

The Relationship between Adverse Childhood Experiences and Sexual Risk Behavior in
Incarcerated Male Youth

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ABSTRACT

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Youth involved in the criminal justice system exhibit elevated rates of sexual risk behavior (SRB), placing them at high risk for sexually transmitted infections (STIs) and other deleterious outcomes. High levels of youth-maternal connectedness have been shown to act as a protective factor for SRB in nationally representative studies and in studies with primarily White youth samples. However, there are mixed findings in the research literature on the association of maternal connectedness and SRB among African American and Latino youth, a population who are disproportionately over-represented in the criminal justice system. Additionally, no studies to date have examined the role of maternal connectedness in SRB among justice-involved youth. This dissertation used archived data to determine if maternal connectedness can buffer against the negative effects of adverse childhood experiences (ACEs) on SRB among justice-involved youth. A secondary aim was to explore the prevalence of ACEs among youth in the sample, including several new ACE items that focus on adversity occurring outside the home.

Participants (N=263) were sentenced or detained adolescent males at a large correctional facility in New York City, aged 16-18 and predominantly African American and Latino. Data were collected from the baseline interview of an intervention study conducted from 2009-2010. Youth participated in an individually administered, computer-based survey covering a range of topics, such as sexual health history, family relationships, substance use, and exposure to adverse events.

Consistent with the literature, our sample of detained youth reported a high degree of SRB and a significant number of adverse experiences. Logistic regression analysis found that total ACE scores do not predict risky sexual behavior, even when controlling for maternal connectedness, substance use, age, and number of days incarcerated/detained. However, every participant endorsed exposure to at least 2 ACEs and 92% endorsed exposure to 4 or more, suggesting that the restriction in range may have obfuscated a relationship between total ACE scores and sexual risk-taking. The new ACE items, including poverty, racial discrimination, and neighborhood violence were prevalent. Additionally, several of the individual ACE items, including physical abuse, emotional abuse, and racial discrimination were independently associated with sexual risk outcomes. Maternal connectedness was negatively correlated with one type of risky sexual behavior—frequency of substance use during sex. Maternal connectedness and total ACE scores were, as predicted, negatively correlated.

These findings suggest that our sample of incarcerated youth have experienced such a profound degree of adversity and trauma that perhaps ACE scores alone cannot adequately predict their engagement in risky sex. The fact that so many of the adolescents in the study endorsed the new ACE items also provides strong support for dissemination of the revised ACE inventory. This study highlights the need for greater research on risk and protective factors influencing adolescent SRB, as well as psychosocial correlates of ACEs among at-risk youth. Furthermore, given the syndemic nature of SRB and high prevalence of STIs, HIV, and ACEs in urban communities of color, future research should consider a more comprehensive and integrative approach to preventing both childhood adversity and unwanted sexual risk outcomes. Directions for future research and clinical implications are discussed.

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Introduction

Adolescents and emerging adults involved in the justice system report high rates of risky sexual behavior compared to youth in the general population (Teplin, Mericle, McClelland, & Abram, 2003; Timmermans, van Lier, & Koot, 2008). Sexual risk behavior (SRB), including sex without a condom, sex with multiple partners, and substance use prior to sex places youth at great risk for sexually transmitted infections (STIs) including HIV. Incarcerated African American and Latino youth, particularly those from urban areas with high rates of STIs and HIV, are especially vulnerable, as they are overrepresented in the criminal justice system. In order to prevent and reduce SRB among justice-involved youth, further research is needed that identifies risk and protective factors.

Determining risk factors for adolescent SRB is an important initial step for developing strategies to promote safer sex practices and prevent the spread of STIs. In addition to individual characteristics of many youth, several aspects of the microsystem (e.g. school, family, peers, etc.) have been examined for their role in contributing to SRB. Adverse childhood experiences (ACEs) are stressful events occurring in childhood, which have been associated with a wide variety of negative psychological, behavioral, and health outcomes in adults, ranging from obesity and alcoholism, to STIs and early death (CDC & Kaiser Permanente, 2016). In recent years, researchers have begun to investigate the cumulative impact of ACEs on adolescent and adult SRB and outcomes, including unintended pregnancy and STIs. While there is empirical evidence that ACEs are associated with SRB in adulthood (Anda et al., 2006; Campbell, Walker, & Egede, 2016; Klein, Elifson, & Sterk, 2007), there is a gap in the research on adolescents, particularly at-risk youth, including detained and incarcerated adolescents. Additionally, few studies have incorporated newer, empirically-derived ACEs, which include peer and community-

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level stressors, such as bullying, neighborhood violence, discrimination, and foster care.

While identifying risk factors is critical to developing effective prevention efforts for risky behaviors, it is not enough on its own. With few exceptions, the majority of studies on adolescent SRB focus solely on risk factors without considering sources of protection and resilience (Buhi & Goodson, 2007; Fergus & Zimmerman, 2005). In accordance with a risk and resilience framework, it is critical that individual and environmental protective factors are identified in order to develop effective interventions. The family system, including family structure and family processes/dynamics is frequently cited as playing a protective role against SRB. In particular, perceived communication, warmth, and support/connectedness between adolescents and their parents have been shown to be associated with lower levels of SRB (Deptula, Henry, & Schoeny, 2010; Gillmore, Chen, Haas, Kopak, & Robillard, 2011; Shneyderman & Schwartz, 2013). However, the vast majority of studies that have examined this protective factor have been conducted with predominantly middle- to upper-middle class, white adolescents (Deptula et al., 2010; Parkes, Henderson, Wight, & Nixon, 2011; Price & Hyde, 2009; Shneyderman & Schwartz, 2013; Sieving et al., 2000) and few studies have examined racial/ethnic differences (Gillmore et al., 2011; C. C. Henrich, K. A. Brookmeyer, L. A. Shrier, & G. Shahar, 2006). Despite their disproportionate level of risk, there is comparatively less research examining the role of parental connectedness in SRB among African American and Latino youth, and the research that does exist has elicited mixed findings. Similarly, this line of research has not examined justice-involved youth and their families, a subgroup of youth who engage in sexual and other behaviors that confer the highest level of risk. Moreover, no research to date has investigated if maternal connectedness can buffer against, or compensate for the negative effects of ACEs on adolescent SRB. Hence, there is a dearth of literature that integrates

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familial-level risk and protective factors with regard to adolescent SRB.

The goal of this dissertation is to use a risk and resilience theoretical framework to explore the relationship between ACEs, maternal connectedness, and SRB in the lives of predominantly African American and Latino heterosexual adolescent males detained at a large jail complex in New York City. This study aims to fill gaps in the literature on both ACEs and SRB in adolescence. This research extends previous findings by providing insight into how a strong adolescent-parent relationship can potentially offset some of the risk incurred by childhood adversity. Ultimately, this data may inform intervention and prevention efforts aimed at reducing the spread of STIs among incarcerated youth prior to incarceration and/or upon release.

Chapter One: Literature Review

Sexual Risk Behavior (SRB) in Adolescence

Adolescence is a period of normative experimentation with sexual behavior. According to 2007-2010 data from the National Survey of Family Growth data (NSFG), nearly half of girls and boys have engaged in oral sex by age 19 (Copen, Chandra, & Martinez, 2012). Forty one percent of students report having had sexual intercourse by 12th grade, according to the 2015 National Youth Risk Behavior Survey (YRBS, 2015), which reports longitudinal data on various health risk behaviors among a nationally representative sample of high school students (CDC, 2016a). The average age for first sexual intercourse is 17.2 for females and 16.8 for males ("National Survey of Family Growth," 2007).

SRB refers to any sexual activity that increases the odds of associated negative consequences, such as a sexually transmitted infections (STIs), human immunodeficiency virus (HIV) infection, and unintended pregnancy (CDC, 2016b; Taylor-Seehafer & Rew, 2000). SRB

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includes, but is not limited to: early sexual debut, unprotected sex (i.e. sex without a condom), anal sex, sex with multiple partners, and using drugs or alcohol prior to or while having sex. SRB tends to emerge and peak during adolescence, persisting into young adulthood (Fergus, Zimmerman, & Caldwell, 2007; Mahalik et al., 2013).

Although condom use among adolescents increased significantly during the 90's in part due to successful public health initiatives to spread awareness about HIV, it began to decrease and level off in the early 2000's (CDC, 2016c). Many adolescents continue to report engaging in several types of SRB. Among adolescents who reported being currently sexually active on the YRBS in 2015, 14% did not use any method to prevent pregnancy during last sexual intercourse. Furthermore, 12% had intercourse with four or more partners, 4% had sex before age 13, and 21% drank alcohol or used drugs before last sexual intercourse. YRBS data indicate a significant decrease in the use of condoms since 2003 (63% in 2003 to 57% in 2015), as well as a long-term linear decrease in the prevalence of ever having been tested for HIV (Kann et al., 2016). In other words, the progress made 20 years ago has stalled in recent years.

Low rates of condom use and testing have a serious impact on adolescents' sexual health. Sexually active adolescents and young adults are disproportionately at risk of acquiring STIs, including HIV, compared to older adults (CDC, 2014). The CDC estimates that adolescents ages 15-19 and young adults ages 20-24 make up approximately one quarter of the sexually active population, yet they account for *half* of the 20 million new STIs that occur in the United States each year (CDC, 2014). For example, adolescents accounted for nearly two thirds of all reported chlamydia cases in 2014, while approximately 2,000 adolescents ages 13-19 are diagnosed with HIV annually (CDC, 2015). Adolescents are at greater risk for STIs than adults because they are less likely to get tested, are more likely to have concurrent partners, and feel more uncomfortable

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discussing their sexual health with their doctors. Barriers preventing adolescents from seeking sexual health prevention services, including STI and HIV testing include: financial concerns, perceived discrimination, lack of transportation, long waiting times, discomfort with facilities and services, and concerns about confidentiality (Tilson et al., 2004). In addition to the public health consequences associated with STIs, there is a tremendous economic burden. The estimated cost of treating STIs (including HIV) among 15-24 year olds is 6.5 billion dollars (Chesson, Blandford, Gift, Tao, & Irwin, 2004). In summary, despite overall improvements in sexual health practices over the past two decades, adolescents continue to be one of the most at-risk groups for sexual risk outcomes, particularly STIs. The next few sections describe SRB among males and youth of color.

National trends in sexual risk behavior among adolescent males. According to the 2015 YRBS, nearly half of all males in grades 9-12 reported having had sexual intercourse. Among sexually active males, 6% reported having sex before age 13 and 14% reported having four or more partners by 12th grade (CDC, 2016d). Early sexual debut, while not a risk, per se, is associated with later negative health outcomes, including higher rates of STIs (McNeely et al., 2002; Sieving, McNeely, & Blum, 2000; Vasilenko, Kugler, & Rice, 2016). Similarly, multiple partners increases STI risk due to random exposure and increased likelihood of choosing a partner with higher STI infection rates (Aral, Fullilove, & Coutinho, 1991). In addition, 62% of high school boys reported that they or their partner used a condom during last sexual intercourse and 25% reported that they used substances before last sex (CDC, 2016d). It should be noted, however, that YRBS data surveys a nationally representative sample of adolescents, and the results may not be generalizable to atypically developing youth, such as those who drop out of school, are homeless, or are involved in the criminal justice system.

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Adolescent males also engage in greater sexual risk-taking compared to females. For example, they are more likely to report earlier sexual debut, use of alcohol or drugs before last sex, more sexual partners, and less condom use compared to females (CDC, 2016d). Although girls and men who have sex with men (MSM) are at greater risk for STIs, adolescent males rarely get tested and often underreport diagnoses. In fact, only 11% of adolescent males report ever getting tested for HIV (Smith, Guthrie, & Oakley, 2005). According to the 2014 STI Surveillance Report, among males aged 15-19, there were 718 cases of Chlamydia and 221 cases of Gonorrhea per 100,000 people (CDC, 2014).

Ethnic and racial differences in adolescent sexual risk behavior. African American and Latino adolescent males exhibit patterns of both risky and protective sexual behavior. For example, YRBS data from 2015 indicate that African American boys in 9th-12th grade are more likely to report wearing a condom during last sexual intercourse compared to their Latino and White counterparts. Additionally, male Latino and African American students are more likely to report getting tested for HIV and other STIs compared to their White counterparts (CDC, 2016d). Yet, Latino and African American adolescent males report earlier sexual debut, greater number of sexual partners, and increased risk of paternity compared to White peers (Cuffe, Newton-Levinson, Gift, McFarlane, & Leichter, 2016; Scott, Steward-Streng, Manlove, & Moore, 2012). Early sexual debut and multiple sexual partnerships pose a significant health threat because they are linked to elevated rates of STIs/HIV and increased likelihood that young men will become fathers outside of committed relationships (Kogan et al., 2013). In addition, Latino and African American youth are more likely to be diagnosed with gonorrhea, chlamydia, and HIV compared to White youth (CDC, 2012). These trends are particularly notable in urban environments. For example, in New York City, the rate of reported cases of chlamydia per

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100,000 people in 2013 among males ages 15-19 was 30 times higher for African Americans and 11 times higher for Latinos compared to non-Latino Whites (New York City Department of Health and Mental Hygiene, 2013a). Similarly, African American and Latino youth are diagnosed with HIV at disproportionately higher rates than their White, non-Latino peers in New York City (New York City Department of Health and Mental Hygiene, 2013b).

Social sexual networks. The disproportionate rates of STI infection in African American and Latino communities cannot be entirely accounted for by individual-level risk factors, such as condom use and number of partners; the environmental context is also an important contributing factor. Social sexual networks (individuals linked through sexual contact) are another aspect of the environment that play a critical role in facilitating HIV and STI infection rates among African Americans. For example, research shows that African American men and women tend to engage in assortative mixing (partnerships formed between people with similar characteristics) by race but disassortatively by risk, which in turn, transmits and maintains infection within their communities (Aral, Adimora, & Fenton, 2008; Hamilton & Morris, 2015; Lutfi, Trepka, Fennie, Ibanez, & Gladwin, 2015). Additionally, the low male to female ratio within African American communities as a result of high mortality and incarceration rates among African American men are associated with lower marriage rates, higher rates of concurrent partnerships, and greater disassortative mixing by risk level (Adimora & Schoenbach, 2005; Aral et al., 2008).

To summarize, trends in sexual risk outcomes among adolescents occur within the context of environmental factors, including geographic location, socioeconomic status, incarceration rates, and social sexual networks. While African American and Latino urban-dwelling youth report a number of protective behaviors relative to their White counterparts, (e.g. African American adolescents are more likely to wear condoms than White adolescents), they

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are more likely to experience negative consequences, including unintended pregnancy or HIV infection. Hence, African American and Latino youth living in poor urban areas with high rates of STIs carry an increased burden to protect themselves and their sexual partners. For these youth, normative sexual behavior is *riskier* when compared to youth living in areas with low prevalence of STIs and HIV as well as those from other racial/ethnic groups. The next section describes sexual risk trends among one of our nation's most high-risk subgroups: juvenile offenders.

Youth involved in the justice system. Problem behavior theory holds that risk behaviors in adolescence tend to cluster together (Jessor & Jessor, 1977) and a large body of research has shown strong support for the co-occurrence of risky behaviors including substance use, gang involvement, offending behavior, and truancy, in addition to risky sexual behavior (Le Blanc & Bouthillier, 2003; Voisin, Neilands, Salazar, Crosby, & Diclemente, 2008).

Adolescents and young adults involved in the justice system are more likely to report risky sexual behavior compared to the general youth population (Teplin et al., 2003; Timmermans et al., 2008). Studies on detained youth ages 11 to 18 showed that approximately 32% of males reportedly did not use condoms in the month prior to detainment and 61% reported having more than one sexual partner in the past three months (Robillard, Conerly, Braithwaite, Stephens, & Woodring, 2005; Teplin et al., 2003). This places them at high risk for STIs. Epidemiological studies indicate that approximately 11% of detained adolescent males test positive for an STI (excluding HIV). The rates of chlamydia and gonorrhea range from 6-9% and 1-2%, respectively for justice-involved youth (Aalsma et al., 2011; R. H. Kahn et al., 2005; Robertson, Thomas, St Lawrence, & Pack, 2005). As with the general population, males involved in the juvenile justice system engage in greater sexual risk-taking than their female

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counterparts, despite their lower risk for STIs (Robillard et al., 2005; Teplin et al., 2003). Male incarcerated youth use condoms less consistently (Tolou-Shams, Brown, Houck, & Lescano, 2008), initiate sexual activity at an earlier age (Biello, Ickovics, Niccolai, Lin, & Kershaw, 2013), and report more sexual partners compared to non-incarcerated youth (Robillard et al., 2005). Justice-involved African American and Latino youth are particularly susceptible to STIs (Lofy, Hofmann, Mosure, Fine, & Marrazzo, 2006) and among males, high rates of sexual risk behavior persist into adulthood (Abram, Stokes, Welty, Aaby, & Teplin, 2017). Notably, despite their propensity for sexual risk-taking, research on SRB among heterosexual male juvenile offenders is limited compared to that of females and MSM.

In addition to being at higher risk for STIs, African American and Latino youth are disproportionately represented in the justice system. Although individuals of color make up one third of the nation's youth population, they account for over two thirds of detained youth. African American youth, for example, make up about 16 percent of the youth population, yet they accounted for 35% of juvenile arrests in 2014 (Office of Juvenile Justice and Delinquency Prevention [OJJDP], 2015). Latino adolescents are one and a half times more likely to be incarcerated than their White counterparts (Human Rights Watch, 2002). There are many reasons why Latino and African American males are overrepresented in the juvenile justice system, including greater likelihood of living in urban areas, higher arrest rates, increased likelihood of being tried in an adult court which leads to higher conviction rates, and systematic racial bias within the justice system (Armour & Hammond, 2009; "Disproportionate Minority Contact in the Juvenile Justice System," n.d.; Poe-Yamagata, 2009). Structural racism also plays a critical role; compared to Caucasian youth, African American and Hispanic youth are at an elevated risk for juvenile justice involvement at every stage, from initial law enforcement contact to

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dispositions, even when controlling for type of crime (OJJDP, 1999).

In the vast majority of states, youth under the age of 18 who commit crimes are placed in the juvenile justice system. Previously, New York and North Carolina were the only two states where 16 and 17 year-olds were automatically prosecuted as adults regardless of their offense ("Get the facts," 2016). Being housed with adult inmates places adolescents at increased risk for assault, sexual violence, and mental health issues (Austin, Dedel Johnson, & Gregoriou, 2000). As with crime in general, incarceration of 16- and 17-year-olds falls disproportionately on youth of color.

In summary, while risky sexual activity is a normative part of adolescent development, certain subgroups of youth are particularly susceptible to associated negative consequences, including unintended pregnancy, STIs and HIV. African American and Latino youth living in urban environments with high rates of STIs and a host of other environmental disadvantages such as higher rates of poverty, incarceration, and unemployment are particularly vulnerable. Juvenile offenders, who are disproportionately African American and Latino and tend to exhibit a cluster of risk behaviors (including drug use and gang involvement) are also at increased risk for sexual risk-taking and STIs compared to the mainstream adolescent population.

Risk and Resilience Framework

A risk and resilience model has been used for decades to assess factors that both contribute to, and mitigate or buffer the impact of risk on adolescent behavior and health outcomes (Garmezy, 1971; Jenson & Fraser, 2006; Rutter, 1987a). Originating in epidemiology, risk factors are individual characteristics or environmental conditions that increase an individual's likelihood of experiencing poor overall adjustment or negative outcomes, including problem behavior (Engle, Castle, & Menon, 1996). Michael Rutter (1985, 1987b) was one of the

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first researchers to discover that it is the *accumulation* of risk, and not any one individual factor that leads to the development of problem behaviors and other adverse outcomes in adolescents and adults. Protective factors, on the other hand, are internal or external resources that ameliorate or minimize the impact of risk (Copeland-Linder, Lambert, Chen, & Jalongo, 2011). Protective factors are thought to operate in three ways: (1) reduce or buffer the impact of risk factors, (2) interrupt a chain of risk factors, and (3) prevent or block the onset of a risk factor (Jenson & Fraser, 2006). Similar to risk factors, protective factors can have a positive cumulative effect on an individual (Fraser, Kirby, & Smokouski, 2004). Given its application to at-risk youth, a risk and resilience framework will be used to guide the current study.

Resilience is defined as the phenomenon of successful coping or adaptation in the face of adversity (Rutter, 1987b). The groundbreaking work of Rutter (1987b, 1989), Garmezy, Masten, and Tellegen (1984), and Werner and Smith (1982) contributed to the development of resilience theory, a strengths-based theoretical framework concerned with the development of positive outcomes in spite of risk exposure. Although there has been some debate about the definition of resilience, it is generally agreed that it includes individual characteristics, the context, risk factors, and counteracting, protective factors (Zimmerman & Arunkumar, 1994). Resilience theory seeks to identify protective factors for individuals who are characterized as “at-risk” for multiple adverse outcomes (Resnick, 2000). Of particular relevance, resilience theory places an emphasis on assets and resources rather than on pathology or deficits, which has been the approach traditionally taken with minority communities (Attneave, 1989). Furthermore, it is a solution-oriented approach, which guides programs, policies, and interventions (Resnick, 2000).

Several models of resilience have been identified. The compensatory model of resilience has been used to explain how protective factors can alter the trajectory of a risk factor to adverse

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outcomes (Garmezy et al., 1984; Rutter, 1985). In the compensatory model, a promotive factor directly affects an outcome, independent of the risk factor (Zimmerman & Arunkumar, 1994). This is in contrast to the protective factor model, in which a promotive factor moderates or reduces the effect of the risk factor on a negative outcome. The compensatory model can be tested by analyzing the direct effects of the promotive factor using multiple regression or structural equation modeling. With regard to the protective role of parents on adolescent risk behavior, the compensatory model has more empirical support than the protective model (Fergus & Zimmerman, 2005).

Several studies have applied a risk and resilience framework to their research on adolescent SRB (Lohman & Billings, 2008; Pingel et al., 2012; Resnick et al., 1997). Feeling supported by caring individuals, including parents, teachers, and peers has repeatedly been found to be an important protective factor for resilient adolescents (Resnick, 2000; Resnick, Harris, & Blum, 1993). Compared to the number of studies that focus on risk factors for SRB in adolescence, far fewer have examined positive factors that may promote safe sexual practices (Fergus & Zimmerman, 2005). Studies that only focus on risk factors of risk-taking behavior in youth, including SRB, provide an incomplete picture of their developmental context and perpetuate a problem-focused approach to understanding youth development. This is particularly problematic for youth of color, for whom less research, in general, has been devoted to protective factors. It is therefore important that protective factors, such as family resources, also be identified for youth who are particularly vulnerable to risky sexual activity. Connectedness to others, including school, friends, community, and family is frequently cited as a critical protective factor across racial and ethnic groups (Resnick et al., 1997). In fact, supportive parenting has been shown to be the single most robust predictor of resilience in the face of a

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range of adversities (Luthar, Crossman, & Small, 2015). In summary, protective factors help instill resilience in at-risk youth, which allows them to cope in the face of adversity.

Adverse Childhood Experiences (ACEs)

As mentioned earlier, Rutter (1989) proposed a cumulative risk model, which posits that the accumulation of risk factors is a stronger predictor of emotional and behavioral problems than any single stressor. With regard to childhood adversity, researchers have acknowledged that the traditional approach of examining one or only a few risk factors ignores the broader interrelated context in which they occur. A constellation of risk factors can be categorized as additive (each stressor uniquely contributes to an outcome) or multiplicative (one stressor enhances others) (Rutter, 1989). Rutter's work paved the way for research on Adverse Childhood Experiences (ACEs). ACEs are negative and potentially traumatic life events or experiences occurring prior to age 18 that are linked to a wide range of unfavorable psychosocial and health outcomes later in life (CDC & Kaiser Permanente, 2016). The influence of ACEs are so well-recognized that many states now collect data on them as part of the Behavioral Risk Factor Surveillance System (BRFSS), an annual state-based telephone survey that assesses health and risk factors among adults.

In 1998, Anda and Felitti's groundbreaking study was the first to establish the relationship between ACEs and adult health and wellbeing in a large sample. The original ACE study, conducted by Kaiser Permanente Health System, in collaboration with the CDC surveyed 17,000 adult insured members in San Diego, California from 1995 to 1997, with two waves of retrospective data collection. The first wave, which was conducted in August 1995-March 1996, assessed three categories of child maltreatment (physical, sexual, and psychological abuse) and four categories of household dysfunction (living with someone who abused substances, was

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mentally ill, or previously incarcerated, or living with a mother/stepmother who was the victim of domestic violence). Emotional neglect, physical neglect, and parental separation/divorce were added to the second wave of data (June-October 1997), resulting in 10 total ACE items.

Participants receive one point for each adverse event they endorse as having ever occurred during the first 18 years of their life. A cumulative ACE index is calculated by summing the total number of ACE items endorsed on a scale from 0 (exposed to none of the ACE categories) to 10 (exposed to all of the ACE categories). In the first wave of data, more than half of the participants reported one ACE and a quarter reported two or more. Of the 7 ACEs assessed, the most prevalent was household substance abuse (25.6%) (Felitti et al., 1998). Table 1 lists the survey questions from the original ACE study. Recent estimates suggest that 63% of adults in the US have experienced at least one ACE (M. Brown & Cohen, 2014).

The cumulative risk model originally proposed by Rutter (1987b) has been applied to assessment of ACEs, such that a greater number of ACEs is associated with worse outcomes for adult health risk behaviors, including alcoholism, drug abuse, depression, smoking, STIs, sexual promiscuity, and suicide (Anda et al., 2006; Felitti et al., 1998). Empirical research confirms that due to the powerful additive effect of ACEs, it is better to measure them as a composite variable of cumulative stress exposure rather than as isolated experiences (Anda, Butchart, Felitti, & Brown, 2010). Assessing ACEs cumulatively also provides a fuller picture of an individual's odds for risky outcomes given the interrelatedness of the ACE variables. For instance, Dong and colleagues (2004) found that 86.5% of individuals who reported exposure to one ACE also reported exposure to at least one additional ACE, and 58% reported exposure to at least three additional ACEs (Dong et al., 2004). In light of these findings, the current study will use a "cumulative stressor" approach to examine the relationship between ACEs and SRB in our

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sample.

The expanded ACE questionnaire. There are several important limitations of the original ACE questionnaire. For example, the original ACE study sampled predominantly White and middle to upper-middle class, insured adults, which limits the generalizability of the results to non-White and underprivileged populations. The survey questions also focused exclusively on the home environment, while neglecting community and neighborhood-level risk factors. Recently, several researchers have called for expanding the current ACE inventory to better represent individuals from more racially and socioeconomically diverse backgrounds (Cronholm et al., 2015; Finkelhor, Shattuck, Turner, & Hamby, 2015). Newer proposed ACEs include: socioeconomic status, peer isolation/rejection, peer victimization, community violence exposure, perceived racial discrimination, living in unsafe neighborhoods, and placement in foster care (Cronholm et al., 2015; Finkelhor, Shattuck, Turner, & Hamby, 2013).

The “expanded” set of ACEs has not been as widely studied as the original ACEs, however there is preliminary empirical evidence that they are as, if not more, predictive of later psychosocial outcomes (Cronholm et al., 2015; Finkelhor et al., 2015). Analyzing data from the National Survey of Children’s Exposure to Violence 2014, which assesses prevalence of childhood victimizations among a nationally representative sample of nearly 2,000 youth and their caregivers, Finkelhor et al. (2015) found support for the addition of several new ACE questions. Specifically, they found that measures assessing peer victimization, peer isolation/rejection, and community violence exposure predicted mental health problems, while low SES predicted physical health problems. Cronholm and colleagues (2015) administered the Philadelphia Adverse Childhood Experiences Survey (PHL ACE Survey) to a representative sample of over 13,000 children and adults in Southern Pennsylvania from 2012-2013. Forty-five

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percent of the sample identified as White compared to 80% of the participants in the original ACE study. In addition to 9 out of the 10 original ACE questions (parental separation/divorce was excluded), the survey also assessed perceived racism, witnessing violence, living in an unsafe neighborhood, being bullied, and foster care placement. Of the original ACEs assessed, physical abuse and household substance abuse were the most prevalent. Exposure to community violence and racial discrimination were the most commonly endorsed of the new ACEs. Approximately 50% of participants reported experiencing both types of ACEs, while 14% reported experiencing only the original ACEs (Cronholm et al., 2015). Notably, being male, non-White, and having an income level well below the poverty line were associated with having a higher expanded ACE score, but not conventional ACE score. This suggests that certain subgroups are more vulnerable to specific types of adversities that are not represented by the original ACE survey. Using the same data, Wade et al. (2016) found that the new ACEs were associated with risky health behaviors and mental illness, but not physical health conditions, whereas the original ACEs were associated with all three.

To summarize, empirical research has demonstrated that there are 10 types of adverse childhood experiences relating to the family and home environment, as well as several newer proposed community and interpersonal-level adverse childhood events, which have a negative cumulative influence on a range of unfavorable health and psychosocial outcomes later in life.

ACEs and sexual risk behavior. ACE scores have repeatedly been linked to the development of risky behaviors in adolescence and adulthood, including alcohol abuse, smoking, and SRB (Campbell et al., 2016; Dube, Felitti, Dong, Giles, & Anda, 2003; Ramiro, Madrid, & Brown, 2010; Wade et al., 2016). A consistent, dose-dependent relationship has also been demonstrated between ACEs and SRB in adulthood, including unprotected sex (Klein et al.,

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2007), multiple sex partners (Dube et al., 2003; Felitti et al., 1998; Klein et al., 2007), sex without a condom, receiving money or drugs in exchange for sex (Campbell et al., 2016; Klein et al., 2007), and having sex while high or while a partner was high (Klein et al., 2007). Using ACE data from the original Kaiser study, researchers found that higher ACE scores were associated with early intercourse and sexual promiscuity. Specifically, individuals with four or more ACEs were 6.6 times more likely to have had sex by age 14 and 3.6 times more likely to have 30 or more lifetime partners (Anda et al., 2006). ACEs have also been linked with STIs in adulthood (Campbell et al., 2016; Dube et al., 2003; Felitti et al., 1998; Hillis, Anda, Felitti, Nordenberg, & Marchbanks, 2000). Scores on the expanded ACE scale (i.e. those that include peer and community-level stressors) are also positively correlated with STIs in adults (Wade et al., 2016). In general, however, few studies with SRB as an outcome have incorporated the expanded ACE questions.

Gaps in the Research

As previously explained, the majority of research on ACEs, including their effect on SRB, is focused on long-term outcomes among adults. Significantly less research has been devoted to examining the cumulative impact of ACEs on adolescent development. There is some evidence that ACEs are linked to unintended teen pregnancy (Anda et al., 2001; Hillis et al., 2010; Hillis et al., 2004; Ramiro et al., 2010), and early sexual debut (M. J. Brown, Masho, Perera, Mezuk, & Cohen, 2015; Ramiro et al., 2010) in community-based samples. Yet, as previously explained, the majority of published research on this topic focuses on the impact of individual adverse events, particularly sexual abuse as a predictor, with less focus on other forms of adversity (e.g. household incarceration or mental illness) and more importantly, the cumulative effects of ACEs. For example, of the original ACEs assessed in the literature,

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childhood sexual abuse appeared to have the strongest individual impact on adolescent boys' involvement in teen pregnancy (Anda et al., 2001) and early sexual debut (M. J. Brown et al., 2015; Ramiro et al., 2010). In addition, youth who were victims of maltreatment have been found to initiate sex earlier (Cavaiola & Schiff, 1988; Cunningham, Stiffman, Dore, & Earls, 1994; Hernandez, Lodico, & DiClemente, 1993; Kogan, Cho, & Oshri, 2016), use condoms less frequently (Kogan et al., 2016), and have more sexual encounters while under the influence of drugs and/or alcohol (Biswas & Vaughn, 2011; Kogan et al., 2016) compared to non-maltreated peers.

Not only has there been a stronger emphasis on individual ACEs, but the majority of studies examining the relationship between cumulative ACEs and SRB are conducted on girls and MSM. Less research has focused on heterosexual males. Furthermore, the majority of published adolescent ACE studies use predominantly White samples. Greater research is necessary to understand these relationships among adolescents who are at a higher risk for SRB and related consequences, including inner city youth and youth of color. Studies that have included non-White youth samples tend to focus on the effects of individual ACEs, particularly child abuse. For example, Newcomb, Locke, and Goodyear (2003) found that parental neglect, abuse and alcohol-related problems were each associated with several high-risk sex activities, including less condom use, more partners, and less HIV testing in a large sample of urban Latina adolescents. While these studies contribute to the broader literature on childhood adversity and adolescent SRB, they ignore the cumulative impact of multiple forms of stress and adversity.

There is strong empirical evidence that justice-involved youth are more likely to experience traumatic events during childhood, including sexual and physical abuse, poverty, and neighborhood violence compared to youth not involved in the justice system (Abram et al., 2004;

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Pinto, Fernandes, Mesquita, & Maia, 2015; Schuck & Widom, 2005) and that individual adverse childhood events such as maltreatment are associated with offending behavior later in life (Widom & Maxfield, 2001). In fact, Fox, Perez, Cass, Baglivio, and Epps (2015) found that for each additional ACE a child endorses, the odds of becoming a serious and violent juvenile offender increase by 35%, when controlling for other risk factors, such as impulsivity, anti-social peer influence, and socio-economic status. However, data on prevalence of cumulative ACEs among this population is limited. In applying cumulative ACE scores to adjudicated youth, Baglivio et al. (2014) discovered that the average composite ACE score for male juvenile offenders in Portugal was 3.48 out of 10. Domestic violence, parental separation or divorce, and household incarceration were the top three most reported by both males and females. Similar scores were reported by Bielas et al. (2016) in their sample of male juvenile offenders in Zurich and ($M=3.22$) and Wagner, Muzzey, Hensel, Zaban, and Ott (2017) 2017 ($M=3.3$), whose sample consisted of 12-19 year olds involved in the criminal justice and foster care systems. Table 6 provides a comparison across studies.

In general, most ACE studies with justice-involved youth focus on girls, and therefore, the results may not be generalizable to males. Moreover, while there are studies examining the relationship between individual ACEs and SRB (primarily on females), almost no research to date has examined the *cumulative* effect of ACEs on SRB among incarcerated adolescent males. One exception is a study by Wagner et al. (2017), who found that among foster care and juvenile justice-involved youth aged 12-19 ($M=16.3$), ACE scores were indirectly associated with substance use at last sex, having 4 or more lifetime partners, inconsistent birth control use in the last three months, and inconsistent condom use during the last three months. System-involvement and less favorable attitudes toward abstinence and avoiding pregnancy acted as

mediators. However, no information regarding the sex and racial/ethnic composition of the sample was provided.

In summary, there is a paucity of research on the cumulative impact of ACEs on adolescent SRB, particularly among heterosexual males and high-risk groups, such as inner city and incarcerated youth. In the following section, we review the specific life experiences that comprise the ACE inventory and summarize their individual associations with SRB among adolescent males.

The original ACE questions

Sexual abuse. Childhood sexual abuse (CSA) is defined as the involvement of a child in sexual activity that he or she does not fully comprehend, is unable to give informed consent to, is not developmentally prepared for, or that violates the laws or social taboos of society (Norman et al., 2012). Approximately 8-16% of men in the US report a history of childhood sexual abuse (Felitti et al., 1998; Stoltenborgh, van Ijzendoorn, Euser, & Bakermans-Kranenburg, 2011), although the number may actually be higher due to underreporting. Justice-involved youth are particularly susceptible to maltreatment, including sexual abuse. Among a random sample of 1,095 male youth detained at a juvenile detention center in Illinois, 10% reported a history of sexual abuse (King et al., 2011).

There is an extensive literature on the relationship between CSA and subsequent sexual health and risk behavior. According to a systematic review (Draucker & Mazurczyk, 2013), there is substantial evidence that CSA is associated with greater sexual risk-taking in adolescence and young adulthood, including greater number of lifetime partners (Saewyc, Magee, & Pettingell, 2004), earlier age at first voluntary intercourse (Noll, Trickett, & Putnam, 2003), casual sex (Olley, 2008), sex without a condom (Houck, Nugent, Lescano, Peters, & Brown, 2010),

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exchange of money or favors for sex (Champion, 2011), pregnancy or involvement in pregnancy (Saewyc et al., 2004), and STI diagnosis (Buffardi, Thomas, Holmes, & Manhart, 2008). The 25 peer-reviewed studies included both cross-sectional and longitudinal data, as well as samples representing a range of ages from early adolescence through young adulthood, geographic location, socioeconomic status, and ethnic/racial background. Two important limitations however, were the range of definitions used for CSA and the focus on females.

The majority of research on CSA and SRB has focused on girls and young women, while heterosexual males have largely been neglected. However, the research that does exist for males supports this relationship as well. Adolescent males and young adults who were victims of sexual abuse are 80% more likely to impregnate a girl than those without a history of sexual abuse. They are 110% more likely if the sexual abuse was violent in nature (Anda et al., 2001). Engaging in unprotected sex was also higher among boys with a history of CSA compared to those without among 96 inner-city African American adolescents (Bornovalova, Gwadz, Kahler, Aklin, & Lejuez, 2008). A meta-analysis on the relationship between CSA and adolescent SRB indicated that sexually abused boys are at higher risk for unprotected sexual intercourse, multiple partners, and pregnancy involvement compared to non-abused boys (Homma, Wang, Saewyc, & Kishor, 2012). In sum, there is strong empirical support for a positive association between CSA and adolescent SRB, with less research on males.

Physical abuse. Childhood physical abuse (CPA) is defined as the intentional use of physical force against a child that results in, or has a high likelihood of resulting in harm for the child's health, survival, development, or dignity. It includes hitting, beating, kicking, shaking, biting, strangling, scalding, burning, poisoning, and suffocating (Norman et al., 2012). Of the 3.4 million referrals made to U.S. local and state child protective services in 2012, 18% were victims

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of physical abuse (U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families, & Children's Bureau, 2016). The prevalence of CPA against boys in the general population ranges from 14-32% (Anda et al., 2001; Bynum et al., 2011; Felitti et al., 1998). Among a large random sample of youth detained at a juvenile detention center in Illinois, more than two-thirds of males reported a history of physical abuse (King et al., 2011).

The relationship between CPA and sexual risk-taking is less well established compared to CSA, and the majority of studies sample heterosexual women and MSM. There is a small body of literature that focuses on heterosexual males. Men who were physically abused as children are 40% more likely to have an STI (Hillis et al., 2000) and 70% more likely to impregnate a girl (Anda et al., 2001) compared to men who have not been abused. Physical abuse was also associated with uncommitted partners and risky and impulsive sex acts (e.g. unprotected sex or sex with an acquaintance) in a large sample of racially diverse college students (Walsh, Latzman, & Latzman, 2014). Compared to non-abused adolescent males, those who experienced CPA are more likely to have one-night stands (Negriff, Schneiderman, & Trickett, 2015) and earlier sexual debut (S. M. Brown & Shillington, 2017; Tenkorang & Obeng Gyimah, 2012). According to a systematic review and meta-analysis, there is robust evidence for a relationship between CPA and SRB, as well as STIs in adults (Bensley, Van Eenwyk, & Simmons, 2000; Norman et al., 2012; H. W. Wilson & Widom, 2009). For instance, HIV is twice as common in physically abused males than controls, and there is a dose-response relationship, such that more frequent abuse is associated with higher rates of HIV (Jewkes, Dunkle, Nduna, Jama, & Puren, 2010). Most research to date examining the association between physical abuse and SRB among justice-involved youth has been conducted with girls and focuses more generally on child maltreatment

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(Lopez et al., 2011; Odgers, Robins, & Russell, 2010). A few studies with justice-involved youth found no relationship between CPA and SRB. For example, a study on youth in a juvenile detention facility in Japan found no significant correlation between boys' reported physical abuse and sexual debut (Tsutsumi, Izutsu, & Matsumoto, 2012). A longitudinal study examining maltreated foster care youth also found no relationship between physical abuse, sexual abuse, or neglect and SRB (Taussig, 2002). In summary, there is some empirical evidence that childhood physical abuse is associated with risky sexual behavior and outcomes among adolescent males in the general populations, yet little research focuses on highly vulnerable populations, including justice-involved youth, and the research that does exist suggests a non-significant relationship.

Emotional abuse. Childhood emotional abuse (CEA) falls under the larger umbrella of psychological maltreatment. It refers to a repeated pattern of behavior that leads children to believe that they are worthless and unloved, and ultimately results in damage to their psychological health and psychosocial development (Brassard, Hart, & Hardy, 1991). CEA includes belittling, threatening, frightening, discriminating, ridiculing, and other forms of rejection or hostile treatment (Norman et al., 2012). CEA frequently occurs as verbal abuse or excessive demands on a child's performance. According to a population-based representative sample, 24.8% of men reported experiencing verbal abuse during childhood (Bynum et al., 2011). A higher rate was reported among an urban population (33.2%) (Cronholm et al., 2015).

Compared to physical abuse, there is limited research on the relationship between CEA and SRB. According to a systematic review and meta-analysis, emotional abuse is significantly associated with STIs and risky sexual behavior (Norman et al., 2012), as well as unintended pregnancy in adulthood (Dietz et al., 1999). In adult men, specifically, emotional abuse has been found to be positively associated with early sexual debut, having more than 3 partners, and

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unintended pregnancy (S. M. Brown & Shillington, 2017; Ramiro et al., 2010). Emotionally abused men are also 40% more likely to ever have had an STI compared to non-abused peers (Hillis et al., 2000). HIV infection is twice as common in individuals who have been emotionally abused versus non-abused individuals (Jewkes et al., 2010). With the exception of one study on female detainees, no research was found that focused on justice-involved adolescent males. Lopez et al. (2011) found that emotional abuse was significantly associated with non-condom use among female adolescent detainees (Lopez et al., 2011). Many studies investigating SRB as an outcome variable measured maltreatment (including emotional physical and/or sexual abuse) as one unified construct, and therefore no specific conclusions could be drawn about the unique contribution of emotional abuse (Bornovalova et al., 2008). To summarize, there is preliminary evidence that childhood emotional abuse is associated with adolescent SRB, though greater research is needed on the topic.

Neglect. Neglect is a pattern of failure over time on the part of a parent or other family member to provide for the development and well-being of the child—where the parent is in a position to do so—in one or more of the following areas: health, education, emotional development, nutrition, shelter, and safe living conditions (Norman et al., 2012). Physical neglect is characterized by failure to provide adequate food, clothing, and shelter, while emotional neglect involves a lack of basic emotional needs, such as love, encouragement, belonging and support (Klein et al., 2007). Neglect is the most reported form of child maltreatment among calls made to Child Protective Services (USDHHS, 2012). According to the Kaiser ACE study, 14.8% of adults (12.4% of men) reporting experiencing emotional neglect during childhood, while 10% (10.7% for men) reported physical neglect (CDC & Kaiser Permanente, 2016). Lower rates were reported by Philadelphia residents in the expanded ACE survey: 7.7% and 7% for emotional and

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physical neglect, respectively (Cronholm et al., 2015).

Despite its high prevalence, research on the psychosocial effects of neglect during adolescence and beyond is surprisingly limited compared to other forms of child maltreatment. Many studies combine neglect with other types of maltreatment, which limits our understanding of its unique impact. The research that does exist demonstrates a significant association between neglect and SRB according to both prospective and retrospective studies (Norman et al., 2012). For example, Haydon et al. (2011) found that physical neglect occurring prior to 6th grade was significantly associated with test-identified STIs in a sample of adult men and women from the Add Health study. Similar results were found for a sample of approximately 500 rural African American men (*M* age =20.29), as parental neglect predicted number of partners, inconsistent condom use, frequency of vaginal sex in past three months, and substance use before sex (Kogan et al., 2016). In one of the few studies focusing exclusively on neglect and sexual risk outcomes for adolescents, results demonstrated that youth who have been neglected are more likely to engage in one-night stands and become pregnant than non-neglected youth (Negriff et al., 2015). Another study reported that adolescents aged 13-17 with neglect histories have earlier sexual debuts and more partners compared to non-neglected youth (Thibodeau, Lavoie, Hébert, & Blais, 2017). Consistent with these findings, neglect history was correlated with earlier sexual debut and lower likelihood of getting tested for HIV in a sample of Latina adolescents (Newcomb et al., 2003). Individuals with neglect histories are more likely to report earlier sexual contact, involvement in prostitution, and HIV compared to non-neglected peers, according to a large prospective cohort design (H. W. Wilson & Widom, 2008).

In summary, the literature suggests that childhood physical and emotional neglect is associated with sexual risk outcomes in adulthood, though greater research is needed with

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adolescent samples.

Household substance use. According to the original ACE questionnaire, household substance abuse refers to living with an individual who is an alcoholic or “problem drinker” or uses street drugs. Approximately 24% of men and 30% of women involved in the original ACE study reported household substance abuse (Felitti et al., 1998).

Household substance use is associated with several sexual risk outcomes in adolescence and beyond, including teenage pregnancy/involvement in teenage pregnancy (Anda et al., 2002; Hillis et al., 2004), self-reported history of STIs (Hillis et al., 2000), self-perceived risk of AIDS, earlier sexual debut (Waldron et al., 2015), transactional sex, anal sex without a condom (Fang, Chuang, & Lee, 2016), and having 30 or more partners (Hillis, Anda, Felitti, & Marchbanks, 2001). More specifically, maternal drug abuse during childhood or adolescence was associated with risky sexual activity, including earlier sexual debut, concurrent promiscuity, substance use before/during sex, and intoxication of substances before/during sex among a community-based sample of Latina adults (Dillon et al., 2010). In a national sample of adolescents from the Add Health project, youth whose parents abused alcohol and smoked cigarettes were more likely to have earlier age of sexual debut, however, no effect was found for contraceptive use at first sex (Wilder & Watt, 2002). In summary, research demonstrates a relationship between substance use among household members and adolescent SRB.

Household incarceration. Household incarceration is defined as having a member of one’s household go to prison. Among the original ACE study sample, 4.1% of men and 5.2% of women reported household incarceration (Felitti et al., 1998).

Household incarceration is related to a range of sexual risk outcomes for adolescents and young adults, such as teenage pregnancy/involvement in teenage pregnancy (Anda et al., 2002;

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Hillis et al., 2004), self-reported history of STIs (Hillis et al., 2000), self-perceived risk of AIDS, early sexual debut (M. J. Brown et al., 2015), and having 30 or more partners (Hillis et al., 2001). According to the results of a cross-sectional study using the 2011 Behavioral Risk Factor Surveillance System (BRFSS) survey, household incarceration in childhood is associated with increased odds for HIV risk behavior (including intravenous drug use, treatment for an STI, transactional sex, and anal sex without a condom) (Campbell et al., 2016). Similar results were found for a study examining family stress, which included household member incarceration, in addition to household substance use and mental illness among a predominantly low-income, inner-city sample of African American youth. Higher levels of family stress increased the risk for multiple SRBs, including being high or drunk during sex, having unprotected sex, and having anal sex (Voisin, Elsaesser, Kim, Patel, & Cantara, 2016). In summary, the lack of research on the relationship between household incarceration and sexual risk outcomes in adolescence makes it difficult to draw strong conclusions, however there is some evidence for an association between the two.

Parental separation or divorce. The original ACE study examined individuals whose parents had been divorced or separated. The prevalence of parental divorce/separation in the original ACE sample was 21.8% for men and 24.5% for women.

There is a paucity of research examining the relationship between parental divorce or separation and adolescent SRB, and the studies that do exist have mixed findings. Parental separation and divorce have been found to be associated with teenage pregnancy/involvement in teenage pregnancy (Anda et al., 2002; Hillis et al., 2004), more sexual partners (Bellis et al., 2014; Orgiles, Espada, Johnson, Huedo-Medina, & Carratala, 2012), and early sexual debut (Bellis et al., 2014; Waldron et al., 2015). For example, youth whose parents are separated are

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about twice as likely to have sex before age 16 as youth whose parents remain together (Ramiro et al., 2010). For adult men, parental separation or divorce is associated with transactional sex, anal sex without a condom, and STIs (Fang et al., 2016). Other studies have found that parental separation/divorce only has a minimal impact on SRB (Dorius, Heaton, & Steffen, 1993; Fergusson, Horwood, & Lynskey, 1994; Orgiles, Carratala, & Espada, 2015). For example, Orgiles et al. (2015) found that adolescents' perception of their parents' relationship has more of an effect on sexual activity than their parents' marital status. In summary, the literature examining the relationship between parental separation or divorce and adolescent SRB is limited, and recent studies indicate mixed findings.

Household mental illness. Household mental illness was defined by the original ACE study as having a household member who was depressed, mentally ill, or attempted suicide. The reported prevalence in the original ACE study was 14.8% for men and 23.3% for women (Felitti et al., 1998). There is minimal research on the impact of household mental illness and SRB in adolescents and adults.

Individuals who report having had a household member with mental illness during childhood are at increased risk for: teen pregnancy/involvement in teen pregnancy (Anda et al., 2002; Hillis et al., 2004), STI infection (Hillis et al., 2000), early sexual debut, more lifetime partners, and self-perceived risk of AIDS (Bellis et al., 2014; Ramiro et al., 2010). For example, in a nationally representative sample of youth involved in the National Epidemiological Survey on Alcohol and Related Conditions, parental psychopathology was found to be a risk factor for early sexual debut (M. J. Brown et al., 2015). Another study found that adolescents who reported having a mentally ill member of their household were almost four times as likely to initiate sex before age 16, twice as likely to have three or more partners, and twice as likely to have an

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unintended pregnancy (Ramiro et al., 2010). Having a household member with mental illness, in conjunction with household substance use and incarceration has been shown to increase African American adolescents' odds of risky sex, such as having sex while high or drunk and engaging in unprotected sex (Voisin et al., 2016). In summary, although there is a paucity of research on the unique contribution of household mental illness on adolescent SRB, there is some evidence that living with someone who is mentally ill is associated with negative sexual outcomes among adolescents.

Domestic violence toward mother. The original ACE study included domestic violence against women in the home. Specifically, exposure to physical abuse, or the threat of abuse toward one's mother or stepmother was assessed. Approximately 12% of men and 14% of women reported experiencing this ACE (Felitti et al., 1998).

Domestic violence toward mothers is linked with numerous behaviors/outcomes, including teenage pregnancy/involvement in teenage pregnancy (Anda et al., 2002; Hillis et al., 2004), STI infection (Hillis et al., 2000), sexual promiscuity, early sexual debut, and higher self-perceived risk of AIDS (Bellis et al., 2014; Ramiro et al., 2010). According to a systematic review (Voisin, Hong, & King, 2012) of the predisposing factors to sexual risk outcomes among detained adolescents, exposure to family violence is correlated with risky sex, including unprotected sex, STI infection, promiscuity, and trading sex for money (Odgers et al., 2010; Repetti, Taylor, & Seeman, 2002). Exposure to household violence appears to have a particularly strong effect for adolescent males, who, according to one study, are almost three times more likely than girls to report multiple partners and use of drugs during sex (Voisin, 2005). To summarize, the literature indicates that exposure to abuse against one's mother or maternal figure is associated with SRB among adolescent males.

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The expanded ACE questions

The following adverse events, which focus on exposure to adversity outside the home were not included in the original Kaiser ACE study, however, later research has provided empirical support for including them in the ACE inventory.

Peer victimization. Peer victimization is defined as assault, physical intimidation, or property victimization by a non-sibling peer. Approximately 10% of adolescents report peer victimization (Finkelhor et al., 2015). The research examining the effects of peer victimization on health risk behavior in adolescence is new, however, there is some preliminary evidence to support a link. According to a longitudinal study using data from the 2011 national YRBS, peer victimization, including physical, verbal, relational, and cyber bullying is a risk factor for having sex with four or more partners and failing to use a condom during adolescence (Hertz, Everett Jones, Barrios, David-Ferdon, & Holt, 2015). Adolescents who are bullied are also more likely to engage in casual sex (i.e. sex with more than one person who the individual does not know well), as well as sex under the influence of drugs or alcohol compared to non-victimized peers (Holt, Matjasko, Espelage, Reid, & Koenig, 2013). Similar results were found in a study of inner-city African American youth, in which peer victimization was significantly correlated with having sex without a condom, but not transactional sex or unplanned pregnancy (Hong, Voisin, Cho, & Espelage, 2016). In summary, there is a growing body of empirical research demonstrating a relationship between peer victimization during childhood and adolescent SB.

Peer isolation/rejection. In their revised ACE inventory, Finkelhor et al. (2015) described the peer isolation/rejection variable as having no friends, being called mean names, having had rumors or lies spread about him/her, or been socially excluded by peers. Cronholm et al. (2015) also included bullying in their expanded ACE scale. Approximately 22% of

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adolescents report feeling isolated or rejected by their peers (Finkelhor et al., 2015). Extant research indicates that peer rejection is indirectly linked to risky sexual behavior, such as sexual debut, STI diagnoses, and number of lifetime and recent partners in adolescence and young adulthood (Brendgen, Wanner, & Vitaro, 2007; Lansford, Dodge, Fontaine, Bates, & Pettit, 2014). However, a study conducted on adolescents girls did not establish a link between peer rejection and number of sexual partners or use of protection (Prinstein & La Greca, 2004). No research was found that examined the relationship between peer isolation and SRB. In sum, recent studies suggest a possible relationship between peer rejection and adolescent SRB, though research on the topic is fairly new and limited.

Low socioeconomic status. Low socioeconomic status (SES) was defined as ever having had a period of two or more years during which an individual's family was poor or on public assistance (Finkelhor, Shattuck, Turner, & Hamby, 2015). There is mixed evidence in support of a relationship between socioeconomic status and adolescent SRB. According to a review of the literature on the antecedents of adolescent pregnancy and SRB, higher family income and parental education is protective against early sexual initiation, use of contraception, and pregnancy/involvement in a pregnancy. However, no effect sizes were provided (Kirby, 2002). A meta-analysis provided weak evidence that socioeconomic status is a risk factor for early sexual debut in adolescence (Zimmer-Gembeck & Helfand, 2008). Across all twelve studies, the median effect size was .06. Only one study found a significant association between SES and early sexual debut, and the sample consisted entirely of White youth. In summary, there are mixed findings regarding the relationship between low socioeconomic status and SRB in adolescence. Additionally, other factors, such as geography and race may need to be taken into account when examining the role of socioeconomic status.

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Exposure to violence. Finkelhor et al. (2015) described “exposure to community violence” as exposure to crime or violence, including having witnessed an assault, having someone close murdered, being exposed to shooting, or being in a war zone. Similarly, Cronholm and colleagues (2015) asked participants if they had ever witnessed violence in real life. The reported prevalence of witnessing violence ranges from 12-40% depending on the sample, with urban youth reporting higher rates of exposure (Cronholm et al., 2015; Finkelhor et al., 2015). Research demonstrates that people who have witnessed or been a victim of violence during childhood are at greater risk for engaging in SRB. Exposure to community violence has a particularly detrimental effect on boys, who are more likely to have multiple partners, engage in unprotected sex, and use drugs during sex (Albus, Weist, & Perez-Smith, 2004; Brady & Donenberg, 2006; Voisin, 2005).

Similar results have been found for adolescents involved in the juvenile justice system. A systematic review of the research on ecological risk factors for SRB among detained adolescents found that while controlling for race, gender, SES, and family factors, exposure to community violence is a risk factor for being drunk or high during sexual intercourse, having sex with a partner who was high or drunk, and having an STI. For example, detained youth who witnessed community violence are twice as likely to report having been high on alcohol or other drugs during sexual intercourse than peers not exposed to community violence (Voisin et al., 2008; Voisin et al., 2007). In summary, there is empirical support that exposure to violence in childhood is linked to SRB in adolescents, including adjudicated youth.

Unsafe neighborhood. “Adverse neighborhood experiences” refer to feeling unsafe in one’s neighborhood or feeling that neighbors do not look out for one another. Twenty-seven percent of inner-city youth report exposure to unsafe neighborhoods (Cronholm et al., 2015).

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Compared to the research on community/neighborhood violence, far fewer studies have examined *perceived* neighborhood safety and unsafe sexual activity. The few studies that assess perceived neighborhood safety incorporate it into larger constructs regarding neighborhood environment, including crime, social disorder, disorganization, and sense of belonging. For example, one study demonstrated that adolescents who feel safe and a sense of belongingness in their neighborhood are at lower risk for having unprotected sex compared to peers who feel unsafe or alienated within their communities. (Brooks, Magnusson, Spencer, & Morgan, 2012). Another study found that young adults with higher levels of perceived fear of their neighborhood reported greater levels of drug use than those who reported lower levels of perceived fear (Theall, Sterk, & Elifson, 2009). In summary, the dearth of research precludes us from drawing conclusions about the relationship between perceived neighborhood safety and sexual risk outcomes among adolescents.

Foster care. Cronholm et al. (2015) asked if participants were ever in foster care. Almost 3% of their sample endorsed this question. Nationally, approximately 1% of youth have been placed into foster care system, with African American youth disproportionately at-risk (Children's Bureau, 2014). A recent review of the literature on sexual activity and risk behavior indicates that children involved in the foster care system have a propensity for risky sexual behaviors (Winter, Brandon-Friedman, & Ely, 2016). Involvement in the foster care system is associated with earlier sexual debut, younger age at first pregnancy, and greater than the median number of sexual partners in adolescence and young adulthood (Carpenter, Clyman, Davidson, & Steiner, 2001; Gramkowski et al., 2009; James, Montgomery, Leslie, & Zhang, 2009). According to Add Health Study data, young adults (and males in particular), who have been in foster care are at greater risk for laboratory confirmed STIs, including HIV, gonorrhea and

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chlamydia (Ahrens, McCarty, Simoni, Dworsky, & Courtney, 2013; Ahrens et al., 2010). In general, studies comparing SRB among foster care youth to non-system involved peers are lacking. In summary, there is preliminary evidence to support a relationship between foster care placement and adolescent SRB.

Racial discrimination. Racial discrimination is defined as feeling that an individual was treated poorly because of his or her race or ethnicity. Thirty-four percent of urban youth report discrimination during childhood (Cronholm et al., 2015). There is a growing body of work examining the relationship between racial/ethnic discrimination and sexual risk-taking among individuals of color. Research on adolescents indicates that African American and Latino youth who perceive themselves as victims of racial discrimination are more likely to engage in sexual risk-taking, including more recent and lifetime sexual partners, younger age at first sex, having sex without a condom, and drinking or using drugs before having sex compared to peers who perceived less or no discrimination (Flores, Tschann, Dimas, Pasch, & de Groat, 2010; Roberts et al., 2012; Stevens-Watkins, Brown-Wright, & Tyler, 2011; Stock, Peterson, Gibbons, & Gerrard, 2013; Tobler et al., 2013). The research suggests that youth who experience discrimination are at higher risk for posttraumatic stress, thereby increasing their engagement in risky sex.

In summary, recent research indicates that supplementing the original 10-item questionnaire with additional proposed ACEs highlighting peer and community-level factors may better characterize the life experiences of youth of color than the original ACE inventory alone. The psychological and health outcomes (including SRB) of the cumulative expanded ACEs have not been thoroughly studied, although preliminary research indicates that several of them are negatively associated with SRB in adults and possibly adolescents. Thus, taken

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together, many of the original and newer ACEs have strong empirical support for their association with SRB. For example, both childhood sexual abuse and peer rejection are positively associated with lifetime number of partners, casual sex, and unprotected sex, while for others (e.g. peer isolation), the links are primarily hypothesized based on theory. Nevertheless, similar to Rutter's empirical findings regarding the cumulative effect of risk factors on functioning, a large body of research has demonstrated the cumulative, graded relationship of ACEs with risk behavior. This study aims to advance this body of research by focusing on the cumulative effects of ACEs on adolescent sexual risk-taking.

The Role of Substance Use

As with sexual experimentation, experimenting with illegal substances is common during adolescence. Substance use is the consumption of an illicit substance, including alcohol for minors. It is particularly concerning for adolescents because they tend to try multiple substances and consume them in large quantities (Feldstein Ewing, Filbey, Loughran, Chassin, & Piquero, 2015; McClelland, Elkington, Teplin, & Abram, 2004). Among mainstream high school students ages 15-19, 32.8% reported that they have consumed alcohol within the past 30 days and 17.7% reported having 5 or more drinks in a row within a few hours. Nearly 40% have tried marijuana and 21.7% report current use.

Higher rates of alcohol and drug use are consistently found among justice-involved youth. Most juvenile offenders report using substances other than cigarettes prior to age 13 (Prinz & Kerns, 2003). Nearly 50% of male juvenile detainees meet criteria for one or more substance use disorders, with the highest prevalence among alcohol and marijuana use (McClelland et al., 2004). Rates of lifetime and daily marijuana use are estimated to be 54% and 16%, respectively among juvenile detainees (Grigorenko, Edwards, & Chapman, 2015). Slightly

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less than 50% of male juvenile offenders report heavy alcohol use (Feldstein Ewing et al., 2015). While used less frequently, rates of other drugs, including hallucinogens, cocaine, ecstasy, methamphetamines and heroin are still higher among justice-involved youth compared to their mainstream peers (Lebeau-Craven et al., 2003).

The relationship between substance use and sexual risk behavior. Research on the relationship between substance use (SU) and SRB typically involves two types of analyses: global-level associations, or “global overlap” (ie., does engaging in behavior A increases the likelihood of engaging in behavior B?) and event-level associations or “situational overlap” (i.e., does in engaging in behavior A on a given occasion vary as a function of engaging in behavior B on that same occasion?). There is strong empirical support that substance use and SRB (including STIs) are globally associated among adolescents and young adults, however event-level data yield a less clear picture (Cooper, 2002; Fortenberry, 1995; Marshall, 2014). For example, drinking prior to sex is consistently associated with casual sex and multiple partners. Yet on an event-level, it is inconsistently linked to decreased use of protective behavioral strategies (e.g. contraception use). Research suggests that alcohol and drug use can either promote or inhibit risky sexual behavior depending on the context and individual characteristics, such as age and type of sexual encounter (Cooper, 2002; Leigh, 2002). Differences in adolescent racial subgroups are unclear because most studies have been conducted with predominantly White samples.

Global associations between SU and SRB and related outcomes also apply to justice-involved youth (Castrucci & Martin, 2002; Malow, Devieux, Rosenberg, Samuels, & Jean-Gilles, 2006; Marshall, 2014; Robertson et al., 2005). For instance, a number of studies have demonstrated that substance use is predictive of sexual debut, contraception use, number of

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partners, alcohol use during sex, and frequency of intercourse, among both mainstream and justice-involved adolescents (Castrucci & Martin, 2002; D. M. Huebner & Perry, 2015; Kingree, Braithwaite, & Woodring, 2000; Kotchick, Shaffer, Forehand, & Miller, 2001; Schmiede & Bryan, 2016). However, event-level data with this high-risk population is limited. One study found that general and recent marijuana use was both globally and situationally associated with higher levels of unprotected sex among a sample of predominantly African American adolescent detainees ages 12-17 (Kingree et al., 2000).

The relationship between substance use and ACEs. Research indicates that ACEs are a risk factor for substance use among adolescents and young adults. Youth who have experienced adverse circumstances in childhood are at a heightened risk for more frequent and earlier initiation of drug and alcohol use (Allem, Soto, Baezconde-Garbanati, & Unger, 2015; Bellis et al., 2014; Dube et al., 2003; Rothman, Edwards, Heeren, & Hingson, 2008). For example, Allem et al. (2015) found that an increase in ACE score was associated with a 31% higher probability of marijuana use and 24% higher probability of binge drinking among Hispanic emerging adults. One possible explanation for this link is that adolescents use substance to cope with (i.e. “self-medicate”) trauma (Dixon, Leen-Feldner, Ham, Feldner, & Lewis, 2009; Leeies, Pagura, Sareen, & Bolton, 2010). Compared to the literature on adults, however, fewer studies have examined the relationship between ACEs and SU in adolescence. Furthermore, as is the case with research on SRB, there is a gap in the literature with regard to offending populations, particularly among juvenile offenders. To date, no studies have examined the cumulative effect of ACEs on alcohol or drug use using a justice-involved sample.

The Protective Role of Families

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As previously illustrated, the overwhelming majority of ACEs represent familial-level factors. However, supportive and stable families can also be a tremendous protective factor in terms of adolescents' engagement in risk-taking behaviors. In fact, parenting quality explains more variance in youth behavior than any other single factor (Simons, Simons, & Wallace, 2005). The family system serves as the primary agent of socialization for children, and it is the first context in which they are socialized into gender roles, including sexuality and masculinity/femininity (Harter, 1999). The family has been studied as an important source of influence on youth sexual activity, as parents can provide sexual education, model healthy or unhealthy relationships, teach norms, values, and attitudes associated with sexuality, and monitor adolescent sexual behavior. Family influence has typically been divided into three categories when discussed in the literature: structural features (e.g. parent's marital status, socioeconomic status, education level); processes (including relationships between family members and parenting strategies); and biological influences, such as timing of puberty (Miller, 2002). The adolescent sexual risk literature has shifted away from focusing on family structure variables to emphasizing family processes because of their stronger theoretical foundation. It is also easier to change familial processes and relationship dynamics than it is to change structural factors. Furthermore, it can be argued that family structure influences adolescent behavior through specific family processes, such as parental support, monitoring, and control.

A large body of literature has examined the importance of the parent-adolescent relationship and its impact on a wide range of risk behaviors, including substance use, delinquency, and unprotected sex. How adolescents perceive their relationship with their parents can affect the decisions they make when faced with potentially high-risk situations. Attachment, communication, support, relationship quality, relationship satisfaction, closeness, and

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connectedness are among the frequently studied parent-adolescent relationship variables in the research on adolescent SRB. A strong parent-child relationship is characterized as one involving emotional closeness, warmth, trust, security, and open communication (R. E. Kahn, Holmes, Farley, & Kim-Spoon, 2015). Perceived parental support refers to an individual's perception that he or she feels loved, cared for, wanted, and understood. The pathways through which parents affect adolescent sexual risk-taking is unclear, however, it has been proposed that adolescents who feel unsatisfied with their family relationships may seek independence through relationships with others, including sexual intimacy (Moore & Rosenthal, 1996). In summary, research continues to uphold the importance of supportive family functioning for healthy adolescent behaviors.

Parental connectedness and adolescent sexual risk behavior. The current study examines perceived maternal connectedness as a protective factor for adolescent SRB. Perceived parental connectedness is the perception that one can reliably count on his/her parents or caregivers to provide emotional and instrumental support (Frauenglass, Routh, Pantin, & Mason, 1997). The literature on familial influences on adolescent risk behavior operationalizes adolescent-parent connectedness in many ways, ranging from attachment, support, and warmth to parental monitoring, involvement and communication. For the purposes of this study, maternal connectedness will be defined as adolescents' perceived bond with their mother or closest maternal figure, as defined across three broad dimensions: trust (the degree of mutual understanding and respect), communication (the extent and quality of spoken communication), and the absence of alienation (feelings of anger and interpersonal alienation).

A review of the literature suggests that there is sufficient evidence to conclude that maternal connectedness is inversely associated with adolescent SRB, and that a strong maternal

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bond is a protective factor for male adolescents in terms of risky sexual behavior. This relationship has been demonstrated with cross-sectional and longitudinal studies and a range of sexual risk outcomes. Most studies included in this review used longitudinal designs, as well as nationally representative samples (e.g. Add Health). Parental connectedness was assessed by the adolescent's perception of their relationship for all studies except one, which used behavioral observations of parent-child relationship quality in addition to adolescent report (Price & Hyde, 2009). The majority of the studies described below examine parental connectedness (or related constructs) for both parents, although more attention was given to results pertaining to the mother-child relationship (Dittus & Jaccard, 2000; Price & Hyde, 2009; Sieving et al., 2000). Outcome variables included SRB (e.g. having sex while drunk or high) as well as negative outcomes resulting from unsafe sexual behavior, including STIs and unwanted pregnancy.

Among studies with predominantly White participants, the majority found that parental connectedness was positively associated with sexual debut, such that adolescents who felt more connected to their parents initiated sex at a later age compared to peers who reported lower levels of connectedness (Deptula et al., 2010; R. E. Kahn et al., 2015; Parkes, Henderson, Wight, & Nixon, 2011; Price & Hyde, 2009; Resnick et al., 1997; Shneyderman & Schwartz, 2013; Sieving et al., 2000). Condom use was also predicted by parental connectedness, in that youth who reported higher levels of connectedness to their parents were more likely to use condoms during sex compared to youth who reported lower levels of connectedness (Deptula et al., 2010; Gillmore et al., 2011; Parkes et al., 2011; Shneyderman & Schwartz, 2013). Other sexual risk variables against which parental connectedness was found to be protective include: number of sexual partners (Roche, Ahmed, & Blum, 2008), use of birth control (Dittus & Jaccard, 2000), diagnosed STIs, and sex under the influence of substances (Deptula et al., 2010; Schneyderman

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et al., 2000). Finally, several studies created a composite sexual risk index (SRI) composed of individual sexual risk factors. The results of these studies indicated that higher perceived parental connectedness is associated with lower total SRI scores (Chen, Thompson, & Morrison-Beedy, 2010; Christopher C. Henrich, Kathryn A. Brookmeyer, Lydia A. Shrier, & Golan Shahar, 2006; Luster & Small, 1994; Neumark-Sztainer, Story, French, & Resnick, 1997). A few studies reported contrary findings, however. One study using Add Health data found that parent relationship satisfaction was not correlated with age at sexual debut for middle-aged adolescent males (McNeely et al., 2002). These results may be due to the fact that the authors measured relationship satisfaction from the mother's perspective, as well as higher rates of attrition for males. Another study indicated that parental closeness, warmth, and attachment were not related to SRB (Somers & Paulson, 2000). The reason for these contradictory findings may be the small sample size (n=157) or limited variability in the predictor variables. Nonetheless, there is overall, strong empirical evidence that parental connectedness can play a protective role in preventing or reducing SRB among the general youth population.

In spite of these promising results, several methodological weaknesses in the literature were identified. Among these issues are a lack of a consistent and thorough conceptual framework of risky sexual behavior, assessment issues (e.g. overreliance on self-report measures), weaknesses in design/data analysis (lack of longitudinal designs, poorly defined independent variables), and obstacles to study replication (e.g. lack of demographic and descriptive data). For those studies using cross-sectional designs, temporal precedence could not be established and thus, causal relationships could not necessarily be drawn between parental connectedness and sexual risk outcome. For example, it is possible that adolescents who engage in SRB became more distant from their family and feel less connected as a result. Most relevant

to the current study, the majority of research on this subject focuses on White adolescents and those attending school. Minority youth, school dropouts, and adjudicated youth have largely been ignored in the literature. This is concerning given that they are at greater risk for SRB and negative consequences. It is therefore important to review studies that include more marginalized youth populations, including racial minorities and juvenile offenders.

Gaps in the Research

Youth of color. The comparative lack of research focused on youth of color makes it difficult to make any conclusive statements about the relationship between parental connectedness and adolescent SRB within specific racial/ethnic groups, particularly those living in high-poverty, urban environments (Markham et al., 2010). For example, Gillmore et al. (2011) suggested that because of their culture's emphasis on strong family values (e.g. *familismo*), interdependence, and respect for familial authority, obligations, and communication, Latino and African American adolescents may feel a stronger bond toward their parents, who in turn may have a greater influence on them compared to White youth. Therefore, it is possible that the relationship between parental connectedness and SRB might be stronger for youth of color, yet only two studies have examined racial/ethnic differences: One study found that family factors, including support, communication, closeness, and control were related to condom use for White youth but not African American youth (Gillmore et al., 2011), while another found no differences in the relationship between parent connectedness and sexual risk behavior between African American and White youth (C. C. Henrich et al., 2006). Given that such few studies analyze their results by race/ethnicity, it is difficult to draw conclusions about whether or not parental connectedness is protective against SRB among African American and Latino adolescents.

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While comparatively less research on this topic has been devoted to youth of color, several longitudinal and cross-sectional studies have been conducted with African American and Latino adolescents in recent years. The extant research indicates that family connectedness (and related constructs) likely play a protective role with regard to sexual risk-taking among Latino and African American boys. The majority of these studies examined condom use as an outcome variable and found that youth who feel a stronger sense of connectedness to their parents are more likely to use a condom during sex (Harris, Sutherland, & Hutchinson, 2013; Jaccard, Dittus, & Gordon, 1996; Markham et al., 2003; Pingel et al., 2012). Similarly, parental connectedness is associated with delayed sexual debut (Browning, Leventhal, & Brooks-Gunn, 2004), lower likelihood of impregnating a partner (Markham et al., 2003), less frequent sex (Jaccard et al., 1996); and fewer partners (Harris et al., 2013; Van Campen & Romero, 2012) among African American and Latino adolescents. A few studies demonstrated contradictory results. For example, one study looking at African American youth from the Add Health dataset found that maternal warmth and parental acceptance were not associated with adolescents' total number of sexual partners (Broman, 2007). Another longitudinal study of low-income African American and Latino adolescent boys found that neither paternal nor maternal attachment was associated with composite sexual risk scores (Lohman & Billings, 2008). Several studies found a negative correlation between parental connectedness and total SRI scores for African American and Latino youth (Doljanac & Zimmerman, 1998; Neumark-Sztainer et al., 1997; Peterson, Buser, & Westburg, 2010; Trejos-Castillo & Vazsonyi, 2009).

In summary, there are mixed findings with regard to the relationship between parental connectedness and SRB for youth of color. Overall, the results suggest that a strong parent-child bond can be a source of protection against negative sexual consequences, but the dearth of

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literature analyzing differences by race/ethnicity makes it difficult to draw conclusive statements, particularly for African Americans and Latinos. There is a need for greater research with non-mainstream youth populations in order to determine the role that family plays in protecting against SRB.

Justice-involved youth. Due to their disproportionately high rate of HIV and other STIs compared to the general population, it is especially important to investigate protective factors for SRB among incarcerated youth. Most studies on the correlates of SRB focus on characteristics of the individual. Justice-involved youth have largely been neglected in the literature on familial influences on SRB. Studies that have investigated the role of parental connectedness in this population tend to focus on other risky behaviors, such as substance abuse or violence. One study investigating psychosocial correlates of risky sexual behaviors among 280 detained females (Mean age = 15.3) found that lower levels of perceived familial support were associated with higher total SRI scores, which include behaviors such as sex without a condom, having sex while high or drunk, and having sex with multiple people at the same time. Although the researchers did not specifically assess *parental* connectedness, these findings suggest that the same protective family factors found in the general population may hold true for justice-involved youth as well (Voisin, DiClemente, Salazar, Crosby, & Yarber, 2006). Interestingly, another study using cross-sectional data collected from approximately 1,000 predominantly African American and Latino, male adolescents ages 12-19 in juvenile correctional facilities found that perceived family support is associated with *more* sexual partners for boys (Mosack, Gore-Felton, Chartier, & McGarvey, 2007). The authors' explanation is that parents may offer more support once they become aware of their sons' sexual activity. These discordant findings may also be attributable to alternative familial factors (e.g. family structure, socioeconomic status, etc.) or the

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measure used to assess parental support (i.e. general family support as opposed to feelings of connectedness toward each parent).

In summary, the role of parent-child connectedness as a protective factor for adolescents has been well documented in the sexual risk literature, however, many of the studies are drawn from primarily White, nationally representative samples. Yet, groups who are particularly vulnerable to HIV and other STIs, including African American and Latinos adolescents, as well as youth involved in the justice system have largely been ignored in the literature. The findings on youth of color are limited, particularly for Latinos, and there is almost no extant literature with incarcerated youth. There is a need for research that investigates how parental connectedness influences sexual risk-taking among these high-risk populations.

Family connectedness and substance use. As previously explained, ACEs have been shown to be positively correlated with substance use in adolescence and young adulthood. In addition to protecting against SRB, family connectedness also appears to be negatively associated with adolescent substance use. Specifically, stronger attachment to family is associated with reduced alcohol and illicit drug use (Cleveland, Feinberg, Bontempo, & Greenberg, 2008; Peterson et al., 2010; Roche et al., 2008). Therefore, it is plausible that family connectedness may also act as a protective buffer against the deleterious effects of ACEs on substance use. A recent study from S. M. Brown and Shillington (2017) discovered that the relationship between ACEs and adolescent substance use is moderated by protective adult relationships. For youth without supportive adults in their lives, cumulative ACE scores were positively associated with drug and alcohol use. Although the mechanism for this link is unknown, it has been hypothesized that a strong parent-adolescent bond reinforces internal psychological characteristics, such as self-esteem that in turn, mitigates the negative impact of

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ACEs (Braverman, 2001). To our knowledge, no extant research has examined how a strong parent-child bond may reduce substance use among justice-involved youth.

Maternal connectedness as a protective factor. Given the devastating consequences ACEs can have on future psychosocial development, it is imperative to identify factors that protect children facing adverse experiences. The family context has been identified as one such source of protection. As illustrated previously, there is a large literature on the ability of family, particularly parental connectedness to protect against adolescent SRB. Individuals who have faced multiple ACEs can go on to lead healthy lives through the establishment of supportive social ties (Dube, Felitti, & Rishi, 2013). However, there is an absence of research on whether the family context can protect against sexual risk outcomes when the wider constellation of household/environmental risk factors is considered. Very few studies to date have examined the ability of positive family processes to protect against negative psychosocial outcomes for youth that have experienced ACEs. One study found that family functioning, as assessed by frequency of shared meals, parental involvement, family stress, and parental demands moderates the relationship between cumulative ACE risk and adolescent health and emotional well-being (Balistreri & Alvira-Hammond, 2016). However, SRB was not included as a dependent variable.

Similarly, the results of a study conducted by Hillis et al. (2010) proved that family strengths (e.g. closeness, support, loyalty, protection, importance, love, and responsiveness to health care needs) were protective against adolescent pregnancy when childhood abuse and family dysfunction were present. Specifically, the authors found that the risk of adolescent pregnancy and early sexual debut (before age 15) significantly decreased as the number of childhood family strengths increased. Delayed sexual initiation was partially responsible for the decreased risk of pregnancy. One possible explanation is that childhood trauma drives

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adolescents to seek intimacy and interpersonal support that may have been lacking in childhood via sexual relationships at an earlier age than their peers. As such, adolescents who feel loved and protected by their parents are less likely to engage in early sexual activity, thus reducing their chances of STIs and pregnancy. One limitation of this study, however, is that the researchers did not appear to measure perceived closeness using an empirically validated scale. Also, the retrospective design of the study meant that the ACEs being studied occurred several decades ago and therefore the findings may not be generalizable to today's youth. Finally, the expanded ACE questions were not included in the study. Nevertheless, other researchers have found that prevention programs designed to target adolescent pregnancy are effective because they bolster competence and confidence by fostering relationships with others, including peers and family members. Thus, it has been proposed that strong family-child relationships may reduce the tendency for adolescents to seek relational intimacy by engaging in early sexual activity (Hillis et al., 2010). To our knowledge, there are no studies to date that have explicitly examined if maternal connectedness can buffer against SRB or related outcomes among adolescent males or high-risk youth populations. Further research is needed to better understand how family processes/dynamics may act as a protective buffer against SRB in boys with a significant history of adversity, including African American and Latino adolescents and justice-involved youth.

In summary, to the extent that families can be a source of risk for youth living in chaotic and dysfunctional homes, they can also provide a sense of security and emotional support. Adolescents who feel connected to their parents and feel comfortable communicating with them are less likely to engage in high-risk behaviors, including SRB, such as unprotected sex or sex with multiple partners. Furthermore, while there is limited research on the topic, a few studies

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suggest that a strong parent-adolescent relationship could even buffer against the negative cumulative effects of ACEs. As Luthar et al. (2015) explained, “good quality of caregiving is the single most robust of protective factors for children exposed to various adversities, so that positive relationships with alternate caregivers could serve protective functions for maltreated youth (p. 7).” Overall, there is a lack of research examining how perceived parental connectedness could reduce SRB and outcomes among adolescents with a history of adversity, and even less has been written about vulnerable subgroups, such as African American and Latino adolescents and juvenile offenders.

Statement of the Problem

Justice-involved youth engage in risky sexual behavior, including inconsistent condom use, sex with multiple partners, and substance use prior to or during sex at a higher rate compared to their non-adjudicated counterparts (Robillard et al., 2005; Teplin et al., 2003; Timmermans et al., 2008). Consequently, they are at higher risk for STIs/ HIV and unplanned pregnancies (R. H. Kahn et al., 2005; Lofy et al., 2006; Robertson et al., 2005). The majority of research on SRB and associated risk factors among justice-involved youth populations focuses on females and men who have sex with men. Fewer studies have been conducted with adolescent males who identify as heterosexual. Adverse childhood experiences (ACEs), which investigate the cumulative effect of negative childhood events, have received increasing attention in recent years for their impact on adult and adolescent psychosocial outcomes, including risky sexual behavior (Felitti et al., 1998). In addition, a new “expanded” ACE inventory, which includes all 10 items from the original ACE questionnaire, as well as several neighborhood and peer-level stressors has been shown to more accurately represent the experiences of individuals of color than the original ACE questions alone (Cronholm et al., 2015; Finkelhor et al., 2015). To our

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knowledge, minimal research to date has examined the cumulative effects of ACEs on SRB among justice-involved youth, and no studies with this population have incorporated the newer ACE items. The paucity of research on this subject is alarming given that these youth experience more ACEs and engage in elevated rates of SRB on average, than the general youth population (Abram et al., 2004; Pinto et al., 2015; Schuck & Widom, 2005). This represents a critical gap in the ACE research.

Extensive research has also been conducted on protective factors that reduce the likelihood of SRB and promote safe sex practices among youth. Family has frequently been identified as a protective resource for adolescents in terms of its influence on decision-making and risky behavior. For example, research shows that adolescents who communicate with their parents, feel loved and supported, and trust their parents are less likely to engage in SRB than adolescents who feel less connected to their parents (Deptula et al., 2010; Markham et al., 2010; Roche et al., 2008; Shneyderman & Schwartz, 2013). However, fewer studies of this nature have been conducted with African American, Latino, or system-involved youth. Therefore, the question of whether or not parental connectedness can serve as a source of resilience for these higher-risk groups remains to be seen.

This study attempts to contribute to the existing body of work on adolescent SRB through a risk and resilience lens. The goal of the study is to fill some of the gaps in the literature on the role of ACEs and maternal connectedness on SRB among adolescents, with a sample of predominantly African American and Latino, heterosexual incarcerated males. Specifically, this study seeks to determine if maternal connectedness can buffer against the negative effects of ACEs on SRB.

Chapter Two: Hypotheses

Hypothesis 1

ACEs and SRB will be related, such that higher total ACE scores are associated with greater sexual risk-taking. Specifically, individuals in the high sexual risk group will endorse more ACEs than individuals in the low sexual risk group.

Rationale for Hypothesis 1

ACEs are linked to a myriad of negative psychosocial and health outcomes later in life (Anda et al., 2006; Felitti et al., 1998). Research demonstrates a link between cumulative ACE scores and sexual risk-taking in adulthood, including unprotected sex and multiple sexual partners (Anda et al., 2006; Campbell et al., 2016; Klein et al., 2007). Fewer studies have been conducted with adolescents, though their results provide preliminary evidence that greater ACE scores are associated with earlier sexual debut and higher likelihood of unintended pregnancy and impregnating a girl (Anda et al., 2001; Hillis et al., 2010; Ramiro et al., 2010). Although there is research on single forms of adversity (particularly childhood maltreatment), there is a gap in the literature on the cumulative impact of ACEs on youth, and almost no research to date has specifically looked at incarcerated or detained adolescents. In addition, newer ACE variables have been proposed, which focus on stressors occurring outside the home and have been shown to better represent the childhood experiences of marginalized youth populations than the original ACE questions alone (Cronholm et al., 2015; Wade et al., 2016). This study aims to contribute to the existing body of research on the cumulative impact of ACEs on adolescent SRB, incorporating both the original and newer ACE questions.

Hypothesis 2

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Maternal connectedness will be associated with SRB. Specifically, individuals in the high sexual risk group will report lower maternal connectedness than individuals in the low sexual risk group.

Rationale for Hypothesis 2

The literature on SRB indicates that maternal connectedness is a predictor of SRB and negative sexual health outcomes among nationally representative youth samples (R. E. Kahn et al., 2015; Price & Hyde, 2009; Shneyderman & Schwartz, 2013). Specifically, maternal connectedness and related constructs are inversely associated with a range of sexual risk outcomes, ranging from age of sexual debut and substance use during sex to STI diagnosis (Chen et al., 2010; Deptula et al., 2010). However, there is a dearth of literature demonstrating that this relationship holds for youth of color, and the research that does exist demonstrates mixed results. Justice-involved youth, who are disproportionately Latino and African American have also been neglected in the literature on adolescent SRB and the contributing role of familial factors. The current study attempts to narrow this gap by measuring reported SRB in a group of predominantly Latino and African American incarcerated adolescent boys, and examining the role, if any, of perceived maternal connectedness. The broader purpose of this study is to expand the research on risk and protective factors influencing SRB among high-risk youth. Clarifying the role that supportive parenting can have on adolescent sexual behavior can help researchers develop more effective interventions for high-risk populations.

Hypothesis 3

Maternal connectedness and ACE scores will be inversely related, such that higher maternal connectedness is associated with lower total ACE scores.

Rationale for Hypothesis 3

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All ten of the original ACEs focus on household dysfunction in the form of behavior (e.g. household substance use, mental illness, incarceration) or relationship dynamics (e.g. child abuse, domestic violence, separation/divorce) (Felitti et al., 1998). These questions likely capture—at least to some extent, the relationship dynamics between children and their caregivers in the context of pervasive adversity. Thus, children who report a higher number of ACEs were likely raised in more dysfunctional and unstable homes and are more likely to have problematic relationships with their mothers/maternal figures compared to children who have experienced fewer ACEs. For example, research shows that adults who have experienced childhood maltreatment are less likely to have bonded with their parents compared to adults who did not experience childhood maltreatment (Rikhye et al., 2008).

Hypothesis 4

Maternal connectedness will moderate the relationship between ACEs and SRB. Specifically, higher maternal connectedness will be associated with a reduction in the relationship between ACE scores and SRB.

Rationale for Hypothesis 4

Hillis et al. (2010) found that childhood family strengths, such as perceived closeness, support, protection, and love are protective against adolescent pregnancy and early sexual debut among women who were exposed to ACEs. Given that maternal connectedness has been shown to be inversely associated with SRB, and ACE scores have been shown to be positively associated with SRB, it holds that using a risk and resilience model, high levels of maternal connectedness could buffer the negative effects of ACEs on SRB.

Chapter Three: Method

Participants

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This dissertation uses archived data from a longitudinal intervention study, in which a cohort of male adolescents ($N = 268$) aged 16-18 years ($M = 17.42$, $SD = 0.71$) were recruited from a major secure adult correctional facility in the New York City area between 2009 and 2010. Due to missing baseline questionnaire data, five participants were excluded from the analyses presented in this paper. Descriptive statistics for the 263 participants are provided in Table 2.

At the time the study was conducted, by statute in New York State, adolescents aged 16 and older who commit misdemeanors and felonies were considered adults under the jurisdiction of the adult criminal correctional system. However, adolescents aged 16-18 years are housed in areas designated for adolescent populations, and research participants were recruited from the two housing areas designated for male adolescents aged 16-18 years at Rikers Island Correctional Facility in New York City. Participants were assigned to a specific housing area depending on whether or not they had been sentenced. Fifty five percent ($n = 144$) of the participants were recruited from the housing area designated for adolescents who were convicted and sentenced to a prison term of one year or less and 45 percent ($n = 119$) of the participants were recruited from the housing area designated for adolescents who were detained, indicating that they had been charged with a crime and were awaiting disposition of their case.

Approximately 56% of youth reported committing a violent crime in their lifetime (e.g., attacking someone with a weapon, attempting to kill or seriously injure someone); 84% reported committing a non-violent crime in their lifetime (e.g., stealing, selling drugs). Fifty-six percent reported committing both violent and non-violent crimes in their lifetime (one person reported committing solely a violent crime). Approximately 16% reported no history of violent or non-violent crimes. Charge information was also collected at the time of the interview. Public records

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of the participants' criminal charges at the time of enrollment in the intervention were obtained for the majority of the adolescents (73.8%). Sixty-one percent ($n = 118$) of the participants were charged with a violent felony and 39 percent ($n = 76$) of the participants were charged with a non-violent felony or misdemeanor.

Procedure

Participants were invited to participate in the study through regular recruitment sessions held in their housing areas. Research staff introduced the study and asked all interested youth to complete a recruitment form, which was used to determine their interest in participating, eligibility for the study, and emancipation status (if under age 18). Youth were deemed eligible if they had at least six weeks left to serve on their sentence or anticipated detention status. Research staff met with interested youth to further explain the study, answer questions, and obtain informed consent or assent. Emancipated 16-17 year olds and youth over the age of 18 signed informed consent. Youth were considered emancipated if they had fathered a child, were legally married, or were financially independent from their parents/guardians or independently made most of their own decisions, such as where they attended school (Feierman et al., 2009). Youth aged 16-17 who were not emancipated could sign informed assent and study staff obtained verbal (telephone) consent from the youths' parent or guardian.

Participants completed a 2.5-hour computer-based baseline interview on a laptop using the Questionnaire Development System (Nova Research, 2000). The interview was programmed using an audio-computer assisted self-interview format (ACASI) that read each question aloud to the participants. All participants wore headphones to ensure privacy and confidentiality. Interviews were conducted in a private space with a trained interviewer and administered individually. The majority of the interview was comprised of assessment measures that used

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Likert-type or open-ended responses. Youth answered questions about a wide range of topics including demographic information, history of offending and criminal justice involvement, mental health, sexual health practices, substance use, family environment, and exposure to violence. Youth who reported any suicidal ideation, intent, or action within the past three months were referred to appropriate mental health services. Three computerized tasks were also administered. All participants received 25 dollars in their commissary accounts for participating in the baseline interview.

Measures

Background and demographic information. Participants reported on a number of background and demographic variables including their age, race/ethnicity, educational history, and criminal background.

Sexual risk behavior. SRB is defined as any type of sexual activity that increases the chances of contracting or transmitting a sexually transmitted infection or the occurrence of an unwanted pregnancy (CDC, 2016b). It includes unprotected sex or inconsistent contraception use, early sexual initiation, high-risk partners (e.g. IV drug users), multiple partners, and having sex while under the influence of alcohol or drugs. Sexual behavior, including sexual health history and risky sexual behaviors was assessed using the National Alcohol Survey (Graves, 1995). Select items regarding sexual behavior were administered, including type (e.g. oral sex) and age of initiation of sexual activity with members of the opposite and same sex, number of sexual partners, lifetime occurrence of penile/vaginal sex, and frequency of condom use. Information on STD diagnoses and perception of risk for HIV was also assessed. As only 1.2% of the sample endorsed ever having a male partner, this study focused on vaginal sex with females.

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For the current study, SRB was measured in several ways. First, it was measured continuously with individual questions, including number of recent partners, number of lifetime partners, and frequency of drug use during recent sex. Condom use during the three months prior to arrival at Rikers was calculated as a proportion by dividing the frequency of condom use from frequency of vaginal intercourse and subtracting this value from one. Additionally, a dichotomized, composite sexual risk score was created, dividing participants into a low risk group and a high risk group. The low risk group was comprised of participants who reported no sex or only protected sex (i.e. used a condom 100% of the time) with a maximum of two partners during the three months prior to incarceration. Participants who reported having more than two partners or any unprotected sex (i.e. used a condom less than 100% of the time) during the past three months were in the “high risk” group. This cut-off score was based on a study by Donenberg, Emerson, and Kendall (2018) among justice-involved youth. As discussed in the introduction, a stringent cut-off was used for this sample because the majority of participants are lived in communities in New York City that have disproportionately high rates of STIs and HIV. STIs and HIV tend to be geographically clustered which substantially increases community members’ risk of infection even when engaged in very low risk sexual behavior. (Hallfors, Iritani, Miller, & Bauer, 2007). Thus, compared to youth who reside in communities with lower rates of HIV and other STIs, urban African American and Latino youth have an increased risk of infection simply by engaging in developmentally normative sexual behavior.

ACEs. Adverse Childhood Experiences (ACEs) are potentially traumatic events occurring during the first 18 years of a person’s life that can have deleterious effects on their health and wellbeing (CDC & Kaiser Permanente, 2016). The original ACE questionnaire assesses exposure to 10 adverse events occurring during a child’s first 18 years of life. Each item

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is comprised of one or more questions assessing physical, sexual, and psychological abuse, emotional neglect, physical neglect, parental separation or divorce, household substance abuse, mental illness, incarceration, or domestic violence toward mother. Participants who endorse any of the questions for each item receive a point. Points are summed to comprise a total ACE score ranging from 0 (no ACEs) to 10 (all the ACEs). As described previously, newer versions of the ACE questionnaire have been proposed that include additional adverse events occurring outside the home, such as exposure to violence, peer isolation/rejection, socioeconomic status, and racial discrimination (Cronholm et al., 2015; Finkelhor et al., 2015).

For the present study, 13 ACEs were assessed up through the present day using variables derived from standardized and validated measures. The majority of the questions matched those from the original ACE questionnaire, while five of the ACEs (parental separation/divorce, domestic violence, parental substance use, poverty status, and foster care) were measured using proxy variables. Our ACE measure included eight of the original items (emotional and physical neglect, physical, emotional, and sexual abuse, domestic violence, parental substance abuse, and parental separation/divorce) and five of the newer proposed items (peer isolation/rejection, racial discrimination, poverty, exposure to violence and foster care).

For this study, each ACE was assessed with at least one question or statement, with the exception of poverty, for which participants' zip codes were used to determine neighborhood poverty status. Participants who endorsed an item received one point for the corresponding ACE. For items that included more than one question or statement (e.g. Family members sometimes hit one another OR family members sometimes get so angry that they throw things), participants only had to endorse one of the questions in order to receive a point for that ACE. All items were dichotomized to represent whether the participant did or did not ever experience the ACE

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regardless of the frequency of exposure. Thus, participants received a point if they *ever* experienced that ACE regardless of the frequency. The original and revised ACE questions, as well as the items administered for the present study are presented in Table 1. Consistent with the vast majority of research examining ACEs, items were summed to form a total ACE score out of 13 possible points. Recently, researchers have begun to conduct factor analyses, which have yielded several factors, although the number of items has varied (Ford et al., 2014; Mersky, Janczewski, & Topitzes, 2017; Olofson, 2018). Reliability for this measure has not been reported.

Abuse and neglect. Emotional neglect, physical neglect, emotional abuse, physical abuse, and sexual abuse were assessed using the corresponding subscales on the Childhood Trauma Questionnaire-Short Form (Bernstein et al., 1994). The CTQ-SF is a 28-item self-report retrospective inventory that measures abuse and neglect during childhood and adolescence (Bernstein & Fink, 1998). It is comprised of five clinical subscales: physical, sexual, and emotional abuse, and physical and emotional neglect. Positively worded items are reverse scored and all items are added to create subscale totals. Participants were counted as having experienced physical abuse, emotional abuse, sexual abuse, physical neglect, or emotional neglect if they endorsed any item from the corresponding subscale regardless of frequency.

Parental substance use. One item (“my parents were too high or drunk to take care of me”) from the physical neglect subscale of the CTQ was used to assess parental substance abuse and was not counted toward the physical neglect subscale. Participants received a point for this item if they endorsed any frequency other than “never.” Although this item does not directly correspond to the original ACE question about household substance use, it better reflects the negative impact of parental substance use on child and adolescent development. Due to the

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wording, however, it likely underestimates overall substance abuse within the home among this population.

Domestic violence. Domestic violence was assessed with two items from the Family Environment Scale (FES; Moos, 1994). The FES assesses the current social and environmental characteristics of families across three domains: relationship, personal growth, and system maintenance. Two of the original 10 subscales were administered in the current study: conflict (amount of openly expressed anger and conflict among family members) and control (how much set rules and procedures are used to run family life). Participants were asked whether “family members sometimes get so angry that they throw things” or “family members sometimes hit each other.” Participants received a point if they endorsed either item.

Peer isolation and rejection. Peer isolation and rejection were assessed with two items from the Brief Symptom Inventory, a self-report screening measure of psychological symptoms (Derogatis, 1993). Patients reported on “feeling lonely” and “feeling that people are unfriendly or dislike you” during the past week. Both items were derived from the Depression subscale. Participants received a point if they endorsed either item regardless of the frequency.

Exposure to violence. The Exposure to Violence Scale (ETV) is a self-report measured used to assess the subject’s experience of different forms of violence (Buka, 1997). Four acts of violence were defined in the current study: seeing someone shoved or punched; seeing someone attacked with a knife; hearing a gunshot; and seeing someone be shot. Participants received one point if they experienced any of these incidents during their lifetime.

Racial discrimination. Racial discrimination was assessed with the Everyday Discrimination Scale (Clark, Coleman, & Novak, 2004; D. R. Williams, Yan, Jackson, & Anderson, 1997). The EDS is a nine-item measure used to assess perceived racism in day-to-day

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life (e.g. “You are treated with less courtesy than other people, because of your race”). All nine items were administered in the current study. Participants received one point if they endorsed any of the items.

Parental separation or divorce. Participants were asked who raised them the most growing up. Those who reported that they were primarily raised by someone other than both of their biological or adoptive parents were coded as having experienced parental separation or divorce. This question was modified from the original ACE question to include boys who were raised by unmarried but cohabitating parents. This modification, which was used by Finkelhor et al. (2013) better serves to represent parental arrangements of our urban and predominantly African American and Latino sample. Furthermore, research suggests that parental divorce or separation may not be a strong predictor of later psychosocial outcomes due to the minimized stigma in recent years (Finkelhor et al., 2013).

Poverty. Poverty was assessed by looking up each participants’ zip code and determining the neighborhood poverty index according to the United States Census Bureau for the 2010 census (“United States Census Bureau,” 2010). Participants who lived in a neighborhood in which at least 20% of residents lived below the poverty line were categorized as having exposure to poverty.

Foster care. Finally, placement into foster care was assessed with a single question that asked, “Who is the main person on the outside who is currently responsible for you?” Participants who chose “foster parent” for their response were categorized as having experienced this ACE. Because it is possible that some youth may have previously been placed in foster care but were not at the present time, this question may underestimate the number of youth who were involved in the foster care system at one point or another.

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Table 1.
Adverse Childhood Experiences Questions

Construct	Original ACE Scale	Current Study
Emotional Abuse	Did a parent or other adult in the household often swear at you, insult you, put you down, or humiliate you, or act in a way that made you afraid that you might be physically hurt?	People in my family called me things like "stupid", "lazy", or "ugly;" People in my family said hurtful or insulting things to me; I thought that my parents wished I had never been born; I felt that someone in my family hated me; I believe that I was emotionally abused
Physical Abuse	Did a parent or other adult in the household often push, grab, slap, or throw something at you; or ever hit you so hard that you had marks or were injured?	I got hit so hard by someone in my family that I had to see a doctor or go to the hospital; People in my family hit me so hard that it left me with bruises or marks; I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor; I was punished with a belt, a board, a cord, or some other hard object; I believe that I was physically abused
Sexual Abuse	Did an adult or person at least 5 years older than you ever touch or fondle you or have you touch their body in a sexual way, or try to or actually have oral, anal, or vaginal sex with you?	Someone tried to touch me in a sexual way, or tried to make me touch them; Someone tried to make me do sexual things or watch sexual things; Someone threatened to hurt me or tell lies about me unless I did something sexual with them; Someone molested me; I believe that I was sexually abused
Emotional Neglect	Did you often feel that no one in your family loved you or thought you were important or special; or your family didn't look out for each other, feel close to each other, or support each other?	There was someone in my family who helped me feel that I was important or special; People in my family looked out for each other' People in my family felt close to each other; I felt loved; My family was a source of strength and support
Physical Neglect	Did you often feel that you didn't have enough to eat, had to wear dirty clothes, and had no one to protect you or your parents were too drunk or	I didn't have enough to eat; I knew that there was someone to take care of me and protect me; I had to wear dirty clothes; There was someone to take me to the

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	high to take care of you or take you to the doctor if you needed it?	doctor if I needed it
Parental Separation or Divorce	Were your parents ever separated or divorced?	Who raised you most of the time when you were growing up?
Domestic Violence	Was your mother or stepmother: often pushed, grabbed, slapped, or had something thrown at her; or sometimes or often kicked, bitten, hit with a fist, or hit with something hard or ever repeatedly hit over at least a few minutes or threatened with a gun or knife?	Family members sometimes get so angry that they throw things; Family members sometimes hit each other
Parental Substance Use	Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?	My parents were too drunk or high to take care of the family
Peer Isolation/Rejection	Did you often or very often feel lonely, rejected or that nobody liked you? ^b	Feeling lonely; Feeling that people are unfriendly or dislike you
Exposure to Violence	Did you live for 2 or more years in a neighborhood that was dangerous, or where you saw people being assaulted? ^b How often, if ever, did you see or hear someone being beaten up, stabbed, or shot in real life? ^a	Have you ever seen or been present when someone was attacked with a knife?; Have you ever seen or been present when somebody was shoved, kicked or punched? ^c Have you ever seen or been present when someone was shot?; Have you ever heard a gun shot?
Foster Care	Were you ever in foster care? ^a	Who raised you most of the time when you were growing up?; Who is the main person on the outside who is currently responsible for you?
Poverty	Was there a period of two or more years when your family was very poor or on public assistance? ^b	<i>Used zip codes to determine neighborhood poverty level</i>
Racial	While you were growing up,	You are treated with less courtesy than

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Discrimination	how often did you feel that you were treated badly or unfairly because of your race or ethnicity? ^a	other people, because of your race; You are treated with less respect than other people, because of your race; You receive poorer service than other people, because of your race; People act as if you are not smart, because of your race; People act as if they are afraid of you, because of your race; People act as if you are dishonest, because of your race; People act as if they are better than you, because of your race; You are called names, because of your race; You are threatened or harassed, because of your race.
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Shaded cells denote questions from modified ACE Scale:

^aCronholm et al., 2015

^bFinkelhor et al., 2015

Maternal connectedness. Perceived maternal connectedness (MC) was assessed using a shortened version of the Inventory of Parent and Peer Attachment (IPPA), which was originally developed by Armsden and Greenberg (1987). The IPPA-SF (Raja, McGee, & Stanton, 1992) is a 12-item self-report questionnaire used to assess older adolescents' and young adults' feelings towards parents and peers. Only the maternal scale was used in the current study. The scale is comprised of three subscales: Trust (feelings of security toward the attachment figure), Communication (perceiving the attachment figure as sensitive and responsible to his/her emotional needs), and Alienation (perception of anger or emotional disconnection from the attachment figure). Each subscale contains 4 items, with 12 items per scale. Although there is no consensus in the literature on how to best cluster the subscales for the IPPA, there is empirical support for using the original 3-factor model when assessing minority populations. For example, the results of a study of attachment among African Americans in the juvenile justice system found support for a 3-factor model (Andretta et al., 2015). Thus, a 3-factor model

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(communication, trust, and alienation) was applied in the present study. It should be noted that the IPPA should not be viewed as a proxy for attachment, as conceived by Ainsworth and Bowlby (Ainsworth & Bell, 1970; Bowlby, 1969). Instead, van der Vorst, Engels, Meeus, Deković, and Vermulst (2006) proposed that the IPPA is perhaps best described as an index of “perceived parental security,” which is how it was operationalized in this study.

Participants were instructed to respond to each item based on their mother or the person who acted as their mother. If they had more than one maternal figure, they were instructed to answer the questions for the person who they felt had most influenced them. Responses were recorded on a 5-point scale, ranging from “almost never or never true” to “almost always or always true.” The IPPA is scored by reverse-scoring the negatively worded items and then summing the response values in each subscale. A total composite score is calculated by averaging the three subscale scores with the alienation subscale reverse-coded. Higher scores indicate stronger perception of maternal connectedness. Chronbach’s alpha was 0.86 for the Maternal Attachment scale.

Substance use. Alcohol and marijuana use were measured with two questions from the National Alcohol Survey (Graves, 1995). Each question assessed frequency of use in the three months prior to incarceration on a Likert Scale from 0 (*none*) to 9 refers (*3 or more times per day*). See Appendix for each response choice. Thus, higher scores indicate more frequent substance use.

Data Analysis

Descriptive statistics. Descriptive analyses for the 263 participants were conducted on all variables of interest. Specifically, descriptive statistics were used to assess demographic

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information, ACEs, maternal connectedness, and individual risky sexual behaviors and outcomes.

Missing data. More than 5% of data for the variables of interest were completely missing. The majority of missing data involved items in which participants responded “don’t know” or “refuse to answer” on the SRB questions or measures assessing the individual ACEs, all of which contained sensitive data. A missing data analysis was first conducted in order to observe patterns of missingness. In order to maximize power, Multiple Imputation (MI) was applied to the missing data. MI generates multiple versions of the dataset and pools the parameter estimates for all of the imputed datasets. A Markov chain Monte Carlo (MCMC) uses linear regression models to impute missing continuous variables one at a time using complete or filled-in variables from one step as a predictor in all subsequent steps (SPSS Inc., 1989, 2011). SPSS applies linear regression imputation for continuous variables and logistic regression imputation for categorical variables. Output for each “complete” dataset are produced (in this case, 5 sets), plus pooled output that estimates what the results would have been if the original dataset had no missing values. These pooled results are generally more accurate than those provided by single imputation methods. MCMC was used to impute missing values for all of the independent variables. A diagnostic macro program was used to establish successful convergence prior to imputing the data set (Enders, Fairchild, & MacKinnon, 2013).

Data analysis plan. In order to test the first three hypotheses, bivariate correlations were run between each of the primary variables: Total ACE score, total IPPA score, sexual risk category, as well as several individual sexual behavior variables (number of recent and lifetime partners, substance use during sex, and condom use). In order to test the fourth hypothesis (i.e. the full model), a hierarchical logistic regression model was run to determine if ACE scores,

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maternal connectedness, and their interaction predict sexual risk level. A dichotomous sexual risk category (0=low sexual risk, 1=high sexual risk) was used for the outcome. Due to multicollinearity between the interaction term and maternal connectedness and ACE Total score, each of these variables was centered. Age, frequency of alcohol and marijuana use in the three months prior to arrival at Rikers Island, and length of time incarcerated at baseline were included in the model as covariates. Substance use was controlled for because it was hypothesized that more frequent general consumption of alcohol and marijuana would be associated with greater number of sexual partners and less consistent condom use. Age was controlled for because it was hypothesized that older adolescents were likely to report a greater number of lifetime partners and incidents of substance use during sex compared to younger adolescents. There is also evidence that older age is associated with less consistent condom use in both minority and mixed race samples. Length of time incarcerated was controlled for because it was hypothesized that adolescents who had been incarcerated for a longer period of time would be less likely to recall their sexual history prior to incarceration compared to adolescents who were recently detained. Additionally, participants who had been incarcerated for less time had more opportunity to engage in risky sex. Variables were added chronologically to the hierarchical regression model. Thus, factors that affected youth during their childhood were added first.

Chapter Four: Results

Demographics

As shown in Table 2, the mean age of the sample was 17.42 ($SD=.72$) years at baseline. Forty-five percent ($n = 118$) of the sample reported to be African American, 27.8% ($n = 73$) reported to be Hispanic or Latino and 27.4% ($n = 72$) reported to be multiracial (the majority of whom identified as Black and Hispanic). On average, the participants had completed nearly 10

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years of schooling ($M = 9.96$, $SD = 1.29$), 11% obtained their GED and their WRAT-3 reading scores ($M = 38.96$, $SD = 7.16$) indicated that their reading levels were typical of those found among seventh graders. The average length of incarceration at baseline was 131 days ($SD=130.93$. $Range=7-953$) or approximately 4.5 months. Over half of the youth reported that their mother was the primary person who raised them and was currently responsible for them. All descriptive level data, including demographics were analyzed prior to implementing multiple imputation procedures.

Table 2.
Demographic Information for Participants (N=263)

Characteristic	<i>n</i>	%
Age (years)		
16	36	13.7
17	81	30.8
18	146	55.5
Race/Ethnicity		
Black/African American	118	44.9
Hispanic/Latino	73	27.8
Multiracial/Other*	72	27.4
Charges		
Violent Felony	118	61
Non-Violent Felony/Misdemeanor	76	39
Obtained GED	17	11
Primary Caretaker Growing Up		
Mother	149	56.7
Father	6	2.3
Mother and Father	35	13.3
Mother and Other	19	7.2
Father and Other	5	1.9
Grandparent	28	10.6
Other	21	8
Current Primary Caretaker		
Mother	187	71.1
Father	35	13.3
Grandparent	40	15.2
Sibling	20	7.6
Other	43	16.3
No one	22	8.4
Characteristic	<i>M</i>	SD

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Other Demographic Information

Age	17.42	.72
Estimated Reading Level (grade)	7 th	--
Incarceration Length (days)	112	131

**predominantly Black and Hispanic*

Sexual Risk Behavior

Table 3 shows the descriptive information for SRB. Due to a number of outliers, winsorization (Salkind, 2010) was used to transform extreme values into small and large percentiles for lifetime number of partners, number of partners in the three months prior to incarceration, and number of times used alcohol or marijuana during sex in the three months prior to incarceration. The percentiles were chosen based on which best eliminated extreme values. Sixteen percent of the sample was categorized as “low risk,” while 70% were considered “high risk.” On average, participants reported approximately 22 partners in their lifetime and five partners during the three months prior to their arrival at Rikers Island. Participants reported, on average, using alcohol or other drugs during sex eight times during the three months prior to their arrival at Rikers Island. Overall, 73% of the sample reported ever using a condom during the three months prior to their arrival at Rikers Island. On average, they had unprotected sex 37% of the time.

Substance Use

Also included in Table 3 is descriptive information for substance use in the 3 months prior to arrival at Rikers Island. Marijuana use was prevalent; approximately 70% of adolescents reporting using it nearly every day or more and 31% reported that they used it 3 or more times per day. Alcohol use was less frequent in comparison, with 19% reportedly drinking at least nearly every day.

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Table 3.

Descriptive Information for Sexual Risk Behavior and Substance Use

Sexual Risk Behavior	<i>n</i>	<i>M (SD)/%</i>	Median	Range
Number of lifetime partners	226	22.20 (15.61)	19.00	5-50
Number partners 3 months before Rikers	237	4.90 (4.05)	3.00	1-12
Number of times used substances during sex 3 months before Rikers	231	8.18 (11.10)	3.00	0-35
Used a condom 3 months before Rikers	258	73.0%	--	--
Proportion of unprotected sex during 3 months before Rikers	235	0.37 (.43)	.10	0-1
Risk Category	228	16.3%	--	--
Low	43	70.3%		
High	185			
Alcohol use 3 months before Rikers	222		--	--
never		6.1	--	--
< 1x/month		8.4	--	--
1x/month		9.1	--	--
2-3x/month		14.1	--	--
1-2x/week		18.3	--	--
3-4x/week		9.5	--	--
nearly every day		8.4	--	--
1x/day		2.3	--	--
2x/day		3.4	--	--
≥3x/day		4.9	--	--
Marijuana use 3 months before Rikers	229			
never		5.3	--	--
< 1x/month		2.3	--	--
1x/month		.4	--	--
2-3x/month		2.3	--	--
1-2x/week		.8	--	--
3-4x/week		6.5	--	--
nearly every day		28.9	--	--
1x/day		3.0	--	--
2x/day		6.5	--	--
≥3x/day		31.2	--	--

ACEs

Tables 4 and 5 provide descriptive data for ACEs. As shown in Table 4, the average ACE score was 6.43 ($SD=2.16$) out of a maximum possible score of 13. Thus, on average, youth reported exposure to 6 types of adversity. All participants reported experiencing at least two ACEs. As shown in Table 5, exposure to violence (92%), parental separation/divorce (87%), and

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poverty (73%) were the top three most prevalent types of adversity reported. Foster care was the least prevalent, while sexual abuse and parental substance abuse were reported by less than 10% of the sample.

The majority of the youth endorsed four of the five new/adapted ACEs. Table 6 compares the average total ACE score for our sample to other studies. Participants in our sample generally endorsed a similar percentage of ACEs compared to other studies with justice-involved youth and a significantly higher percentage compared to nationally representative adolescents. It should be noted that on the Childhood Trauma Questionnaire, the minimization/denial scale, which measures possible underreporting of maltreatment (false negative) was fairly high among the sample. On average, 53.2% of participants minimized their maltreatment experiences. Therefore, rates of abuse and neglect are likely underestimates.

Table 4.
Total ACE Score and Frequencies

<i>n</i>	<i>M (SD)</i>	Range
244	6.43 (2.16)	2-12

# ACEs	Frequency	%
1	0	0
2	4	1.6
3	16	6.6
4	38	15.6
5	27	11.1
6	41	16.8
7	35	14.3
8	38	15.6
9	26	9.9
10	14	5.3
11	3	1.1
12	2	0.8
13	0	0

Table 5.
Prevalence of ACEs

ACE	<i>n</i>	%
Exposure to Violence	258	92.4

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Parental Separation/Divorce	263	86.7
Poverty	259	73.4
Racial Discrimination	255	70.3
Peer Isolation/Rejection	262	66.2
Emotional Abuse	263	56.3
Domestic Violence	258	50.2
Physical Abuse	260	48.3
Physical Neglect	262	38.0
Emotional Neglect	262	36.1
Parental Substance Abuse	260	9.1
Sexual Abuse	260	8.4
Foster Care	263	2.3

Note: all variables were dichotomized as occurred or never occurred

Table 6.
A Comparison of Mean ACE Scores in the Literature

Study	Sample	<i>M</i> (<i>SD</i>)	# ACEs Assessed	% Endorsed
Current Study	Incarcerated males aged 16-18	6.43 (2.16)	13 (8 original, 5 new)	49
Baglivio et al. (2014)	Male juvenile offenders aged 18	3.48 (NR)	10 (all original)	35
Wagner et al. (2017)	Youth in juvenile justice facilities, and foster care aged 12-19	3.3 (0.2)	8 (5 original, 3 new)	41
Balistreri and Alvira-Hammond (2016)	Nationally representative sample of youth aged 12-17	1.2 (NR)	9 (5 original, 4 new)	13
Pinto et al. (2015)	Portuguese detained males aged 12-19	4.53 (2.03)	10 (all original)	45

Note: NR= not reported

Maternal Connectedness

Descriptive information for maternal connectedness, as well as a comparison of the total mean IPPA-SF scores for the current study to those reported in previous studies are shown in Tables 7 and 8, respectively. The data show that youth in our sample generally perceive their relationship with their mothers, or maternal figures as high on trust, moderately high on communication, and relatively low on alienation. The scores for the current study appear to be consistent with those found in the literature for other community-based samples of adolescents.

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Table 7.
Descriptive Information for Maternal Connectedness

Subscale	<i>n</i>	<i>M (SD)</i>	Median	Range
Trust	236	4.25(0.86)	4.50	1.0-5.0
Communication	235	3.86(0.89)	4.00	1.0-5.0
Alienation	235	1.98(0.88)	1.75	1.0-5.0
Total	232	4.04(0.73)	4.25	1.0-5.0

Table 8.
A Comparison of IPPA-Short Form Total Mean Scores in the Literature

Study	Current Study	Laible, Carlo, & Raffaelli (2000)	Kim-Spoon, Longo, & McCullough (2012)	Branje, Hale, Frijns & Meeus (2010)
Population	Incarcerated males aged 16-18	Midwestern middle and high-school aged adolescents (M age=16.0)	Community sample of southern adolescent boys aged 10-15 (M=12.63)	Community sample of Dutch adolescents (M=16.68)
<i>M (SD)</i>	4.05 (0.74)	3.51 (0.79)	4.19 (0.55)	4.02 (0.85)

ACEs, Maternal Connectedness, and Sexual Risk

Table 9 shows the bivariate correlations between ACEs, maternal connectedness (MC), and sexual risk outcomes. Contrary to Hypothesis 1, Total ACE scores were not significantly correlated with SRB, as measured through individual risk behaviors (e.g. number of lifetime partners), nor a composite score. MC was not correlated with SRB, with the exception of substance use (SU) during sex, with which it was negatively correlated. In other words, greater maternal connectedness was associated with less frequent substance use during sex. Therefore, hypothesis 2 was partially supported. Finally, ACE scores and MC were significantly correlated, such that higher ACE scores were associated with reduced maternal connectedness. Thus, Hypothesis 3 was supported.

Table 9.
Bivariate Correlations Between ACE Total Score, Maternal Connectedness (MC), Sexual Risk Outcomes, Age, Days Detained at Rikers Island, and Frequency of Marijuana and Alcohol Use in the Three Months Prior to Incarceration

Variable	1	2	3	4	5	6	7	8	9	10
1. Total ACE	-									
2. MC	-.55**	-								
3. # Lifetime Partners	-.04	.03	-							
4. # Recent Partners	-.09	.13	.63**	-						

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5. Unprotected Sex	.06	-.07	-.18	-.13	-					
6. SU During Sex	.08	-.16*	.16*	.21**	.31**	-				
7. Age	.09	-.10	.04	.04	.00	.10	-			
8. Days Detained	.01	.05	.14*	.13*	.08	-.04	.06	-		
9. Marijuana Use	.01	-.10	.07	.10	.07	.15*	.01	.01	-	
10. Alcohol Use	.04	.00	.08	.09	.08	.26**	.07	.03	.18*	-
*p<.05, **p<.01										
<i>M</i>	6.43	4.04	22.20	4.90	37.3%	8.18	17.42	111.75	6.57	3.88
<i>SD</i>	2.16	0.73	15.61	4.05	0.24	11.10	.72	130.93	2.56	2.34
Range	2-12	1-5	5-50	1-12	0-75	0-35	16-18	7-953	0-9	0-9

SU = Substance Use; MC=Maternal Connectedness

Note: Frequency of marijuana and alcohol use was measured on a scale from 0 (no substance use) to 9 (3 or more times per day).

A logistic regression was performed to ascertain the effects of Total ACE score, maternal connectedness, the interaction between ACE score and maternal connectedness, age, marijuana, and alcohol use in the 3 months prior to arrival at Rikers, and number of days incarcerated at baseline on the likelihood that participants' fall into the high risk sexual behavior group. All assumptions of logistic regression were assessed and met. Specifically, the analysis contained one dichotomous dependent variable and one or more continuous or nominal independent variables, there was independence of observations and all categories of the dependent variable and the independent variables were mutually exclusive and exhaustive (and the Durbin Watson value was close to 2). Additionally, the minimum of 15 cases per independent variable was met, multicollinearity was not an issue according to the VIF/Tolerance values, there exists a linear relationship between the independent variables and logit transformation of the dependent variable using the Box-Tidwell procedure, and there were no significant outliers. Several cases had potentially influence leverage points, however, the results did not change when these cases were filtered out. SPSS does not provide pooled omnibus test statistics, nor R^2 statistics, therefore the range of values provided across the five imputations is provided. As shown in Table 10, the overall final logistic regression model was not statistically significant: $\chi^2(7) = 6.75-10.01$, $p > .05$. For the final model, Nagelkerke's R^2 ranged from .047 to .069, indicating that these

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predictors explained little variation in sexual risk category (i.e. less than 7%). As shown in Table 10, none of the predictors was statistically significant, including the interaction term, indicating that maternal connectedness does not appear to moderate the relationship between ACEs and SRB. Hypothesis 4 was therefore null.

Table 10.
Logistic Hierarchical Regression Predicting Likelihood of Sexual Risk Level Based on Age, ACE Score, Maternal Connectedness (MC), Recent Alcohol and Marijuana Use, and Length of Stay at Rikers Island.

	B	SE	Wald Statistic	Odds Ratio [95% CI]	χ^2
Model 1					
Constant	2.42	4.23	.33	11.24 [.00, 44411.77]	.05
Age	-.06	.24	.05	.95 [.59, 1.52]	
Model 2					
Constant	2.21	4.25	.43	9.13 [.00, 37901.76]	.26
Age	-.043	.24	.03	.96 [.60, 1.54]	
ACE	-.034	.08	.21	.97 [.83, 1.13]	
Model 3					
Constant	2.18	4.25	.26	8.87 [.00, 36870.95]	.30
Age	-.04	.24	.09	.96 [.60, 1.55]	
ACE	-.02	.10	.07	.98 [.81, 1.18]	
MC	.05	.27	.04	1.05 [.62, 1.81]	
Model 4					
Constant	2.17	4.23	.26	8.77 [.00, 36874.32]	.39
Age	-.04	.24	.03	.96 [.60, 1.55]	
ACE	-.02	.10	.07	.98 [.81, 1.18]	
MC	.03	.29	.03	1.03 [.58, 1.84]	
ACExMC	.02	.10	.09	1.02 [.84, 1.24]	
Model 5					
Constant	1.59	4.35	.46	19.75 [.00, 119270.06]	4.60
Age	-.06	.25	.05	.94 [.58, 1.54]	
ACE	-.02	.10	.05	.98 [.81, 1.19]	
MC	.07	.30	.08	1.08 [.60, 1.92]	
ACExMC	.03	.10	.14	1.03 [.84, 1.26]	
Alcohol	.03	.09	.39	.97 [.81, 1.15]	
Marijuana	.12	.07	3.71	.89 [.78, 1.01]	
Model 6					

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Constant	1.14	4.38	.31	12.01 [.00, 77547.86]	7.85
Age	-.05	.25	.04	.95 [.58, 1.56]	
ACE	-.02	.10	.07	.98 [.80, 1.19]	
MC	.04	.30	.04	1.04 [.58, 1.87]	
ACExMC	.04	.10	.23	1.04 [.85, 1.27]	
Alcohol	.03	.09	.33	.97 [.82, 1.16]	
Marijuana	.12	.07	3.74	.89 [.78, 1.01]	
Rikers Days	.00	.00	2.47	1.00 [.10, 1.00]	

Note: Results are pooled across imputations. Pooled Wald statistic, chi-square, and r-square change values of imputed data sets were not provided in SPSS, so the average values are provided instead.

Additional Exploratory Results

The aforementioned hypotheses are focused on the cumulative impact of ACEs (i.e. an individual's total ACE score). However, given the overall limited literature on childhood adversity and SRB in adolescence, this study additionally aims to explore the relationship between individual ACEs and various sexual risk outcomes. For example, it would be beneficial to assess the relationships of each ACE, in both its original and binary form (as per the ACE questionnaire) with different SRB outcomes to find out which ACEs are most highly correlated with different forms of SRB. For example, how do the relationships compare between the newer and the older ACEs and which types of adversity appear to be the most highly associated with SRB? Additional exploratory analyses were therefore conducted to compare the relationship between each of the individual ACE questions (as measured both dichotomously and continuously) and the SRB. Bivariate correlations were run, and those ACEs that were significantly correlated with any of the sexual risk outcomes were used in a regression model to test their predictive value. The original, non-imputed data set was used for these analyses because there were less missing data.

Relationship between individual ACE items and SRB. Correlations were run between each individual ACE question in both its original, continuously measured form and dichotomized

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(e.g. yes/no) form and SRB outcomes. When the binary ACE questions were analyzed, the following patterns emerged: Sexual abuse and parental separation/divorce were negatively correlated with sexual risk level, $r = -.17, p = .012$ and $r = -.15, p = .027$, respectively. Thus, greater sexual abuse and experiencing parental separation or divorce are associated with less risky sex. However, one cell had an expected count of less than five for sexual abuse. Parental separation/divorce was also negatively correlated with percentage of unprotected sex, $r = -.213, p = .001$. Foster care was negatively associated with number of lifetime partners, $r = .145, p = .029$, although the distribution was small. Physical abuse, sexual abuse, and peer isolation/rejection were all negatively correlated with number of sexual partners in the three months prior to arrival at Rikers Island. Racial discrimination was significantly positively correlated, $r = .169, p = .011$ with frequency of substance use during sex in the three months prior to arrival at Rikers.

Racial discrimination, physical, emotional, and sexual abuse and physical and emotional neglect could be analyzed continuously, as those were the only ACE questions that were derived from standardized measures. Number of reported sexual partners in the three months prior to arrival at Rikers Island was negatively correlated with sexual abuse, $r = -.13, p = .042$, physical abuse, $r = -.16, p = .012$, and emotional abuse, $r = -.14, p = .033$, as measured by their respective subscales on the CTQ.

Racial discrimination, measured dichotomously (experienced any discrimination or no discrimination) and physical and emotional abuse (measured continuously on the CTQ) were selected to include in later regression models due to their significantly high correlation.

Racial discrimination and sexual risk behavior. A hierarchical multiple regression was performed to determine if perceived racial discrimination predicts the number of times participants used substances during sex, while controlling for recent marijuana and alcohol use

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and number of days incarcerated at baseline. Age was not controlled for, as the age range of the participants was extremely narrow. All assumptions for multiple regression were assessed and none were violated. Specifically, scatterplots demonstrated a relatively linear relationship between the IV and DV, the residuals were normally distributed and independent of one another, there was no multicollinearity according to the VIF values, homoscedasticity was established according to a plot of standardized residuals versus predicted values, and there appeared to be no significant points of influence. As shown in Table 11, adjusted R^2 for the final model was 8%, a small effect size according to Cohen (1988). Together, perceived discrimination, alcohol use, marijuana use, and number of days at Rikers significantly predicted substance use during sex, $F(4, 177)=5.05, p<.001$, although this was largely driven by alcohol use. As shown in Table 11, Alcohol and marijuana use were added in the second block and added statistical significance to the model. Only alcohol use significantly predicted substance use during sex in the final model. Specifically, the average number of times participants used substances during sex increased by 1.32 for every 1-point increase on the alcohol use Likert scale (i.e. more frequent alcohol use in the 3 months before Rikers), holding constant perceived discrimination, marijuana use, and number of days at Rikers. Regression output is shown in Table 11.

Table 11.
Summary Table for Substance Use During Sex Based on Perceived Racial Discrimination, Recent Alcohol and Marijuana use, and Length of Stay at Rikers Island.

	B	SE	β	t	Adjusted R^2	$R^2 \Delta$	F	F Δ
Model 1					.01	.01	2.49	2.49
Constant	7.36	1.79		4.10**				
Discrimination	3.23	2.05	.12	1.58				
Model 2					.09	.09	6.58**	8.53**
Constant	-1.20	2.95		-.41				
Discrimination	2.60	1.97	.09	1.32				
Alcohol	1.31	.37	.25	3.50**				

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Marijuana	.62	.33	.13	1.86				
Model 3					.08	.00	5.05**	.49
Constant	-.78	3.01		-.26				
Discrimination	2.67	1.98	.10	1.35				
Alcohol	1.32	.38	.25	3.52**				
Marijuana	.61	.33	.13	1.85				
Days at Rikers	-.00	.01	-.05	-.70				

*p<.05, **p<.01

Abuse and sexual risk behavior. A hierarchical multiple regression was performed to determine if physical and emotional abuse predict number of recent sexual partners while controlling for marijuana and alcohol use during the three months prior to arrival at Rikers and number of days incarcerated at baseline. All assumptions for multiple regression (as described in the last section) were assessed and none were violated. As shown in Table 12, adjusted R² for the final model was 4.0%, a small effect size according to Cohen (1988). The overall model was significant, F(5, 185)=2.58, p<.05. In the initial model, physical abuse significantly predicted number of sexual partners in the three months prior to incarceration. Specifically, the number of sexual partners decreases by .22 for every 1-point increase on the CTQ physical abuse subscale, holding all other variables constant. When emotional abuse, alcohol use, marijuana use, and number of days at Rikers were added to the model, physical abuse was no longer a significant predictor. No individual variables were significant predictors for the final model.

Table 12.

Summary Table for Number of Partners in the Past 3 Months Based on Physical Abuse, Emotional Abuse, Recent Alcohol and Marijuana use, and Length of Stay at Rikers Island.

	B	SE	β	t	Adjusted R ²	R ² Δ	F	FΔ
Model 1					.02	.03	5.71*	5.70*
Constant	6.30	.72		8.82**				
Physical Abuse	-.22	.09	-.17	-2.34*				

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Model 2					.03	.01	4.01*	2.28
Constant	6.72	.76		8.81**				
Physical Abuse	-.10	.12	-.08	-.90				
Emotional Abuse	-.15	.10	-.14	-1.51				
Model 3					.04	.02	2.85*	1.66
Constant	5.35	1.10		4.86**				
Physical Abuse	-.12	.12	-.10	-1.06				
Emotional Abuse	-.14	.10	-.13	-1.43				
Alcohol	.17	.13	.10	1.32				
Marijuana	.12	.12	.08	1.06				
Model 4					.04	.01	2.57*	1.47
Constant	5.03	1.13		4.46**				
Physical Abuse	-.11	.12	-.10	-1.0				
Emotional Abuse	-.15	.10	-.13	-1.46				
Alcohol	.16	.13	-.09	1.24				
Marijuana	.12	.11	.08	1.06				
Days at Rikers	.00	.00	.09	1.21				

*p<.05, **p<.01

Chapter 5: Discussion

Summary of Findings

While sexual activity is developmentally normative for (late) adolescents, justice-involved youth engage in sexually risky behaviors (SRB) at a higher rate compared to the general youth population which places them at increased risk for unwanted outcomes, including STIs, HIV, and unplanned pregnancies (Biello et al., 2013; Robillard et al., 2005; Teplin et al., 2003; Tolou-Shams et al., 2008). Despite their susceptibility to risk, few studies have closely examined the constellation of familial-level risk and protective factors for SRB in the juvenile justice population. Studies using nationally representative or predominantly white adolescent samples have found that maternal connectedness is associated with reduced sexual risk-taking. However, this relationship has not yet been established for justice-involved youth, and the data on Latino and African American adolescents are mixed. The aim of the current study was to use

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a risk and resilience framework to understand the relationship between adverse childhood experiences (ACEs), maternal connectedness (MC), and SRB in a sample of incarcerated male youth who were of predominantly African American and Latino descent. SRBs were defined as inconsistent condom use, substance use during sex, and a high frequency of recent and lifetime sexual partners. All SRBs involved female partners, as the overwhelming majority of study participants reported opposite-sex experiences. The study sought to investigate the cumulative and individual impact of both the original and newer proposed ACEs on SRB, and to determine if MC moderates the relationship between ACEs and SRB.

Contrary to our hypotheses, which were based on literature of non-incarcerated adolescent and adult samples (Dube et al., 2003; Felitti et al., 1998; Hillis et al., 2010; Klein et al., 2007), we found that ACE scores were not related to SRB, even when controlling for maternal connectedness and substance use. Marijuana and alcohol use was controlled for because of the strong global associations between sexual risk behavior and substance use for adolescents (Castrucci & Martin, 2002; Marshall, 2014). Maternal connectedness was inversely related to substance use during sex, suggesting that it could potentially serve as a protective factor. Several of the individual risk factors that comprised the ACE scale were independently associated with risky sex, including sexual, physical, and emotional abuse, as well as racial discrimination. Overall, the present study found that although incarcerated male youth endorse a high number of ACEs, including several of the expanded ACE items, total ACE scores are not an adequate predictor of their SRB.

Sexual Risk Behavior

The adolescents in our sample reported engaging in a high degree of SRB, including number of lifetime and recent partners and substance use during sex. Condom use was

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inconsistent, although the majority of youth reported using a condom at least once in the three months prior to their arrival at Rikers Island. Seventy percent of the youth engaged in high-risk sexual behavior, that is, having more than two partners or any unprotected sex during the three months prior to their arrival at Rikers. Although making direct comparisons to other studies is challenging, as sexual risk outcomes and age parameters vary, our sample reported greater sexual risk-taking compared to the general adolescent population. For example, 87% of our sample reported having sexual intercourse with four or more partners in their lifetime, compared to 16% and 22% of a nationally representative sample of male high school juniors and seniors, respectively (CDC, 2016d). Rates of SRB in our study were comparable with other research focusing on justice-involved youth. For example, 27% of our sample reported that they did not use a condom in the three months prior to their arrival at Rikers compared to another study in which 32% of male juvenile detainees did not wear a condom in the month preceding detainment (Robillard et al., 2005). Thus, consistent with the literature, the youth in our sample frequently engage in risky sexual activity, making them susceptible to unwanted outcomes, including STIs and unintended pregnancy.

ACEs

The adolescents in our sample endured tremendous adversity. On average, they reported exposure to approximately six ACEs, which is higher than the rate reported by a nationally representative sample of adolescents (Balistreri & Alvira-Hammond, 2016) and the original ACE study (Felitti et al., 1998). Our sample reported a slightly higher rate compared to other studies of justice-involved youth, however, it is generally consistent with preexisting research (Baglivio et al., 2014; Balistreri & Alvira-Hammond, 2016; Pinto et al., 2015; Wagner et al., 2017). According to the literature on ACEs, the youth in our study are at risk for a multitude of negative

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outcomes in adulthood, including alcohol and drug problems, depression, concurrent partnerships, and STIs (Felitti et al., 1998; Wade et al., 2016). As is common among males (Bullock & Beckson, 2011; Widom & Kuhns, 1996), sexual abuse was likely underreported in our sample relative to the other ACEs questions. Although participants had privacy when completing the questionnaires, they may have felt self-conscious about disclosing abuse due to shame or fear of stigma.

Compared to nationally representative and community-based samples, the range of ACE scores in our study was wider, however, variability was smaller. Specifically, 92% of our sample endorsed four or more ACEs and nearly half reported seven or more. Youth who are exposed to four or more ACEs are 12 times more likely to experience negative health outcomes, including sexual risk behavior, alcoholism, obesity, drug abuse, diabetes, and suicide attempts compared to youth without such exposure (Burke, Hellman, Scott, Weems, & Carrion, 2011; Campbell et al., 2016; Dube et al., 2003; Felitti et al., 1998). Additionally, juvenile offenders are four times more likely to report four or more ACEs (50% compared to 13%) than college educated participants in the original ACE study enrolled in the Kaiser Permanente health insurance program (Baglivio et al., 2014). Thus, in addition to their current multiple problem behaviors, the young men in our sample are at extreme risk for future negative psychological and health consequences.

This study was unique in that it focused on the lives of incarcerated youth and incorporated some of the expanded ACE items. To our knowledge, only a handful of studies have assessed the prevalence of the original ACEs—and none have assessed the expanded items in a juvenile justice population. The prevalence of individual ACEs and total ACE scores endorsed by this sample was generally consistent with other studies on incarcerated youth (Pinto et al., 2015; Wagner et al., 2017), although ours assessed more ACEs, including several of the

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newer proposed items. Notably, exposure to violence, parental separation or divorce, poverty, and perceived racial discrimination were the most prevalent ACEs in our sample, while peer rejection/isolation was endorsed by two thirds of participants. With the exception of parental separation, these items are from the expanded ACE questionnaire. These findings are consistent with Cronholm et al. (2015), in which exposure to violence, poverty, and racial discrimination were also the most commonly endorsed expanded ACE items among children and adults in southern Pennsylvania.

Our findings suggest, that while the youth in our sample would still have reported greater adversity compared to the general population as measured by the original ACE indices, these scores would have underrepresented their experiences. Therefore, the addition of the expanded ACE items more accurately captures the scope of trauma and adversity faced by justice-involved youth compared to the original ACE inventory alone. The inclusion of discrimination is particularly relevant given that Latino and African American youth are disproportionately overrepresented in all aspects of the criminal justice system, including higher arrest and conviction rates (OJJDP, 2015). Furthermore, although extensive research on the long-term outcomes of the expanded ACE inventory has yet to be conducted, several recent reports have demonstrated associations between high ACE scores using the expanded version and short-term outcomes, including substance use and SRB (Ramos-Olazagasti, Bird, Canino, & Duarte, 2017; Wade et al., 2016). Our results shed light on the need for greater research on the impact of the expanded inventory of ACEs for both adolescents and adults in general, as well as high-risk subpopulations, such as incarcerated youth. In sum, our study provides support for the inclusion of the expanded ACE items with high-risk youth populations in order to capture a wider range of

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important and highly prevalent adverse events that are likely to impact youths' short and long term trajectories.

ACEs and sexual risk behavior. Contrary to hypothesis one, total ACE scores were not significantly associated with SRB, including sexual risk level based on a composite score or individual sexual risk variables (e.g. number of recent partners, substance use during sex). This was somewhat surprising given that there is strong empirical and theoretical evidence linking cumulative adverse experiences to SRB in adulthood (Dube et al., 2003; Klein et al., 2007; Wade et al., 2016) and some evidence for adolescents based on community samples (Anda et al., 2001; Hillis et al., 2010; Ramiro et al., 2010). As previously explained, the lack of variability in ACE scores may explain our null hypothesis. While there was statistical variability in ACE scores reported by our participants, the distribution may not have had enough clinically significant variability to see a relationship between ACE scores and sexual risk outcomes. In other words, these young men represent such an extreme subsample of at-risk youth and have experienced so much adversity in their lives, that their total ACE scores alone cannot predict their SRB.

At the same time, there is limited research on ACEs within this population, and only one study to date has examined the relationship between ACE scores and sexual risk outcomes among justice-involved youth. Wagner et al. (2017) found that among youth who were in foster care, juvenile detention centers, or attending a high school with a high proportion of system-involved youth aged 12-19, ACE scores were indirectly associated with different types of risky sexual behaviors, including substance use at last sex, having four or more lifetime partners, and inconsistent condom use. It should be noted that this study differed from the current study in several ways: the age range was wider and included younger adolescents, their participants endorsed fewer ACEs on average, and not all of their participants were directly involved in the

juvenile justice system. Further research, including replication with different adolescent samples is clearly needed to better understand if there is a relationship between ACE scores and SRB among justice-involved youth.

Maternal Connectedness

In spite of the adversity they faced, the young men in our sample generally reported feeling close and connected to their mothers/maternal figures. Levels of connectedness for our sample are similar to those reported by other community adolescent samples (Branje, Hale, Frijns, & Meeus, 2010; Kim-Spoon, Longo, & McCullough, 2012; Laible, Carlo, & Raffaelli, 2000). This is particularly interesting in light of the high level of exposure to ACEs, which are predominantly family-level variables, including maltreatment and household dysfunction. It is also possible that given the extreme stress and systematic violence participants' faced on a daily basis while incarcerated, as well as being away from their family, friends, and neighborhood, participants felt vulnerable and lonely. As a result, they may have longed for their caregivers and rated their mothers/maternal figures as more supportive than they might have if they were not incarcerated. Additionally, cultural values, such as respect for elders and *familismo*, (dedication, commitment, and loyalty to family), may have led some participants to minimize feelings of maternal unsupportiveness or alienation (Cauce & Domenech-Rodriguez, 2002; Kuhlberg, Pena, & Zayas, 2010). It is also important to consider that because we did not ask the youth who abused them, the ACEs endorsed do not necessarily reflect their mothers' behavior. Other household members, such as fathers/stepfathers and grandparents may have been the perpetrators of maltreatment, which may not have affected the youth's perception of their mothers.

Nevertheless, despite facing a number of traumatic events in childhood, most youth endorsed feeling connected to their mother or a maternal figure. As Hillis et al., (2010)

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explained, “ACEs are by no means incompatible with living in a family with numerous strengths.”

Maternal connectedness and sexual risk behavior. Our results provided partial support for hypothesis two. We found that youth with higher levels of maternal connectedness were less likely to report one specific sexual risk behavior: the use of substances during sex. This is consistent with Shneyderman and Schwartz (2013), who found that parent-adolescent closeness was negatively associated with adolescents having sex under the influence of substances among a nationally representative sample of youth. Substance use, in general, may have mediated this relationship. In fact, several studies indicate that parental support and connectedness is negatively correlated with adolescent substance use (Borca et al., 2017; Oman et al., 2004; Yugo & Davidson, 2007), which in turn lowers the likelihood of substance use during sex. However, the correlation between MC and substance use during sex in our study was small. It should be noted that the frequency of substance use among participants was extremely high; over 70% reported that they smoked marijuana nearly everyday or multiple times per day. Participants’ may have interpreted the item that asked about the frequency of substance use during sex in varied ways. That is, some youth may have indicated very frequent use of substances along with sexual behavior since their substance use co-occurred with the majority of their activities of daily living (attending school, hanging out with friends, criminal behavior), while others may have endorsed a lower frequency, reasoning that their general high level of substance use was not tied specifically to engagement in sexual behavior.

Similar to several studies of African American and Latino adolescents (Broman, 2007; Calhoun & Friel, 2001; Lohman & Billings, 2008), we did not find a relationship between maternal connectedness and other types of risky sexual behavior (including our sexual risk

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composite score). Yet our findings are at odds with a number of reports demonstrating a protective effect of MC for sexual risk behavior among African American and Latino youth (Browning et al., 2004; Lohman & Billings, 2008; Pingel et al., 2012; Ritchwood, Howell, Traylor, Church, & Bolland, 2014; Trejos-Castillo & Vazsonyi, 2009) and points to the need for further research to unpack the mechanisms by which maternal-adolescent relationships in African American and Latino families are associated with youths' sexual behavior in general and those that place youth at greater risk. Moreover, little is known about justice-involved youth and if there is a differential effect of maternal adolescent relationship status on sexual behavior versus delinquent or criminal behavior. The use of similar assessments of MC and SRB across future studies would help to advance our understanding of the apparent discrepancies in the literature.

From a developmental perspective, Ritchwood et al. (2014) found that maternal connectedness plays a larger role in early adolescents' sexual risk behavior but is substantially reduced by late adolescence. Our sample focused on a group of late adolescents with a particularly high level of criminal behavior that may serve to accelerate an 'adult-like' identity among youth which significantly diminishes the role maternal connectedness plays in risk taking behaviors. Additionally, data assessing the role of adolescents' perception of masculinity and further exploration of masculinity theories may have shed light on why maternal connectedness and SRB do not appear to be strongly linked. Another consideration is that other aspects of parenting style, such as control, monitoring, and explicit communication about sex may be more effective in reducing the likelihood of SRB than maternal connectedness. To this point, other studies have found a link between parental monitoring, control, and communication and adolescent SRB (A. J. Huebner & Howell, 2003; Kincaid, Jones, Sterrett, & McKee, 2012),

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particularly the protective benefits of concurrent high levels parental warmth and monitoring on adolescents' SRB.

Nonetheless, the finding that maternal connectedness and substance use during sex are inversely related suggests that perhaps a supportive parent-child relationship can act as a protective factor. In accordance with the resilience literature, future research should continue to explore how other familial dynamics and resources can foster resilience among justice-involved youth and reduce their vulnerability to SRB and other risky behaviors, like substance abuse and delinquency. Additionally, researchers should consider the protective role of adolescents' relationships with other family and community members, including fathers, siblings, teachers, coaches, and religious leaders.

Maternal connectedness and ACEs. As predicted by hypothesis three and consistent with a risk and resilience perspective, there was a significant, inverse relationship between ACEs and maternal connectedness. Although to our knowledge there are no studies that explicitly examine the relationship between ACEs and maternal connectedness, it makes sense that these constructs would be inversely related given that many of the traditional ACEs involve household members, including abuse or neglect, domestic violence, and household substance use. Thus, we would expect that youth who have endured more abuse, neglect, and other forms of adversity in their household would report feeling less supported and loved by their caregivers compared to youth who did not experience as much adversity. In fact, several of the items corresponding to emotional abuse specifically assess the extent to which participants felt unloved and unsupported by their family. A bidirectional relationship may also exist, such that children who have a stronger bond with their parents are better protected from adverse experiences compared to those with a weaker bond. As previously noted, however, the average score for maternal connectedness

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was still very high, indicating that many of these youth felt connected to their mothers in spite of the stressors and trauma that they endured growing up.

Maternal connectedness, ACEs, and sexual risk behavior. Contrary to hypothesis four, total ACE scores do not predict sexual risk behavior, even when taking into account maternal connectedness, participants' age, substance use, and number of days detained. Substance use (marijuana and alcohol) was controlled for because it has been shown to be positively associated with sexual risk-taking among adolescents, including justice-involved youth (Castrucci & Martin, 2002; Malow et al., 2006; Marshall, 2014; Robertson et al., 2005). Given the paucity of research on the effects of ACEs during adolescence (particularly in high-risk youth samples), this study provides important evidence that contrary to the research conducted with adults, ACE scores may not be a strong predictor of adolescent engagement in risky sex, regardless of how close they feel to their mothers. At the same time, the restriction in range (i.e. limited clinical variability in ACE scores) makes it difficult to draw conclusions about the relationship between ACEs and SRB for our sample, and future research is warranted.

Supplemental Findings: Individual ACEs and Sexual Risk Behavior

Although the focus of this study was on the cumulative impact of ACEs, additional exploratory analyses were conducted to more closely examine the individual ACE items. This was particularly important as the majority of research on adolescent SRB focuses on childhood maltreatment, with less attention to other ACEs, particularly the newer proposed ones. Several of the individual ACEs were found to be related to SRB. Specifically, racial discrimination was positively correlated with frequency of substance use during sex in the three months prior to arrival at Rikers. Thus, higher rates of perceived discrimination are associated with greater sexual risk-taking. This is consistent with studies showing that African American and Latino

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adolescents who experience racial discrimination are more likely to engage in SRB and outcomes (Flores et al., 2010; Roberts et al., 2012; Stock et al., 2013; Tobler et al., 2013). In a model predicting substance use during sex in the three months prior to incarceration, which included perceived discrimination, recent alcohol use, recent marijuana use, and number of days at Rikers, only recent alcohol use was a significant predictor.

Emotional abuse and physical abuse were negatively correlated with number of sexual partners in the three months prior to arrival at Rikers. This was surprising because the literature generally indicates that childhood maltreatment is associated with *greater* sexual risk-taking for males (Hillis et al., 2000; Negriff et al., 2015; Walsh et al., 2014). Underreporting of abuse may have played a role, as more than half of the adolescents minimized or denied experiencing maltreatment and the restricted range may have obfuscated any meaningful relationship between reported abuse and SRB. Physical abuse significantly predicted number of sexual partners in the three months prior to arrival at Rikers, but was rendered non-significant when emotional abuse, alcohol use, marijuana use, and number of days at Rikers were added to the model.

Syndemics

A risk and resilience theoretical framework, which incorporates both risk and protective factors, was used to guide the hypotheses and data analysis for this study. In keeping with research (Felitti et al., 1998; Rutter, 1985) and clinical work (Burke et al., 2011) that demonstrates significant negative developmental outcomes of the cumulative impact of multiple individual and familial risk factors, we focused primarily on the youths' ACE scores in this study. Moreover, we incorporated the newest ACE items, which measure social and ecological experiences that have been independently associated with negative developmental outcomes (Cronholm et al., 2015; Finkelhor et al., 2015; Wade et al., 2016) and are highly germane to the

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youth in our sample. These items were endorsed by an overwhelming majority of youth and underscore the need to conceptualize our findings using a more comprehensive framework that takes into account sociocultural, geographical, institutional, and structural forces.

Syndemic theory has emerged as a conceptual framework for explaining how individual experiences and social conditions influence both individual disease burden and its transmission within a population (Singer, 2009). A syndemic is defined as two or more epidemics and the geographical or social forces that give rise to and perpetuate a high burden of disease in a community or population (Singer & Clair, 2003; Stall et al., 2003). In recent years, syndemic theory has been used to explain the heightened vulnerability to HIV/AIDS among highly marginalized populations. Merrill Singer (1996) was the first researcher to identify substance abuse, violence, and AIDS (SAVA) as a syndemic among low SES populations in northeastern cities. Since Singer's groundbreaking work, syndemic theory has been applied to other marginalized populations including men who have sex with men (MSM) and African American and Latino MSM (Dyer et al., 2012; Halkitis et al., 2013; Stall et al., 2003). For example, substance use, depression, histories of trauma and sexual abuse, intimate partner violence, and HIV constitute a syndemic among the MSM population because all of these factors reinforce one another and have an additive effect on the spread of HIV, as increases in risk factors increase the prevalence of sexual risk behavior and rates of HIV among communities of MSM (Stall et al., 2003). While less research has applied syndemic theory to heterosexual populations, recent reports have highlighted the importance of considering similar clusters of risk factors that constitute a syndemic among African American and Latino men living in poor urban areas (Cleland, Lanza, Vasilenko, & Gwadz, 2017; P. A. Wilson et al., 2014). Harmful psychosocial conditions, including trauma, substance abuse, incarceration, discrimination, and poverty interact

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dynamically, heightening vulnerability to and sustaining HIV (P. A. Wilson et al., 2014).

Although we did not find a correlation between total ACE scores and SRB, several relationships emerged between individual ACEs and specific SRBs that underscore the importance of the expanded ACE inventory. Notably, racial discrimination was endorsed by the vast majority of youth in our sample and was associated with SRB, consistent with a growing body of research (Flores et al., 2010; Roberts et al., 2012; Stock et al., 2013). Yet experiences of racial discrimination do not exist in a vacuum, and for these justice-involved youth, perceptions of individual racial discrimination may represent a more visible and tangible experience within the larger context of structural racism which is most acutely exemplified in their experiences with the criminal justice system (Armour & Hammond, 2009; OJJDP, 1999).

Coupled with interpersonal adverse experiences including trauma and neglect, manifestations of structural racism reported by youth on the expanded ACE scale include living in highly racially segregated communities with a high concentration of poverty and violence. HIV and other STIs are highly concentrated in the highest-poverty neighborhoods in NYC, which are predominantly African American and Latino, highlighting the structural underpinnings of racial/ethnic health disparities (New York City Department of Health and Mental Hygiene, 2015; P. A. Wilson et al., 2014). Poverty may contribute to SRB and heightened STI and HIV vulnerability through a lack of access to health care and an association with sex work, substance use, and incarceration. In poor and racially segregated neighborhoods, there are few opportunities for economic advancement either through jobs or education. As a result, adolescents' social networks often include people who are unemployed, school dropouts, and single parents (Baumer & South, 2001). In addition to a lack of positive adult role models and parental supervision, boys may interpret these behaviors as socially acceptable and markers of

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social status and come to view unprotected sex and teen pregnancy as normative behaviors that are shared by community residents (Browning, Leventhal, & Brooks-Gunn, 2005; Cubbin, Santelli, Brindis, & Braveman, 2005; Haynie, Silver, & Teasdale, 2006; Miller-Johnson, Costanzo, Coie, Rose, & et al., 2003; Ramirez-Valles, Zimmerman, & Newcomb, 1998).

In addition to living in poor communities, the youth in our study endured a tremendous amount of adversity and trauma, including abuse, domestic violence, and racial discrimination. Research has reliably demonstrated high rates of trauma among urban individuals of color, which is associated with increased likelihood of incarceration and participation in violence (J. K. Williams, Wyatt, Resell, Peterson, & Asuan-O'Brien, 2004). Additionally, the majority of youth in our study reported frequent substance use; over two-thirds of participants reported smoking marijuana nearly every day or more. In addition to the global associations between substance use and risky sex (Cooper, 2002; Marshall, 2014), daily use may serve as a coping mechanism (Dixon et al., 2009; Leeies et al., 2010). The aforementioned factors represent a complex web of synergistically related conditions, which may facilitate and maintain sexual risk behavior and unwanted sexual outcomes among African American and Latino urban communities.

As a framework for conceptualizing both disease burden and identifying potential targets of intervention, there are notable limitations to syndemic theory (P. A. Wilson et al., 2014). First, syndemic theory fails to consider the potential adaptive functions of individual-level behaviors, such as substance use and sexual behavior, as means of psychological escape and a way to cope with daily stressful experiences (Diaz, Ayala, Bein, Henne, & Marin, 2001; Dixon et al., 2009; Leeies et al., 2010; McKirnan, Ostrow, & Hope, 1996). Second, syndemic theory focuses solely on risk factors without accounting for sources of resilience that may reduce the impact of a syndemic, such as neighborhood cohesion, which has been identified as a form of “social

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capital” at the community level that can buffer against health risk behaviors (Browning et al., 2005; Lomas, 1998). The concept of resilience may complement syndemic theory to identify features of risk factors that may promote healthy adaptation in the face of various stressors and reduce the impact of a syndemic in a community (P. A. Wilson et al., 2014). Finally, the mechanisms and pathways by which syndemic factors impact and amplify disease burden have yet to be articulated.

To our knowledge, there are no reports that have considered a syndemic framework to conceptualize sexual risk behavior with opposite sex partners among justice-involved male youth of color. Utilizing the expanded ACE inventory provided an opportunity to capture the overwhelming number of interpersonal and ecological adverse events and conditions experienced by our participants and highlight the syndemic features of these findings. While the extremely high rates of adverse experiences reported by our sample may have obscured our ability to find associations between total ACE scores and sexual risk behavior, documenting youths’ broader experiences adds to the growing recognition of a more comprehensive understanding of the structural factors impacting health behaviors and disease burden among highly disadvantaged populations.

While the ACE inventory, including the expanded items, is a highly useful screening tool for early identification of at-risk youth, it fails to capture the temporal sequencing of adverse experiences as well as the pathways by which clusters of factors exert negative effects. Further, specific psychological and interpersonal factors that may mitigate or exacerbate these experiences are not identified. Since the majority of research on SRB and related outcomes (e.g. HIV) has primarily focused on MSM, more research is needed that explores possible syndemics among heterosexual youth of color. The current gap in the literature is particularly concerning

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for heterosexual male adolescents involved in the justice system, as their increased exposure to childhood adversity and engagement in SRB makes them a uniquely vulnerable population, whose behavior affects their communities and society at large. Finally, research that explores protective factors and mechanisms of resilience within the context of this syndemic may help to identify potential points of intervention at structural, social and individual levels and improve both primary and secondary prevention efforts for highly vulnerable populations.

Clinical Implications

Based on our results, it is strongly recommended that clinicians (e.g. pediatricians, psychologists, social workers, etc.), particularly those who work with inner-city youth, include the “expanded” ACE items proposed by Cronholm et al. (2015) and Finkelhor et al. (2015) when assessing childhood adversity and trauma. In addition, clinicians should assess for individual and environmental strengths and resources, such as supportive family members that could potentially mitigate or offset risk factors.

Given the long-term consequences associated with ACEs, the data also provide support for the urgent need for wrap-around services for at-risk youth, particularly trauma-informed care. Improving the coordination among systems that provide HIV/STI interventions to youth – primary care, education, mental health, and juvenile justice – can reduce the prevalence of SRBs and substantially reduce the spread of HIV/STI in young people (Snyder, 2006). For instance, HIV/STI prevention for justice-involved youth would likely be more effective if delivered through a trauma-informed approach that simultaneously addresses critical information about sexuality as well as adverse life experiences and their potential influence on sexual decision-making. Additionally, research on the HIV syndemic suggest that social welfare programs that offer financial assistance for health care, housing, and education are likely to promote resilience

and reduce the likelihood of unwanted sexual risk outcomes. Unfortunately, compared to the general population, there is comparatively less research on the sexual activity of high-risk youth populations, including adolescents involved in the foster care and juvenile justice systems. Until there is more nationally representative data on these sub-populations, it will be challenging for policy makers and program planners to promote safe sexual practices among these individuals.

Limitations and Directions for Future Research

The results of this study must be considered in light of several limitations. Perhaps the most important limitation is that the conclusions drawn from this study are limited by the generalizability of the sample. Participants were charged with a variety of crimes, however, they predominantly represent a group of seriously violent offenders. Among the participants for whom charge records were obtained, sixty-one percent were charged with a violent felony (e.g. murder, assault, burglary, armed robbery). In comparison to the larger justice-involved youth population, only 4.7% of juvenile arrests in 2009 and 4.6% in 2012 were for violent crimes (OJJDP, 2009, 2012).¹ In addition, our sample was limited in terms of race/ethnicity, sexual orientation, and age. As such, these results may not generalize to youth who have less violent records, are younger, identify as homosexual or bisexual, or have a different racial/ethnic makeup. Future research should examine detained or incarcerated youth that represent varying levels of delinquency, geography, and racial/ethnic backgrounds. Further, it should be noted that due to New York State law, these youth were held in an adult facility and tried in adult court.²

¹ According to the OJJDP website, due to differences in agency reporting practices, national estimates for the offenses of “rape” and “sex offenses” are not available after 2012. Additionally, estimates for the Violent Crime Index (which included “forcible rape”) are not shown after 2012, as this category is no longer compatible with prior years.

² In April 2017, New York passed legislation that raised the age of criminal responsibility to 18 years old. The measure is slated to take effect on October 1, 2019. Once the measure takes effect, 16 and 17 year-olds will no longer be permitted to be housed in adult facilities or jails, nor will they be placed or held at Rikers Island in New York City. Instead, they are to be placed in specialized juvenile detention facilities that are certified by the city.

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Accordingly, the results of this study may not be generalizable to adolescents incarcerated at youth correctional facilities or those incarcerated in jurisdictions where, if convicted, they are unlikely to face as stringent punishment if they were sentenced as adults.

There were also limitations with regard to the measures. In terms of the ACE items, the majority were modified from their original form, measured by proxy, or adapted from newer proposed ACE inventories, while two of the original ACEs—household mental illness and household incarceration were not included at all. Changes in how these variables were operationalized may have impacted results. For example, another study on male juvenile offenders found that 8% reported household mental illness and 65% reported having a family member that had been incarcerated (Baglivio et al., 2014). Thus, ACE scores for the current study would likely have been even higher if these items had been assessed. In addition, researchers have recently begun to conduct factor analyses with the ACE items, which have yielded several factors, although the number of items has varied (Ford et al., 2014; Mersky, Janczewski, & Topitzes, 2017; Olofson, 2018). Further research on the best way to analyze the ACE scale is warranted. Another limitation with regard to the ACEs is that although they were assessed up through the present time, adverse events that occurred while the youth were incarcerated, such as abuse from correction officers and inmate-on-inmate violence were not assessed. According to an investigative report on the treatment of adolescent male inmates at Rikers Island conducted by the United States Attorney's Office for the Southern District of New York, nearly 44% of the adolescent male population in custody during the time this study was conducted had been subjected to use of force by staff members on at least one occasion (U.S. Department of Justice, 2014). According to a survey by the US Justice Department, hundreds of adolescents are raped or sexually assaulted at juvenile detention facilities, and many of them are

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victimized repeatedly. The majority of these incidents go unreported as many youth fear retaliation or not being taken seriously (Beck, Cantor, Hartage, & Smith, 2012). The inclusion of these incidents would likely have increased total ACE scores.

There were also some methodological weaknesses with regard to the measurement of maternal connectedness. For example, only the maternal scale on the IPPA-SF was administered. The inclusion of the paternal and peer scales may have increased the number of protective factors, which could potentially result in the anticipated inverse relationship between familial support and SRB. From a developmental perspective, peer support may be particularly salient, as the majority of the participants were 18 years old. Additionally, the IPPA only assessed the youth's *current* relationship with their mothers. Therefore, maternal support was only assessed during late adolescence. Given that some research indicates that parents are less influential compared to peers during late adolescence (Ritchwood et al., 2014), perhaps maternal support is less protective against SRB among older adolescents than it is for younger adolescents. Different results may have been obtained if data were collected at earlier developmental stages. Additionally, the IPPA only measures a few aspects of parent-child dynamics. Maternal warmth and support may not be enough to buffer sexual risk. The literature on the role of families in adolescent sexual activity indicates that other aspects of parenting, including monitoring, control, and attitudes toward and communication about sex may be important. Future research should examine how these parenting constructs are related to sexual risk-taking among incarcerated youth.

All of the measures in this study relied on self-reported data, which is vulnerable to recall and social desirability bias. For example, as previously discussed, participants may have overreported feelings of maternal connectedness due to social desirability, cultural values, and

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lack of perspective due to their current circumstances. In fact, Gorrese and Ruggieri (2012) have made the argument that “since attachment is thought to be a mental representation of one’s emotional bonds and past experiences in relationships, it is thought that the best way to measure attachment is through narratives that tap into the implicit representations of the mind.” Future research should consider alternative methods of measuring parent-child connectedness and other constructs associated with attachment.

Participant responses may also have been biased due to a fear that they would not be kept confidential or might somehow impact their legal status (e.g. admittance of substance use). In particular, many participants appeared to exaggerate number of sexual partners, while underreporting STIs and incidents of sexual and physical abuse. Future studies that include biomarkers for STI diagnosis would be beneficial. Although only 1.2% of the sample endorsed ever having a male partner, participants were not specifically asked about their sexual activity during their time at Rikers, including consensual and non-consensual sex with other males. Therefore, participants may have discounted these incidents or underreported their experiences due to feelings of shame or fear of repercussion. Self-reported responses may also have been affected by emotional trauma resulting from incarceration or events leading to their incarceration. Additionally, due to the varied operationalization of SRB in the literature, future researchers should attempt to measure risk behaviors in a way that is consistent with other large-scale, nationally representative longitudinal studies, such as the National Longitudinal Study of Adolescent to Adult Health (Add Health) and the Youth Risk Behavior Surveillance System (YRBSS). This will make it easier to draw comparisons of the prevalence of different types of SRB across samples. For example, many studies measure condom and substance use during last sexual intercourse, which reduces recall bias.

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Finally, this research study lacked an experimental design, which precludes conclusions about causation. For instance, while a resilience framework suggests that stronger maternal connectedness decreases engagement in SRB (in this case, substance use during sex), it is possible that adolescents who engage in SRB became more distant from their families and feel less connected as a result. As such, longitudinal studies are needed which explore the cumulative and individual effects of ACEs, including the newer proposed ACEs on justice-involved youth, as well as factors that protect against negative sexual risk outcomes. For example, as over half of the participants endorsed committing a violent crime, it would be pertinent to investigate if ACE scores predict types of crime in an adolescent sample. Future studies should also explore the underlying mechanisms linking ACEs, such as discrimination and maltreatment to SRB. Finally, as previously explained, syndemic theory underscores the importance of examining the dynamic relationship between SRB and contextual risk factors, including trauma, poverty, and mass incarceration. Therefore, in order to better understand the complicated relationship between SRB, sexual risk outcomes (i.e. HIV, STIs) and ACEs, researchers should form multidisciplinary research teams involving public health experts, epidemiologists, ethnographers, and mental health professionals. Using mixed-method research strategies may also allow for a more nuanced and comprehensive understanding of risk and protective factors.

Conclusion

Justice-involved adolescents engage in higher rates of sexual risk-taking compared to the general juvenile population, resulting in disproportionate rates of STIs and HIV (Lofy et al., 2006). Although SRB has been shown to be positively associated with a number of adverse childhood experiences in research studies on adults, minimal research has explored this relationship in adolescents, and heterosexual male juvenile delinquents have been particularly

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neglected in the ACE literature. This dissertation extends the literature by investigating the relationship between adverse childhood experiences, maternal connectedness, and SRB in a sample of predominantly violent juvenile male offenders.

Results demonstrated that our sample endorsed a high degree of adverse experiences and reported high rates of SRB. Consistent with previous literature, ACE scores and SRB were positively associated. Maternal connectedness was inversely correlated with one type of SRB-substance use during sex. With regard to the main research question, cumulative ACE scores were not found to predict SRB, even when controlling for maternal connectedness, although the restriction in the range of ACE scores may have contributed to this finding. Supplementary analysis revealed that several of the individual ACE items were correlated with SRB, although they did not predict its occurrence. The majority of the youth endorsed experiencing four types of community-level adverse events, providing support for the “expanded” ACE inventory proposed by Cronholm et al. (2015) and Finkelhor et al. (2015). Taken together, results suggest that cumulative ACE scores are not a strong predictor of sexual risk activity among justice-involved youth. Nevertheless, given the high rates of adversity and sexual risk-taking reported by these youth, and the complex relationship between SRB, trauma, poverty, incarceration and other ACEs, future research should use a syndemic framework when studying this highly vulnerable population. A greater understanding of the underlying syndemic factors will help inform the development of interventions aimed at reducing SRB and STIS/HIV among high-risk youth. For example, justice-involved youth may benefit from prevention efforts that target safe sexual practices through a trauma-focused lens. Finally, greater research is needed to determine how to promote resilience within the juvenile justice population, particularly within the context of profound adversity.

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Appendix A: National Alcohol Survey: Sexual Behavior Questions
(Graves, 1995)

Directions: We are going to ask you some questions about your sexual relationships. Remember that you don't have to answer any question that you don't want to.

1. First we have a question about your sexual orientation. How do you identify yourself in terms of your sexual orientation? (Choose one)

Heterosexual or straight (only have sex with females)
Homosexual, lesbian, or gay
Bisexual
Other
Don't Know
Refuse to Answer

2. How do you think of your sexual orientation?

3. Some of the questions you will answer ask about "vaginal sex." "Vaginal sex" is when a male partner puts his penis in a female's vagina. Sometimes people say they 'made love' or 'had sex'. What do you usually call that?

4. In your lifetime, have you ever had vaginal sex with a female partner, that is have you ever [Response to #3]?

Yes No Refuse to Answer

5. In your lifetime, have you ever had any kind of sex with a male partner, including, touching, oral, or anal sex?

Yes No Refuse to Answer

6. How old were you the first time you [Response to #3] with a female partner?

Don't Know Refuse to Answer

7. In your lifetime, how many girls or women have you [Response to #3] with?

Don't Know Refuse to Answer

8. In the 3 months before your arrival at Rikers, how many girls or women have you [Response to #3] with?

Don't Know Refuse to Answer

9. In the 3 months before your arrival at Rikers, how many times did you have 'vaginal sex'; that is, how many times did you [Response to #3] with these [Response to #8] female partners?

Don't Know Refuse to Answer

10. When you [Response to #3] these [Response to #9] times in the 3 months before your arrival, during how many had you been drinking alcohol?

Don't Know Refuse to Answer

11. When you [Response to #3] these [Response to #9] times in the 3 months before your arrival at Rikers, during how many had you been using other drugs?

Don't Know Refuse to Answer

12. How old were you the first time you had any kind of sex with a male partner?

Don't Know Refuse to Answer

13. In your lifetime, how many male sexual partners have you had any kind of sex with?

Don't Know Refuse to Answer

14. In the 3 months before your arrival at Rikers, how many male sexual partners have you had any kind of sex with?

Zero Don't Know Refuse to Answer

15. In the 3 months before your arrival at Rikers, did you have anal sex with any of these male partners? Anal sex is when a male partner puts his penis in your rectum or butt.

Yes No Refuse to Answer

16. In the 3 months before your arrival at Rikers, how many male sexual partners did you have anal sex with?

Zero Don't Know Refuse to Answer

17. In the 3 months before your arrival at Rikers, how many times did you have anal sex with these [Response to #16] male partners?

Don't Know Refuse to Answer

18. In the 3 months before your arrival at Rikers, did you use a condom any of these times?

Yes No Refuse to Answer

19. When you had anal sex these [Response to #17] times, how many times did you use a condom?

Don't Know Refuse to Answer Not Applicable

20. When you had 'anal sex' these [Response to #17] times in the 3 months before your arrival at Rikers, during how many had you been drinking alcohol?

Don't Know Refuse to Answer

21. When you had 'anal sex' these [Response to #17] times in the 3 months before your arrival at Rikers, during how many had you been using other drugs?

Don't Know Refuse to Answer

22. Since the your arrival at Rikers, have you had any kind of sex with male partners?

Yes No Don't Know Refuse to Answer Not Applicable

23. Since your arrival at Rikers, how many times have you had any kind of sex with a male partner?

Zero Don't Know Refuse to Answer

24. Did you use a condom any of these times?

Yes No Refuse to Answer

Please tell us whether you or your partner used any of these methods to prevent pregnancy or sexually transmitted infections in the 3 months before your arrival at Rikers

25. Did your partner use the birth control pill, Depo "the shot", or implants?

Yes No Don't Know Refuse to Answer

26. Did you and your partner use the rhythm method? That's when you have sex at a time of the month when you think she can't get pregnant.

Yes No Refuse to Answer

27. Did your partner use a diaphragm or cervical cap?

Yes No Refuse to Answer

In the 3 months before your arrival at Rikers...

28. Did you use the withdrawal method? That's when you pull out before you ejaculate or come.

Yes No Refuse to Answer

29. Did you use a condom?

Yes No Refuse to Answer

30. Did you use any other method to prevent pregnancy or sexually transmitted infections?

Yes No Refuse to Answer

31. What was that method?

32. You said you had 'vaginal sex' [Response to #9] times in the 3 months before your arrival at Rikers. During how many of these times did you and your partner use a condom?

Don't Know Refuse to Answer

33. In your whole life, have you ever been diagnosed with a sexually transmitted infection, such as genital herpes, genital warts, or gonorrhea?

Yes
No
Don't Know
Refuse to Answer

Not Applicable

34. Which sexually transmitted infections have you ever had? (Check all that apply)

Syphilis

Gonorrhea

Genital herpes

Genital warts

Chlamydia

HIV

Hepatitis B

OTHER

Refuse to Answer

35. When you think about your sexual activities, how risky would you say your behavior is, in terms of getting HIV or AIDS? (Choose one)

Safe

Slightly risky

Somewhat risky

Very risky

Don't know

Don't Know

Refuse to Answer

Not Applicable

Appendix B: Substance Use Questions
(Graves, 1995)

In the three months prior to your arrival at Rikers, did you...

Have any kind of drink containing alcohol, whether it was beer, wine or liquor?

- 0= Never in the 3 months before my arrival at Rikers
- 1= Less than once a month
- 2= About once a month
- 3=2 or 3 times a MONTH
- 4=1 or 2 times a WEEK
- 5=3 or 4 times a WEEK
- 6=nearly every day
- 7= 1 time a day
- 8=2 times a day
- 9=3 or more times a day
- 97=Don't Know
- 98=Refuse to Answer
- 99=Not Applicable

Use marijuana?

- 0= Never in the 3 months before my arrival at Rikers
- 1= Less than once a month
- 2= About once a month
- 3=2 or 3 times a MONTH
- 4=1 or 2 times a WEEK
- 5=3 or 4 times a WEEK
- 6=nearly every day
- 7= 1 time a day
- 8=2 times a day
- 9=3 or more times a day
- 97=Don't Know
- 98=Refuse to Answer
- 99=Not Applicable

Appendix C: Inventory of Parent and Peer Attachment-Short Form (IPPA-SF)
(Raja et al., 1992)

Directions: The following statements ask you about your feelings about your mother or the person that acted as your mother. If there is more than one person that has acted as a mother to you, answer the questions for the one you feel has most influenced you.

Respond to each statement using the following choices:

1=Almost Never or Never True

2=Not Very Often True

3=Sometimes True

4=Often True

5=Almost Always or Always True

7=Don't Know

8=Refuse to Answer

9=Not Applicable

1. My mother respects my feelings.
2. When I'm angry at something, my mothers tries to be understanding.
3. I wish I had a different mother.
4. My mother accepts me as I am.
5. I tell my mother about my problems and troubles.
6. My mothers helps me to understand myself better.
7. I get upset easily around my mother.
8. Talking over my problems with my mother makes me feel ashamed or foolish.
9. My mother has her own problems, so I don't bother her with mine.
10. If my mother knows something is bothering me, she asks me about it.
11. I feel angry with my mother.
12. I don't get much attention at home.