



Published in final edited form as:

AIDS Educ Prev. 2002 October ; 14(5 Suppl B): 24–35.

Impulsivity and HIV Risk Among Adjudicated Alcohol- and Other Drug-Abusing Adolescent Offenders

Jessy Dévieux, Robert Malow, Judith A. Stein, Terri E. Jennings, Barbara A. Lucenko, Cara Averhart, and Seth Kalichman

Jessy Dévieux, Robert Malow, Terri E. Jennings, Barbara A. Lucenko, and Cara Averhart are with the University of Miami School of Medicine, Department of Psychiatry, Miami, FL. Judith A. Stein is with the University of California at Los Angeles. Seth Kalichman is with the Department of Psychology, University of Connecticut, Storrs

Abstract

Although impulsivity is likely to be related to HIV risk—particularly in incarcerated substance-abusing youth—this area of research has been understudied. To investigate the relationship between impulsivity and various HIV/AIDS risk behaviors and attitudes, a sample of court-referred and incarcerated culturally diverse inner-city adolescents (males: $N = 266$; females: $N = 111$) were divided into high and low impulsive groups based on the Millon Adolescent Clinical Inventory Impulsivity Scale. Findings showed that compared to the less impulsive group, the highly impulsive adolescents reported more frequent marijuana and alcohol use in the last 3 months as well as a significantly higher proportion of unprotected sex when high on alcohol and marijuana, higher perceived susceptibility to HIV, more AIDS-related anxiety, greater HIV knowledge, less sexual self-efficacy, and less favorable sexual attitudes. Implications for interventions among incarcerated youth are discussed.

HIV infection is a serious health threat among adolescents, especially among those adolescents who abuse drugs and engage in other deleterious health risk behaviors associated with illicit activities. Although young men who have sex with men (MSM) are at the highest risk for HIV, data from prevalence surveys continue to reflect the disproportionate impact of the AIDS epidemic on racial/ethnic minority populations, especially women, youth, and children in those populations (Centers for Disease Control and Prevention [CDC], 1998). Among recent cases of HIV reported among 13-to 24-year-olds, 44% were female, 63% were African American, 26% had heterosexually acquired infections, 31% were MSM, and 6% were injection drug users. The CDC (2001) further estimated that at least half of all new HIV infections occur among adolescents or young adults under the age of 25. Since 1993, the number of adolescents with HIV increased by 34%, making AIDS one of the leading causes of death among persons 15- to 24 years of age (Jemmott & Jemmott, 2000; Kirby, 2000; Rotheram-Borus, 2000).

One reason for this increase in HIV among youth may be that risk taking and greater impulsivity is common during adolescence, and thus adolescents are more likely than adults to engage impulsively in high-risk behaviors such as unprotected sex with multiple partners and risky substance abuse (Kotchick, Shaffer, Forehand, & Miller, 2001; Loeber, Stouthammer-Loeber, & White, 1999). This tendency toward impulsive behavior (i.e., behavior based on emotion

Address correspondence to Dr. Robert Malow, Professor and Director, AIDS Prevention Center, University of Miami School of Medicine/JMH, Department of Psychiatry and Behavioral Sciences, 1695 NW 9 Ave., Suite 3208, Miami, FL 33136; e-mail: Rmalow@bellsouth.net.

This work was funded in part by Grants RO1 DA11875 and PO1 DA01070-28 from the National Institute on Drug Abuse and Grant RO1 AA11752 from the National Institute on Alcohol Abuse and Alcoholism.

without forethought or consideration of consequences) and its attendant high-risk correlates may be even more evident among incarcerated youth who may engage in varied behaviors that carry highly significant risks (Godin, Fortin, Michaud, Bradet, & Kok, 1997; Kim, McFarland, Kellogg, & Katz, 1999; Lux & Petosa, 1994).

Evidence that mainstream adolescents continue to engage in risky behaviors, despite having adequate knowledge about HIV/AIDS prevention, indicates the presence of a broad range of contributing factors to AIDS risk behaviors (Kotchick et al., 2001). Specific factors may include mental illness, impulsivity, and the experience of life stressors (Donohew et al., 2000; McCoul & Haslam, 2001; Smith, 2001). Furthermore, such contributing factors may be even more prominent and exacerbated among youth involved with the criminal justice system (Kim et al., 1999; Lanier, Pack, & DiClemente, 1999). Numerous authors have investigated the relationship between mental health problems and risky behaviors among adolescents. Clearly, the most troubled adolescents are at risk for HIV infection due to correlates of their mental illness, including frequent delinquency, involvement with risky social networks, and fragmented familial relationships (DiClemente & Ponton, 1993; Smith, 2001).

The literature indicates that adolescents' risky behaviors are not only related to mental health problems but also to substance abuse (Conner, Stein, Longshore, & Stacy, 1999; Kotchick et al., 2001; Petraitis, Flay, Miller, Torpy, & Greiner, 1998). This association can be conceptualized as part of a general pattern of problem behavior (e.g., Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995) or as an expression of less control under the influence of drugs or alcohol. Adolescents using substances are less likely to assess situations for risk while they are under the influence of drugs and/or alcohol. In a review, Kotchick et al. (2001) reported that adolescents who abused alcohol and drugs reported a greater frequency of high-risk behaviors including less condom use than do those adolescents who do not abuse drugs and alcohol.

A number of authors have also noted the prevalence of impulsiveness among substance abusers, suggesting that the characteristic of impulsivity may be an important correlate of other high-risk behaviors (Conner et al., 1999; Kotchick et al., 2001). Pack, Crosby, and St. Lawrence (2001) found that sexual risk behavior among adolescents from a variety of contexts was predicted by impulsiveness. However, Pack et al. (2001) also found that whereas impulsivity did predict risk behavior, it accounted for only a small portion of the variance. In the current study, we tested whether impulsivity was associated with high-risk behaviors and attitudes toward condoms and other safe sex behaviors in an incarcerated adolescent population. If the most impulsive incarcerated youth also report high-risk behaviors and negative attitudes, this may signal the need to identify such youth for special intervention programs designed to meet their needs. Furthermore, such findings within a population of individuals expected to be more impulsive and at-risk than average (e.g., Daderman, Wirsén Meurling, & Hallman, 2001; DiClemente, Lanier, Horan, & Lodico, 1991) will have implications for nonincarcerated adolescents at greater risk of contracting HIV/AIDS due to their at-risk behaviors.

METHOD

PARTICIPANTS

Participants included 266 male and 111 female-inner city, culturally diverse adolescent offenders enrolled in two ongoing NIH-funded HIV prevention projects conducted in a juvenile detention facility and a court-ordered treatment center. The sample approximated consecutive admissions to the programs between 1998 and 2000. Participants were excluded from the study only if they refused to provide informed assent and/or their parents (or legal guardians) refused to provide written consent for participation. No participants suffered from severe cognitive or

psychiatric impairments (e.g., psychosis) that would have compromised their ability to complete the assessment. All adolescents were fluent in spoken English.

The modal subject was a low income, ethnic or racial minority adolescent who abused alcohol, marijuana, and/or noninjection “crack” cocaine and resided in the inner city. The mean age of the sample was 15.71 ($SD = 1.32$; range = 13-18), and the average level of education was 8.72 years ($SD = 1.33$). Study participants were 30.6 % African American, 9.0% non-Hispanic White, 32.5% Hispanic, 8.5% Haitian, and 19.4% of other ethnic backgrounds. In terms of involvement with the criminal justice system, self-reported total arrests in lifetime ranged from 0 to 68 with a mean of 3.50 and a standard deviation of 5.99.

ASSESSMENT PROCEDURES

Measures included the impulsivity scale of the Millon Adolescent Clinical Inventory (MACI; Millon, Millon, & Davis, 1993), a measure of HIV transmission risk behaviors, skills and attitudes as detailed below. All assessment procedures were conducted by experienced interviewers trained to create a process sensitive to gender and cultural issues. To avoid interviewer drift and other contaminating factors, interviewers received ongoing supervision from a clinical psychologist for the duration of the study. Subsequent to informed consent and parental consent, assessment measures were administered orally to facilitate accurate reporting, full completion, and to compensate for any literacy difficulties. Baseline assessments were administered 1 week after participants' admission and clearance from treatment staff that detoxification was adequately completed. This was done to minimize the effect of detoxification or withdrawal factors on test performance and to maximize accuracy of responses.

Interviewers were careful to ensure that respondents understood the meaning of each question, and would repeat or elaborate on questions if a respondent showed any confusion. Interviewers were trained to adopt a nonjudgmental attitude during interactions in order to establish rapport and build trust. In addition, as suggested by Jemmott, Jemmott, and Fong (1992), efforts were made to motivate participants to respond accurately, thus reducing the likelihood that reports of sexual experiences were either minimized or exaggerated. Participants were informed that their responses were confidential and would be used to help improve HIV prevention programs for other adolescents.

MEASURES

The MACI Impulsive Propensity Scale, based on 24 items from the MACI was used because this scale taps the most common behavioral symptomatology experienced by our sample as other scales have not been specifically developed for adolescents. Other advantages of the MACI Impulsive Propensity Scale are that, like other MACI clinical scales, item content has been developed to operationalize formal diagnostic symptoms, and the scale has demonstrated adequate reliability and validity across a wide variety of settings (Davis, Woodward, Goncalves, Meagher, & Millon, 1999; McCann, 1997; Millon, & Davis, 1993). Sample items include: “As soon as I get the impulse to do something I act on it,” and “I usually act quickly without thinking.” On the MACI Impulsive Propensity Scale, higher scores indicate a tendency to act out feelings with minimal provocation or forethought and little control over strong emotions such as aggressive and sexual impulses. For the group comparisons, the simpler and more directly computed MACI raw score totals (i.e., the summation of relevant scale items) were used in favor of base-rate scores. The latter involve a complicated system of weights and adjustments that are not available to the public domain. But more important, they were originally developed for the purpose of optimal selection of differentiating, diagnostic cutting scores. For nondiagnostic analysis of between-group comparisons, the summed raw score item creates a simpler and more interpretable index.

Sex risk and drug risk variables were derived using modified versions of sexual risk assessment measures (Gibson & Young, 1994; Otto-Salaj, Heckman, Stevenson, & Kelly, 1998) that were adapted by Malow and Ireland in 1996 (Malow, Devieux, Jennings, Lucenko, & Kalichman, 2001). Measures included retrospective recall of numbers of sex partners, unprotected sex acts, and condom use during the previous 3- and 6-month periods (prior to being in a confined setting), as well as unprotected sex acts proximal to marijuana, alcohol or cocaine use during those previous 3 months. HIV risk variables included *perceived susceptibility* (perceived risk for contracting HIV), *AIDS-related anxiety* (anxiety about becoming HIV infected), *sexual self-efficacy* (confidence to adopt and maintain HIV preventive behaviors), *personal attitudes toward condoms*, *sexual attitudes* (importance placed on peer, partner, and parental approval of condom use), and *prevention beliefs* (belief that using condoms and being monogamous can prevent HIV/STD infection). The Sexual Attitudes scale has a 5-point Likert format with response options ranging from “extremely unimportant” to “extremely important” and yields a mean score with a possible range of 1 to 5. The remaining scales have 4-point formats with response options ranging from “strongly disagree” to “strongly agree” and total scores ranging from 1 to 4. These scales have been shown to mediate HIV risk and have demonstrated validity and reliability among similar samples (Gibson & Young, 1994; Malow & Ireland, 1996).

Based on focus groups and in-depth interviews, the research team has added items to the survey and modified the language to be culturally sensitive, reflecting the local terminology of the target population. In addition, we adapted a tabular format to facilitate administration and a calendar-based methodology (i.e., a Time-Line Follow-Back Procedure; Sobell & Sobell, 1980, 1995) to promote accurate recall. Items measuring substance use elicited the frequency of alcohol, marijuana, cocaine, and polysubstance use during the 3 months prior to being in a restricted environment. This reporting period was chosen because recall has been shown to be reliable up until 3 months (Kauth, St. Lawrence, & Kelly, 1991).

The Adolescent Drug Abuse Diagnosis Questionnaire (ADAD; Friedman & Utada, 1989) is a structured interview recommended by the Center for Substance Abuse Treatment consensus panel (McLellan & Dembo, 1993) for comprehensively assessing demographic, social, and psychological function among drug abusing adolescents. For the current study, we used relevant sociodemographic data, including age, level of education, living situation (with family or separate from family) and ethnicity from each subject.

The *Behavioral Intentions Scale* is a 7-item measure that assesses participants' intent to take future actions to reduce HIV risk (e.g., “I will use a condom the next time I have sex”). This scale was derived by D. Klinkenberg (personal communication, March 1998) by simplifying a measure used by Otto-Salaj et al., (1998), and by adding an item about drinking (“I will use a condom the next time I have sex even if I've been drinking”). A subsample ($n = 86$) of the study participants described above was used to pilot test this scale. A Cronbach's alpha of .94 indicated that the scale is internally consistent.

Knowledge about HIV transmission was assessed using an 18-item true/false questionnaire (adapted from St. Lawrence, Jefferson, Alleyne, & Brasfield, 1995). Participants received 1 point for each correctly answered item. Sample items include: “A person can get HIV from having sex one time,” and “Condoms make intercourse completely safe.” Participants received 1 point for each correctly answered item.

Condom use skills were assessed by rating the participant's ability to properly enact nine steps to correctly placing a condom on a penile model (adapted from Sorensen, London, & Morales, 1991). Participants were rated for successful completion of such items such as “Opened the condom package without tearing the condom,” and “Condom rolled to the base of the penile model.” Scores reflect the total number of correct steps.

STATISTICAL ANALYSES

High and low impulsivity study participants were defined by median split, with those who scored 14 or below on the impulsivity scale, defined as low impulsivity and the high impulsivity symptom group was defined as those who scored 15 or higher. Analyses of variance (ANOVAs) were used to test for group differences on sex risk behavior, frequency of substance use, HIV-related attitudes and beliefs, and condom use skills.

RESULTS

Means and standard deviations for the total sample and for each group, as well as *F* ratios, and *p* values for the ANOVAs, are reported in Table 1. Preliminary analyses revealed no differences between groups by data collection site, age, gender, level of education, ethnicity, or living situation. Participants who rated high on impulsivity reported more frequent marijuana and alcohol use in the last 3 months. In addition, those high on impulsivity reported a significantly higher proportion of unprotected sex when using alcohol and marijuana (see Table 1).

High impulsivity participants also reported greater perceived susceptibility to HIV, higher AIDS-related anxiety, and greater knowledge about HIV. Furthermore, those high on impulsivity reported less sexual self-efficacy, and less favorable sexual attitudes (social norms) than those who were low on impulsivity. No significant group differences were found for cocaine use during the last 3 months, number of partners during the last three months, percent unprotected sex during the last 3 months, proportion of unprotected sex when high on cocaine, proportion of unprotected vaginal sex acts during the last 3 months, number of sex acts during the last 3 months, condom attitudes, condom use skills, prevention beliefs, or behavioral intentions (all *p* values > .05).

DISCUSSION

This study evaluated how the disposition of impulsivity is associated with various HIV risk behaviors and attitudes among adolescent offenders. Despite a high prevalence of impulsivity among adolescent offenders (e.g., Daderman, 1999; Daderman et al., 2001; Luengo, Otero, Carrillo-de-la-Pena, & Miron, 1994), and a number of studies documenting a strong association between impulsive traits and HIV risk behavior in adults (Kelly, 1997; McCoul & C Haslam, 2001), relatively little attention has been focused on these relationships among incarcerated adolescents. This study confirms the existence of a relationship between impulsivity and a variety of HIV-risk related attitudes and behaviors even within a sample of adolescent offenders who might not have been expected to manifest a wide range of variability in impulsiveness. Indeed, prior research has indicated that there is variability in impulsivity within samples of incarcerated adolescents (e.g., Oas, 1985), and thus it is worthwhile to assess the impact of impulsiveness within this at-risk population. The results showed that those with higher levels of impulsivity as measured by the MACI reported greater levels of marijuana and alcohol use, and more unprotected sexual behavior when high on alcohol and/or marijuana.

Adolescent offenders with greater levels of impulsivity also reported less favorable sexual attitudes than those with lower levels of impulsivity and also reported greater knowledge about HIV, higher perceived susceptibility to HIV, and higher anxiety about contracting HIV than those in the low-impulsivity group. Thus, the high-impulsivity adolescents appear to be realistic in their assessments that they are at high risk of contracting HIV but also may have less perceived control over their sexual behavior despite their greater knowledge about HIV than their less impulsive peers.

Our findings for a heterogeneous group of male and female alcohol- and other drug-(AOD) abusing adolescent offenders, both in treatment and incarcerated, indicate that those with higher

impulsivity demonstrate greater levels of sexual and drug-related HIV risk. These findings add to the growing evidence identifying such traits as risk factors for contracting and transmitting HIV (e.g., Donohew et al., 2000; McCoul & Haslam, 2001; Sheer & Cline, 1995). Despite greater levels of knowledge about modes of HIV transmission and methods of self-protection, as well as heightened perceptions of susceptibility for contracting HIV, the high-impulsivity AOD youth reported more risky behaviors and less favorable HIV risk-related attitudes than their low-impulsivity counterparts. Such findings are consistent with the adult literature, which describes impulsive adults as more likely to engage in sexually impulsive behavior (McCoul & Haslam, 2001).

Moreover, our findings extend the adult literature to high-impulsivity adolescents involved with the juvenile justice system and associated substance treatment programs, an association that warrants more focused study. The assumption that there is little variability in impulsiveness among incarcerated youth is clearly counter-productive. The data from this study suggest that AOD-abusing adolescent offenders should be assessed for levels of impulsivity. Incarcerated youth with high levels of impulsiveness should be provided with more intensified or targeted risk reduction programs similar to those suggested in other studies on risk reduction interventions in more normative populations of youth (e.g., Donohew et al., 2000; Sheer & Cline, 1995). Because such adolescents have fairly good knowledge of the modes of HIV transmission, interventions focusing on specific attitudinal and behavioral changes may be more important for reducing the risk of HIV and preventing transmission in this subgroup.

One study limitation in the current research includes the use of self-reports, which may have been unintentionally or intentionally biased because of the sensitivity of sexual behavior and substance use issues addressed in the assessments, although self-report measures of AOD abusers have been shown to be valid (Malow, Gustmen, Ziskind, McMahan, & St. Lawrence, 1998). Additional caution must be taken in assessing the reliability of self-report among participants involved in the criminal justice system, as there may be response bias due to fear of legal action. However, several strategies mentioned in the assessment procedures were utilized to increase accurate recall and to motivate honest responding. Additionally, decreased reporting of sexual episodes would be expected if such self-report bias existed. However, contrary to this expectation, these adolescents reported high frequencies of sexual activity, including unprotected sex. Although there is growing usage of self-administered (paper and pencil) surveys to gather data on illicit or socially undesirable behavior, concerns pertaining to literacy level contraindicate such an approach with a sample such as this (Turner, Lessler, & DeVore, 1992).

Another study limitation is that because of the nature of the sample the current findings can only be generalized to substance abusing adolescents in court-ordered treatment or in a detention setting. Attention to adjudicated adolescents seems a necessary first step for the prevention community in learning to deal with impulsivity in relationship to both HIV risk and the criminal justice system. Another limitation is that there was a great deal of variability in the responses of the participants as evidenced by the large standard deviations reported in the Results section. Examination of the means of the responses indicate that several of the statistically nonsignificant comparisons might have been significant if more sensitive measures could have been employed.

CONCLUSIONS

The results of this study highlight the notion that within a sample of incarcerated adolescents, despite their surface similarities, this is a heterogeneous group particularly in their degree of impulsivity. This investigation suggests that the level of impulsivity may be important to consider in designing and tailoring HIV prevention interventions for high-risk subgroups such

as those in court-ordered detention and substance abuse treatment. HIV prevention interventions should be tailored for adolescents who display more impulsive characteristics. Such tailored interventions have been designed for adolescents in the general population (Donohew et al., 2000) and have been tested among AOD-abusing adults as well (Bowen, Williams, McCoy, & McCoy, 2001; Fisher, Misovich, Kimble, & Weinstein, 1999; Prendergast, Urada, & Podus, 2001). At-risk adolescents with comparable symptoms may require more intense, structured, and prolonged HIV prevention interventions.

Acknowledgements

The authors thank Brenda Lerner, Adriana Chizan-Pluta, Mario Sanchez-Martinez, and Gabriel Cardenas for their assistance and the University of Miami/Jackson Memorial Center's Adolescent Addiction Research Program.

References

- Bowen AM, Williams M, McCoy HV, McCoy CB. Crack smokers' intention to use condoms with loved partners: Intervention development using the theory of reasoned action, condom beliefs, and processes of change. *AIDS Care* 2001;13:579–594. [PubMed: 11571005]
- Centers for Disease Control and Prevention. Trends in the HIV & AIDS Epidemic. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 1998.
- Centers for Disease Control and Prevention. HIV/AIDS Surveillance Report 2001;2(2)
- Conner BT, Stein JA, Longshore D, Stacy A. The effects of drug abuse treatment on cigarette smoking. *Experimental and Clinical Psychopharmacology* 1999;7:64–71. [PubMed: 10036611]
- Daderman AM. Differences between severely conduct-disordered juvenile males and normal juvenile males: The study of personality traits. *Personality and Individual Differences* 1999;26:827–845.
- Daderman AM, Wirsén Meurling A, Hallman J. Different personality patterns in non-socialized (juvenile delinquents) and socialized (Air Force pilot recruits) sensation seekers. *European Journal of Personality* 2001;15:239–252.
- Davis, RD.; Woodward, M.; Goncalves, A.; Meagher, SE.; Millon, T. Studying outcome in adolescents: The Millon Adolescent Clinical Inventory and Millon Adolescent Personality Inventory. In: Maruish, ME., editor. *The use of psychological testing for treatment planning and outcomes assessment*. 2. Mahwah, NJ: Erlbaum; 1999. p. 381-397.
- DiClemente RJ, Lanier MM, Horan PF, Lodico M. Comparison of AIDS knowledge, attitudes, and behaviors among incarcerated adolescents and a public school sample in San Francisco. *American Journal of Public Health* 1991;81:628–630. [PubMed: 2014866]
- DiClemente RJ, Ponton LE. HIV-related risk behaviors among psychiatrically hospitalized adolescents and school-based *adolescents*. *American Journal of Psychiatry* 1993;150:324–325. [PubMed: 8422086]
- Donohew L, Zimmerman R, Cupp PS, Novak S, Colon S, Abell R. Sensation seeking, impulsive decision-making, and risky sex: Implications for risk-taking and design of interventions. *Personality and Individual Differences* 2000;28:1079–1091.
- Fisher JD, Misovich SJ, Kimble DL, Weinstein B. Dynamics of HIV risk behavior in HIV-infected injection drug users. *AIDS and Behavior* 1999;3:41–57.
- Friedman, AS.; Utada, A. *Adolescent drug abuse diagnosis*. Philadelphia: Belmont Center for Comprehensive Treatment; 1989.
- Gibson, DR.; Young, M. Assessing the reliability and validity of self reported risk behavior. In: Battjes, RJ.; Slobada, Z.; Grace, WC., editors. *The context of HIV risk among drug users and their sexual partners*. Rockville, MD: U.S. Department of Health and Human Services; 1994. p. 218-235. NIH Publication No. 94-3750
- Godin G, Fortin C, Michaud F, Bradet R, Kok G. Use of condoms: Intention and behaviour of adolescents living in juvenile rehabilitation centers. *Health Education Research: Theory and Practice* 1997;12:289–300.

- Jemmott, J.; Jemmott, L. HIV behavioral interventions for adolescents in community settings. In: Peterson, J.; DiClemente, R., editors. *Handbook of HIV Prevention*. New York: Kluwer Academic/Plenum; 2000. p. 103-127.
- Jemmott JB, Jemmott LS, Fong GT. Reductions in HIV risk-associated sexual behaviors among black male adolescents: Effects of an AIDS prevention intervention. *American Journal of Public Health* 1992;82:372-377. [PubMed: 1536352]
- Jessor R, Van Den Bos J, Vanderryn J, Costa FM, Turbin JS. Protective factors in adolescent problem behavior: Moderator effects and developmental change. *Developmental Psychology* 1995;31:923-933.
- Kauth MR, Lawrence JS, Kelly JA. Reliability of retrospective assessments of sexual HIV risk behavior: A comparison of biweekly, three-month, and twelve-month self-reports. *AIDS Education and Prevention* 1991;3:207-214. [PubMed: 1834142]
- Kelly JA. HIV risk reduction interventions for persons with severe mental illness. *Clinical Psychology Review* 1997;17:293-309. [PubMed: 9160178]
- Kim AA, McFarland W, Kellogg T, Katz MH. Sentinel surveillance for HIV infection and risk behavior among adolescents entering juvenile detention in San Francisco: 1990-1995. *AIDS* 1999;13:1597-1598. [PubMed: 10465095]
- Kirby, D. School-based interventions to prevent unprotected sex and HIV among adolescents. In: Peterson, J.; DiClemente, R., editors. *Handbook of HIV prevention*. New York: Kluwer Academic/Plenum; 2000. p. 83-101.
- Kotchick BA, Shaffer A, Forehand R, Miller KS. Adolescent sexual risk behavior: A multi-system perspective. *Clinical Psychology Review* 2001;21:493-519. [PubMed: 11413865]
- Lanier MM, Pack RP, DiClemente RJ. Changes in incarcerated adolescents' human immunodeficiency virus knowledge and selected behaviors from 1988 to 1996. *Journal of Adolescent Health* 1999;25:182-186. [PubMed: 10475494]
- Loeber R, Stouthammer-Loeber M, White HR. Developmental aspects of delinquency and internalizing problems and their association with persistent juvenile substance use between ages 7 and 18. *Journal of Clinical Child Psychology* 1999;28:322-332. [PubMed: 10446681]
- Luengo MA, Otero JM, Carrillo-de-la-Pena MT, Miron L. Dimensions of anti-social behaviour in juvenile delinquency: A study of personality variables. *Psychology, Crime and Law* 1994;1:27-37.
- Lux KM, Petosa R. Using the health belief model to predict safer sex intentions of incarcerated youth. *Health Education Quarterly* 1994;21:487-497. [PubMed: 7843979]
- Malow RM, Ireland SJ. HIV risks correlates among non-injection dependent men in treatment. *AIDS Education and Prevention* 1996;8:226-235. [PubMed: 8806951]
- Malow RM, Gustman S, Ziskind D, McMahon R, Lawrence J. Evaluating HIV prevention interventions among drug abusers: Validity *issues*. *Journal of HIV/AIDS Prevention and Education for Adolescents and Children* 1998;2:21-40.
- Malow RM, Dévieux J, Jennings TJ, Lucenko B, Kalichman SC. Substance abusing adolescents at varying levels of HIV risk: Psychosocial characteristics, drug use and sexual behavior. *Journal of Substance Abuse Treatment* 2001;13:103-117.
- McCann, JT. The MACI: Composition and clinical applications. In: Millon, T., editor. *The Millon inventories: Clinical and personality assessment*. New York: Guilford Press; 1997. p. 363-388.
- McCoul MD, Haslam N. Predicting high risk sexual behaviour in heterosexual and homosexual men: The roles of impulsivity and sensation seeking. *Personality and Individual Differences* 2001;31:1303-1310.
- McLellan, T.; Dembo, R. Screening and assessment of alcohol and other drug (AOD) abusing adolescents. 3. Washington, DC: U.S. Department of Health and Human Services, Public Health Service, Center for Substance Abuse Treatment; 1993. Improvement protocol (TIP). Treatment Improvement Protocol Series
- Millon T, Davis RD. The Millon Adolescent Personality Inventory and the Millon Adolescent Clinical Inventory. *Journal of Counseling and Development* 1993;71:570-574.
- Millon, T.; Millon, C.; Davis, R. *Manual for the Millon Adolescent Clinical Inventory*. Minneapolis, MN: National Computer Systems; 1993.

- Oas PT. Impulsivity and delinquent behavior among incarcerated adolescents. *Journal of Clinical Psychology* 1985;41:422–424. [PubMed: 3998167]
- Otto-Salaj LL, Heckman TG, Stevenson LY, Kelly JA. Patterns, predictors and gender differences in HIV risk among severely mentally ill men and women. *Community Mental Health Journal* 1998;34:175–190. [PubMed: 9620162]
- Pack RP, Crosby RA, Lawrence JS. Associations between adolescents' sexual risk behavior and scores on six psychometric scales: Impulsivity predicts risk. *Journal of HIV/AIDS Prevention and Education for Adolescents and Children* 2001;4:33–47.
- Petratis J, Flay BR, Miller TQ, Torpy EJ, Greiner B. Illicit substance use among adolescents: A matrix of prospective predictors. *Substance Use and Misuse* 1998;33:2561–2604. [PubMed: 9818990]
- Prendergast ML, Urada D, Podus D. Meta-analysis of HIV risk-reduction interventions within drug abuse treatment programs. *Journal of Consulting and Clinical Psychology* 2001;69:389–405. [PubMed: 11495169]
- Rotheram-Borus MJ. Expanding the range of interventions to reduce HIV among adolescents. *AIDS* 2000;14:33–40. Suppl 1
- Sheer VC, Cline RJW. Individual differences in sensation seeking and sexual behavior: Implications for communication intervention for HIV/AIDS prevention among college students. *Health Communications* 1995;7:205–223.
- Smith MD. HIV risk in adolescents with severe mental illness: Literature review. *Journal of Adolescent Health* 2001;29:320–329. [PubMed: 11691593]
- Sobell, LC.; Sobell, MB. Convergent validity: An approach to increasing confidence in treatment outcome conclusions with alcohol and drug abusers. In: Sobell, L.; Sobell, M.; Ward, E., editors. *Evaluating alcohol and drug abuse treatment effectiveness: Recent advances*. New York: Pergamon Press; 1980. p. 177-183.
- Sobell, L.; Sobell, MB. NIAAA treatment handbook series 4, assessing alcohol problems: A guide for clinicians and researchers. Washington, DC: National Institutes of Health and National Institute on Alcohol Abuse and Alcoholism; 1995. Alcohol consumption measures. (NIH Publication No. 95-3745, pp. 55–73)
- Sorensen, JL.; London, J.; Morales, E. Group counseling to prevent AIDS. In: Sorensen, J.; Wermuth, D.; Gibson, K.; Choi, J.; Gydish, S.; Batki, S., editors. *Preventing AIDS in drug users and their sexual partners*. New York: Guilford Press; 1991. p. 99-115.
- Lawrence JS, Jefferson KW, Alleyne E, Brasfield TL. Comparison of education versus behavioral skills training interventions in lowering sexual HIV-risk behavior of substance-dependent adolescents. *Journal of Consulting and Clinical Psychology* 1995;63:154–157. [PubMed: 7896983]
- Turner, C.; Lessler, JT.; DeVore, J. Effects of mode of administration and wording on reporting of drug use. In: Turner, C.; Lessler, JT.; Gfroerer, J., editors. *Survey measurement of drug use: Methodological studies*. Rockville, MD: National Institute on Drug Abuse; 1992. DHHS Publication No. ADM 92-1929

TABLE 1
ANOVAs Comparing Low and High Impulsivity Groups on Sex and Drug Risk Behaviors, HIV Relevant Attitudes, and Skills

Variable	Total Sample (<i>n</i> = 377) Mean (<i>SD</i>)	High Impulsivity (<i>n</i> = 201) Mean (<i>SD</i>)	Low Impulsivity (<i>n</i> = 176) Mean (<i>SD</i>)	<i>F</i>	<i>P</i>	<i>d</i>
Number of times used marijuana (last 3 months)	28.74 (41.86)	35.51 (49.62)	21.01 (28.97)	11.57	0.001	0.35
Number of times used alcohol (last 3 months)	6.35 (12.59)	8.48 (14.85)	3.92 (8.81)	12.67	0.001	0.37
Number of times used cocaine (last 3 months)	4.08 (14.62)	5.05 (14.28)	2.98 (14.96)	1.9	0.169	0.14
Number of partners (last 3 months)	1.93 (3.90)	1.93 (2.29)	1.93 (5.16)	0	0.987	0
Proportion unprotected sex (last 3 months)	38.87 (40.32)	42.59 (39.92)	34.63 (40.47)	3.68	0.056	0.2
Proportion unprotected sex when high on alcohol (last 3 months)	12.95 (32.06)	17.21 (35.71)	8.08 (26.58)	7.75	0.006	0.29
Proportion unprotected sex when high on cocaine (last 3 months)	5.95 (22.69)	8.02 (25.79)	3.59 (18.32)	3.6	0.058	0.2
Proportion unprotected sex when high on marijuana (last 3 months)	19.08 (35.29)	23.97 (37.67)	13.49 (31.54)	8.43	0.004	0.3
Proportion unprotected vaginal sex (last 3 months)	27.27 (39.15)	30.47 (39.87)	23.62 (38.09)	2.88	0.09	0.18
Total number of sex acts (last 3 months)	17.37 (31.85)	16.91 (25.60)	17.91 (37.83)	0.09	0.761	0.03
Anxiety about contracting HIV	3.13 (0.67)	3.21 (0.63)	3.04 (0.70)	6	0.015	0.25
Condom attitudes	3.24 (0.36)	3.21 (0.35)	3.28 (0.38)	3.84	0.051	0.2
Condom use skills	4.83 (2.18)	4.91 (2.09)	4.74 (2.29)	0.58	0.446	0.08
Knowledge about HIV	13.37 (2.88)	13.67 (2.81)	13.03 (2.94)	4.63	0.032	0.22
Perceived susceptibility	2.31 (0.62)	2.37 (0.59)	2.24 (0.65)	4.23	0.04	0.21
Prevention beliefs	2.69 (0.48)	2.66 (0.49)	2.72 (0.46)	1.76	0.186	0.18
Sexual self-efficacy	3.24 (0.57)	3.16 (0.50)	3.33 (0.63)	8.52	0.004	0.3
Behavioral intentions	22.44 (5.30)	22.12 (5.73)	22.80 (4.76)	1.55	0.214	0.13
Sexual attitudes	4.30 (0.63)	4.21 (0.65)	4.39 (0.60)	7.57	0.006	0.28