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Gender moderates the relationship between impulsivity and sexual risk-taking in a cocaine-using psychiatric outpatient population

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ABSTRACT

Adults who abuse substances are at increased risk for contracting sexually transmitted infections, including HIV. Within this population, sexual risk behaviors have been associated with increased impulsivity. Studies in non-clinical populations showing gender-related differences in sexual decision-making and casual sexual partnering suggest impulsivity has a greater influence on men than women, but these differences have not been documented in substance-using patients. In a sample of 89 adults with recent cocaine use and receiving outpatient psychiatric treatment, we tested the hypothesis that gender moderates the effect of impulsivity on sexual risk-taking. Using logistic regression modeling, we tested the main and gender-moderated effects of task-related impulsivity on the probability of having a casual sexual partner and multiple sexual partners. Results confirmed a significant gender-by-impulsivity interaction; men who were more impulsive on a continuous performance task had significantly higher rates of sexual risk-taking than less impulsive men, but women's impulsivity was unrelated to these outcomes. Impulsive men were over three times as likely as less impulsive men to have a recent casual partner. Implications of these results and suggestions for future research are discussed.

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1. Introduction

Adults who abuse substances make impulsive decisions about sexual partnerships (Johnson & Bruner, 2012) and engage in high rates of sexual risk behavior that may place them at increased risk for sexually transmitted infections, including HIV (Booth, Kwiatkowski, & Chitwood, 2000; Centers for Disease Control and Prevention, 2013; Leigh & Stall, 1993). Studies involving substance-using adults have demonstrated that impulsivity (measured variably by self-report questionnaires) is positively related to sexual risk-taking. Across studies, men and women who used substances and had more impulsive tendencies reported having more sexual partners, higher rates of sex without a condom, more frequent engagement in sex for trade, generally increased sexual risk-taking (Black, Serowik, & Rosen, 2009; Hayaki, Anderson, & Stein, 2006; Lejuez, Bornoalova, Daughters, & Curtin, 2005;

Lejuez, Simmons, Aklin, Daughters, & Dvir, 2004; Reimers, Maylor, Stewart, & Chater, 2009; Trobst, Herbst, Masters, & Costa, 2002), and a preference for immediate, riskier sexual opportunities over delayed but safer (condom-protected) alternatives (Johnson & Bruner, 2012). No gender-related differences in the association between impulsivity and sexual risk behavior were reported in those studies.

However, many studies have identified gender-related differences in decision-making about casual sexual encounters, and a predominantly male preference for immediate over delayed sex has been described. For example, in one study men applied less stringent standards than women when rating characteristics of hypothetical short-term sexual partners (Buss & Schmitt, 1993), and were more willing to have sex with a person they had known only a short time. In an experimental task, women considered more criteria when selecting potential short-term partners, and rejected a greater proportion of hypothetical partners than men (Saad, Eba, & Sejean, 2009). In a well-known study conducted on a college campus, spontaneous sexual offers proposed by a stranger of the opposite sex were more likely to be accepted by male than female students (Clark & Hatfield, 1989). Among

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cocaine-dependent adults, men disproportionately discounted the value of hypothetical delayed, condom-protected sexual opportunities in favor of more immediate, but riskier, sexual offers (Johnson & Bruner, 2013), and college-age men were more likely than women to choose briefer, immediate sexual opportunities over longer but delayed or less probable opportunities (Lawyer, Williams, Prihodova, Rollins, & Lester, 2010). In summary, studies have demonstrated that men were less discriminating than women when choosing short-term sexual partners, and favored immediate over safer sexual offers when given hypothetical choices.

An analysis of national survey data from U.S. adults found that impulsivity was differentially associated with sexual risk behavior for men. In that study, higher scores on self-rated impulsivity predicted lower probability of using a condom with a new sexual partner for men, but not for women (Temple, Leigh, & Schafer, 1993). To determine whether these gender-related differences extend to a clinical population, we tested the hypothesis that the relationship between impulsivity and sexual risk-taking, defined as having a recent casual sexual partner or multiple sexual partners, would be stronger for men than women in a sample of adults in outpatient psychiatric treatment reporting recent cocaine use.

2. Methods

2.1. Participants

Data for this study are a subset of pre-intervention data collected for a clinical trial comparing two behavioral interventions targeting cocaine use and sexual risk behavior (clinicaltrials.gov # NCT01327586). Adults recruited for participation were receiving outpatient treatment at state-operated mental health centers, reported any cocaine use in the past 60 days, and received Social Security disability payments as their primary income. Recent sexual risk behavior was *not* an inclusion criterion.

Of the 108 adults who provided written informed consent for participation in the clinical trial, 89 were included in these analyses. Eight individuals were excluded for missing data on target variables, and 11 were excluded because their scores on the primary impulsivity measure were worse than chance, suggesting misunderstanding of the task. Participants self-reported their biological sex/gender, age, race/ethnicity, years of education, employment, marital status, and sexual orientation. Race was measured by two dichotomous indicators, African-American and Hispanic, with participants identifying Caucasian or "Other" race constituting the reference group. The sexual orientation variable was converted to a dichotomous indicator (heterosexual or not) because only nine participants reported homosexual or bisexual orientation. Axis-I psychiatric diagnoses were determined by the Structured Clinical Interview for DSM-IV (First, Spitzer, Gibbon, & Williams, 2012).

Participants ranged in age from 19 to 57 years (Mean = 43, $SD = 9.3$), and the majority ($n = 53$; 60%) were men. Forty-nine (55%) participants were African-American, 23 (26%) were Caucasian, 14 (16%) were Hispanic, and 3 (3%) reported "Other" race/ethnicity. Participants reported 7–16 years of education (Mean = 11.5, $SD = 1.8$) and 28 (32%) had worked at all in the past three years. Forty-nine (55%) participants had a schizophrenia-spectrum disorder, 15 (17%) had major depressive disorder, 14 (16%) had bipolar disorder, 10 (11%) had generalized anxiety disorder, 4 (4%) had psychosis not otherwise specified, 12 (13%) had more than one disorder, and one participant had no Axis-I disorder. For analyses, the 9 participants with generalized anxiety disorder without co-occurring psychotic or mood disorder ($n = 8$) or no Axis-I disorder ($n = 1$) were the reference group. Most participants ($n = 75$; 84%) reported heterosexual orientation, 6 (7%) bisexual, 3 (3%) homosexual, and 5 (6%) did not report sexual orientation. Two participants (2%) were married, 3 (3%) were cohabiting with a partner, 21 (24%) were

divorced, widowed or separated, 62 (71%) were never married, and one did not report marital status. Thirty-four participants (38%) had a primary sexual partner. Of the 83 participants who provided their HIV status, 5 (6%) were HIV positive.

2.2. Measures

2.2.1. Sexual risk behaviors

Sexual risk behaviors, assessed by Audio Computer-Assisted Self-Interview, included information about sexual partners in the last 28 days, exchange of sex for money, drugs, or other goods, and use of drugs or alcohol at the most recent sexual experience. A primary partner was defined as a spouse, fiancée or other steady partner. A casual partner was defined as any individual who was not a primary partner (regardless of whether the participant had a primary partner) with whom the participant had sexual contact or a primary partner with whom the participant exchanged sex for goods, a friend with whom the participant had sex occasionally, or someone with whom the participant had sex only once. Having sexual contact with more than one person in the past 28 days constituted having multiple partners.

2.2.2. Impulsivity

Impulsivity was assessed by The Immediate and Delayed Memory Task (IMT/DMT 2.0) (Dougherty & Marsh, 2003; Dougherty, Marsh, & Mathias, 2002; Dougherty, Marsh, Moeller, Chokshi, & Rosen, 2000). The IMT/DMT has demonstrated validity as a measure of impulsivity for individuals with psychiatric disorders. Scores have reliably differentiated respondents with psychiatric disorders from healthy controls, and correlated significantly with other measures of impulsivity (e.g., Barratt Impulsiveness Scale, Trail Making Test, Time Estimation Task) as well as real-world indicators of impulsivity or impulse control deficits (e.g., physical aggression). The computer-delivered assessment involves two continuous performance tasks testing memory and impulsivity-related responses. In the IMT, participants attended to 5-digit numbers presented on a computer screen for 0.5 s, one every second, for five minutes. Participants were instructed to depress the button on the mouse if two consecutive numbers matched, and to withhold the response if they differed. The DMT required participants to discriminate matching and non-matching number pairs presented 3.5 s apart and separated by a filler number (12345) presented three times. Two blocks of each task (IMT then DMT) were presented in a 21.5-min trial. The parameter of interest was IMT-A-prime (A'), a measure of discrimination accuracy between signal (a matching number) and noise (a non-matching number). A' values range from 0.5 (chance) to 1.0, with higher values indicating better stimulus discrimination and less impulsive responding. Fourteen participants who had valid IMT-A' scores had missing or invalid DMT-A' scores, suggesting participants stopped responding during the DMT or misunderstood the task. Participants were paid \$10 for engaging in the IMT/DMT task, regardless of performance.

2.2.3. Substance use

Days of cocaine, alcohol, opiate, and marijuana use in the 90 days prior to study enrollment were measured by a timeline follow-back (TLFB) calendar (Sobell & Sobell, 1992). TLFB is an interview technique that uses reference to dates and events on a calendar to cue accurate recall of target events over a specific time period. The technique has provided desirable test-retest reliability of retrospective self-reports of alcohol use (Sobell, Maisto, Sobell, & Cooper, 1979) and reliable and valid substance use data for adults with psychiatric and substance use disorders (Carey, Carey, Maisto, & Henson, 2004; Haddock et al., 2009; Hjorthøj, Hjorthøj, & Nordentoft, 2012).

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