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## The Validity of Truant Youths' Marijuana Use and Its Impact on Alcohol Use and Sexual Risk Taking

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### Abstract

Few studies investigating the validity of marijuana use have used samples of truant youth. In the current study, self-reports of marijuana use are compared with urine test results for marijuana to identify marijuana underreporting among adolescents participating in a longitudinal Brief Intervention for drug-involved truant youth. It was hypothesized that marijuana underreporting would be associated with alcohol underreporting and engaging in sexual risk behaviors. The results indicated marijuana underreporting was significantly associated with self-denial of alcohol use, but not associated with sexual risk behavior. Also, there was an age effect in marijuana use underreporting such that younger truant youth were more likely to underreport marijuana use, compared to older truant youth. Implications for policy and future research are discussed.

### Keywords

Truant youth; validity of marijuana use; marijuana use; alcohol use; sexual risk behaviors

### Introduction

The collection of valid drug use information from adolescents is critical in studies of criminal justice populations, clinical populations and the general population. The validity of drug use information affects the accuracy of estimates of this behavior for epidemiological, treatment planning, service need identification, and prevention and intervention efforts. Further, the validity of drug use measures impacts the validity of associations and causal inferences drawn from them, as well as theory addressing such relationships.

The utilization of self-report survey data is a hallmark of a clinical assessment and a common source of drug use information. Convenience, low cost, ease of administration, comprehensiveness, and the fact that the individual is the most knowledgeable reporter have encouraged the use of self-report drug use data. Unfortunately, self-report drug use data can be invalid due to random sampling errors, selection bias, intentional inaccurate responses (e.g., falsifying information due to social stigma and social desirability), and unintentional inaccurate responses (e.g., recall problems and unfamiliarity with drug names) (Harris, Griffin, McCaffrey, & Morral, 2008; Skog, 1992). Problems associated with measurement validity for drug use can have potentially harmful impacts on analytical results and treatment initiatives. In an examination of the influence of false negative (i.e., intentional and unintentional underreporting of behavior that occurred) versus false positive (i.e., intentional and unintentional reporting of behavior that did not occur) self-report drug use, Skog (1992) suggests that the frequency of false negative responses may be higher than false positive responses.

Validity of adolescent self-report of drug use is important for epidemiological and clinical studies. Survey and drug treatment studies typically assess drug use by the adolescent with the protection of confidentiality or anonymity. Yet, studies indicate adolescents underreport substance use, particularly for less socially acceptable drugs, such as cocaine and opiates, compared to marijuana (Fendrich & Vaughn, 1994; Harrison, 1997; Williams & Nowatzki, 2005). Similar trends have been identified among criminal justice populations as well. For example, Harris et al. (2008) examined the effects of inconsistencies in drug and alcohol use among adolescents from 10 substance abuse treatment programs. They found self-report inconsistency rates were lowest for marijuana (5.7%) and alcohol (7.5%) compared to other drug use (rates ranged from 8.8% for heroin to 34.5% for inhalants).

Research on the overall validity and reliability of the self-report method for assessing adolescent drug use and related problems is still debated in the literature. Validity issues may be particularly problematic when it comes to monitoring drug use as part of treatment (Lennox, Dennis, Ives, & White, 2006). Some studies involving patients in treatment programs have found that participants accurately report their drug use, at least at program entry (Babor, Steinberg, Anton, & Del Boca, 2000; Del Boca & Noll, 2000). Stinchfield (1997) found that adolescents attending a treatment program for drug dependence generally reported more prior drug use and consequences at discharge compared to the disclosures at the start of intervention. Magura and Kang (1996) completed a meta-analytic review of 24 published studies examining the validity of self-reported drug use among high risk populations. They found high rates of drug use underreporting, which could bias prevalence estimates and treatment outcome studies.

The concern that criminal justice populations underreport their alcohol and drug use has led to reliance on biological (e.g., blood, hair, saliva, and especially urine) data to obtain more accurate estimates of this behavior (Dembo et al., 1999; Dembo, Williams, Wish, & Schmeidler, 1990; Golub, Liberty, & Johnson, 2005; Mieczkowski, Newel, & Wraight, 1998; Yacoubian, VanderWall, Johnson, Urbach, & Peters, 2003). For example, Bessa and colleagues ((2010) sought to validate self-reported drug use by comparing pregnant adolescent self-reported use of cocaine and marijuana against hair analysis. Results

indicated the teens did not report use of any of these two drugs, but hair testing detected cocaine and/or marijuana use among 6% of the teens. In a longitudinal study of 400 high-risk, urban teens and their parents, Delaney-Black and associates (2010) compared youth self-reports and hair analysis for cocaine, opiate and marijuana use. The adolescent hair specimens were 52 times more likely to identify cocaine use, compared with the self-reports. This lack of concordance occurred in spite of their knowledge of the “certificate of confidentiality” obtained for this study.

In general, studies of the concordance between self-reports and biological measures of substance use have indicated fair validity for alcohol and marijuana (e.g., Harrison, 1997; Williams & Nowatzki, 2005), but weak validity for less socially acceptable substances like cocaine and opiates (e.g., Fendrich, Johnson, Wislar, Hubbell, & Spiehler, 2004; Williams & Nowatzki, 2005). Similar trends have been found in concordance studies of adolescents involved in substance abuse treatment programs and the criminal justice system (e.g., Bursleson & Kaminer, 2006; Harris et al., 2008; Yacoubian, 2001). In terms of alcohol, however, a comparison of biometric results and self-reports found that biometrics were unsatisfactory as a screening tool for alcohol consumption in adolescents (Comasco et al., 2009). Therefore, self-reports of alcohol use may be the most valid option available for study.

Little is known about the validity of self-reported substance use among truant youth. While some truant youth may never become involved in the criminal justice system, truancy is considered a behavior that places them at greater risk of engaging in more negative behaviors (Garry, 2001; National Center for School Engagement, 2006). Truancy is associated with poor standardized test performance (Caldas, 1993; Lamdin, 1996), high school dropout (Bridgeland, Dilulio, & Morison, 2006), a stressed family life (Baker, Sigmon, & Nugent, 2001; Kearney & Silverman, 1995), and emotional and psychological functioning problems (Diebolt & Herlache, 1991; Egger, Costello, & Angold, 2003; Kearney & Silverman, 1995). Of particular concern is the relationship between substance use and truancy (Dembo et al., in press a, b; Soldz, Huyser & Dorsey, 2003). Recent national surveys and scientific studies consistently document that truant youth in the U.S. and in other countries are at high risk of involvement in drug use, particularly alcohol and marijuana.

Alcohol and marijuana use is higher among truant youth, compared to youth who attend school regularly. In a meta-analysis examining truancy and substance use, Hallfors et al. (2002) found truancy was a strong marker for youth substance use. Truancy is positively associated with alcohol and marijuana use (Duarte & Escario, 2005; Roebuck, French, & Dennis, 2004; Siziya, Muula, & Rudatsikira, 2007), and a predictor of initiating and escalation of alcohol and marijuana use (Henry & Huizinga, 2007; Henry & Thornberry; 2010). There is a critical need for better understanding of validity issues related to self-reported drug use among truant youth to inform prevention and intervention efforts. We are not aware of any such studies that have been completed to date.

The purpose of the present study was to examine how underreporting of marijuana use among truant youth is related to other risk factors, specifically alcohol use and sexual risk

behaviors. It was hypothesized that truant youth who underreport marijuana use will be more likely to self-report no alcohol use, than youth who do not underreport marijuana use. It is also hypothesized there would be differences between truant youth who underreport marijuana use and those who do not with regard to sexual risk behaviors, though the nature of these differences is uncertain. Engaging in sexual risk activities is another behavior area where youth might be reluctant to report participation, particularly youth who deny marijuana use. It was included as a comparison risk-domain in this study. The results of the present study document the importance of incorporating biological tests measuring drug use in epidemiological, prevention and intervention studies involving truant youth. This is particularly the case in regard to their marijuana use and alcohol use over time.

## Method

### Subjects and Procedures

The sample consisted of truant youth participating in a prospective, longitudinal study of the impact of an intervention, the Brief Intervention (BI), on substance use and other risk behaviors. The study was set in an urban area in a southeastern state in the U.S. The sample consisted of 297 youth, who were enrolled and completed baseline interviews, in the truancy intervention project between March 2, 2007 and June 21, 2012. Youth with a verified record of truancy were recruited for the study from the local truancy intake center, school social workers, and a community diversion program. Youth who were ages 11 to 17, resided within a 25-mile radius of the study site, had limited involvement in the juvenile justice system (i.e., no official record of delinquency or up to two misdemeanor arrests), and demonstrated some indication of alcohol or other drug use (determined through a screening instrument, the Personal Experience Screening Questionnaire [PESQ], Winters, 1992) were enrolled in the project.

Enrollment involved: (1) A project staff member meeting with the youth and his/her parent/guardian and providing an overview of the project. (2) They were informed that BI services are free, provided in-home, and participation is voluntary. (3) For interested parents and youths, an in-home meeting was scheduled to further discuss the BI project, answer any questions, complete the consent and assent processes, and conduct separate youth and parent/guardian baseline interviews

Following the completion of parental consent and youth assent procedures, separate baseline interviews were conducted with the youths and their parents/guardians. Then, the youth and their parent/guardian were randomly assigned to one of three project service conditions: (1) BI-Youth (BI-Y) intervention that involved two BI sessions administered to the youth; (2) BI-Youth and Parent (BI-YP) intervention that involved the same two sessions administered to the BI-Y youth and an additional session to the parent; or (3) the Standard Truancy Services (STS) offered by the truancy intake center plus a project provided referral service overlay (access to a government-developed agency and service resource guide to assist with any family service needs). A detailed discussion of the BI, and associated background material, can be found in Winters, Fahnhorst, Botzet, Lee, & Lalone (2012), Winters & Leitten (2007), Catalano, Hawkins, Wells, & Miller (1991), and Clark & Winters (2002). All study procedures were approved and monitored by a local IRB. At each interview point,

respondents were informed that the researchers had received a Certificate of Confidentiality to protect against unauthorized release of the study data.

Research data involved personal interviews and urine tests were administered by trained research staff. The main data collection instrument used in this study was the Adolescent Diagnostic Interview (ADI, Winters & Henly, 1993). The ADI was designed to be delivered within a highly structured and standardized format (e.g., most questions are yes/no) to capture DSM-IV criteria for substance use disorders and related areas of functioning. Item construction primarily involved advice from an expert panel and feedback from field testers. *DSM* guidelines and results from the statistical analysis provided the basis for scoring rules. Reliability and validity studies of the ADI, involving over 1000 drug clinic adolescents, provide a wide range of psychometric evidence pertaining to inter-rater agreement, test-retest reliability, convergent validity (with clinical diagnoses), self-report measures, and treatment referral recommendations (Winters & Henly, 1993; Winters & Stinchfield, 2003).

The data for the present study were collected from truant youth and their parents/guardians at five time points: baseline ( $n = 297$ ), 3-month follow up ( $n = 248$ ), 6-month follow-up ( $n = 236$ ), 12-month follow-up ( $n = 207$ ), and 18-month follow-up ( $n = 165$ ). Parent/guardian and youth interviews at each time point were completed separately, and in private. Completion of follow-up interviews depended on when youths entered the project. Youths who began participation early in the project completed all four follow-up interviews, but youths who enrolled most recently were not yet due for any follow-up interview at the time of the present study. The 3-month follow-up interview was scheduled for 90 days from the date of the youth's last participation in project services (i.e., the last intervention or STS session). The 6-month follow-up interview date was scheduled for 90 days following completion of the 3-month follow-up interview; the 12-month follow-up interview was scheduled for 180 days after the completion date of the 6-month follow-up interview; and the 18-month follow-up interview was scheduled for 180 days after the completion date of the 12-month follow-up interview. On 16 occasions, when a follow-up interview was not performed near the scheduled time, a retrospective interview was performed at the same time as the following interview. For example, if a 6-month interview was not performed approximately three months after the 3-month interview, two interviews were performed approximately nine months after the 3-month interview. One was a retrospective 6-month interview, covering the period of three months after the 3-month interview. The other was the 12-month interview, from the end of the period covered in the retrospective 6-month interview until the time the 12-month interview was conducted. Overall completion rates of 93.7%, 93.0%, 91.7%, and 87.0% were achieved for the 3-month, 6-month, 12-month, and 18-month follow-up interviews, respectively. Of the completed follow-up interviews, 96% of the 3-month, 95% of the 6-month, 97% of the 12-month, and 98% of the 18-month interviews were completed within 60 days of the scheduled interview date.

Each truant youth and parent/guardian was paid \$15 for completing interviews. The baseline interviews and the majority of the follow-up interviews were administered in the youths' homes. At each follow-up time point, fewer than 3% of the truant youths were interviewed in a secure program setting, such as residential commitment programs, county jails, or a

juvenile detention center. The interviews for parents/guardians averaged 30 minutes; the youth interviews averaged one hour.

Most truant youths in the study were male (64%), and averaged 14.80 years in age ( $SD = 1.31$ ). Thirty-seven percent of the truant youths were Caucasian, 26% were African American, 29% were Hispanic, 1% were Asian, and 7% were from other, mainly multi-ethnic backgrounds. Relatively few truant youths (16%) lived with both of their biological parents. In contrast, a majority of the truant youths were living either with their biological mother alone (33%) or with their mother and another adult (33%). Ten percent of the parents/guardians reported an annual income of more than \$75,000, while 39% reported annual incomes of \$25,000 or less. Median family income was \$25,000 to \$40,000.

## Measures

**Marijuana use**—Marijuana use was measured through self-report and urinalysis. The self-report marijuana use information was captured by questions on the ADI (Winters & Henly, 1993) at baseline interview and at each follow-up interview. The baseline marijuana use measures referred to lifetime use up to the point of the baseline interview; while the follow-up marijuana use measures referred to use since the last interview. The ADI questions probed the use of marijuana as never, less than five times, or five or more times.

Urine specimens were also collected to assess recent drug use via the Onsite CupKit® urine screen procedure. During the consent and assent processes at baseline, parents/guardians and youth were informed that voluntary urine specimens would be obtained from the youth at the baseline and follow-up interviews, in order to validate self-reported drug use. The Onsite CupKit® tests for recent use of methamphetamines, opiates, cocaine, and marijuana. For marijuana (THC), the positive threshold level is 50 ng/ml of urine, and the surveillance window is 3-4 days for infrequent users, 10 days for heavy users, and 30 days for chronic users and/or users with high body fat. Since they are not very accurate, urine tests for alcohol use were not conducted. We were not able to obtain blood or hair samples for alcohol use testing.

The urine test used had high levels of accuracy, precision, and specificity. In regard to accuracy, evaluation studies indicate that, compared to GC/MS, 100% of the marijuana positive samples, and 96.4% of marijuana negative samples were in agreement with GC/MS tests of these samples. Using different lots to assess within-run, between-run, and between-operator precision, a rate of >99% was achieved across all lots, all sites, and all operators. High specificity was also achieved.

For the present study, the focus was on truant youth who underreported use of marijuana. Therefore, a dichotomous indicator of marijuana underreporting was created. Marijuana "underreporters" were truant youth who tested positive for marijuana in urinalysis but denied marijuana use. All other truant youth were combined into one category of truant youth who did not underreport marijuana use. The "other" category included truant youth with consistent responses between their self-reports of marijuana use and urine test results (i.e., self-reported use and tested positive, or self-reported no use and tested negative), truant youth who overreported marijuana use (i.e., self-reported use but tested negative), and truant



youth who were missing urine test results (i.e., refused or missing because of issues beyond the youth's control such as living out of state).

In addition to measuring whether or not truant youths were classified as underreporters, a variable reflecting the number of marijuana use underreporting occasions from baseline through 18-month follow-up was created for each truant youth for subsequent analyses. The underreporting occasions indicator was coded such that 0 = none, 1 = 1 underreporting occasion, 2 = 2 underreporting occasions, 3 = 3 underreporting occasions, and 4 = 4 underreporting occasions.

**Alcohol use**—The ADI alcohol questions probed the truant youths' use of alcohol to the point of experiencing its effects, such as feeling a buzz or getting drunk, with responses categorized as never, less than five times, or five or more times (Winters & Henly, 1993). From the alcohol use data at each time point, a measure of alcohol use was created that reflected the self-reported use of this substance as "never," "1 to 4 times," or "five or more times." The baseline alcohol use questions probed lifetime use up until the time of the baseline interview, while the follow-up interviews probed the use of alcohol since the date of the previous interview.

**Sexual risk behavior**—Participating truant youth were asked to indicate whether or not they had engaged in several sexual risk behaviors from the POSIT HIV/STD Risk Behavior instrument. The POSIT 11-item HIV/STD risk scale was developed by the NOVA Research Company (Young & Rahdert, 2000). The instrument has been pilot tested and IRT analysis has found the scale to have very good psychometric properties (e.g., internal consistency = 0.80, one-week test-retest reliability = 0.90; concurrent validity with the Sexual Risk Questionnaire scores:  $r = 0.80$ ).

For the present study, responses to two items in the POSIT were used to indicate sexual risk behaviors: (1) "Have you had sexual intercourse without using a condom?" and (2) "Have you had sex with two or more people?" For the baseline interview, the questions referred to having *ever* engaged in these two acts. For the follow-up interviews, the questions referred to having engaged in these two acts since the previous interview. Lack of condom use and number of sexual partners are widely used sexual risk behavior measures in related research (Brook, Balka, Abernathy, & Hamburg, 1994; Bryan, Ray, & Cooper, 2007; Cooper, 2002; Elkington, Bauermeister, Brackis-Cott, Dolezal, & Mellins, 2009; Goldstein, Barnett, Pedlow, Murphy, 2007; Komro, Tobler, Maldonado-Molina, & Perry, 2010; Morris, Baker, Valentine, Pennisi, 1998; Morris, Harrison, Knox, Tromanhauser, & Marquis, 1995; Murphy, Brecht, Herbeck, & Huang, 2009; Wetherill & Fromme, 2007). Hence, a summary measure of the two items was created with three ordinal categories for each wave, where 0 = engaged in none of the two sexual risk behaviors (i.e., sexual intercourse without using a condom; having two or more sexual partners), 1 = engaged in one of the two sexual risk behaviors, 2 = engaged in both sexual risk behaviors.

**Sociodemographic and treatment measures**—In addition to the marijuana, alcohol, and sexual risk behavior measures, sociodemographic measures for age in number of years ( $M = 14.80$ ,  $SD = 1.31$ ), gender (0 = male [64%], 1 = female [36%]), ethnicity (0 = non-

Hispanic [71%], 1 = Hispanic [29%]) were included in subsequent analyses. Further, a categorical measure for the type of treatment was also included for subsequent analyses: BI-Y (33.3%), BI-YP (33.3%), and STS (33.7%).

To ensure that there was no selection bias with respect to the measures before we proceeded with analyses, we compared the STS, BI-Y, and BI-YP groups in regard to their baseline demographic characteristics, alcohol use, sexual risk behavior, and marijuana use. No significant differences were found for each of these variables. (A table reporting these results has been omitted due to space concerns. A copy is available from the senior author upon request.)

### Analysis Strategy

For each time point, we compared marijuana use underreporters and all other truant youth in regard to their reported alcohol use and involvement in sexual risk behavior. In view of the small sample sizes, a one-sided Fisher's Exact Test was used to test the hypotheses of the association between underreporting of marijuana use and not reporting alcohol use and sexual risk behavior.

## Results

### Descriptives

As shown in Table 1, approximately 5% of truant youth at baseline and 10% of truant youth at any follow-up wave were missing urine test information. The urine test results were missing due primarily to reasons beyond the truant youth's control (e.g., youth moved out of state and a long distance telephone interview was conducted but no urine test was given; or being in a secure facility). Only 1.0% ( $n = 3$ ) of the truant youths were marijuana use underreporters at baseline, 8.1% ( $n = 20$ ) at 3-month follow-up interview, 8.9% ( $n = 21$ ) at 6-month follow-up interview, 5.8% ( $n = 12$ ) at 12-month follow-up interview, and 6.7% ( $n = 11$ ) at 18-month follow-up interview. Over half of the truant youth at each wave were consistent with their self-reported use of marijuana and urine test results. In other words, many truant youths who self-reported marijuana use also tested positive for the drug, and many truant youths who denied marijuana use also tested negative for the drug. Furthermore, a substantial portion of truant youth demonstrated inconsistencies in their marijuana use that reflect over reporting (see column marked "self-reported only"). The large percentage of self-reported only (tested negative but reported marijuana use) truant youth at baseline (42.4%) is not surprising, since the baseline substance use questions probed lifetime use.

At each time point, the truant youth interviews included a question on the recency of marijuana use: past day, past 2 days, past week, past 2 weeks, past month, past 6 months, and more than 6 months ago. Given the 30 day surveillance window for detecting marijuana use via urine testing, we examined, at each time point, the concordance between the urine test results and youth reported recency of use of the drug within the past month. Results indicated the vast majority of truant youth at each time point reported recency of marijuana use within the surveillance window period (baseline: 64% [there were only 3 marijuana use



underreporters at baseline –see Table 2]; 3 month follow-up: 86%; 6 month follow-up: 89%; 12 month follow-up: 86%; 18 month follow-up: 86%). (Of course, at each time point, no recency of use question was asked of truant youth denying marijuana use.)

Overall, 40 (13.5% of  $n = 297$ ) truant youths in this study underreported their marijuana use at one or more time point. Among these 40 youth, 50.0% ( $n = 20$ ) were marijuana underreporters on one occasion, 37.5% ( $n = 15$ ) on two occasions, 7.5% ( $n = 3$ ) on three occasions, and 5.0% ( $n = 2$ ) on four occasions. Individual truant youth patterns of marijuana under reporting across the five time points is presented in the appendix.

Table 1 also presents the truant youths' self-reported alcohol use at each time point. As can be seen, following baseline, there was an increase in the percent of truant youths reporting alcohol use from 3-month to 18-month follow-up interview, especially use 5 or more times. There is a corresponding, general decrease in the percent of truant youths indicating the use of alcohol as “never” or “1 to 4 times.”

We asked parents/guardians about their child's alcohol use, but these data proved of limited value. For example, parent reports of their project child's alcohol use were always much lower than the youth reported (youth reported use, parent reported youth use, respectively: baseline: 62%, 39%; 3 month follow-up: 29%, 14%; 6 month follow-up: 25%, 16%; 12 month follow-up: 31%, 14%; 18 month follow-up: 38%, 15%). As youth grew older and more peer involved, parents has less contact with, and knowledge about the behavior of, project youth. As well, over time, a sizable number of project youth moved into living arrangements with girlfriends, boyfriends, or others. There were, also, a number of instances where a follow-up interview with parents could not be completed—due to their work schedules, etc. Parent/guardian under estimates of their child's drug use in our study are consistent results from other studies, which have, shown, for example, that only 1 in 100 parents believe their teens have used stimulant drugs to stay awake to study, while recent studies report 1 in 10 10th-graders and 1 in 8 12th-graders have used these drugs for this purpose (C.S. Mott Children's Hospital National Poll on Children's Health, 2013).

Further, Table 1 displays the results for the summary index of sexual risk behavior across the five time points. As can be seen, there is a gradual increase in the percent of truant youths reporting engaging in both sexual risk behaviors from 3-month to 18-month follow-up, and a corresponding, general decrease in the percent of truant youths reporting not engaging in any of these behaviors or in one of them. (Although from 42% to 56% of truant youths did not report engaging in one or another of the two sexual risk behaviors in Table 1, it is important to note that the vast majority of truant youths reported having some sexual experience [e.g., sexual contact with another person] at each time point [baseline: 81%; 3-month follow-up: 74%; 6-month follow-up: 75%; 12-month follow-up: 77%; 18-month follow-up: 75%]).

### **Marijuana Use Underreporting and Self-Reported Alcohol Use**

Table 2 displays the results of our examination of the relationship between the truant youths' underreporting of marijuana use and their reported use of alcohol at each time point. As can be seen, from baseline through 18-month follow-up, there is a clear relationship between

underreporting marijuana use and reported use of alcohol. Underreporters of marijuana use are significantly more likely to deny the use of alcohol as well. Given the relatively small number of cases in the marijuana under reporting group at each time point, this consistent pattern of differences is quite impressive.

### **Marijuana Use Underreporting and Self-Reported Sexual Risk Behavior**

Table 2 reports the results of our study of the relationship between marijuana use underreporting and the truant youths' self-reported involvement in sexual risk behavior at each time point. With the exception of 18-month follow-up, no significant relationship was found between the marijuana underreporting and sexual risk behavior over time.

### **Relationship Between Underreporting, Intervention Group, and Demographic Characteristics**

The final analyses examined the relationship between the number of marijuana underreporting occasions and the three intervention groups (STS, BI-Y, and BY-YP), gender, ethnicity, and age. No significant effects were found for intervention group, gender, and ethnicity. We did find an age effect in marijuana use underreporting. Younger aged truant youth were significantly more likely to be underreporters for marijuana than older truant youth. Underreporting was highest among children age 14 and younger. (A table reporting these results has been omitted. A copy is available from the senior author.) This result is considered further in the discussion section.

## **Discussion and Conclusion**

Research has indicated validity issues in self-reported substance use, but little is known of its occurrence and impact within the truant youth population. The present study utilized a sample of truant youth participating in a longitudinal intervention for substance use and other risk behavior in an urban area in a southeastern state. The purpose of the study was to examine marijuana underreporting among truant youth and its association with self-reported alcohol use and sexual risk behaviors. The results provide support for the hypothesis of an association between underreporting use of marijuana and use of alcohol, but not the hypothesis of an association between underreporting use of marijuana and sexual risk behavior (i.e., refraining from using a condom and having sex with multiple partners). Truant youth underreporting their use of marijuana were more likely to report no alcohol use over time, than youth not underreporting marijuana use. This finding suggests there is a bias in self-reporting alcohol use that may be similar to marijuana underreporting. No consistent relationship between underreporting use of marijuana and self-reported engagement in sexual risk behavior was found. Hence, the drug use effects we found appear limited to substance use behavior, not the reported engagement in sexual risk activities.

The present study also examined the relationship between truant youths' demographic characteristics (gender, age, and ethnicity) and intervention group (STS, BI-Y, and BI-YP) and the number of marijuana underreporting occasions across the five waves of data. The analyses revealed no significant differences in gender, ethnicity, or intervention group assignment and the frequency of marijuana underreporting across the five data waves. The

analyses did, however, indicate an age effect in marijuana use underreporting. Younger aged truant youth were significantly more likely to be underreporters than older truant youth. Underreporting was highest among children age 14 and younger. It may be that younger truant youth regard the use of marijuana as more socially unacceptable, than older youth, leading them to be less truthful in their use of the drug.

We further studied the possibility that the truant youth underreporting of marijuana use developed as a function of being in the study, with truant youth receiving intervention services (i.e., BI-Y and BI-YP) being less likely to report use of the drug, than STS youth. Our comparison involved, for each follow-up period, a cross-tabulation between BI youth (BI-Y + BI-YP) and STS youth in regard to underreporting or not underreporting marijuana use. Fisher's Exact Test results indicated no significant effects for the 3 month, 6 month, and 12 month follow-up periods (baseline interviews were completed before random assignment to project service conditions). For the 18 month follow-up period only, STS youth were significantly more likely to deny the use of marijuana, than BI youth (Fisher's Exact Test, 2-tailed significance level= 0.049). However, this barely significant difference is not statistically significant using the Bonferroni test, which takes into the account the number of tests (.05/4=.012)

The identification of a potential self-report bias in the alcohol use data underscores an important point. While every effort was made to ensure data validity (e.g., conducting interviews in private in the youth's home, informing them of our Certificate of Confidentiality), the possible self-report bias in the alcohol use data reduce the validity of the analyses involving this substance. Many prevention and early intervention studies involving at-risk youth rely on self-report data in their analyses. The existence of systematic, self-report bias in these data reduce the value of these data in drawing conclusions regarding the effectiveness of these intervention efforts. Where self-report bias is respectable, a non-significant intervention effect could be due, less to the intervention itself, than systematic under reporting of the research subjects.

In the absence of confirmatory data, such as urine tests for drug use, there is no firm way of identifying the magnitude and consistency of this self-report bias in alcohol use over time. Our findings strongly urge that all studies of substance use among at-risk youth, especially intervention studies, include self-report and biological specimen data (e.g., urine tests) of this behavior (Dembo et al., 1999). When self-reports and biological test results for the same drug are discordant, emphasis should be given to the biological test results.

Research has shown at-risk youth are less likely to report the use of less socially acceptable drugs, such as cocaine, than more socially acceptable drugs like marijuana (e.g., Dembo et al., 1999). However, the findings of the current study suggest that, for the truant youth we researched, a salient pattern of underreporting alcohol use also likely exists. It would be important to replicate our findings in studies of truant youth in other jurisdictions and with different sociodemographic characteristics. Such replication would further underscore the importance of using biological measures of substance use in studies involving truant youth, to reduce bias in estimating the prevalence of use, and the effectiveness of intervention-service efforts to reduce their drug involvement (Magura & Kang, 2006). In this vein, efforts

should be made to determine if drug use underreporting among truant youth exists among such youth who are not brought to truancy centers or placed in diversion programs. As well, it would be important to assess whether the results we obtained are specific to truant youth, and may not generalize to other adolescent populations.

When comparing self-reported marijuana use with urinalysis results, there are a few issues related to validity that should be noted. First, for truant youths who appeared consistent in their use (self-reports match urine test results) there may be situations where the consistency is not valid. Due to the short surveillance window and threshold for detecting marijuana for the urine test, it is possible that truant youths who denied marijuana use actually used the drug but either the time of use was beyond the surveillance window or the amount used was smaller than the detection threshold. Second, for truant youths who appeared inconsistent by self-reporting use but getting negative test results, it is possible that the inconsistency occurred because truant youths self-reported marijuana use that occurred beyond the surveillance window and/or detection threshold of the urine test for marijuana. It may also be the case, however, that these youth are intentionally overstating their marijuana use. Intentional falsification of self-reported drug use may occur for a variety of reasons, including peer or social acceptance (see Harris et al., 2008 for detail). Unfortunately, validating overreported marijuana use is difficult and limited by the precision of biological tests. Consequently, the present study focuses on a more obvious validity issue, underreporting.

Three limitations to the current study should be mentioned. First, the sample size was relatively small. This limited the power and nature of statistical analyses used to test the hypotheses. Future research should attempt to study larger samples of truant youth to better understand the effect of marijuana use underreporting. Second, the urine tests used for detecting the presence of marijuana (THC) in the youth's body were limited in sensitivity. The urine test could only detect marijuana if it had been used within a relatively short time frame, maximum of 5 to 30 days prior to test, depending on frequency of use. Further, the urine test could only detect marijuana that met the 50ng/ml THC threshold. Truant youth who used marijuana with low THC concentrations and/or more the 30 days prior to the test would test negative for the substance. Test sensitivity is an issue with all biological assays of substances. Research should endeavor to utilize biological testing that is most sensitive for detecting the given substance. Finally, while urine testing was used to validate, at least in part, marijuana use, collateral data were not available to validate self-reported alcohol use and sexual risk behaviors. Future research should attempt to validate alcohol use and sexual risk behavior using biological tests and collateral reports.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1**

## Descriptive Information for Marijuana Use, Alcohol Use, and Sexual Risk Behaviors

Variable	Baseline	3-Month follow-up	6-Month follow-up	12-Month follow-up	18-Month follow-up
Marijuana use:					
Underreported (tested positive but reported no use)	1.0%	8.1%	8.9%	5.8%	6.7%
Consistent (tested and reported same)	52.2%	66.9%	65.3%	70.0%	70.9%
Self-reported only (tested negative but reported use)	42.4%	14.1%	13.6%	14.0%	10.9%
Missing urine test	4.4%	10.9%	12.3%	10.1%	11.5%
Total	100.0%	100.0%	100.2%	99.9%	100.0%
<i>n</i>	297	248	236	207	165
Alcohol use:					
Never	38.4%	71.0%	74.6%	69.1%	61.8%
1 to 4 times	30.3%	23.0%	18.2%	19.3%	21.2%
5 or more times	31.3%	6.0%	7.2%	11.6%	17.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
<i>n</i>	297	248	236	207	165
Sexual risk behavior:					
None	55.7%	53.7%	51.1%	47.6%	41.8%
1 sexual risk behavior	25.0%	30.1%	29.8%	29.6%	33.9%
Both sexual risk behaviors	19.3%	16.3%	19.1%	22.8%	24.2%
Total	100.0%	100.1%	100.0%	100.0%	99.9%
<i>n</i>	296	246	235	206	165

*Note.* The sexual risk behaviors refer to responses to the following items: (1) Had sexual intercourse without using a condom, and/or (2) Had sex with two or more people. Total percentages across waves may be less than or greater than 100% due to rounding errors.

**Table 2**  
 Relationship Between Marijuana Use Underreporting and Reported Use of Alcohol and Engaging in Sexual Risk Behavior at Each Time Point

Variable	Baseline		3 mon. follow-up		6 mon. follow-up		12 mon. follow-up		18 mon. follow-up	
	MJ Underrep.	Others	MJ Underrep.	Others	MJ Underrep.	Others	MJ Underrep.	Others	MJ Underrep.	Others
<b>a. Alcohol use:</b>										
None	100.0%	37.8%	90.0%	69.3%	100.0%	72.1%	100.0%	67.2%	90.9%	59.7%
Use 1 or more times	-	62.2%	10.0%	30.7%	-	27.9%	-	32.8%	9.1%	40.3%
One-sided Fisher's Exact										
Test p-level	$p = .056$		$p = .037$		$p = .002$		$p = .010$		$p = .035$	
<b>b. Sexual risk behavior:</b>										
None	66.7%	55.6%	50.0%	54.0%	61.9%	50.0%	58.3%	46.9%	72.7%	40.3%
Engaged one or more	33.3%	44.4%	50.0%	46.0%	38.1%	50.0%	41.7%	53.1%	27.3%	59.7%
One-sided Fisher's Exact										
Test p-level	$p = \text{n.s.}$		$p = \text{n.s.}$		$p = \text{n.s.}$		$p = \text{n.s.}$		$p = .037$	
n	3	293 or 294	20	226 or 228	21	214 or 215	12	194 or 195	11	154

Note. MJ underrep. refers to youth who were identified as possibly underreporting their marijuana use.