchased from the jail commissary. Participants were encouraged to contact the primary researcher if they had any questions or concerns about the study. All procedures were approved by the Institutional Review Board of the University of

Washington and King County's Research Administrative Review Committee, a Public Health internal feasibility review board.

Measures

Demographics. Demographic questions included birth date, marital status, number of children, if they had ever lost parental rights, history of foster or institutional care, race, ethnicity, level of education on a 5-point Likert scale up to "graduate degree", and frequency of private and community religious/spiritual practices in the past three months rated on a 6-point Likert scale from "Never" to "More than once a week."

Housing. Two categorical variables were created to assess participants' housing situation in the 90 days prior to their booking date. Participants were first asked, "During the 90 days before you came to jail, where had you been living?" The options they were provided were: "house or apartment you paid for," "house or apartment someone else paid for," "motel, hotel, or boarding house," "on the street, in a car, or in a homeless shelter," "halfway house or other transitional house," "drug treatment facility," "jail, prison, or other detention facility," and/or "somewhere else." Participants were then asked, "Who did you live with?" The answer options provided for this question were: "live alone," "spouse, partner, someone you were having a sexual relationship with," "friends or roommates," "your children or someone else's children," "family or other relatives," "strangers or people I barely knew," and/or "other." For each variable, participants were allowed to select as many living locations and/or living partners as were applicable.

Resources. Participants' financial resources were assessed with three categorical variables. First, participants indicated whether they were working (part- or full-time) and/or going to school during the 90 days prior to their booking date. Second, participants indicated

how they received money aside from a legal job. Options included family, romantic partners, SSI, welfare, illegal sources, etc. Third, participants were asked to estimate how much money overall they received from these sources, with response options ranging on a likert scale from “0-\$300” to “More than \$3,000”.

Health. Participant health history was assessed using two categorical variables. For mental health, participants were asked “Have you ever been hospitalized or treated for depression, anxiety, or any other mental or psychiatric illness?” For sexual health, participants were given a list of sexually transmitted infections (i.e. hepatitis C, HIV/AIDS, Gonorrhea, Syphilis, etc.) and asked, “Has a doctor, nurse, or other health professional ever told you that you had any of the following diseases?”

Alcohol use. Participants’ alcohol use habits and history were assessed using a brief version of the Alcohol Use Disorders Identification Test (AUDIT-C; Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998). The AUDIT-C is a three-item screening measure used to identify potential hazardous drinking and alcoholism. Hazardous drinking was identified using a cut-off of 3 or higher on the AUDIT-C (Bradley et al., 2003).

Caviness et al. (2009) found the AUDIT-C to have acceptable reliability in a sample of incarcerated women (Cronbach’s alpha = .88, Mean = 4.2). Internal consistency in our sample was high, $\alpha = .90$. The three questions indicated frequency and volume of average alcohol consumption. Participants were instructed to respond to the questions with regard to the three months prior to their booking date. Participants were also asked how old they were when they first got drunk. Hazardous drinking was identified using a cut-off of 3 or higher on the AUDIT-C (Bradley et al., 2003).

Drug use. Current drug use levels and drug use history were assessed in five sections. To begin, participants were asked to respond freely to the question: “How old were you the first time you used marijuana or any other recreational drugs?” If the participant responded with “never,” then the researcher proceeded onto the next section without any further drug-related questions. If the participant responded with an age, the researcher continued with the second section: the short form of the Drug Abuse Screening Test (DAST-10; Addiction Research Foundation, 1982). The DAST-10 is a 10-item screening tool used to assess potential drug abuse and consists of 10 yes/no questions (total score out of 10) that cover the respondent’s drug use habits, feedback they have received from loved ones about drug use, and their thoughts and feelings about their drug use. A substantial or severe level of abuse is indicated by a score of 6 or higher (Addiction Research Foundation, 1982). Saltstone, Halliwell, and Hayslip (1994) found the original form of the DAST to have an alpha of .88 in a sample of incarcerated women. Wingo, Ressler and Bradley (2014) found the shortened version, (DAST-10) to have an even higher internal consistency (Cronbach’s alpha = .92) in a community sample of inner-city, low-income, high stress and highly traumatized participants. A score of 6 or higher on the DAST-10 is indicative of substantial or severe levels of drug abuse (Addiction Research Foundation). In our sample, Cronbach’s alpha was .90. Participants were instructed to respond to the questions with regards to the past year prior to their booking date. In order to use information about both alcohol use and drug use as part of substance abuse severity—given the lack of relation between these variables (see table 5)—a composite measure was constructed adding the two together after weighting them as percent of maximum possible (Cohen, Cohen, Aiken, West, 1999).

For the third section of the drug assessment, two ordinal variables were created to assess drug-related social norms and future intentions to use drugs, respectively. For social norms,

participants were asked, “How would the people who are important to you feel about you using drugs?” with response options ranging from 1 (very much against it) to 5 (very much support it). For intentions to use, participants were asked, “In the six months after your release, what are the chances that you will use drugs again?” with response options that ranged from 1 (very low chance) to 5 (very high chance).

For the fourth section of the drug assessment, participants were asked whether or not they had used specific drugs over the course of their lifetime. The specific drugs in question were: crack cocaine, powder cocaine, methamphetamine (or other amphetamines), heroin, speedball or goofball (heroin mixed with either methamphetamine or cocaine), and pain killers. When applicable, participants were also asked if they had used that drug in the past 90 days (prior to their booking date), and how often they used it in the past 90 days, with response options that ranged from 1 (less than once a week) to 4 (6 or more times a week). For all drugs except for crack cocaine, participants were also asked if they had injected the drug in the 90 days prior to their coming to jail and how often they had injected it, with the same response options used above.

The final section of the drug assessment covered injection drug use (IDU) practices, starting with: “How old were you the first time you injected any drug?” and “Who is the person, besides you, most responsible for you starting to shoot drugs for the first time? In other words, if you never knew them, you probably wouldn’t have started injecting drugs at that time.” To assess IDU social network, participants were asked: “During the 90 days before you came to jail, how often did you hang out with people who injected drugs?” with possible responses that ranged from “never” to “daily or almost daily.” To assess injection equipment sharing, participants were asked about how often they shared cookers, cotton, rinse water and

syringes/needles that others could have used before them in the three months prior to their jail booking. If participants responded with anything other than “none of the time (never),” they were asked if any of the people that had shared with had Hepatitis C or HIV/AIDS. They were also asked how often they used infection prevention techniques such as bleaching or boiling the needle/syringe. Response options ranged from “none of the time (never)” to “every time (always).” To assess IDU intentions, participants were lastly asked, “In the six months after your release, what are the chances that you will inject drugs again?” Response options ranged from “very low chance” to “very high chance.”

Sexual behavior and partner characteristics. Participants’ sexual behavior and partner characteristics were assessed in five sections: (1) sexual history, (2) characteristics of most recent main male sex partner, (3) situational dynamics of the last sexual encounter with main male sex partner, (4) characteristics of most recent non-main male sex partner, and (5) history of sex work.

Section 1. First, participants were asked to state the number of both male and female sex partners they had had in their lifetime. ‘Sex’ was defined to participants as oral, anal, and/or vaginal intercourse. Participants were then asked how old they were when they first had consensual sex and how old their partner was at this time. Finally, participants were asked how many male and female sex partners they had had in the 90 days prior to their booking, and how many of the male partners were considered ‘main sex partners’. ‘Main sex partner’ was defined as someone with whom they “had a regular, steady or ongoing sexual relationship.”

Section 2. Participants were asked to label their relationship with who they considered to be the most “important” main male partner (i.e., ‘boyfriend’, ‘friend’, ‘drug dealer’, etc.), when they first had sex with him, if they lived together in the 90 days before coming to jail, and if he had had any other sex partners since their first sexual encounter. Participants were asked how

many times they had had vaginal and anal sex with this partner in the 90 days before coming to jail and the frequency with which they used condoms, with response options on a 5-point Likert scale ranging from “none of the time (never)” to “every time (always).” A measure of overall condomless sex (including during both vaginal and anal sex) was calculated as a sum of incidents, both for the dichotomous items at last sex and for the Likert scale items for condom use over the past three months. The latter measure was also weighted by the number of vaginal and anal sex events that occurred with that main partner during this period in accordance with recommended best practices for self-report of condom use (Noar, Cole, & Carlyle, 2006).

To assess partner risk factors, participants were asked about: the frequency with which their partner used drugs in the 90 days prior to their booking date; whether or not their partner had ever injected drugs, ever been incarcerated in a jail or prison, or ever been diagnosed with Hepatitis C, HIV/AIDS, or any other sexually transmitted infections; if they had any children with this partner or if they were trying to have a baby with this partner in the 90 days before jail; whether or not they had a conversation with this partner about using condoms and/or getting an HIV test in the past 90 days; and whether or not this partner was at all responsible for their arrest, conviction, or sentence.

Section 3. Participants were then asked to respond to a series of questions about the last time they had had sex with their main male partner. Participants were asked how long ago this was, how ‘in love’ they felt with their partner at the time (answer choices ranged from ‘not at all’ to ‘extremely’), if they had had an agreement to be monogamous, and if they had been in a fight that day. Participants were asked how drunk or high they and their partner were during this encounter (answer choices on a 5-point scale ranged from ‘not at all’ to ‘extremely’) and what substance they and/or their partner were using (if applicable). Participants were also asked who

had initiated sex that day and the reason(s) they had had sex that day from a list of answer choices including “you wanted to make him happy,” “you wanted to feel closer to him,” “you wanted to avoid a fight,” “he forced you to,” and “you wanted to feel pleasure, were turned on or horny.” Participants were asked to state how “close, intimate or connected” they felt to their partner both before and after sex (answer choices on a 5-point scale ranged from “not at all” to “extremely”). Finally, participants were asked whether they had vaginal and/or anal sex during this encounter, whether she or he suggested using a condom, and if a condom was used for either or both act(s). Degree of commitment to a main partner in the past 90 days was defined by responses to the following five dichotomous questions: whether she lived with her partner, whether he had been her only partner, whether she labeled her partner as a husband, boyfriend, “my man” or fiancé versus other titles, whether her and her partner had had an agreement to be monogamous the last time they had sex, and whether she had been his only partner since the first time they had had sex.

Section 4. If the participant had more than one male sex partner in the 90 days before she came to jail, she was asked to think about the most recent non-main male partner and to respond to several of the same questions that were asked about their main sex partner regarding sexual behavior and partner risk characteristics occurring over the 90 days prior to her booking. These included: frequency of vaginal and anal sex; condom use; date of first sexual intercourse; partner’s drug use; partner’s history of IDU, incarceration and disease diagnoses; discussions about condoms and HIV testing; and partner’s influence on current criminal circumstances.

Section 5. Participants were asked about “trading sex,” which was defined for participants as having sex in exchange for money, drugs, food or shelter. This section asked for their age at sex work initiation and at last sex exchange, how many times in their life they’d

traded sex (response options provided on a 5-point scale ranging from “Less than 5 times” to Over 100 times”) and how often they had used a condom during sex work; these answer choices were on a Likert scale ranging from 1 (none of the time [never]) to (every time [always]).

Incarceration history. Incarceration history was assessed using four items: age at first incarceration in any detention facility; lifetime number of bookings; which types of convictions they had; and an estimate of how many months and years they’d spent incarcerated over their whole lifetime.

Depression. Participant depression was evaluated using the Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001), a 10-item scale in which participants are asked to state how often they were bothered by certain problems over the last two weeks (e.g. “Having little interest or pleasure in doing things”). Response options ranged from 0 (not at all) to 3 (nearly every day). Participants were instructed to think back to the two weeks prior to their entering jail when responding to the questions. The PHQ-9 has been found to have acceptable reliability in samples of drug users (both in and out of treatment programs) with alphas above .81 (Daniulaityte et al., 2010; Delgado et al., 2011). In our sample, alpha was .86.

HIV risk self-efficacy. Risk protection self-efficacy was evaluated using Self-Efficacy for Limiting HIV Risk Behaviors (LHRB; Smith, McGraw, Costa, & McKinlay, 1996), a 9-item scale in which participants are asked how sure they are that they could do certain things in the future (e.g. “talk about safe sex with a casual partner”). Participants were asked to rank how sure they were with answer choices that ranged from 1 (not sure at all) to 5 (very sure). In a multi-city study that examined the habits of HIV positive women who engaged in IDU, Latka et al. (2006) found the LHRB to have very high reliability (Cronbach’s alpha = .95). However, alpha was low in our sample, $\alpha = .55$.

Emotion regulation. Participants' ability to regulate their emotions was assessed using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), a 36-item survey in which participants are asked to state how often in their lives certain situations apply to them (e.g. "I am clear about my feelings," "when I'm upset, I can still get things done"). Response options ranged from 1 (almost never) to 5 (almost always). Johnson and Lynch (2013) found high reliability for each subscale of the DERS when used in a sample of incarcerated women who had been exposed to childhood sexual abuse (Cronbach's $\alpha = .86$ for Awareness, $.85$ for Goals, $.86$ for Impulse Control, and $.87$ for Strategies). The DERS had very high reliability in our sample, $\alpha = .95$.

Relationship-specific adult attachment style. Attachment anxiety and avoidance in their most recent main sexual relationship was evaluated using the romantic partner measure of the Experiences in Close Relationships—Relationship Structures questionnaire (ECR-RS; Fraley et al., 2011). The ECR-RS is a 9-item scale derived from the widely used Experiences in Close Relationships—Revised (Fraley, Waller, & Brennan, 2000), which allows for contextualized assessment of attachment styles. In the ECR-RS, participants report how strongly they agree or disagree on a 5-point Likert scale with statements (e.g., "it helps to turn to this person in times of need") intended to assess attachment-related anxiety and avoidance within specific relational domains. Participants were asked to report their agreement with these statements with regards to the person they previously named as their most important main male sex partner. The ECR-RS has two subscales, avoidance and anxiety, that are most often evaluated individually. Goldenson, Geffner, Foster and Clipson (2007) used this scale in a population of female domestic violence offenders and found it to have strong reliability for each subscale ($\alpha = .89$ and $.90$ for

avoidance and anxiety, respectively). Internal consistency was high for both subscales in our sample, $\alpha = .88$ (avoidance) and $.90$ (anxiety).

Sexual relationship power. Power dynamics in their most recent main sexual relationship were evaluated using the Sexual Relationship Power Scale (SRPS; Pulerwitz, Gortmaker, & DeJong, 2000), a 23-item measure with two subscales. In the first subscale, Relationship Control, participants are asked to rank their agreement (1 = “strongly disagree,” 4 = “strongly agree”) with certain statements (e.g. “When my partner and I disagree, he gets his way most of the time.”). Relationship Control has been found to have high reliability when used with incarcerated women ($\alpha = .92$; Knudsen et al., 2008) and women who are patients at a methadone outpatient clinic ($\alpha = .90$; Campbell, Tross, Hu, Palicova, & Nunes, 2012). Items in the other subscale—Decision-making Dominance—ask who (“Me,” “My partner,” or “Both”) tends to make specific decisions in the relationship (e.g. “who usually has more say about what types of sexual acts you do?”). The same two studies (Knudsen et al., 2008; Campbell et al., 2012) found slightly lower but still acceptable reliabilities for the Decision-making Dominance subscale ($\alpha = .83$ and $.80$, respectively). Per author instructions for use of the SRPS in analyses where sexual relationship power is used to predict condom use (as in the current study), items that asked specifically about condom use were omitted from the scale score (Pulerwitz et al., 2000).

Relationship conflict and violence. Intimate partner violence in their main sexual relationship was evaluated using the partner items from the short form of the Revised Conflict Tactics Scales (CTS2S; Straus & Douglas, 2004). This 10-item scale asks participants to state how many times certain tactics were used by their partner to resolve conflict in the past year, including two items each for the following subscales: negotiation, psychological aggression, physical assault, injury and sexual coercion. Response options ranged on a likert scale from

“never happened” to “more than 20 times in the past year.” Rather than dichotomizing values for use as a prevalence variable (occurrence or not in the past year), we opted to calculate annual frequencies of the behaviors. Given the highly skewed nature of the subscales of sexual coercion, physical assault and injury, these items were first recoded into annual frequency, according to instructions in the CTS2 scoring manual (Straus, 2001), and then summed together to create one ordinal item of annual frequency of partner violence in the past year. In similar populations of incarcerated women, the CTS2S scale has demonstrated high reliability ($\alpha > .89$; Jones, Ji, Beck & Beck, 2002; Lucente, Fals-Stewart, Richards & Goscha, 2001). In the current study, $\alpha = .77$.

Trauma history and traumatic stress. Trauma exposure, posttraumatic symptom severity, functional impairment, and other DSM-IV-TR diagnostic criteria for PTSD were assessed using the 49-item Posttraumatic Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997). First, participants were asked about their exposure to 11 different types of traumatic experiences (e.g. “a serious accident, fire, or explosion,” “sexual assault by a family member or someone you know”), including which event bothered them the most, the date of the event, and whether the event involved injury, life endangerment, feelings of helplessness and/or terror. An interpersonal trauma was defined as events involving sexual or physical assault, child abuse, or torture. To assess symptom severity, participants were asked to state how often they had been bothered by 17 specific PTSD symptoms (e.g. “having bad dreams or nightmares about the event”) in the month prior to their jail booking, with response options ranging from 0 (not at all or only one time) to 3 (5 or more times a week/almost always), as well as the duration and onset of these symptoms. Finally, participants were asked to identify which areas of their life have been affected by any of the aforementioned symptoms. The PDS has shown high reliability

for symptom severity among women who reported having experienced intimate partner violence ($\alpha = 0.86$; Peterson, 2013). In our study, Chronbach's alpha was .93.

Data Analysis

First, we explored the distributional characteristics of all variables and looked for out-of-range values. Monotone transformations were tested for potential improvements to normality for skewed variables. Data were also compared to previous studies that have used the scales in similar populations to evaluate the validity of scales within our sample (see Measures section for studies compared). Decisions about how to most effectively use specific measures were made according to distributional characteristics; however, no continuous measures were dichotomized to avoid the potential problems associated with that practice (MacCallum, Zhang, Preacher, & Rucker, 2002). Bivariate correlations were computed to determine which items to include in later analyses as covariates and to identify outliers and other distributional abnormalities in scatterplots. All preliminary analyses were conducted using SPSS version 22.0.

To examine the relationships proposed in the model in Figure 1, we conducted path analysis using SEM with Mplus version 7.0 statistical modeling software (Muthén & Muthén, 2012). SEM was chosen because it estimates paths between both latent and observed variables, tests the relationships between variables and underlying constructs at the same time, and can identify all total effects, standard errors for indirect effects, measurement error, and overall fit of the model. Because several of the variables included in the model were ordinal, we chose the robust weighted least squares estimator using mean- and variance-adjusted chi-square statistics (WLSMV) with the default Delta parameterization. This estimator was chosen because—in contrast to full WLS—it has been shown to consistently produce proper solutions the vast majority of the time in computer simulations, even in complex models with $N < 200$ (Flora &

Curran, 2004). At the same time, in such models, there is a slight tendency towards an inflated chi-square statistic, which can lead to greater likelihood of a Type I error (Flora & Curran, 2004). While a significant chi-square would be interpreted as indicating some misfit, we decided to interpret a model if the ratio of the chi-square to degrees of freedom (X^2/df) was less than two as long as all other fit indices were favorable. Specifically, an acceptable model would need to meet the following criteria based on recommendations in the literature: RMSEA with a cut-off of .05 for good fit and .08 for acceptable fit, CFI > .95, and WRMSR < .90 (Yu & Muthen, 2002). The common two-step procedure for model testing was used (Kline, 2011), starting with confirmatory factor analysis followed by path analysis.

Results

Descriptives

From women incarcerated in a county jail, we collected 215 surveys. Ten were later excluded from all analyses: eight were duplicates, one was from a woman who exhibited psychotic symptoms during the interview; and one was from a woman who screened out during the interview for not having had intercourse with a main partner in the 90 days prior to arrest (this information conflicted with what was provided during screening). Less than ten participants had any missing data. Of these, most were single items. Because of the low missingness, sophisticated imputation methods were deemed unnecessary and missingness was addressed with simple median and mean replacement.

Demographics. The final sample ($N = 205$) were diverse in age ($M = 32.7$, $SD = 9.2$, range 18-63) and race/ethnicity, with 28.0% identifying as multiple races (participants were permitted to select as many races as they wanted). Among participants who selected multiple races, 86.4% selected American Indian or Alaska Native, 37.3% selected African-American, and

6.8% selected Native Hawaiian or Pacific Islander). Of those participants who indicated only one race ($n = 146$), 15.8% identified as having Hispanic ethnicity, 63.0% as non-Hispanic White, 11.6% as American Indian or Alaska Native, 9.6% as African-American, 2.1% as Asian-American, and 2.1% as Native Hawaiian or Pacific Islander. Most participants were of low socio-economic status during the 90 days prior to their arrest, with 61.5% receiving food stamps, 13.1% on Disability or SSI income, 42.9% homeless or having unstable housing (e.g. motel, transitional housing), and 39.7% living on less than \$900/month (equivalent to \$10,800 annual income, which is below the poverty level of \$11,670). Most (83.4%) were unemployed and 31.2% never finished high school or received a GED. Many relied on sexual partners (48.3%) and either family or friends (37.5%) for financial help. The majority of participants had children (73.7%) with 2.5 children on average. Out of all mothers in the sample ($n = 151$), 36.4% had lost custody or parental rights for at least one child. Women had a wide range of criminal justice experiences, having spent an average of 1 year incarcerated over their lifetimes ($SD = 48.7$ months), starting at an average age of 18 years old ($SD = 7.9$). See Table 1 for a full listing of socio-demographic information.

Mental health and coping resources. The majority of participants were not well. Many were experiencing depressive symptomatology, with 61.0% of the sample scoring 15 or higher on the PHQ-9, indicating moderate to severe levels. According to The Posttraumatic Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997), 44.9% met DSM-IV-TR diagnostic criteria for PTSD, with 36.6% of those endorsing “moderately severe or severe levels” of posttraumatic stress as indicated by a PDS symptom severity score of 21 or higher. Most women were multiply traumatized, having experienced an average of 5.2 out of 11 event types from the PDS, with 74.1% of the sample having experienced child sexual abuse at the average age of 11 years old,

and 95.1% having experienced at least one interpersonal trauma (i.e., physical or sexual assault/abuse, or torture), and 64.4% having experienced some sort of accident (e.g., car accident, fire, or explosion). Along with high levels of negative affect, women in the sample also had difficulties regulating their emotions, with a mean of 88.2 ($SD = 26.0$) on the DERS compared to 78.0 ($SD = 20.7$) among female college students and 118.0 ($SD = 18.5$) among drug treatment-seeking women diagnosed with Borderline Personality Disorder and Substance Dependence (see Gratz & Roemer, 2004; and Axelrod, Perepletchikova, Holtzman, & Sinha, 2011; respectively). Just under half (48.3%) attended religious services or meetings and most (72.7%) engaged in private religious or spiritual practices like praying. See Table 2 for descriptive results for all mental health and coping variables.

Relationship characteristics. Women answered relationship questions with regard to their “most important” main male sex partner, with “main” partner defined as someone with whom they had a regular, steady or ongoing sexual relationship. These partners were most frequently identified as a husband, boyfriend, man or fiancé (71.2%). Most women lived with them (64.4%), had an agreement to be monogamous (62%), and it had been an average of 21 months since the first time that they had had sex (though with substantial variability in that time period, $SD = 73$). Women on average reported being “Quite a bit” ($Mdn = 4$) in love with their main partners the last time they had had sex. However, their partners also engaged in some maladaptive methods of resolving conflict, according to the CTS2S items (Straus & Douglas, 2004). The vast majority used both adaptive negotiation (94.1%) and psychological aggression (82.0%). In addition, some women had partners who perpetrated physical assault (33.2%), injury (30.7%), and sexual coercion (16.6%) during relationship conflict. According to scores on the SRPS, women more often disagreed than agreed with statements about their partner having

control in the relationship ($M = 3.1$, $SD = 0.7$); and they endorsed on average equal dominance in decision-making ($M = 2.4$, $SD = 0.7$). Using the ECR-RS scores as indicative of attachment style, most women in the study (58.5%) had a “Secure” attachment style specific to their main partner ($M = 3.2$, $SD = 1.9$ for anxiety; $M = 3.0$, $SD = 1.9$ for avoidance), though these scores are much higher (less “Secure”) than what is reported among college samples ($M = 1.7$, $SD = 0.8$ for anxiety; $M = 2.6$, $SD = 0.9$ for avoidance; Fraley et al., 2011). In terms of types of insecure attachment, according to cut-offs used by the ECR-RS creators, 18.5% of the sample would be classified as having a “Fearful-avoidant” attachment style, 15.1% “Preoccupied”, and 7.8% “Dismissing-avoidant” (Fraley et al.; Fraley, 2010). See Table 3 for full relationship and partner characteristics of the sample.

Substance use. Most women in this sample were hard drug users, with 79.5% endorsing use of at least one of the following substances in the 90 days before their arrest: methamphetamine (71.7%, 57.8% of whom had used at least six times per week), pain pills (49.3%, 38.6% of whom had used at least six times per week), heroin (46.3%, 65.3% of whom had used at least six times per week), and (powder or crack) cocaine (34.6%; 47.1% of those who had used crack cocaine did so at least six times per week). Although alcohol use was less common, 54.1% of the sample did engage in ‘hazardous use’ of alcohol according to the cut-off of three or higher on the AUDIT-C recommended for assessment with women (Bradley, Bush, Epler, Dobie, Davis, Sporleder, et al., 2003). The severity of alcohol use was 33.7% of maximum possible, versus a severity of 71.4% of maximum possible for drug use severity. Indeed, 75.6% of the sample fell into the ‘substantial’ or ‘severe’ drug problem categories with a score of six or higher out of ten, as recommended by the proprietors of the DAST-10 (Addiction Research Foundation, 1982). In addition to high severity and frequency, about half of participants ($n =$

100) were injecting drugs in the 90 days prior to arrest, putting them at much higher risk for infection with HIV and Hepatitis C, especially given that 56.0% of those who injected drugs were at least “sometimes” sharing needles or drug works (e.g. cookers, cotton, or rinse water) with others. Of the 31 women who had at least “sometimes” shared a needle, only 9.7% “always” used bleach, with the majority (51.6%) “never” using bleach in those circumstances. Of those women who had ever injected drugs with a needle ($n = 125$), the median age of injection initiation was 22 ($SD = 8.0$, range 12-45). The person in their life who was most responsible for them beginning to inject drugs for the first time (besides themselves) was a friend ($n = 49$) or a romantic partner ($n = 43$), followed with much less frequency by a stranger ($n = 12$), a parent ($n = 8$), a sibling or other relative ($n = 8$), and a casual sex partner ($n = 2$).

Sexual behavior. While 42% of women had multiple sex partners in the past 90 days, our survey only collected information about the most important main partner and the most recent casual partner; however, some women ($n = 27$) had multiple “main” partners. Condomless sex was extremely common with main partners—91.2% of the sample had condomless vaginal sex with their most important main partner at least “sometimes” in the past 90 days, and 77.1% “never” used a condom for vaginal sex with that main partner. Forty-three women reported anal sex with their main partner, and the vast majority ($n = 39$) had condomless anal sex, which is 19.0% of all participants). Encouragingly, half of women (52.7%) reported talking to their main partner in the past 90 days about either condoms or HIV testing. Among women who had sex with casual partners ($n = 65$), condom use occurred with more frequency—only 21.5% had condomless vaginal sex and two women had condomless anal sex.

A history of sex trading was common among the sample, with 42.4% of the sample reporting trading sex at least once in their lifetime. The median age for the first sex trade was 21

years old ($SD = 8.2$, range 12-44). While condom use was more frequent during traded sex, 49.4% engaged in condomless sex at least “sometimes” while trading sex, and 9.2% reported “never” using a condom during a sex trade.

Three participants (1.5%) self-identified as HIV-positive; 29 (14.1%) self-identified as having Hepatitis C; and 112 (54.6%) reported receiving a diagnosis for at least one other sexually transmitted infection (other than HIV) in their lifetime. See Table 4 for all substance use and sexual risk information about the sample.

Data Preparation for Model Testing

All variables were found to have distributions that differed significantly from the normal distribution according to the Shapiro-Wilk test ($W < .05$); however, none of them had skewness > 2 or kurtosis > 7 , which are criteria that have been recommended for use in structural equation modeling (West, Finch, & Curran, 1995). Nonetheless, given skewness of 1.68 and kurtosis of 3.06, a base-10 log transformation of condomless sex in the past three months, which reduced skewness to -0.74 and kurtosis to 0.05, was selected for use in all analyses. The next highest values for skewness and kurtosis were 0.77 and 1.86, respectively. Ultimately, all variables were deemed acceptable given estimation using WLSMV (Flora & Curran, 2004). To support model convergence, variances were scaled when necessary so that the ratio of smallest to largest variance was no greater than 10.0 (Kline, 2011).

Preliminary bivariate correlations among all variables to be used in the hypothesized model are presented in Table 5. Most variables had consistently significant intercorrelations, with values ranging from low (between factors) to moderately high (among items within factors), all in the directions hypothesized in the conceptual model in Figure 1. Condomless sex, however, only correlated with items in the closeness factor. While the closeness items had consistent

associations with both condomless sex and substance use, all other significant relations were not consistent across factors. These variables were explored with a number of methodological and socio-demographic variables in bivariate analyses for identification of potential confounder variables. Age was not significantly correlated with any variables in the proposed model. However, race, ethnicity, foster/institutional care as a minor, lifetime incarceration duration, age of first incarceration, employment, education, unstable housing, religious practices, and number of days in jail at time of interview were all significantly correlated with at least one item. Those variables that showed consistent patterns of associations with hypothesized latent factors were considered in conjunction with supporting research and theory for inclusion as covariates in the structural model.

Measurement Model

Prior to specification, the measurement model was assessed for identifiability. Given that it is a recursive model with > 2 factors, with at least two indicators per factor, and that it is overidentified with $df = 136 - 42 = 94$, it was deemed appropriate for specification (Kline, 2011).

The latent variables of traumatic stress, relational anxiety, closeness, power, and condomless sex were allowed to freely correlate in a preliminary measurement model, with the following indicators per factor: 1) traumatic stress was indicated by sums of items for the three subscales of the PDS that make up the symptom categories of the DSM IV diagnostic criteria, avoidance, arousal and re-experiencing, as well as the number of areas of functioning (out of nine options) where symptoms were causing impairment; 2) relational anxiety was indicated by the three scale items that make up the anxious attachment subscale of the ECR-RS; 3) closeness was indicated by two likert-response items asking how in-love and how close, intimate or connected they were feeling at the time of the last sexual intercourse with their main partner, and

one count item of five relationship commitment criteria, which were having a monogamous agreement, whether the partner was labeled as boyfriend, fiancé, husband, or “my man”, living together, whether she had been the only sexual partner since they first had sex, and whether she had other partners in the past three months; 4) relationship power was indicated by the sexual relationship power scale, and given the large number of items in the scale, estimation was facilitated using two parcels of each subscale: relationship control (each parcel as a mean of six items) and decision-making dominance (one parcel of three items, and one parcel of four items); 5) condomless sex was indicated by two items summing condom use during anal and vaginal sex either at last sexual intercourse or more generally over the past three month, with the latter weighted by number of sexual occasions for each type of intercourse.

The measurement model had acceptable fit: $\chi^2(94) = 186.49, p < .05, RMSEA = .07$ (90% CI = .06 - .08), CFI = .96, WRMR = .80. However, looking at the Power factor, it was clear that the two subscales, Decision-making Dominance and Relationship Control, were behaving distinctly in the model, with the parcels of Decision-making Dominance having a rather large amount of residual covariance relative to the Relationship Control parcels. This was identified in the difference from R-square values and high standardized expected parameter change (EPC) values for allowing the two parcels to covary—standardized EPC values have been recommended as a more stable index of misspecification than the modification index (Whittaker, 2012). Parceling is only recommended when a set of items are one-dimensional because parceling multidimensional scales can hide misspecification of the model (Kline, 2011; Bandalos, 2002). Thus, the decision was made to select one of the subscales, Relationship Control, for further analyses. This subscale was chosen because it had more items, higher reliability, and has been shown in prior research (including the scale validation study) to

correlate more highly than the other subscale with variables that are of interest in the current study (Pulerwitz et al., 2000; Knudsen et al., 2008).

After respecifying the latent variable Power as indicated by four parcels (means) of randomly grouped items from the Relationship Control subscale of the SRPS, the measurement model converged normally, and had better (more acceptable) fit: $\chi^2(94) = 164.24, p < .05$, RMSEA = .06 (90% CI = .05 - .08), CFI = .97, WRMR = .71. Other than Commitment, all factor loadings for each latent variable were .70 or higher (see Table 6). Given that $\chi^2/df = 1.75$, we decided to proceed with structural analysis.

Sexual Risk Model

SEM was used to test the paths as originally hypothesized in Figure 1, with direct effects of relationship power and closeness, as well as substance use, on condomless sex, with traumatic stress as an antecedent, and relational anxiety as a mediator between traumatic stress and both relationship power and closeness. This model had good fit to the data, $\chi^2(111) = 178.13, p = .0001$, RMSEA = .05 (90% CI = .04 - .07), CFI = .97, WRMR = .78. Inspection of the model modification indices, with particular attention to standardized EPC values, revealed no conspicuous areas of misfit. In addition, factor loadings were stable from the measurement model to the structural model with all fluctuations under .05, and an average fluctuation of .009.

Next, the following socio-demographic and structural/contextual characteristics were tested as potential covariates in the model: Black race, level of education, unstable housing, and lifetime incarceration duration. These items were chosen based on their preliminary bivariate relationships and supportive evidence in the literature. First, a general covariates model was tested that controlled for each of these variables in all effects, specified with all covariates left free to covary with one another. This full covariates model converged normally and had good fit

to the data, with several characteristics identified as significantly related to model factors, including Black race with Closeness, Unstable housing with Power, and Education and Lifetime incarceration duration with Substance Use. An additional model that only included these covariate relationships was then tested, and also had good fit. However, in both of these covariates models, inclusion of covariate relationships did not change the pattern of results, so the more parsimonious model excluding all covariates was chosen and depicted in Figure 2.

This model suggested that both closeness and power in the relationship affected condom use and that these factors were both predicted by traumatic stress, with all effects in the hypothesized directions. It also showed that relational anxiety mediated the effects of traumatic stress on power (the direct effect of traumatic stress on power was non-significant), and traumatic stress on closeness. However, while the model suggested a significant effect of traumatic stress on substance use, the hypothesized effects of substance use on power and substance use on condomless sex were not significant ($p = .17$ and $p = .67$, respectively). Nonetheless, this model accounted for 14% of the variance in relational anxiety, 18% of the variance in relationship closeness, 58% of the variance in relationship power, 17% of the variance in substance use, and 28% of the variance in condomless sex, all of which are significant, $p < .001$. All standardized betas and factor loadings are depicted in Figure 2.

Given that—contrary to our hypotheses—substance use was not related to condomless sex or relationship power in the model, an alternative model was tested with some substance use respecifications. Given the mixed evidence about how to estimate the direction of the pathway between substance use and relationship power, we decided to test the effect in the other direction, with higher relationship power leading to decreased substance use. In addition, although not conspicuously large, the largest area of unestimated variance appeared to be

between substance use and closeness. Given some supportive evidence in the literature that high levels of substance use may decrease relationship closeness (Mudar et al., 2001), this path was also added. Furthermore, given that the estimate of the effect of substance use on condomless sex was consistently close to zero, this effect was fixed to zero in the respecified model. To summarize, this respecified model (depicted in Figure 3) had the following new hypotheses: that decreased relational power would lead to increased substance use (rather than the other way around); that increased substance use would lead to decreased closeness; and that substance use would only affect condomless sex indirectly through the mediator of closeness. This model had good fit: $\chi^2(111) = 159.69, p = .002, RMSEA = .05$ (90% CI = .03 - .06), CFI = .98, WRMR = .70. All paths, which can be seen in Figure 3, were significant, including the pathways from traumatic stress to power, from power to substance use, and from substance use to closeness. Standardized EPC values were now all less than .50. In addition, factor loadings were stable from the measurement model to the respecified substance use structural model with all fluctuations under .02, and an average fluctuation of .006. This respecified Substance Use model accounted for 11% of the variance in relational anxiety, 20% of the variance in relationship closeness, 58% of the variance in relationship power, 28% of the variance in condomless sex, and 13% of the variance in substance use.

In the interests of testing alternative plausible models, a direct effects version of the respecified Substance Use model was tested where direct effects from traumatic stress and relational anxiety to condomless sex, as well as a direct effect from traumatic stress to relationship closeness, were allowed to vary freely. This model demonstrated acceptable (but worse) fit, $\chi^2(107) = 172.52, p = .0001, RMSEA = .06$ (90% CI = .04 - .07), CFI = .97, WRMR = .69, and none of the newly estimated direct paths were significant. Of note, the effect of

relationship power on condomless sex became non-significant when direct effects were included. The more parsimonious respecified Substance Use model was retained.

A simplified model excluding substance use was also tested. According to Hayduk's (1987) instructions regarding simplifications that misspecify spuriously arising covariance, removing substance use was deemed acceptable given that it was a mediator in the full model. This simplified model, with only 73 free parameters, had the added benefit of an increased sample-to-parameter ratio, which allows for more stable estimates (Kline, 2011). The simplified model demonstrated good fit to the data: $\chi^2(98) = 144.77$ ($p = .002$), RMSEA = .05 (90% CI = .03 - .06), CFI = .98, WRMR = .72. All paths were significant and their standardized beta values can be seen in Figure 4. In addition, factor loadings were stable from the measurement model to this simplified structural model with all fluctuations under .02, and an average fluctuation of .004. The simplified model accounted for 12% of the variance in relational anxiety, 18% of the variance in relationship closeness, 58% of the variance in relationship power, and 28% of the variance in condomless sex.

Finally, a direct effects version of the simplified model was tested. Just as with the previous direct effects model, direct paths from traumatic stress and relational anxiety to condomless sex, as well as a direct path from traumatic stress to relationship closeness, were allowed to vary freely. This model demonstrated acceptable (but worse) fit, $\chi^2(95) = 162.40$, $p < .05$, RMSEA = .06 (90% CI = .04 - .07), CFI = .97, WRMR = .72. None of the newly estimated direct paths were significant. Similar to the previous direct effects model, the effect of relationship power on condomless sex became non-significant when direct effects were included. The more parsimonious simplified model, as shown in Figure 4, was retained.

Discussion

This study is the first to our knowledge to investigate a latent structural regression model of sexual risk behavior among incarcerated women, and one of the very few to assess the impact of traumatic stress on sexual risk behavior using this methodology. The main aim was to test a model of condomless sex among incarcerated women based in Social Action Theory. The originally hypothesized model, a respecified substance use model, and a simplified model each demonstrated good fit, and confirmed the majority of the hypothesized pathways, including pathways from traumatic stress to condomless sex through the relationship factors of closeness and power. In addition, relational anxiety served as a significant mediator between traumatic stress and both relationship factors. Our study suggests that, by predicting both lower power and lower closeness in the relationship, increased traumatic stress and relational anxiety have oppositional effects on condomless sex with main partners. The less close women felt to their partners, the less they had condomless sex; on the other hand, the less power they had in the relationship, the more condomless sex they had. This finding is an example of “inconsistent mediation” (Davis, 1985), and, if replicated, would clarify our understanding of the role of traumatic stress in sexual risk-taking, with implications for both research methodology and clinical practice.

With regard to research implications, inconsistent mediation raises concerns about the potential for studies of the relationships between traumatic stress and condomless sex to be misleading when statistical tests do not include evaluation of the effects of inconsistent mediators (MacKinnon, Krull & Lockwood, 2000; MacKinnon, Fairchild, & Fritz, 2007). In other words, when positive and negative indirect effects cancel each other out, tests of the overall effect of traumatic stress on sexual risk-taking may fail to reject null results when significant effects are present (a Type II error). Even among research that aims to explore potential

mediators, these effects would be difficult to identify because the most common methods for mediational analyses require that the independent variable and the dependent variable are significantly related to begin with (Baron & Kenny, 1986; MacKinnon, et al., 2000), which they may appear not to be in simple regression. Indeed, in this study, condomless sex was not related to traumatic stress, relational anxiety, or relationship power in bivariate analyses; nonetheless, this appears to have been a result of inconsistent mediation rather than a lack of effects.

With regard to practice implications, these results provide evidence that interventions aimed at reducing traumatic stress may impact risk for sexually transmitted infections by lowering relational anxiety, changing power dynamics or increasing the level of intimacy within clients' romantic relationships. Indeed, interpersonal functioning improved following exposure-based treatment and skills training for traumatic stress among child sexual abuse survivors (Cloitre, Koenen, Cohen, & Han, 2002); reductions in posttraumatic stress following cognitive processing therapy were associated with decreased interpersonal distrust (Mitchel, Wells, Mendes, & Resick, 2012); and a treatment aimed at decreasing posttraumatic stress and substance use reduced the number of unprotected sexual occasions among women in drug treatment (Hien et al., 2010). Given that the inconsistent mediation shown in our models is based on variance within a sample of women, rather than specific behavioral changes in an individual, it is difficult to know exactly how these divergent pathways might operate for each client; however, the findings highlight the potential for condom use to be impacted by changes in traumatic stress and relational anxiety, and, thus, should be considered in the context of treatments that target such factors among women at risk for HIV and other sexually transmitted diseases.

Our models suggest that increasing closeness and decreasing power in main partnerships predict increased condomless sex, and therefore, increased risk of transmission between main partners. These findings are consistent with results found among adolescents, that lower consistency of condom use with main partners was associated with both higher negative relationship qualities like conflict and partner control and higher positive relationship qualities including love and closeness (Manning, Flanigan, Giordano, & Longmore, 2009). Our results also suggest that, among women with substance use problems, and whose partners are substance-using and criminally-involved, transmission risk is relatively high even within main partnerships. Risk is high partially because many of these relationships are concurrent with other sexual relationships—concurrency dramatically increases the spread of sexually-transmitted infections (Gorbach & Holmes, 2003)—and many women are at frequent and regular risk of disease infection through engaging in risky drug injection practices in between sexual contacts (many of their partners are likely engaging in these risks as well, though this was not assessed). Thus, interventions aimed at supporting women to use condoms in their main partnerships are needed, and the development of such interventions requires consideration of these relationship factors.

The strongest pathway from traumatic stress to condomless sex was through relational anxiety and relationship closeness, with all pathways significant at $p < .001$ across all three models, both with and without the inclusion of direct effects. Given cross-sectional data, we cannot use this data as evidence of causal relationships; however, a causal pathway is conceivable and in line with these findings. For example, distress stemming from interpersonal trauma may increase relationship-based anxiety, perhaps because of core beliefs that men are untrustworthy and dangerous, or beliefs about the self as being unlovable, incompetent and of low worth, all of which are common among interpersonal trauma survivors (Foa, Ehlers, Clark,

Tolin, & Orsillo, 1999). Indeed one study using cross-sectional data conducted with college students found that self-worth was a partial mediator between relational anxiety and traumatic stress (Lim, Adams, & Lilly, 2012). Although the authors interpreted relational anxiety as indicative of early attachment and hypothesized this variable as a precursor of traumatic stress, given cross-sectional data, the results could just as easily be interpreted as supportive of our model, with traumatic stress leading to relational anxiety, partially mediated by low self-worth. These core beliefs and self-doubts may induce ruminations related to their partner's true feelings and likelihood of abandoning them. Then, these ruminations might lead to less feelings of closeness with that person. Given decreased intimacy with this partner, a woman has less reason to engage in condomless sex, an act that has been described by women as a show of trust and intimacy (Bolton, McKay, & Schneider, 2010; Murray et al., 2007). Furthermore, women who have low traumatic stress may be more likely to trust their partners, allow themselves to grow closer and connect more deeply with their partners, and this deeper connection could be seen as a reason to forgo the use of condoms. This is consistent with event analyses showing that greater closeness felt toward a sexual partner predicted condomless sex among women who used drugs (Tortu, McMahan, Hamid, & Neaigus, 2000).

The other pathway in our models from traumatic stress and relational anxiety to condomless sex went through relationship power. While the standardized coefficient for the effect from relational anxiety to power was consistently $-.60$ (between a medium and a large effect) and significant at $p < .001$ in all models, the direct effects from traumatic stress to power and power to condomless sex were somewhat less consistent and lower in magnitude. The originally non-significant direct effect of traumatic stress on power increased (and became statistically significant) in the respecified substance use model and in the simplified model; thus,

original non-significance may have resulted from misspecified substance use paths. In addition, relationship power as a mediator between traumatic stress and sexual risk-taking is consistent with a study conducted with African-American female college students (Munroe et al., 2010). In this study, having greater PTSD symptoms was associated with frequency of condomless vaginal sex, with perceived sexual control as a full mediator of that relationship (Munroe et al.). In further support, one study using structural equation modeling showed that a sense of powerlessness was a significant mediator between the effects of sexual abuse severity and maladaptive relationships (Kallstrom-Fuqua, Weston, & Marshall, 2004). Finally, one study showed that each of three types of traumatic experiences in childhood—physical abuse, sexual abuse, and witnessing IPV perpetrated against one’s mother—increased the risk of IPV victimization by approximately two-fold and experiencing all three increased the risk 3.5-fold (Whitfield, Anda, Dube, & Felitti, 2003). While not equivalent to relationship power, intimate partner violence (IPV) is certainly highly related to relationship control dynamics and indicates that victims have considerably less power (Pulerwitz, Amaro, De Jong, Gortmaker, & Rudd, 2002). Given that traumatic stress often follows experiences of intimate partner violence—31 to 84% of women who had experienced IPV met criteria for PTSD according to one meta-analysis (Golding, 1999), a causal relationship between prior traumatic stress and subsequent involvement in abusive or controlling relationships is likely difficult to demonstrate conclusively because often earlier partner violence may be at least partly responsible for traumatic stress symptoms. In our model, traumatic stress is conceptualized as leading to interpersonally-focused cognitions, emotions, and behaviors, including relational anxiety, that increase acquiescence or deference to more dominant romantic partners (e.g. low self-worth, low assertiveness, fear of conflict, fear of abandonment). One factor that may support a traumatized woman’s involvement

in a controlling relationship is brain functioning. The presence of a romantic partner can function to regulate fear by moderating stress response systems in the brain (Coan, 2010). With functional magnetic resonance imaging (fMRI), Coan, Schaefer, and Davidson (2006) showed that women's brains registered less activation in the neural systems indicating threat response when in the presence of their romantic partners. Among women with high levels of traumatic stress, this effect might serve as a powerful reward—according to the principles of appetitive conditioning—for maintaining a close relationship, even if that meant giving up power or control. The immediate rewarding consequences of keeping a partner close (by perhaps engaging in condomless sex) may be more influential than the long-term consequences of potential disease acquisition. Furthermore, the emotional cost of losing a partner (by perhaps insisting on condoms) would be an influential obstacle to enacting safer sex practices. Fear of disease acquisition itself may even be lower simply as a result of these modulating effects of physical proximity to an emotionally “close” romantic partner.

While the effect of power on condomless sex stayed significant throughout the three models, it became non-significant when direct effects were added—though none of the direct effects were significant and these direct effect models had worse fit to the data. Nonetheless, this could mean that the direct effects of traumatic stress and relational anxiety on condomless sex, while not significant, still influenced enough of the variance between power and condomless sex to lower the effect of relationship power below significance; suggesting that relationship power, as measured in the current analyses, may be a far less influential relationship mediator than closeness. Given supportive evidence in the literature showing a negative association between power or control variables and condom use (Tortu et al., 2000; Bonacquisti & Geller, 2013), we feel confident that relationship power is predictive of condomless sex. However, it may be that

our precise measurement of this construct was lacking. One way to conceptualize how relationship power might influence condomless sex is as a deciding factor in determining which partner's previously held intentions (when in conflict) will be followed. Recent research assessing the influence of condom use intentions on prospective condom use showed that condom use intentions of the partner with higher dominance, the partner with higher relationship power, and the male partner, each were predictive of future condom use over and above that of the couple's joint intentions and the intentions of the less dominant, less powered, or female partner (VanderDrift, Agnew, Harvey, & Warren, 2013). Ultimately, a woman's increased relationship power or control could only predict increased condom use if she actually wanted to use one. Thus, in the case of the present study, given that condom use intentions were not assessed, the somewhat smaller mediational effects of relationship power in the models may be because some of the women who had greater power never intended to use condoms, and some of the women with less power had partners who did intend to use one. Other researchers studying relationship power and condom use have acknowledged this potential moderator to explain null results (Campbell, et al., 2009; Randolph, Gamble, & Buscemi, 2011).

The failure to find evidence for a direct effect of substance use on condomless sex was surprising. A simple understanding of the effects of drugs and alcohol on decision-making, impulse control, and sexual arousal makes the prediction of increased condomless sex with high substance use common sense. Furthermore, an extensive literature documents both associations between substance use and condom use in correlational studies (Scott-Sheldon, Walstrom, Carey, Johnson, & Carey, 2013), and even evidence from controlled laboratory studies (Zawacki, 2011; see also George & Stoner, 2000, and Ross & Williams, 2001, for reviews). On the other hand, there is mixed evidence about mediational and causal effects of substance use in condomless sex

(Leigh, 2002). For example, in a study conducted with low-income women experiencing intimate partner violence (IPV), Cavanaugh, Hansen, and Sullivan (2010) found that IPV-related PTSD, but not drug use, was significantly related to risk behavior in simultaneous logistic regression. They also conducted analyses looking at drug use as a mediator between PTSD and risky sex, and did not find statistical support, which is consistent with our results (Cavanaugh et al.). Furthermore, several studies using longitudinal event-based diary methods to compare sex events by alcohol use within individuals while controlling for confounding variables have found no evidence for the influence of substances on sexual behavior, whether sex occurred within casual or committed relationships (Leigh et al., 2008; Fortenberry, Orr, Katz, Brizendine & Blythe, 1997). These authors concluded that people continue with their habitual patterns of condom use regardless of intoxication level (Leigh et al.). Finally, much of the research investigating substance use and risky sex has focused on sex occurring within casual relationships (e.g. White, Fleming, Catalano, & Bailey, 2009) where the social meaning and interpersonal consequences of condoms differ considerably, and thus, is likely differently affected by intoxication at the time of the sexual encounter.

Nonetheless, we considered other circumstances unique to our study as potential explanations for the lack of effect between substance use and condomless sex. Given our interest in combining alcohol and drug use information together in order to include all participants, we were left with one measure of substance use modeled as a manifest variable, which means our model assumed that it was measured with perfect reliability, which is obviously highly unlikely, and this may have attenuated effect sizes. Therefore, future studies looking at the relationships tested in the current study should try to include multiple measures of substance use so as to rule out the possibility that measurement error leads to inaccurate estimation. Alternatively, if a

researcher could reasonably estimate measurement error in their sample for a particular substance use variable, they would be better justified to estimate a latent substance use variable with that measure as one indicator and fix the value of its measurement error variance based on this prior estimate (Kline, 2011). In addition, since our substance use variable was a composite of drug and alcohol use severity regardless of drug type, and the condomless sex variable has condom use weighted by number of intercourse events, there is the possibility that some drug users are having less sex overall as their use of drugs increases—at very high levels of intoxication, some drugs may decrease sex drive or inhibit sex in other ways—so their values for condomless sex would be opposite that of other users. To test for this possibility, we looked at number of intercourse events by drug abuse severity among specific subgroups of drug users, and the associations were close to zero across all subgroups. Ultimately, our study suggests that the use of condoms in main partnerships is predominantly affected by the dynamics of the relationship. These dynamics could function to influence habitual patterns of behavior and decision-making about condoms over the course of the relationship regardless of substance use.

Either way, our respecified model also suggests that increased substance use leads to condomless sex not directly, but through decreased closeness in the relationship. This finding is exploratory, and requires replication, as there is limited research investigating associations between substance use and relationship closeness. However, one longitudinal study did show substance use to be negatively associated with relationship satisfaction at a later time point (Testa et al., 2003). Relationship satisfaction likely overlaps with closeness, though is not equivalent, and they found a negative association in the reverse chronological order as well, with relationship satisfaction predicting lower substance use at a subsequent time point (Testa et al.),

so it is possible that effects go both ways. More research looking at relationship closeness as a mediator between substance use and condomless sex is warranted.

The findings regarding a significant path from relationship power to substance use (but not the other way around) did not confirm our original hypothesis. We thought that women would be using substances to cope with traumatic stress, and that this reliance on substances would decrease their power in relationships with male partners who have greater access to substances and, when intoxicated themselves, would be more likely to use aggressive or violent behavior to dominate their partners. However, our results supported a different story: that greater traumatic stress lead to decreased power in relationships, which then was associated with greater use of substances, perhaps to cope with both trauma symptoms and controlling partners. This is consistent with a path analysis study among incarcerated women showing a path from relationship dysfunction to increased substance abuse through the mediators of self-efficacy and emotional abuse (Salisbury & Van Voorhis, 2009). Most of the studies we have reviewed to inform these results are measuring intimate partner violence or abuse, which, although not the same thing as power, have been shown to predict both relationship control and decision-making dominance among substance-using women (Campbell et al., 2012). Another such study found bidirectional effects between IPV and substance use among a community sample of women, with both marijuana and hard drug use but not heavy alcohol use predicting increased likelihood of experiencing IPV, and experiences of IPV predicting subsequent heavy episodic drinking but not drug use (Testa et al., 2003). Given the use of a combined substance use variable in our models, we did not test these potential substance-specific effects in the current study, but future analyses of these data using alternative methods may be helpful in gaining more understanding of the role of substance use in relationship power. Finally, in a chart review study of criminally-involved

patients entering substance abuse treatment, individuals with trauma histories co-occurring with substance abuse were significantly more likely (than those with only trauma, only substance abuse, or neither affliction) to report wanting help managing stress and tension, dealing with problems in their marriages or close relationships, improving other relationships, and learning to express their feelings in a healthy way (Clark, Reiland, Thorne, & Cropsey, 2014), suggesting potential interaction effects of substance use and traumatic stress on relationship problems.

This study contributes important information to our understanding of sexual risk-taking among a greatly underserved and at risk population. Jail-detained women are rarely the focus of research or intervention, yet their time inside provides a potentially fruitful opportunity to support improvements in psychological distress and health behavior. Given the stable estimates and medium to large effects of both traumatic distress and relationship factors on condomless sex across three separate latent factor models, this study supports the potential benefit of interventions that address both traumatic stress and relationship dynamics among women with high substance use and criminal involvement. The “inconsistent meditation” effects also highlight the importance of using sophisticated methodology to assess the complex role of traumatic stress on condom use, and the necessity of including evaluation of relationship factors in future analyses.

Limitations

Despite this study’s many strengths, results must be evaluated in the context of some methodological limitations. For example, this study used a combination of ordinal data (with some underlying non-normality) with a relatively modest sample size. The preferred method for analyzing ordinal or non-normal data in MPlus is mean- and variance-adjusted weighted least squares (WLSMV) as was used in the current analysis (Kline, 2011). In one computer simulation

study, this estimator did not perform as well with samples of around $N = 200$ when distributions on categorical variables were highly skewed (Muthen, du Toit, & Spisic, 1997). That being said, our data were only somewhat skewed. Furthermore, a more recent computer simulation study examining the use of this estimator with a variety of sample sizes found that it performed well the vast majority of the time, even in complex models with samples smaller than ours (Flora & Curran, 2004). Another limitation is the cross-sectional and retrospective nature of the data itself. While our results largely support the models proposed, the causal pathways require exploration using longitudinal datasets. Given that behaviors of interest had to have occurred prior to incarceration, retrospective data was unavoidable and is the most common method used to assess sexual behavior. However, future studies should follow women into the community after their release, both to obtain multiple time points and to allow for collection of data closer to its occurrence in the community. Furthermore, there are other methods, like daily diaries or electronic monitoring, that allow for longitudinal analysis of behaviors tracked in almost real time (Leigh et al., 2008). Unfortunately, it may be less feasible to use such methods with indigent and substance-abusing populations given the rates of unstable housing and general chaos that is common in their lives. Perhaps the use of a telephone or other mobile device with incentives (like additional paid time for personal use) would be an effective means for assessing behavior in real time for women with low incomes, as this has been used effectively with low-income and stigmatized populations in prior health behavior research (Catz et al., 2011). Finally, our sample was limited to women in jail who had sex with a main partner in the three months prior to arrest. Although some of these women also had casual partners, and many of the relationships described here may be applicable to other populations of women, women with only

casual sex partners during this time period had to be excluded in order to ensure a full sample of main partner variables, and, therefore, results must be generalized as such.

Future Directions

Based on the data presented here, relationship factors appear to play important and influential roles in incarcerated and substance-abusing women's sexual risk behavior; in addition, relationship factors appear to serve as mediators of the effects of traumatic stress on sexual risk, likely because of the interpersonal nature of their trauma histories. These findings have implications for intervention within correctional settings. Programs for women passing through the criminal justice system may be able to improve multiple outcomes with only one or two intervention targets. In other words, our results suggest that interventions focused on empowering women in their intimate relationships (e.g., to leave abusive partners or to increase assertiveness) may improve sexual protective practices and possibly decrease substance use. The same might possibly be true for an intervention aimed at ameliorating posttraumatic distress. Furthermore, improvements in relationships may support faster traumatic stress recovery as well (Markowitz, Milrod, Bleiberg, & Marshall, 2009). Perhaps traumatic stress and relationship functioning would be most effectively addressed in conjunction with one another, a potential avenue for future research. Given the multiple forms of interpersonal, institutional, and social disadvantage that jail-detained women confront in their daily lives, it is important to find ways to intervene that will lead to improvements across multiple spheres. Furthermore, given limited budgets in correctional settings, bolstering the multiple potential benefits of traumatic stress treatment may increase the likelihood of its availability to women while they are incarcerated, a time when they may be more amenable to intensive trauma treatment. That being said, given the strong positive relationship between closeness and condomless sex, any intervention aimed at

changing these factors must also address how women can maintain personal safety and health in the context of intimacy and closeness. Intervention development research should address ways to navigate condom use within highly valued and emotionally intimate relationships, especially in cases where the woman may have limited control or power to make such decisions. One area worth exploring in this regard is increasing social support (from outside the sexual relationship), as one study using moderated mediation found that high quality social support was associated with less problematic substance use among women who had experienced high sexual trauma, which lead to decreased risky sexual behavior (substance use was a significant mediator of the effect of sexual trauma on risky sex; Johnson & Johnson, 2013). Similar effects on condom use were found for adolescents transitioning out of foster care who had a close relationship with a caregiver (Ahrens, McCarty, Simoni, Dworsky, Courtney, 2013). More investigation into these treatment development hypotheses is needed, and replication of the findings in the current study is an essential next step.

Future research, including replication studies, should ideally use larger samples and multiple time points to more adequately assess causality and to augment replication with tests of other related constructs. As mentioned previously, inclusion of condom use intentions in the model may provide more precise illustration of the role of relationship power. Furthermore, extensive prior research has shown cognitive and motivational factors like attitudes, self-efficacy and risk perception that predict condom use (Albarracín et al., 2001); however, other research suggests that these associations do not hold up among women involved in intimate partner violence relationships (Mittal, Senn, & Carey, 2011). Thus, future research should examine how these cognitive predictors fit into the relationships described in these models. For example, do classic cognitive predictors of condom use serve as mediators of the relation between

relationship dynamics and condom use (e.g., closeness leading to decreased perception of risk leading to less condom use)? And do some relationship factors moderate the impact of cognitive predictors (e.g. at low levels of power, self-efficacy has no effect on condom use; and at high levels, it has a strong effect)? One additional potential moderator of the relation between closeness and condomless sex may be self-control, given that recent experimental research has demonstrated that lower self-control predicts greater likelihood of self-sacrifice in the interest of relationship goals (Righetti, Finkenauer, & Finkel, 2013), meaning that closeness may only lead to condomless sex among women with low self-control. These questions require moderational analyses of latent structural pathways, which must be done with larger samples and, ideally, using multiple time points.

In conclusion, results from the models tested in the current study suggest that, for women involved in the criminal justice system, traumatic stress is influential in sexual risk-taking within primary main partnerships through its effects on relationship factors, including relational anxiety, relationship power, and closeness with their partner, and also, though more tentatively, through its effects on substance use. These findings highlight the importance of addressing relationship factors as part of the sequelae of traumatic experiences in order to decrease infection and transmission risk among this underserved and socially marginalized population.

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Table 1

Sociodemographic Characteristics (N=205)

Variable	<i>n</i>	<i>%</i>	<i>Mean/ Median^a</i>	<i>SD</i>	<i>Min-Max</i>
Age			32.7	9.2	18-63
Race and ethnicity ^b					
Non-Hispanic White	92	44.9			
American Indian or Alaska Native	68	33.2			
African-American	36	17.6			
Hispanic ethnicity	31	15.1			
Asian-American	6	2.9			
Housing prior to arrest					
House/apt. paid by someone else	117	57.1			
House/apt. paid by self	61	29.8			
Hotel, motel, or boarding house	63	30.7			
Homeless	38	18.5			
Other detention/correctional facility	24	11.7			
Motherhood					
Have children	151	73.7			
Number of children (among mothers)			2.5	1.5	1-9
Lost custody or parental rights	55	36.4 ^c			
Income					
Under \$900/month	81	39.7			
Over \$3000/month	46	22.4			
Money from sexual partner	99	48.3			
Money from friends or family	77	37.5			
Foodstamps	126	61.5			
Disability or SSI	27	13.1			
Welfare	25	12.2			
Part-time job	25	12.2			
Full-time job	9	4.4			
Education					
Received high school diploma or GED	141	68.8			
In school during past 90 days	11	5.4			
Incarceration/Institutional Experience					

Months incarcerated over lifetime			<i>Mdn</i> =12	48.7	1-300
Age at first incarceration			<i>Mdn</i> =18	7.9	11-63
Drug- or alcohol related conviction	127	62.0			
Physical violence conviction	75	36.6			
Foster/Institutional Care as minor	52	25.4			

Note. Response time period is the 90 days prior to arrest unless otherwise indicated. Percentages are in reference to the entire sample unless otherwise indicated.

^aThe mean, median or mode was chosen to best communicate the central tendency of the sample. Statistic listed is the mean unless otherwise indicated.

^bPercentages do not add up to 100% because participants were allowed to select multiple races.

^cPercentage is in reference to all mothers in the sample.

Table 2

Mental Health and Coping (N=205)

Variable	<i>n</i>	%	<i>Mean/ Median^a</i>	<i>SD</i>	Min-Max
Mental health treatment (lifetime) ^b					
Taken medication	112	54.6			
Received talk therapy	98	47.8			
Psychiatric hospitalization	54	26.3			
Trauma					
Interpersonal trauma event	194	95			
Number of event types endorsed			5.2	9.2	0-11
Met diagnostic criteria for PTSD	92	44.9			
Symptom severity ^c (past month)			<i>Mdn</i> =29.5	9.4	10-50
Moderate	16	7.8			
Moderate to Severe	51	24.9			
Severe	24	11.7			
Childhood sexual abuse (mean age)	152	74.1	10.9 years	4.1	3-17
Sexual abuse at age 13 or younger	85	41.5			
Areas of functional impairment			3.7	3.1	0-9
Depressive symptoms (past two weeks)					
Mild depression	51	24.9			
Moderate depression	49	23.9			
Moderately severe depression	43	21.0			
Severe depression	33	16.1			
Emotion regulation difficulties (Overall)					
Non-acceptance of Emotions			88.2	26.0	36-162
Goal-directed Behavior			13.3	5.6	6-30
Impulsivity			14.8	5.2	5-25
Impulsivity			14.6	5.9	6-30
Emotional Awareness			16.6	5.9	6-30
Coping Strategies			17.3	6.9	8-40
Clarity of Emotions			11.6	4.3	5-23
Religious or spiritual practices					
Attended services or meetings	99	48.3			
Private spiritual practice	149	72.7			

Note. Response time period is the 90 days prior to arrest unless otherwise indicated. Percentages are in reference to the entire sample unless otherwise indicated.

^aThe mean, median or mode was chosen to best communicate the central tendency of the sample. Statistic listed is the mean unless otherwise indicated.

^bPercentages will not add up to 100% because participants were allowed to select multiple types of mental health treatment.

^cSymptom severity for participants who met DSM IV-TR diagnostic criteria for PTSD.

Table 3

Relationship and Partner Characteristics (N=205)

Variable	<i>n</i>	%	<i>Mean/ Median</i> ^a	<i>SD</i>	Range
Main partner's conflict tactics (past year)					
Psychological Aggression	168	82.0			
Physical Assault	68	33.2			
Sexual Coercion	34	16.6			
Injury	63	30.7			
Adaptive Negotiation	193	94.1			
Sexual Relationship Power (overall)				0.7	1-4
Relationship Control			3.1	0.7	1-4
Decision-making dominance			2.4	0.7	1-4
Anxious Attachment			3.2	1.9	1-7
Avoidant Attachment			3.0	1.9	1-7
Main partner characteristics					
Husband/boyfriend/man/fiancé	146	71.2			
Months since first sex			<i>Mdn</i> =21	73	1-389
Lived with main partner	132	64.4			
Partner's drug use frequency			3.0	1.6	0-4
Responsible for criminal circumstances	43	21.0			
Agreement to be monogamous	127	62.0			
How "in love" at last sex			<i>Mdn</i> =4	1.5	1-5
How close, intimate or connected			<i>Mdn</i> =4	1.2	1-5
Degree "wanted" to have last sex			<i>Mdn</i> =4	1.2	1-5
Trying to have a baby together	23	11.2			
She/He initiated last sex	36/75	18/37	Mutual		
Casual partner characteristics					
Months since first sex			<i>Mdn</i> =3	47	0-231
Responsible for criminal circumstances ^b	5	7.4			

Note. Response time period is the 90 days prior to arrest unless otherwise indicated. Percentages are in reference to the entire sample unless otherwise indicated.

^aThe mean, median or mode was chosen to best communicate the central tendency of the sample for each variable. Statistic listed is the mean unless otherwise indicated.

^bPercentage is out of those participants who had sex with a casual partner in the 90 days prior to arrest ($n=65$).

Table 4

Substance Use and Sexual Risk Behaviors (N=205)

Variable	<i>n</i>	%	Mean/ Median ^a	<i>SD</i>	Range
Substance use					
Used meth	147	71.7			
Used pills	101	49.3			
Used heroin	95	46.3			
Used cocaine (powder or crack)	71	34.6			
Injected drugs	100	48.8			
Shared needle or injection tools	56	27.3			
Alcohol use severity ^b			33.7	32.1	0-100
Potentially hazardous drinking	111	54.1			
Drug use severity ^b			71.4	31.2	0-100
Substantial or severe drug problems	155	75.6			
Main partner					
Had condomless vaginal sex	185	90.2			
Never used a condom for vaginal sex	158	77.1			
Had condomless anal sex (<i>n</i> =43) ^c	39	90.7			
Discussed condoms or testing	108	52.7			
Casual partner (<i>n</i>=65)					
Had condomless vaginal sex ^d	44	67.7			
Never used a condom for vaginal sex ^d	39	60.0			
Had condomless anal sex (<i>n</i> =3) ^c	2	66.7			
Discussed condoms or testing ^d	26	40.0			
Engaged in sex work (lifetime)					
Age at sex work initiation			21	8.2	12-44
Condomless traded sex ^e	43	49.4			
Never used a condom ^e	8	9.2			
Sexual risk correlates					
Age of (consensual) sexual debut			12	4.1	
Self-identified as HIV-positive	3	1.5			
Self-identified having Hepatitis C	29	14.1			
Other STD diagnosis (lifetime)	112	54.6			
Multiple sex partners	86	42.0			

Had sex with IDU ^f	79	38.5			
At least moderately high/drunken at last sex	75	36.6			
Protective behavior self-efficacy			4.6	0.4	3-5
Sure or Very sure could do all 9 behaviors	89	43.4			

Note. Response time period is the 90 days prior to arrest unless otherwise indicated. Percentages are in reference to the entire sample unless otherwise indicated.

^aThe mean, median or mode was chosen to best communicate the central tendency of the sample. Statistic listed is the mean unless otherwise indicated.

^bStatistics are presented as Percentage of Maximum Possible (POMP; Cohen, Cohen, Aiken & West, 1999).

^cPercentages are calculated from the total number of participants who had anal sex with that partner type.

^dPercentages are calculated from the total number of participants who had a casual partner in the 90 days prior to their arrest.

^ePercentages are calculated from the total number of participants who ever traded sex.

^fIDU: Injection drug user.

Table 5

Intercorrelations Among Indicators of Traumatic Stress, Relational Anxiety, Relationship Closeness, Substance Use, Relationship Power, and Condomless Sex

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. PDS Avoidance	—														
2. PDS Re-experiencing	.69**	—													
3. PDS Arousal	.74**	.67**	—												
4. PDS Impairment	.62**	.56**	.64**	—											
5. ECR7: really care	.23**	.18**	.20**	.24**	—										
6. ECR8: abandon me	.29**	.20**	.29**	.28**	.80**	—									
7. ECR9: love as much	.32**	.19**	.25**	.31**	.69**	.78**	—								
8. Close before sex	-.19**	-.11	-.13	-.19**	-.40**	-.38**	-.25**	—							
9. In love	-.11	-.04	-.04	-.07	-.25**	-.16*	-.06	.63**	—						
10. Commitment	-.03	-.03	.00	-.09	-.26**	-.18*	-.09	.34**	.51**	—					
11. Relationship Control	-.33**	-.23**	-.32**	-.32**	-.63**	-.60**	-.61**	.36**	.14	.17*	—				
12. Decision Dominance	-.21**	-.10	-.16*	-.14*	-.36**	-.37**	-.40**	.15*	-.07	-.03	.65**	—			
13. Substance use	.23**	.24**	.32**	.35**	.15*	.22**	.19**	-.26**	-.20**	-.18**	-.24**	-.07	—		
14. Past 3 months CLS	.01	-.04	-.04	.04	-.13	-.04	.07	.21**	.31**	.28**	.05	.05	-.03	—	
15. Last sex CLS	.02	.09	.01	.11	-.08	-.02	.09	.20**	.24**	.20**	-.03	-.07	-.05	.44**	—

Note. PDS = Posttraumatic Diagnostic Scale; ECR = Experiences in Close Relationships Revised, Relationship Structures scale for romantic partner; CLS=Condomless sex.

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

Table 6.

Confirmatory Factor Analysis (CFA) Results

Factor	Indicator	Unstandardized Loadings (<i>SE</i>)	Standardized Loadings	Variance Explained by Factor (<i>R</i> ²)
Traumatic Stress	Avoidance (PDS)	—	.89	.79
	Re-experiencing (PDS)	.59 (.11)	.70	.49
	Arousal (PDS)	.71 (.10)	.83	.69
	Impairment (PDS)	.92 (.18)	.81	.66
Relational Anxiety	ECR7	.94 (.02)	.90	.81
	ECR8	—	.96	.92
	ECR9	.91 (.02)	.87	.76
Relationship Power	RC parcel 1	—	.74	.55
	RC parcel 2	1.14 (.15)	.76	.58
	RC parcel 3	1.59 (.23)	.92	.85
	RC parcel 4	1.17 (.18)	.80	.64
Relationship Closeness	“Close” before sex	—	.93	.86
	“In-love”	.82 (.09)	.76	.58
	Commitment count	.64 (.08)	.59	.35
Condomless Sex	Past three months	—	.71	.50
	Last sexual intercourse	.26 (.07)	.76	.58

Note. PDS=Posttraumatic Diagnostic Scale. CTS=Short form of the Revised Conflict Tactics Scale. ECR=Experiences in Close Relationships—Relationship Structures. RC=Relationship Control subscale of the Sexual Relationship Power Scale. The above model had acceptable fit: $\chi^2(94) = 164.24, p < .05$, RMSEA = .06 (90% CI = .045 - .076), CFI = .97, WRMR = .71. All factor loadings were significant, $p < .001$.

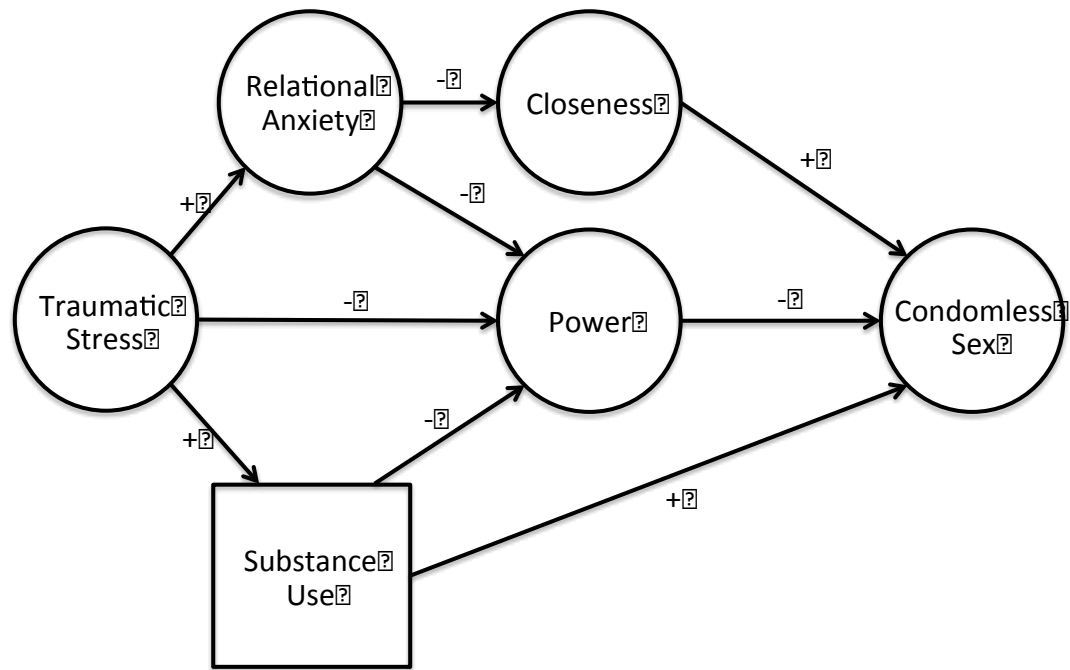


Figure 1. Hypothesized conceptual model based in Social Action Theory of condomless sex in main partnerships predicted by traumatic stress, relational anxiety, relationship closeness, relationship power, and substance use. A plus sign (+) indicates where a positive association was predicted and a minus sign (-) indicates where a negative association was predicted.

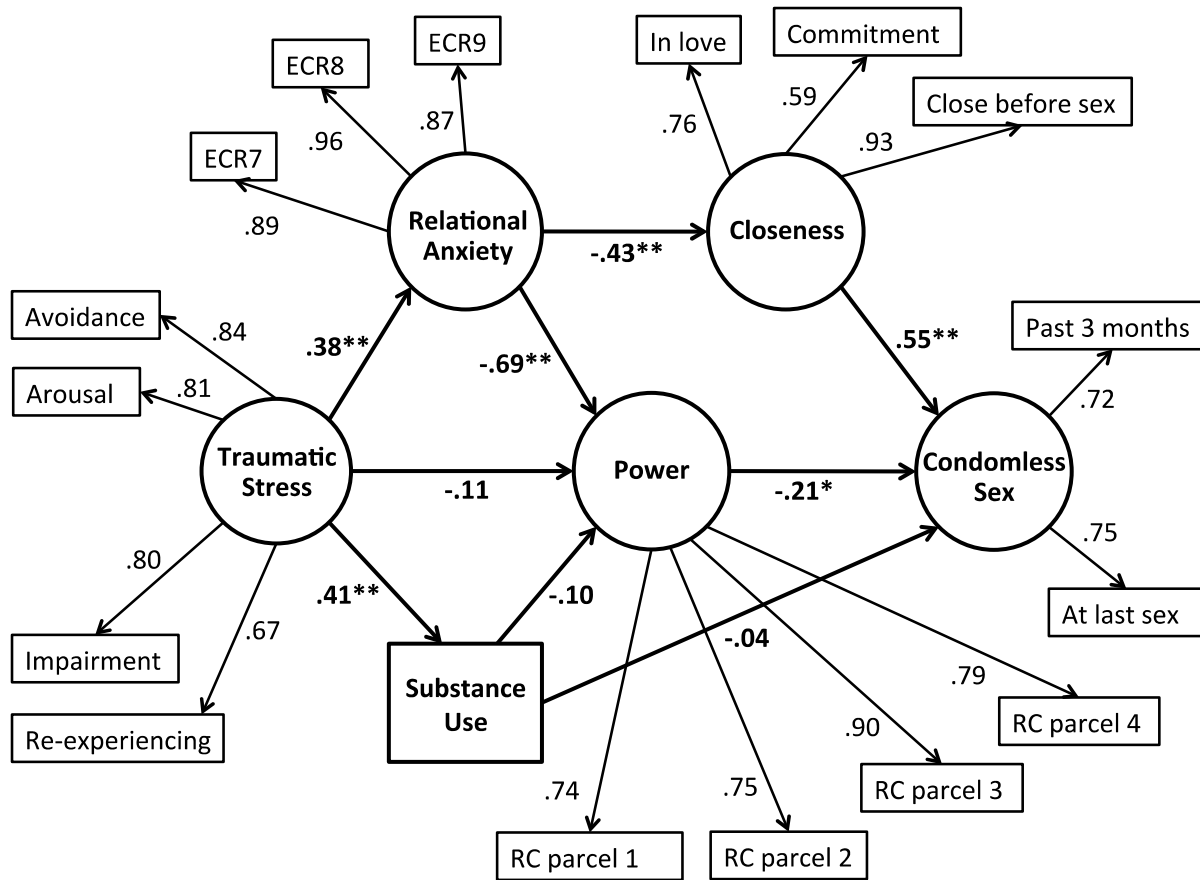


Figure 2. Hybrid structural covariance model of condomless sex in main partnerships predicted by traumatic stress, substance use and relationship factors. * $p < .05$; ** $p < .001$. All factor loadings are significant at $p < .001$. Model fit indices: $\chi^2(111) = 178.13, p = .0001, RMSEA = .05$ (90% CI = .04 - .07), CFI = .97, WRMR = .78.

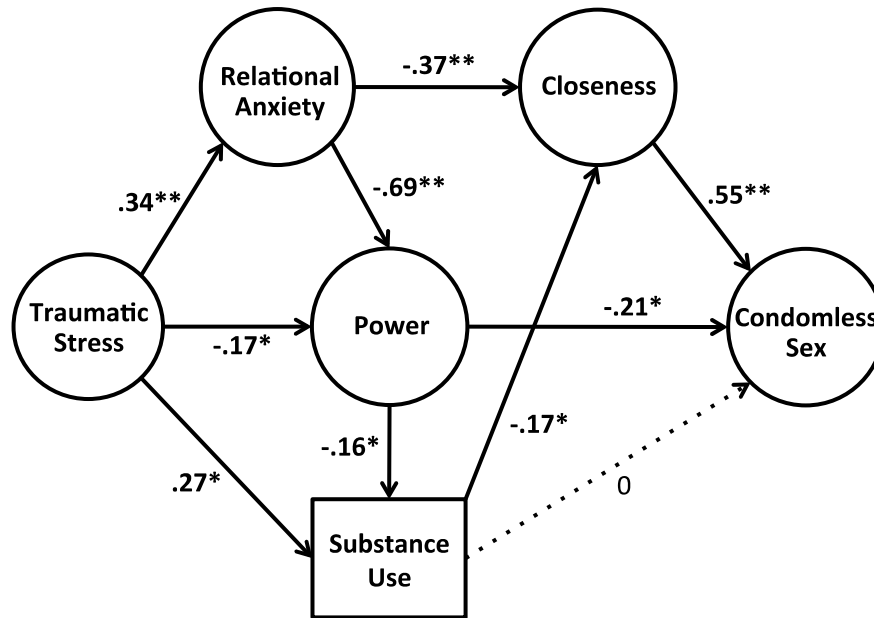


Figure 3. Respecified structural covariance model of condomless sex in main partnerships predicted by traumatic stress, substance use and relationship factors. Three respecifications were tested: estimation of the effect of substance use on closeness, reversal of the direction of the effect between substance use and power, and fixing the relation between substance use and condomless sex to zero (indicated with a dotted arrow). * $p < .05$; ** $p < .001$. Model fit indices: $\chi^2(111) = 159.69, p = .002$, RMSEA = .05 (90% CI = .03 - .06), CFI = .98, WRMR = .70.

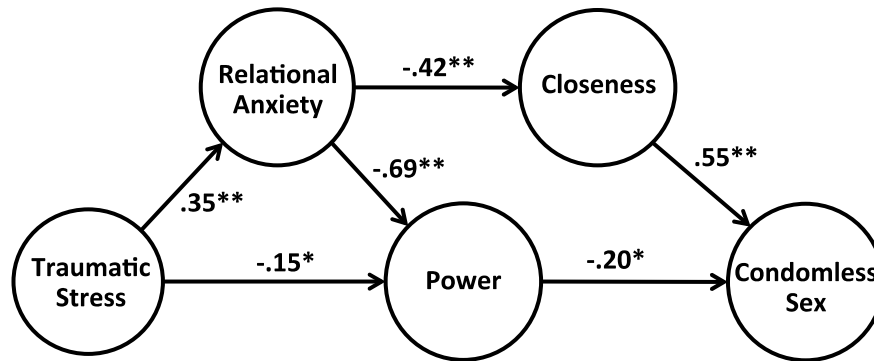


Figure 4. Simplified structural covariance model of condomless sex predicted by Traumatic Stress, Relational Anxiety, Relationship Closeness, and Relationship Power. * $p < .05$; ** $p < .001$. Model fit indices: $\chi^2 (98) = 144.77 (p = .002)$, RMSEA = .05 (90% CI = .03 - .06), CFI = .98, WRMR = .72.