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Gender Differences in Drug Use, Sexually Transmitted Diseases, and Risky Sexual Behavior among Arrested Youths*

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Abstract

Data were collected on arrested youths processed at a centralized intake facility, including youths released back to the community and those placed in secure detention. This paper reports the results of a test of a structural model involving newly arrested male and female youths' sexually transmitted diseases (STD) test results, urine analysis results for recent cocaine and marijuana use, and self-reported engaging in risky sexual behavior. The across gender, multiple group model involved: (1) a confirmatory factor analysis of these variables, reflecting a latent variable labeled Risk, (2) a regression of Risk on the youths' age, and (3) an examination of the covariance between Risk and the youths' race and seriousness of arrest charge. Results indicate the youths' STD status, drug use, and reported risky sexual behavior are interrelated phenomena, similarly experienced across gender. Age was the only correlate of Risk status that demonstrated a significant gender group difference. The youths' race and seriousness of arrest charges did not significantly affect Risk, regardless of gender. Research and policy implications of the findings are discussed.

Keywords

Juvenile offenders; risky sexual behavior; substance use; sexually transmitted disease

In recent years, attention has been directed to the numerous health related risk-taking behaviors engaged in by adolescents. In general, risk-taking refers to "participation in behavior which involves potential negative consequences (or loss) balanced in some way by perceived positive consequences (or gain)" (Gullone & Moore, 2000:393). Some examples of juvenile risk-taking behaviors include, but are not limited to, delinquent behavior, substance use, risky sexual practices, reckless driving, dangerous sports, poor eating habits,

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truancy, and negative peer associations. Research indicates that adolescents are overrepresented in a wide range of risky-taking behaviors (Arnett, 1992; Bonino, Cattellino, & Ciairano, 2003; DiClemente et al., 1996). In addition, adolescents who engage in one form of risk-taking behavior are more likely to engage in other forms of risky behavior (Elliot, Huizinga, & Menard, 1989; Jessor & Jessor, 1977; Levine & Singer, 1988).

Studies also suggest that, although adolescents in the general population display high rates of risk-taking, these types of behaviors are inflated among certain populations, particularly juvenile offenders (Castrucci & Martin, 2002). Two of the more common risk-taking behaviors that have been found to be strongly associated with juvenile offending are risky sexual practices and substance use. In fact, the relationship between juvenile delinquency, risky sexual practices, and substance use has been consistently documented for well over three decades (Jessor & Jessor, 1977; Kotchick, Shaffer, Forehand, & Miller, 2001; LeBlanc and Bouthillier, 2003; Tolou-Shams, Brown, Gordon, & Fernandez, 2007). More recently, research has demonstrated that: 1) juvenile offenders are disproportionately more likely to report risky sexual practices and sexually transmitted disease (STD) infection compared to non-offenders (Crosby, DiClemente, Wingood, Rose, & Levine, 2003; Devine, Long, & Forehand, 1993; DiClemente, Lanier, Horan, & Lodico, 1991; Elliott & Morse, 1989; Shafer et al., 1993; Morris et al., 1995; Tolou-Sham et al., 2007), 2) juvenile offenders report higher frequencies and more serious forms of substance use compared to non-offenders (Elliott et al., 1989; Huizinga & Jakob-Chien, 1998; Office of Applied Studies, 2003, 2004), 3) juvenile offenders report higher levels of sex while using drugs or alcohol compared to non-offenders (Malow, Devieux, Jennings, Lucenko, & Kalichman, 2001; Otto-Salaj, Gore-Felton, McGarvey, & Canterbury, 2002), and 4) juvenile offenders who use substances are substantially more likely to report risky sexual practices and STD infection compared to non-substance using juvenile offenders (Castrucci & Martin, 2002; Kingree, Braithwaite, & Woodring, 2000; Kingree & Phan, 2001; Malow et al., 2001; Rosengard et al., 2006).

Several sociodemographic characteristics have been shown to affect the link between risky sexual practices and substance use among youth. For example, adolescents who report higher frequencies (Elliott & Morse, 1989; Harwell, Trino, Rudy, Yorkman, & Gollub, 1999; Tolou-Shams et al., 2007) and more serious forms of delinquent behavior (Farrington, 1998; Huizinga, Loeber, Thornberry, & Cothorn, 2000; Robertson & Levin, 1999; Timmermans, Van Lier, & Koot, 2007), particularly violent behavior, are more likely to engage in additional risk behaviors, including substance use, risky sexual practices, and STD infection.

Race has been shown to be an important factor for understanding risky sexual practices and substance use among juvenile offenders. On one hand, African-American incarcerated adolescents are more likely to report risky sexual practices and test STD positive (Canterbury et al., 1995; DiClemente, 1991; Kahn et al., 2005; Lofy, Hofmann, Mosure, Fine, & Marrazzo, 2006; Mertz, Voigt, Hutchins, & Levine, 2002; Morris et al., 1995). On the other hand, white juvenile offenders typically report higher levels and more serious forms of substance use (Kilpatrick et al., 2000; McClelland, Elkington, Teplin, & Abram, 2004). Moreover, recent research has suggested that African-American females represent the highest risk group for negative health related outcomes related to risk-taking behavior (CDC, 2008). Specifically, a handful of studies have documented disproportionately higher rates of several risk behaviors, including risky sexual practices and STD status, among this demographic subgroup (CDC, 2006; De Genna, Cornelius, & Cook, 2007; Halpern et al., 2004; Kahn et al., 2005; Lofy et al., 2006).

Furthermore, age is one of the most consistent predictors of a range of risk-taking behavior. On average, as youth progress through adolescence, the tendency to engage in multiple forms of risky behaviors increases. In regard to risky sexual practices and substance use

among juvenile offenders, a wealth of studies has revealed a linear relationship between age and the co-occurrence of risky sexual practices and substance use. That is, older juvenile offenders are more likely to report higher levels of risky sexual practices and substance use, than younger offenders (Kingree et al., 2000; Morris, Baker, Valentine, & Pennisi, 1998; Shafer et al., 1993; Teplin, Mericle, McClelland, & Abram, 2003).

Research also suggests that the relationship between substance use and risky sexual practices among juvenile offenders differs across gender (Kingree & Betz, 2003; Robertson, Thomas, St. Lawrence, & Pack, 2005; Teplin et al., 2003). For example, previous studies have found that female juvenile offenders display higher levels of serious drug use (e.g., cocaine use) (Belenko, Sprott, & Peterson, 2004; Neff & Waite, 2007; Teplin et al., 2003; Kim & Fendrich, 2002; Wei, Makkai, & McGregor, 2003), while male juvenile offenders display higher levels of marijuana use (Barnes, Welte, & Hoffman, 2002; Belenko et al., 2004; Dembo, Wareham, & Schmeidler, 2007; Stevens et al., 2003; Teplin et al., 2003). In regard to sexual behavior, gender differences in risky sexual practices are mixed. Female juvenile offenders, however, are substantially more likely to test STD positive (Canterbury et al., 1995; Joesef, Kahn, & Weinstock, 2006; Kingree et al., 2000; Mertz et al., 2002), than male offenders. Currently, differences in the associations between these behaviors across gender groups are not well understood. The majority of studies examining the relationship between substance use and sexual/STD risk among justice-involved youth and the influence of gender have either relied on gender exclusive samples (typically females) or examined gender differences in risk by simply controlling for the effects of a gender indicator.

The primary purpose of the present study was to examine the covariation among risky sexual practices, STD status, and substance use among a sample of recently arrested juvenile offenders and compare the association among these measures across gender groups. It is important to examine the covariation in risky sexual practices and substance use *across* gender groups, while at the same time, considering the influence of additional demographic factors such as race, age, and arrest charge. Failing to do so could lead to inaccurate generalizations about the nature of these associations among adolescent offenders. Furthermore, such an examination will aid in the improvement of juvenile justice prevention and intervention services by identifying the unique treatment needs of male and female juvenile offenders.

This study makes a unique contribution to the literature in two important ways. First, this study relied on a large sample of recently arrest youth demonstrating various levels of criminal and juvenile justice system (JJS) involvement. Previous studies of the risky sexual behavior-drug use relationship remain quite limited for the general juvenile justice population, especially those under community supervision. The handful of studies that have been conducted involve small samples of arrested youths and/or youths placed in secure detention centers or juvenile correctional facilities (Kahn et al., 2005; Pack, DiClemente, Hook, & Oh, 2000; Teplin et al., 2005). These studies fail to include the majority of at-risk, criminally involved youths who are released to the community following arrest (79.1% of youths arrested in 2005 were released back into the community [Stahl, Finnegan, & Kang, 2008]). Second, this study compares the relationship between risky sexual practices, STD status, and marijuana and cocaine use *across* gender groups. This information will further an understanding of the tendency for male and female juvenile offenders to engage in a variety of risky-taking behaviors. As such, the present paper seeks to extend previous research by including: (1) all youths having contact with the JJS, especially those at the front end, (2) biological test data on both drug use and STDs, and (3) sufficiently large samples of male and female arrested juveniles to conduct statistically informed analyses.

The present study tested the structural model shown in Figure 1. First, as shown, it was hypothesized that STD test status, cocaine use, marijuana use, and self-reported risky sexual behavior (e.g., having sex while using alcohol or other drugs and having intercourse without using a condom) would reflect a latent construct of “Risk.” Second, it was hypothesized that the factor model for Risk in Figure 1 would be similar across gender. Finally, it was hypothesized that this latent construct of Risk would be directly, positively affected by the youth’s age and covary with the youth’s race and the seriousness of arrest charges, and that these effects would vary across gender.

Methods

Data Collection Procedure

Participants were 948 newly arrested juveniles processed at the Hillsborough County, FL Juvenile Assessment Center (HJAC) (a centralized intake facility) between June 19 and September 30, 2006 for males ($n = 506$) and between June 19 and December 31, 2006 for females ($n = 442$). Since females represent approximately 25 percent of the HJAC population, they were over-sampled to yield sufficient power for gender-specific analyses.

A simple, effective, and successful collaborative effort involving the HJAC, the Florida Department of Health (DOH), Hillsborough County Health Department (HCHD), and the Florida Department of Juvenile Justice (DJJ) was established and implemented as part of this NIDA-funded project. Based on the first author’s experience at the HJAC (Dembo & Brown, 1994), and discussions with HJAC personnel, DOH testing laboratory staff, and HCHD administrators, a protocol was established involving three major steps (discussed in more detail in Belenko et al., 2008). First, project trained HJAC assessors provided brief STD pre-counseling to newly arrested juveniles. Second, HJAC assessors requested arrested juveniles, who were over the age of 11 and agreed to provide a urine sample for drug testing (part of the standard HJAC procedure), to consent to their urine specimens being split for Chlamydia and gonorrhea testing.¹ Last, communication-coordination was established between DOH laboratory staff and HCHD Disease Intervention Specialists (DIS), which involved DOH lab staff informing DIS staff of STD positive youths who DIS staff would then seek to locate and treat.

In documenting the feasibility of front-end juvenile justice STD testing, participation rates were high across all three HJAC shifts (7AM-3PM [78%], 3PM-11PM [71%], and 11PM-7AM [72%]). No significant differences were found in STD testing participation by gender, race, age, and post-HJAC placement.

Measures

Socio-demographic measures—Information was collected on the youths’ age and race at the time of entry in the HJAC. Age was operationalized as a continuous indicator representing the number of years old. Race was dichotomized as African American (coded as 1) and non-African American, mostly Caucasian or White (coded as 0).

Drug use results—Voluntarily provided urine specimens were collected during the arrest processing at the HJAC. At the testing lab, the split urine specimens (UA) were tested for drugs using the EMIT (enzyme multiplied immunoassay technique) procedure. In line with the guidelines of the American Correctional Association and the Institute for Behavior and Health, Inc. (1991), the cutoff levels for a positive for each drug were: 50 ng/ml of urine for

¹Under Florida law, youths 12 years of age or older are protected from disclosure to parents of STD test results, and do not need parental consent to receive an STD test.

marijuana and 300 ng/ml of urine for cocaine. The surveillance window for these substances is as follows: for marijuana, moderate users = 5 days, heavy users = 10 days, chronic users = 20 days; for cocaine, any use = 96 hours.² The marijuana and cocaine UA results were dichotomized (0 = negative, 1 = positive) for the analyses. (Although the urine specimens were tested for amphetamines and opiates, the prevalence rates for these two drugs were too low for statistical analyses [1.8% and 0.5%, respectively].)

Chlamydia and gonorrhea—A non-invasive, FDA-approved, urine-based nucleic acid test, GenProbe APTIMA Combo 2 Assay, was used to test for *Chlamydia trachomatis* and *Neisseria gonorrhea*. The sensitivity of Gen-Probe's test has been shown to be superior to culture and direct specimen tests. The sensitivity and specificity of the GenProbe urine-based test are 95.9 percent and 98.2 percent, respectively for Chlamydia and 97.8 percent and 98.9 percent, respectively for gonorrhea (Chacko, Barnes, Wiemann, & DiClemente, 2004). For analyses purposes, a dichotomous variable was created representing positive (coded as 1) results for any STD (i.e., Chlamydia, gonorrhea, or both) or negative (coded as 0) results for all STD tests.

Current charge level—In accordance with Florida State law, each youth brought to the HJAC on a delinquency charge must have a Detention Risk Assessment Instrument (DRAI) completed on him/her by trained HJAC personnel (Dembo & Brown, 1994). The DRAI takes into consideration the youth's most serious current offense, other current offenses and pending charges, prior offense history, current legal status, and aggravating or mitigating circumstances. On the basis of this information, each youth is assigned a point score of risk potential. Youths receiving a score of 7 or more on the DRAI are placed under the supervision of the DJJ; they are assigned a DJJ case manager who monitors their case until final court disposition. The validity of the DRAI has been demonstrated (Dembo et al., 1994). The current *charge level* variable used in analyses differentiates diversion eligible youths (0 = DRAI score 0 to 6 points) from youths whose scores place them under the supervision of DJJ (1 = DRAI score 7 or more).

Risky sexual behaviors—During the HJAC intake process, youths were asked to complete an STD/HIV Risk Assessment Questionnaire. Overall, the female and male youths reported low rates of STD/HIV risk behavior. Seven of the eleven STD/HIV risk behavior items shown in Table 1 (items 1, 2, 3, 4, 8, 10, and 11) refer to personal, risky sexual behaviors. These seven items were combined into a risky sexual behavior index. The index had a skewed score range (0= 73.4%, 1= 18.4%, 2= 7.6%, 3= 0.2%, and 4= 0.4%). Hence, we included the few cases with three or four reported risky sexual behaviors with youths reporting two such behaviors. Since we suspected underreporting in item 4 (Have you had a sexually transmitted disease? –5% of females and <1% of males), this item was included in this summary measure, rather than as a separate index of STD history.

Results

Description of the Female and Male Youths

As Table 2 shows, over half of the male youths, and just under half of the female youths, were African-American. However, a greater proportion of White females (43%), compared to White males (35%), were represented in the study. The gender groups were similar in age. More males, than females, were arrested on serious charges, leading to placement in secure detention or on non-secure home detention (i.e., home arrest).

²Urine was also tested for the presence of amphetamines and opiates. Due to the low prevalence rates for these drugs (1.8% and 0.5%, respectively), however, these were excluded from the present analyses.

Offense History Comparison of the Youths

Table 3 presents offense history information, obtained from official records, for the male and female youths in the study. As can be seen, the male youths, on average, are younger at first arrest, have a larger number of prior arrests, and have spent more days in a secure facility, than the females. In regard to specific offense category differences, the males have a significantly higher rate of prior arrests in five of the seven listed offense categories.

It is important to stress again that the HJAC is a central intake facility. As such, HJAC processes first time offenders, as well as youths with previous arrests and incarceration experience. Depending on their score on the DRAI, HJAC processed youths are released to the community for assignment to one or more diversion program, placed on home arrest, or transported to a secure detention center.

STD, Drug Test Result, and Risky sexual behavior Comparison by Gender

As Table 4 shows, the males had higher, tested prevalence rates for marijuana, than the females. On the other hand, the females tended to report engaging in more risky sexual behavior, and had higher STD prevalence rates, than the males.

Correlations among the Variables in the Model

Table 5 displays the correlations among the variables in the structural model for the male and female youths. As can be seen, positive, significant relationships exist among the four indicators of Risk for the female (overall, 15 of the 21 relationships are statistically significant) and male (overall, 16 of the 21 relationships are statistically significant) youths. Among the females, significant relationships exist between: (1) cocaine use and marijuana use and between cocaine use and engaging in risky sexual behavior, and (2) between marijuana use and engaging in risky sexual behavior. Among the males, significant relationships were found between each pair of the indicators of Risk.

In regard to the socio-demographic variables, age is positively related to each of the four indicators of Risk for the males, and to three of the indicators of Risk for the females. African-American males and females have significantly higher STD positive rates than the other youths in the study. In contrast, African-American youths have significantly lower UA positive rates for cocaine and marijuana (females only), and they are significantly less likely to report risky sexual behavior, than the other youths.

Confirmatory Factor Analyses

The confirmatory factor analyses (CFAs) were completed using Mplus version 5.1 (Muthén & Muthén, 2007). A chi-square test is used to test the fit of the models to the data, with lack of significance indicating an acceptable model fit. Mplus also provides a number of descriptive fit measures to assess the closeness of fit of the model to the data. Four fit indices were used to evaluate the model fit, using the following criteria as indicating an adequate fit: (1) the Tucker-Lewis coefficient (TLI: Tucker & Lewis, 1973), (2) the comparative fit index (CFI: Bentler, 1990), (3) root mean square error of approximation (RMSEA: Steiger & Lind, 1980), and (4) the weighted root mean square residual (WRMR). The typical range for both TLI and CFI is between 0 and 1 (although the TLI can take a value slightly greater than 1) with values greater than .90 indicating an acceptable fit (Arbuckle & Wothke, 1999; Browne & Cudek, 1993). For RMSEA, values at .05 or less indicate a close model fit, and values between .05 and .08 indicate an adequate model fit (Browne & Cudek, 1993). WRMR values of less than .90 indicate a good model fit (Yu & Muthén, 2001).

Our confirmatory factor analyses (CFAs) proceeded in several stages (Widaman & Reise, 1997). First, we estimated the CFA involving one factor, including the three binary variables (STD test results, marijuana urine analysis test results, and cocaine urine analysis results) and the ordered polytomous variable for risky sexual behavior for the sample as a whole. The results indicated a good fit of the model to the data ($\chi^2 [2, N = 948] = 1.32, p = 0.52$; CFI = 1.000; TLI = 1.015; RMSEA = 0.000; WRMR = 0.309). Each of the observed variables loaded significantly on the latent factor.

Next, we examined whether the factor structure was consistent across the female and male groups. These analyses were conducted in two steps: (1) estimation of an unconstrained CFA across the two gender groups, in which the factor loadings and thresholds were free to vary across the groups and the intercepts were held at zero; and (2) estimation of a *strong* measurement invariant model (Widaman & Reise, 1997) (i.e., a constrained CFA involving equal factor loadings and thresholds across the two gender groups), with completion of a chi-square difference test to assess if the restricted model significantly reduced the fit of the model to the data. Results indicated: (a) a good fit of the unconstrained model to the data ($\chi^2 [4, N = 948] = 1.56, p = 0.82$; CFI = 1.000; TLI = 1.050; RMSEA = 0.000; WRMR = 0.336), (b) a good fit of the constrained model to the data ($\chi^2 [7, N = 948] = 7.90, p = 0.34$; CFI = 0.993; TLI = 0.989; RMSEA = 0.017; WRMR = 0.780). (c) the chi-square difference test indicated that the constrained model did not significantly reduce the fit of the model to the data ($\chi^2 [3, N = 948] = 6.00, p = 0.11$). That is, the good fit of the freely-estimated model did not deteriorate when the assumption of equal loadings and thresholds across gender was imposed. (Due to space concerns, tables reporting these results have not been presented. Copies are available from the senior author upon request.)

SEM Analyses and Results

As noted earlier, a structural model (see Figure 1) was estimated across the male and female youths in the study. To test the hypothesis of no gender difference in the factor model for risky behavior, the factor loadings and thresholds were constrained to be equal (measurement invariance) across the gender groups; and the model was estimated simultaneously using multi-group analysis. Even though significant gender differences in prevalence for STDs and marijuana test results were found (see Table 2), a measurement invariance factor model was hypothesized to exist across the two groups involving their STD test results, UA test results for cocaine and marijuana, and self-reported risky sexual behavior. This factor was posited to reflect an underlying latent variable, Risk. UA test results for cocaine were used as the reference indicator in the factor analysis part of the model.

In addition to holding the thresholds and factor loadings equal across the gender groups, the residual variances of the factor indicators were freely estimated across the groups. All structural parameters (factor means, variances, covariances [i.e., Risk and race, and Risk and seriousness of current charge] and regression coefficients [i.e., regression of Risk on age]) were free and not constrained to be equal across the groups. The factor means were fixed at zero for the first reference group (i.e., females) and free to be estimated for the males (Muthén and Muthén, 2007). The structural model was estimated using Mplus version 5.1 (Muthén & Muthén, 2007). Since the STD and drug test results were binary variables, and reported risky sexual behavior was an ordered polytomous variable, a robust weighted least squares estimator with mean-adjusted and variance-adjusted chi-square test statistics (WLSMV), recommended by Muthén and Muthén (2007), was used in the analysis.

As Table 6 shows, the model fit the data well. The results indicate a non-significant chi-square value, good CFI and TLI values, a zero RMSEA, and an WRMR value below 0.90. The confirmatory factor analysis (CFA) part of the model, specifying equal factor loadings

for the indicators of Risk across the gender groups, is consistent with the data. Age is a significant, positive predictor of Risk among the female, but not the male, youths. Further, there are no significant covariances between Risk and race, or between Risk and seriousness of current charge, for either gender group. For the female youths, the residual variance for the latent variable Risk indicates a significant amount of the variance is not accounted for by the variables in the CFA part of the model. On the other hand, for the male youths, 85 percent of the variance in Risk is accounted for by the variables in the factor analysis. Finally, comparison of the Risk intercepts, where female Risk intercept has been fixed to zero and the male Risk intercept freely estimated, indicates the male intercept is significantly different from the female mean of 0.00.

Discussion

The primary goal of this study was to examine the covariation among several substance use and sexual behavior risk-taking indicators across gender groups in a sample of newly arrested juvenile offenders. The results highlighted a common tendency for juvenile offenders to engage in risky sexual practices and substance use. Consistent with the first hypothesis, cocaine use, marijuana use, testing positive for an STD, and reported engagement in risky sexual behavior form a latent construct of "Risk" that reflected the data well. By using a sample of newly arrested juveniles that included first time offenders as well as more serious, chronic offenders, this finding strengthens the evidence in support of a general disposition towards risk-taking behaviors among adolescent offenders as a whole.

Further, in support of our second hypothesis, the results of our study suggest that the covariation among substance use and sexual risk behaviors is similar for boys and girls having contact with the juvenile justice system. That is, the latent variable of Risk possessed a similar factor structure for both the male and female juvenile offenders. This finding is consistent with previous studies on general adolescent samples (Gillmore et al., 1991; Donovan & Jessor, 1985; Welte, Barnes, & Hoffman, 2004), as well as justice involved adolescents (Dembo et al., 1992), that have failed to find any significant differences between boys and girls in the construct of deviance.

Partial support was found for the third hypothesis that there would be gender differences in the relationships between Risk and age, race, and offense seriousness. Race and seriousness of offense charge were not significant predictors of Risk for either of the groups. Using a sample of justice-involved youth, Dembo et al. (1992) also failed to find significant racial differences in a latent construct of deviance; however, a number of studies based on community samples of adolescents have revealed significant racial differences in the factor structure of deviance (Bartlett, Holditch-Davis, & Belyea, 2005; Basen-Enquist, Edmundson, & Parcel, 1996; Welte et al., 2004). These findings suggest that, although important racial differences exist in the tendency for adolescents in general to engage in multiple forms of risk-taking behaviors, these differences may not exist among youths involved in the justice system.

The results of our study also suggest that older girls had a higher level of Risk, than younger girls. It is somewhat surprising that no age effect was found on Risk for the male youths. This is somewhat contradictory to previous studies examining this issue. In general, studies indicate problem behavior among male juvenile offenders increases with age and peaks in mid to late adolescence (Teplin et al., 2003).

The inconsistent finding regarding the association between age and Risk for the male youths may be related to the measures used in our study compared to earlier studies. Previous research highlighting age differences in the tendency to engage in multiple forms of risk-

taking behavior among juvenile offenders rely on self-reported behaviors, particularly substance use (Kingree & Phan, 2001; LeBlanc & Girard, 1997; Teplin et al., 2003). The current study, on the other hand, relies on drug test urinalysis as a measure of substance use which results in a relatively short surveillance window for use. (For heavy users, marijuana stays in a youth's system for approximately 20 days, and cocaine remains in the system for less than four days [Dembo et al., 1999]). Hence, the substance use measures included in our study were only able to capture recent or current drug use, which limited the number of drug users identified in the sample. The risky sexual behavior measures were based on self-reports. However, since these questions were asked by an intake screener who did not have a personal relationship with the youth answering the questions, underreporting of these behaviors at the assessment center is quite likely. Additional research, involving both self-report and biological data on drug use, as well as additional risk factors (e.g., family and peer influences), is needed to tease out the inconsistencies in the findings of our study compared to previous research.

Another possible explanation for the nonsignificant association between age and Risk among the male youths is that, for a large number of these youths, the disposition towards deviance may have developed prior to their contact with the justice system. That is, for the boys, the tendency to engage in risk-taking behaviors may have developed during mid to late childhood and remained stable throughout adolescence. Research indicates that the age of onset of deviant behavior occurs earlier among males, than females (D'Unger, Land, & McCall, 2002; Mazzerolle, Brame, Paternoster, Piquero, & Dean, 2006; Moffit, 1994; Silverthorn & Frick, 1999; Van Lier, Wanner, Vitaro, 2007). This experience could explain why age was related to Risk for the females, but not the males. Additional research is needed to clarify this issue.

Our results highlight the need for early, holistic prevention services that target an array of risk behaviors. It is well documented that adolescents who develop problem behavior at an early age are more resistant to intervention and treatment in later years, and they persist in more serious forms of problem behavior throughout the life span (Lipsey & Williams, 1998; Moffit, Caspi, Harrington, & Milne, 2002; Welsh, 2005). Prevention programs that impede the development of risk-taking behavior offer a cost-effective solution to reducing the prevalence of serious and persistent deviance among both male and female adolescents.

Our findings also underscore the importance of routine screening for STDs, risky sexual behavior, and drug use among youths who have contact with the justice system. A number of interventions have been developed to reduce STD/HIV risk among juvenile offenders (Jemmott et al., 2000; McKernan McKay et al., 2004; St. Lawrence, Crosby, Belcker, Yazdani, & Brasfield, 1999). The impact of these STD/HIV interventions can be increased by tailoring them to meet the needs of specific adolescent subgroups, such as African American females (DiClemente et al., 2008). The findings of this study suggest that juvenile justice agencies should make the introduction of effective interventions that combine STD/HIV and substance use risk reduction a priority in their programs. Centralized intake centers provide a great opportunity for the screening and assessment of a large, diverse number of youths. Intervention efforts targeting risk-taking behaviors at this phase of the juvenile justice process are likely to be more effective than services at the back-end of the system, where a small portion of adolescents, who are typically the most serious offenders, end up.

There are two limitations to the study that should be mentioned. First, the data were cross-sectional. Hence, no causal statements about any of the relationships can be made. Second, the data were collected at one site. It would be important to replicate this study among front end, juvenile justice youths in other jurisdictions serving diverse cultural groups, to, among other things, assess the generalizability of the findings.

Despite these limitations, the results of this study suggest the need for an urgent public health response to the high STD rates, as well as the drug use and risky sexual behavior issues, presented by arrested juveniles. Strong public health and political commitments are needed to address these serious public health problems among this highly vulnerable population. A large number of youths processed by the JJS are from economically stressed families who lack the resources to access health care (Dembo & Schmeidler, 2002). The front door of the juvenile justice system represents an important, procedurally efficient, and effective opportunity to improve these youths' health in a way that directly impacts the health of the general community.

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Figure 1.
Structural Equation Model for Cocaine Use, Marijuana Use, STD, and Risky Sexual Behavior with Covariates

Table 1

Juvenile Assessment Center Risk Questions

	% Males Reporting (n = 500 or 501)	% Females Reporting (n 440 or 441)	Fisher's Exact Test
1. Have you injected drugs?	1.2%	<1%	ns
2. Have you had sex while using non-injecting drugs, including alcohol?	7.6%	8.6%	ns
3. Have you traded sex for drugs or money?	<1%	<1%	ns
4. Have you had a sexually transmitted disease?	<1%	5.0%	***
5. Are you a child of a woman with HIV/AIDS?	<1%	<1%	ns
6. Are you a hemophiliac?	<1%	<1%	ns
7. Have you had a blood transfusion?	1.6%	<1%	ns
8. Have you had intercourse with the opposite sex without using a condom?	20.6%	24.1%	ns
9. Have you been sexually assaulted?	<1%	10.0%	***
10. Have you had sexual intercourse with a man who has had sex with a man?	<1%	<1%	ns
11. Have you had sexual intercourse with a person at risk for HIV/AIDS?	1.0%	<1%	ns

Two tailed p-values:

* p < .05;

** p < .01;

*** p < .001.

Table 2

Sociodemographic Characteristics, Charge Level, Drug Use, and Post HJAC Placement by Gender

Race/Ethnicity:	Male	Female
White	34.7%	43.2%
African-American	54.0%	49.5%
Hispanic White	10.5%	7.2%
Hispanic Black	0.6%	--
Other	0.2%	--
	100.0%	100.0%
	(n = 504)	(n = 442)
Fisher's Exact Test (N = 946), $p < .05$		
<i>Age:</i>	<i>Male</i>	<i>Female</i>
12	2.4%	3.8%
13	9.3%	9.7%
14	12.8%	15.8%
15	19.0%	20.6%
16	24.9%	24.0%
17	27.9%	21.9%
18	3.8%	4.1%
	100.0%	100.0%
	(n = 506)	(n = 442)
χ^2 (6, N = 948) = 6.96, $p = \text{n.s.}$		
<i>Charge Level:</i>	<i>Male</i>	<i>Female</i>
Diversion	58.6%	71.9%
Dept. Juvenile Justice Case	41.4%	28.1%
	100.0%	100.0%
	(n = 505)	(n = 442)
χ^2 (1, N = 947) = 18.38, $p < .001$		
<i>Post HJAC Placement:</i>	<i>Male</i>	<i>Female</i>
Diversion	55.2%	72.2%
Non-Secure Home Detention	18.0%	10.0%
Secure Detention	26.7%	17.9%
	100.0%	100.0%
	(n = 505)	(n = 442)
χ^2 (2, N = 947) = 29.63, $p < .001$		

Table 3
Arrest History and Secure Custody Information by Gender*

	Males	Females
<i>Prior Arrest Information (s.d.)</i>		
Age at first arrest	13.88 (2.18)	14.33 (1.74)
	F(1,942) = 11.75, p < .001	
Number of prior arrests	2.61 (3.52)	1.37 (2.34)
	F(1,943) = 39.53, p < .001	
<i>Number of prior arrests for:</i>		
Violent felonies	0.36 (0.88)	0.17 (0.49)
	F(1,943) = 15.30, p < .001	
Property felonies	0.59 (1.14)	0.14 (0.49)
	F(1,942) = 57.50, p < .001	
Drug felonies	0.07 (0.34)	0.01 (0.08)
	F(1,942) = 14.10, p < .001	
Violent misdemeanors	0.30 (0.70)	0.28 (0.69)
	F(1,942) = 0.12, p = ns	
Property misdemeanors	0.21 (0.50)	0.17 (0.45)
	F(1,942) = 1.63, p = ns	
Drug misdemeanors	0.16 (0.55)	0.04 (0.21)
	F(1,942) = 18.33, p < .001	
Public disorder misdemeanors	0.24 (0.65)	0.16 (0.50)
	F(1,942) = 4.74, p < .05	
<i>Secure Custody Information (s.d.)</i>		
Number of days in secure detention:	14.98 (34.95)	5.75 (19.41)
	F(1,933) = 23.93, p < .001	
Number of days in secure custody (included detention)	37.37 (132.88)	11.75 (62.84)
	F(1,933) = 13.53, p < .001	

* Analyses reported in this table include 504 males and 441 females. One female was missing age of first arrest information.

Table 4

Sexually Transmitted Disease, Drug Test Results, and HIV/STD Risk Behaviors by Gender

	Male	Female
<i>Urine Analysis Drug Test Results</i>		
Marijuana:		
Negative	57.0%	73.5%
Positive	43.0%	26.5%
	100.0%	100.0%
	(n = 505)	(n = 441)
	$\chi^2(1, N = 946) = 27.86, p < .001$	
Cocaine:		
Negative	94.1%	95.9%
Positive	5.9%	4.1%
	100.0%	100.0%
	(n=505)	(n=441)
	$\chi^2(1, N = 946) = 1.69, p = \text{n.s}$	
<i>Sexually Transmitted Diseases</i>		
Negative	89.3%	80.8%
Positive Chlamydia	7.7%	12.4%
Positive Gonorrhea	1.4%	2.5%
Positive Chlamydia and Gonorrhea	1.6%	4.3%
	100.0%	100.0%
	(n = 506)	(n = 442)
	$\chi^2(3, N = 948) = 15.00, p < .01$	
<i>Risky Sexual Behaviors</i>		
None	74.8%	71.8%
One	19.0%	17.8%
Two or more	6.2%	10.5%
	(n = 500)	(n = 439)
	$\chi^2(2, N = 939) = 5.71, p = .06$	

Table 5
Tetrachoric Correlations among the Dependent and Other Variables (males above diagonal, females below diagonal)

Variable	1	2	3	4	5	6	7
1. STD	--	.143	.156	.030	.276***	.394***	.337***
2. Cocaine	.278*	--	.516***	.326**	.277**	-.217*	.277*
3. Marijuana	.202*	.650***	--	.267***	.265***	-.024	.148*
4. Risky Sexual Behavior	.224**	.518***	.277***	--	.290***	-.267***	-.049
5. Age	.155*	.256	.271***	.331***	--	-.154**	.018
6. Race (African American)	.396***	-.332*	-.205**	-.228**	-.153**	--	.184**
7. Current Charge (DJJ case)	.227**	.140	.002	-.025	-.110	.227*	--

Note: Descriptive information on these variables can be found in the narrative.

Two-tailed p-values:

*
p < .05;

**
p < .01;

p < .001.

Table 6

Structural Equation Model for STD, Cocaine Use and Marijuana Use with Covariates: Estimated for Females and Males Separately

	Females (n = 442)			Males (n = 506)		
	Estimate	S.E.	Critical Ratio	Estimate	S.E.	Critical Ratio
<i>Risk by:</i>						
Cocaine test result	1.000	--	--	1.000	--	--
Marijuana test result	0.658	0.144	4.58***	0.658	0.144	4.58***
STD test result	0.327	0.099	3.30***	0.327	0.099	3.30***
Risky sexual behavior	0.632	0.137	4.60***	0.632	0.137	4.60***
<i>Risk on:</i>						
Age	0.293	0.070	4.16***	0.151	0.094	1.60
<i>Risk with:</i>						
Race (African American)	-0.105	0.581	-0.18	0.002	0.020	0.11
Current charge (DJJ case)	0.016	0.037	0.44	-0.001	0.033	-0.03
<i>Intercept:</i>						
Risk	0.006	0.000	--	2.846	2.041	1.39
<i>Residual Variances:</i>						
Risk	0.787	0.210	3.75***	0.149	0.185	0.81

Two tailed test p-values:

*
p < .10;**
p < .05;***
p < .01; p < .001Model fit statistics: $\chi^2(6) = 3.81$, $p = 0.70$; CFI = 1.000; TLI = 1.081; RMSEA = 0.000; WRMR = 0.755.