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# Does it really matter which drug you choose? An examination of the influence of type of drug on type of risky sexual behavior☆

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## HIGHLIGHTS

- This study examines the independent effects of type of substance use on type of risky sexual behavior.
- We examined both between-groups and within-groups effects, which is rarely done in the literature.
- Results support aggregating substances when examining the relations between substance use and risky sexual behavior.

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## ABSTRACT

This study investigates whether certain types of substances are differentially related to certain risky sexual behaviors (RSBs) within the same population and determines whether combination substance use (SU) has additive, redundant or antagonistic effects on RSBs. African-American youth aged 9–19 participated in a large, community-based survey assessing substance use and sexual behaviors. Multilevel modeling was used to predict the differential influence of alcohol, marijuana, and cocaine use on condom use measured in the past 90 days and at last intercourse, sex while drunk/high, and number of sexual partners. Tests of the within-participant relations showed that participants increasing their SU over time concurrently increased their RSBs, establishing a strong link between the two behaviors (alcohol: condom $\beta = -0.045$, sex while drunk/high $\beta = 0.138$, sex partners $\beta = 0.102$; marijuana: condom $\beta = -0.081$, sex while drunk/high $\beta = 0.255$, sex partners $\beta = 0.166$; cocaine: condom $\beta = -0.091$, sex while drunk/high $\beta = 0.103$, sex partners $\beta = 0.031$; all $p$'s $< 0.01$). Tests of the between-participant relations showed that, generally, youth reporting less SU across their teenage years were also more likely to report fewer RSBs over this period (alcohol: condom $\beta = -0.128$, sex while drunk/high $\beta = 0.120$, sex partners $\beta = 0.169$; marijuana: condom $\beta = -0.170$, sex while drunk/high $\beta = 0.638$, sex partners $\beta = 0.357$; cocaine: condom $\beta = -0.353$; all $p$'s $< 0.05$). Moreover, the combination of some substances has unique redundant or antagonistic effects on RSB. Such findings support the consideration of type of SU, and particular combinations of substances, on RSBs in intervention development.



## 1. Introduction

The prevalence of risky sexual behaviors (RSBs), or any sex-related behaviors that increases one's risk for sexually transmitted infections (STIs) or unplanned pregnancy, remains relatively high among adolescents and young adults (e.g., Centers for Disease Control and Prevention [CDC], 2011). Youth from the southeastern region of the United States, particularly those of African descent, are especially vulnerable to the effects of STIs due to high rates of poverty, lower access to quality healthcare, STI stigma, and dense sexual networks (Reif, Geonnotti, & Whetten, 2006; Reif et al., 2014; Sales et al., 2013). Considering the aforementioned challenges facing youth in the South, researchers have been compelled to identify variables that reliably

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predict RSBs within these populations. One variable frequently linked to RSBs is substance use (SU) (Carey, Senn, Walsh, Scott-Sheldon, & Carey, 2016; King, Nguyen, Kosterman, Bailey, & Hawkins, 2012; see Ritchwood, Ford, DeCoster, Sutton, & Lochman, 2015 for review; Tucker et al., 2012).

The study of the relation between SU and RSB is complex and has produced mixed findings; some studies have found strong relations between the two variables (e.g., Tucker et al., 2012) while others have shown more limited associations (e.g. Carey et al., 2016; Walsh, Fielder, Carey, & Carey, 2014). Contradictory findings are partially due to variations in the types of substances and RSBs examined, as well as differences in population-level characteristics (e.g. Leigh, Ames, & Stacy, 2008; Ritchwood et al., 2015). As alcohol and marijuana tend to be the most commonly used substances among youth, the majority of studies on this topic have examined the effects of alcohol use on RSB (e.g., Carey et al., 2016), with fewer studies examining the effects of marijuana (e.g., Anderson & Stein, 2011) and other drug use (e.g., Pagano, Maietti, & Levine, 2014) on RSB among youth. While examinations of the impact of single SU on RSB can be informative, little is known regarding potential differences in the impact of certain types of substances on certain types of RSBs and how these relations might change over time within a target population. Some substances, for example, may have more poignant psychopharmacological effects (e.g., alcohol and cocaine) that link them to sexual behavior than other drugs (e.g., marijuana) (e.g. Johnson et al., 2010; Metrik et al., 2012). Moreover, we know little about the nature of such effects. For example, it is possible that the using two drugs have no effect on RSB above and beyond single drug use. Alternatively, the combination of some types of drugs may further exacerbate engagement in particular types of RSB. To date, no research has examined this relation.

Therefore, the aims of the current study are to: 1) determine whether certain types of substances are differentially related to certain risky sexual behaviors within a sample of high-risk, impoverished African American youth; and 2) determine whether the individual substances have independent additive effects on RSBs. This study is unique in that no other studies on this topic, to date, have examined the differential influence of particular drugs on particular types of sexual risk behaviors within the same population, a sample of impoverished, African American youth from the South. To do this, we develop multilevel models using longitudinal data, which enables us to independently test both within-participant and between-participant relations among our variables. Examining within-participant variability allows us to determine how differences in SU over time affects whether an individual changes their RSBs, whereas examining between-participant variability allows us to determine whether participants with different mean levels of SU have different mean levels of RSBs. This is the first study to examine both between-participant and within-participant effects in the SU-RSB relation, which enables both cross-sectional and longitudinal interpretations.

## 2. Materials and methods

### 2.1. Sample

Between 1998 and 2008, respondents aged 9–19 were recruited from 13 of the most impoverished neighborhoods in Mobile, Alabama to participate in the Mobile Youth Survey (MYS), which is a community-based study of adolescent risky behaviors (Bolland et al., 2007). In 1998, the initial sample was composed of 1771 youth. The initial response rate of youth residing in targeted neighborhoods was between 60% and 70%. In 1999, researchers recruited previous respondents to complete the survey again and also actively recruited a new random sample of participants. For the duration of the project, the researchers used the same recruitment and retention procedure. By 2008, a total of 9477 adolescents had completed the MYS, 9211 (97%) of whom were African American. We therefore limited our analyses to African-American participants to provide a clearer context for our results. The analysis data set included 24,782 observations across these 9211 individuals, with 61.7% providing data for two or more years. The mean number of time points for each youth was 2.69 years and the maximum was 10 years. Time points varied by participants due to the fact that each year after baseline, a small proportion were loss to follow-up and those over aged 19 aged out of the sample. Participants were predominately low-income (85% qualified for free or reduced lunch) and had a mean age of 14.81 years. The sample had more male (60%) than female participants.

### 2.2. Procedures

This study was approved by the Institutional Review Board at a university located in a mid-sized city in the southeastern United States and procedures have been described in detail elsewhere (Bolland et al., 2007). In sum, participants were recruited from both public housing and non-public housing residences. The researchers obtained a list of public housing residences in which youth were listed on the lease and, of these households, 50% were randomly selected and contacted. Although there was no comparable list for non-public housing communities, the researchers attempted to obtain a representative sample by randomly selecting and contacting 50% of the residences in the targeted neighborhoods. These became the active recruitment samples. We passively recruited other youth residing outside of the target neighborhoods using fliers and word of mouth. After parental consent and youth assent were obtained, the survey, which was written at the 5th grade reading level, was administered to youth in groups of 15–30 in local community establishments (i.e., schools, community centers). For younger respondents and those experiencing difficulty, questions were read aloud while participants wrote their corresponding responses on the questionnaire. Additional assistance was provided as necessary. Participants were advised of procedures taken to maintain confidentiality and they were given an incentive of $10 for their participation.

### 2.3. Measures

The MYS consisted of 294 questions focusing on a wide variety of psychosocial characteristics and risky behaviors. Most survey items were adapted from the Youth Risk Behavior Survey and the National Longitudinal Study of Adolescent Health. Participants were identified as living in one of the 13 neighborhoods included. The current analyses focus only on the following measures related to SU and risky sexual behavior. Four SU variables (i.e., alcohol, marijuana, cocaine use, drunk/high on substance) were created using two types of questions. One type asked whether a participant "ever" used substances, respondents selected either "no" or "yes." The other type asked respondents to select either "no," "yes," or "yes, just once" in reference to increasingly shorter periods of time (e.g., sometime, in the past year, in the past 30 days, in the past 7 days). For the current study, we combined these questions into a single item for each substance use category that incorporated the frequency and recency of use (Bolland et al., 2007). Responses to these items were coded as 1 = never used, 2 = used sometime, 3 = used once in the past year, 4 = used more than once in the past year, 5 = used once in the past 30 days, 6 = used more than once in the past 30 days, 7 = used once in the past 7 days, or 8 = used more than once in the past 7 days (Bolland et al., 2007; Ritchwood, Howell, Traylor, Church, & Bolland, 2014).

Risky sexual behavior was represented by four variables: number of sexual partners, frequency of condom use during the last 90 days, condom use at last intercourse, and sex while drunk or high. The response choices for number of sexual partners ranged from 0 (*not sexually active/no change in sexual partner*) to 5 (*5 or more different sexual partners*). The response choices for frequency of condom use during the last 90 days were between 0 and 5 (0 = none of the time, 1 = less than