Effects of Alcohol Cues and Alcohol Intoxication on Drug Use Expectancies Among Men Who Have Sex With Men

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Abstract

Although alcohol and drug use have been identified as HIV-risk factors for men who have sex with men (MSM), little is known about how they interact. An alcohol administration paradigm was used to examine alcohol's cue and pharmacological effects on perceived drug use benefits and consequences in 117 MSM. Planned contrasts indicated that those in the alcohol cue (i.e., placebo) condition reported lower perceived drug consequences compared to controls. No cue effects were found for drug benefits. There was no pharmacological effect of alcohol as compared to alcohol cue on either outcome. Findings suggest that alcohol cues may influence the perception of consequences related to drug use, which has implications for health interventions targeting substance use and HIV risk.

Keywords

alcohol; alcohol cues; drug; substance use; expectancies; risk perception; HIV-risk; men who have sex with men

1. Introduction

Despite gains in the prevention of HIV transmission, men who have sex with men (MSM) remain disproportionately affected by HIV and AIDS (Centers for Disease Control and Prevention, 2010). MSM represent the largest number of new HIV cases and comprise more than half of the total number of HIV diagnoses in the United States (CDC, 2010). Although sex-risk behavior among MSM is multiply determined, research suggests that alcohol and drug use may represent particularly important risk factors in this population (Bimbi et al., 2006; Woolf & Maisto, 2009). The MSM population tends to use substances at higher rates

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than a national sample of American men (CDC, 2010; Stall et al., 2001) and show higher use rates of substances that are more highly associated with HIV risk (Drumwright, Patterson, & Strathdee, 2006; Frosch, Shoptaw, Huber, Rawson, & Ling, 1996). MSM often identify substance use as a major cause of unprotected sex (Gorman, Barr, Hansen, Robertson, & Green, 1997). Moreover co-administration of multiple substances in this population is common (Stall et al., 2001) and is associated with HIV seroconversion (Ostrow et al., 2009).

There is extensive evidence that alcohol and drug use are independently associated with increased HIV-risk behaviors (Baliunas, Rehm, Irving, & Shuper, 2010; Drumwright et al., 2006). Heavy alcohol use has been associated with lower rates of condom use (Kalichman, Simbayi, Vermaak, Jooste, & Cain, 2008), decreased risk perception (Fromme, Katz, & D'Amico, 1997; Maisto, Carey, Carey & Gordon, 2002), and higher rates of sexual risk-taking intentions (George et al., 2009). Similarly, those in the MSM population who use drugs show higher rates of risky behaviors for HIV transmission, including decreased condom use, increased sexual contact with more partners or longer duration of sexual contact with the same partner, and sharing of needles or other tools used for drug delivery (Drumwright et al., 2006).

One of the pathways to elevated sex-risk among those who use alcohol is an increased likelihood to use drugs. There is evidence that involvement in risky activities following alcohol consumption is influenced by changes in expected positive and negative outcomes associated with behavior (Fromme, Katz, & Rivet, 1997). For instance, individuals who consume alcohol perceive fewer negative consequences of risky behaviors (e.g. recreational drug use) compared to those who are sober (Fromme, Katz, & D'Amico, 1997). Even at lower doses (e.g., target BrAc = .04), the consumption of alcohol has been shown to make positive expectancies relatively more salient than negative expectancies of drinking (Palfai & Ostafin, 2003).

The actual consumption of alcohol is not necessary to activate processes that support appetitive responses. The act of drinking an alcohol placebo has been shown to activate expectancies about the effects of alcohol on cognitive tasks (Fillmore, Carscadden, & Vogel-Sprott, 1998). Indeed, simply priming the concept of alcohol can activate positive expectancies around sexual desire (Friedman, McCarthy, Forster, & Denzler, 2005).

In addition to these substance-specific effects of cues and consumption on expectancies, there is evidence for cross-substance effects on cognitive-motivational processes (Ostafin & Palfai, 2006; Palfai, Monti, Ostafin, & Hutchison, 2000). Alcohol administration has been shown to increase attentional bias for cocaine cues among cocaine users (Montgomery et al., 2010) and tobacco cues among regular smokers (Field, Mogg, & Bradley, 2005). Research has shown evidence of cross-cue reactivity, as urges to smoke tend to be stronger in the presence of alcohol cues for those who smoke and drink (Rohsenow, Colby, Martin, & Monti, 2005). Taken together, evidence suggests that cross-substance responses may be a function of common biological and learning processes that change the way that individuals process information related to one substance when exposed to other substances (Little, 2000).

Although the evidence suggests that both the pharmacological and cue effects of alcohol may influence cognitive-motivational processes related to substance use, the effects of alcohol and alcohol cues on MSM's expectancies of drug use benefits and risks have not been well studied. MSM may have unique expectancies around substance use (Mullens, Young, Dunne, & Norton, 2010) and given the prevalence of substance use and associated HIV risk, gaining a better understanding of factors that influence perceived benefits and risks may inform clinical interventions and improve health outcomes for this vulnerable

population. This study examines the effects of alcohol intoxication and alcohol cues on perceived drug use risks and benefits in a sample of MSM through the use of a placebo-controlled alcohol administration paradigm. Based on previous work, it was hypothesized that individuals exposed to alcohol-related cues (i.e. an alcohol placebo beverage) would report lower negative and higher positive drug use outcome expectancies compared to those in the control beverage condition. Similarly, it was hypothesized that participants who consumed alcohol would show lower ratings of negative expectancies and higher ratings of positive expectancies for drugs compared to alcohol placebo subjects.

2. Method

2.1 Participant Recruitment

The current study is a secondary data analysis from a larger data set (Maisto, Palfai, Vanable, Heath, & Woolf-King, 2012). The participants were 117 MSM between the ages of 21 and 50 who were recruited through advertisements in publications that target the gay male or MSM population and internet social networking sites. Eligibility criteria included: history of sexual activity with men; sexual activity in the past year; not in a committed relationship for past 3 months; moderate or heavy current drinking pattern; no current or history of alcohol or psychiatric problems; and no medical problems that would contraindicate the use of alcohol. Given concerns about privacy for individuals in this sexual minority group who were asked about illegal substance use and sexual behavior, researchers obtained a Certificate of Confidentiality from the Department of Health and Human Services. In addition, consultants with experience in local MSM community organizations helped to develop recruitment materials and procedures. For a full description of participant recruitment and sampling procedures, inclusion/exclusion criteria, and data regarding response rate versus enrollment, see Maisto et al. (2012).

2.2 Measures

Drug outcome expectancies was measured with the Cognitive Appraisal of Risky Events (CARE) Questionnaire (Fromme, D'Amico, & Katz, 1999), a reliable and valid instrument of anticipated positive and negative outcomes related to risk behaviors. The CARE investigates a wide range of outcomes, although the two variables of interest for the purposes of this analysis were ratings on a 1-7 scale (1=not at all likely, 4=moderately likely, 7=very likely) of the likelihood of positive consequences and negative consequences, respectively, of recreational drug use of marijuana, cocaine, hallucinogens, and amphetamines as well as the use of drugs in conjunction with alcohol (items 1a-1d and 21 on the questionnaire). An average of scores for these items was derived to create drug use positive (i.e. benefit) & drug use negative consequences (i.e. risk) scores for the variable of interest, in line with previous research (Maisto, Carey, Carey, Gordon, & Shum, 2004). The coefficient alphas for these two subscales in this sample were .80 and .82, respectively.

Social desirability, or the tendency to present oneself in a favorable light, was measured with the Marlowe-Crowne Social Desirability Scale (SDS; short form) (Reynolds, 1982). This variable controls for potential social desirability biases associated with reporting illegal and stigmatized behaviors such as drug use.

2.3 Procedures

Individuals were screened over the phone and if eligible came in to the lab for Session 1, which involved further screening and baseline measures. Participants who were eligible for Session 2 were scheduled to return in approximately 1 week. Upon arrival at the lab for Session 2, participant eligibility was confirmed. Participants were randomly assigned to one of three beverage conditions as part of a 3 Beverage x 2 Arousal design. Participants either

received alcohol (with target BAC = .07%), a placebo (flat tonic water with lime juice, poured from a vodka bottle into a glass with vodka and a vodka-soaked lime on the rim to enhance alcohol cues), or an amount of water comparable to the other two conditions. Placebo manipulations have been shown to be effective, even when individuals in placebo conditions do not believe they have consumed much alcohol or that they are extremely intoxicated (Schlauch et al., 2010). Manipulation checks supported the effectiveness of the design in the current study (Maisto et al., 2012). Participants completed the risk perception measure along with other questionnaires during the ascending limb of the targeted BAC. Prior to these questionnaires participants were exposed to one of two video segments (i.e., high or low arousal). As these videos did not influence hypotheses or results, they are not discussed further here (see Maisto et al., 2012 for a full description of procedures). All participants remained in the laboratory until their BAC was at or below .02% to ensure participants' safety.

2.4 Statistical Analysis

Study hypotheses were tested using hierarchical linear regression analyses. To test the distinct effects of the cue and pharmacological effects of alcohol, two sets of dummy coded variables were created. First, to examine cue effects, we contrasted the placebo and control conditions. To test for alcohol intoxication effects, the alcohol and placebo conditions were compared. Arousal conditions were collapsed across Beverage groups based on previous analyses (Maisto et al., 2012). Four hierarchical regression analyses were conducted to assess the influence of beverage condition on expected drug benefits (CARE Positive subscale) and drug use risk (CARE Negative subscale) (i.e., placebo versus control and alcohol versus placebo for each subscale), controlling for age and SDS in line with Maisto et al., (2012). For all models, the first step included entering participants' age and SDS total as covariates in the model. In step two, we looked at the impact of beverage condition as coded in the contrast (i.e. placebo versus control or alcohol versus placebo) on expectancies of drug use risk and drug use benefit.

3. Results

3.1 Effects of alcohol cues on perceived drug use risk and benefit

Mean CARE scores for the Positive and Negative subscales collapsed across arousal conditions are presented in Table 1. Regression analyses, presented in Table 2, showed that alcohol cues inversely predicted drug use consequences (β = -.29; p <.01) such that individuals in the placebo (i.e. alcohol-cue) condition perceived negative consequences of drug use to be significantly less likely compared to those who were in the control condition. There was no effect of alcohol cue on ratings of perceived drug use benefit (*R-squared change* = .00; p = .96). Analyses were also conducted without social desirability as a covariate and resulted in similar findings.[1]

3.2 Effects of alcohol intoxication on perceived drug use risk and benefit

Regression analyses of the pharmacological effects of alcohol did not provide evidence to support the view that perception of either positive or negative drug outcomes were influenced by consuming alcohol above and beyond cue effects. Alcohol intoxication was not a significant predictor of perceived drug use consequences (*R-squared change* = .00; p = .75) or drug use benefits (*R-squared change* = .00; p = .95).

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[1]For alcohol cue and drug use consequences: (β = -.29; p <.01); Alcohol cue and drug use benefit (R-squared change = .00; p = .95). For alcohol intoxication and drug use risk: (R-squared change = .00; p = .80; Alcohol intoxication and drug use benefit (Rsquared change = .00; p = .97).

4. Discussion

Combined alcohol and drug use may place MSM at particularly high risk for HIV transmission (CDC, 2010; Patterson, Wolf, Hall, & Golder, 2009; Stall et al., 2001). In this study, we sought to better understand the interaction of these risk factors by examining the influence of alcohol and alcohol cues on perceived drug use outcomes in a sample of MSM. Results suggest that alcohol cues may lower the expectancies of negative consequences of drug use among MSM. Individuals who believed they received alcohol endorsed lower likelihood of negative outcomes from using drugs including marijuana, cocaine, hallucinogens, and amphetamines than those exposed to a control beverage. No effects were observed on perceived positive benefits of drug use.

These results are consistent with previous work that suggests that substance cues may modify cognitive-motivational processes across substances (Montgomery et al., 2010). Moreover, these effects appear to be specific to decreasing the perception of risk rather than increasing perceived benefits (Fromme, Katz, & D'Amico, 1997). These findings suggest that drinking-related cues may serve to reduce inhibitory mechanisms (i.e., perceived consequences) for the use of drugs, which may place MSM at increased risk for HIV. In contrast to previous work, however (e.g., Fromme, Katz, & D'Amico, 1997), there was no evidence from this study that alcohol intoxication had an independent influence on perceptions of negative outcomes related to drug use.

Given the connection between drug use and HIV risk in this population (Drumwright et al, 2006), prevention efforts and interventions that aim to reduce HIV risk (Rawson et al., 2008; Reback, Larkins, & Shoptaw, 2004) will need to attend to the effects of alcohol cues as triggers for drug-related risk. While there may be direct pharmacological effects of alcohol on HIV risk behavior (Ostrow et al., 2009), the current study suggests that the effects of drinking cues may also indirectly influence risk through drug use behavior.

A primary strength of this study is that it is one of the few experimental studies to examine the mechanisms that may underlie alcohol and drug use among MSM. The current study suggests that drinking may indirectly influence HIV-related risk by the influence of alcohol cues on the perception of negative drug use consequences. Although important to replicate in subsequent work, these findings highlight the need to attend to the effects of alcohol cues as triggers for drug-related risk in HIV-prevention efforts.

5. Role of the funding sources

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Highlights

- Examines alcohol cues and alcohol intoxication on perceptions of drug use risks and benefits among men who have sex with men.

- Alcohol cues were associated with lower perception of risk for drug use but were not associated with perception of benefits of drug use.

- Alcohol intoxication was not associated with either perception of drug use risk or benefit above and beyond cue effects.

- It is important to better understand the factors that impact risk taking behavior in an understudied population that is at high risk for HIV.

Table 1

Means and Standard Deviations of Drug Use Expectancy Scores by Beverage Condition

	Alcohol (N=38)	Placebo (N=39)	Control (N=40)
CARE Drug Positive	2.99 (1.54)	2.94 (1.24)	2.89 (1.59)
CARE Drug Negative	4.31 (1.81)	4.15 (1.62)	5.01 (1.40)

Table 2

Linear Regression: The Influence of Alcohol Cues on CARE Drug Use-Negative Ratings

Variable	B	S.E.	β	t	Sig	F for ΔR²	ΔR²	Sig F Δ
Placebo vs. Control								
Step 1						2.97	.07	.06
Age	-.04	.02	-.25	-2.25	.03*			
SDS Total	-.05	.07	-.09	-.78	.44			
Step 2						7.45	.09	<.01*
Age	-.05	.02	-.26	-2.45	.02*			
SDS Total	-.06	.06	-.11	-.98	.33			
Alcohol Cue	-.96	.35	-.29	-2.73	<.01*			

Notes: *B* = unstandardized coefficient; *S.E.* = standard error; β = standardized coefficient; SDS Total = social desirability scale total.