



Short Communication

What's the harm? Alcohol and marijuana use and perceived risks of unprotected sex among adolescents and young adults



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HIGHLIGHTS

- Significant association between dual alcohol/marijuana use and sexual risk perceptions.
- Alcohol use only was related to higher likelihood of unprotected sex.
- Unique relations between substance use pattern and perceived risk of vs. actual unprotected sex.

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ABSTRACT

The link between substance use and risky sexual behavior, particularly unprotected sex, among adolescents and young adults has been well established in the literature; however, less is known regarding how different patterns and types of substance use differentially relate to unprotected sex and perceived risks of unprotected sex. The current study examined perceived risks and unprotected sex among adolescents and young adults, and examined whether marijuana use, alcohol use, and dual marijuana and alcohol use were differentially linked to unprotected sex and perceived risks of unprotected sex.

Method: A sample of $N = 144$ adolescents and young adults ($M_{age} = 18.77$, $SD_{age} = 3.4$, range: 12–25) completed self-report questionnaires regarding past month substance use, unprotected sex, and perceived risks of having unprotected sex.

Results: In a hierarchical logistic regression, only alcohol use was related to having unprotected sex at last intercourse ($b = 0.25$, $p < 0.001$). The second multinomial logistic regression showed that the interaction of alcohol and marijuana use was significantly related to lower levels of perceived risk of unprotected sex (moderate risk: $b = 0.06$, $p = 0.04$, $OR = 1.07$; no/slight risk: $b = 0.07$, $p = 0.03$).

Conclusion: While dual marijuana and alcohol use was related to lower perceived risk of unprotected sex, only alcohol use only was associated with a higher likelihood of unprotected sex.

1. Introduction

Adolescence and emerging adulthood is a period when individuals typically begin engaging in substance use and risky sexual behavior (e.g., unprotected sex, sex with multiple partners). Almost 50% of adolescents/emerging adults report any lifetime substance use, with alcohol and marijuana the most commonly reported substances (SAMHSA, 2013, 2014); up to 32% of youth (aged 13–25) report lifetime marijuana use and 63% report ever drinking alcohol (Kann, McManus, Harris, et al., 2016). With respect to risky sexual behaviors (RSB), 43% of high school students reported not using a condom at last

intercourse and only 26% of college students reported consistently using a condom (CDC, 2015). Unprotected sex increases risk for sexually transmitted infections (STIs) and unplanned pregnancy, and youth ages 12–25 account for half of new HIV and STI diagnoses every year (CDC, 2015b, c). Further, individuals who engage in alcohol and marijuana use are more likely to engage in unprotected sex (Bryan, Schmiege, & Magnan, 2012; Scott-Sheldon et al., 2016), potentially due to unique social norms – including perceived risks – associated with substance-using groups (Sussman, Pokhrel, Ashmore, & Brown, 2007). The current study examined the link between substance use patterns (marijuana vs. alcohol vs. alcohol and marijuana use), unprotected sex,

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and perceived risks of unprotected sex among adolescents and young adults, to fill gaps in literature regarding which substance use patterns confer higher risk for RSB. For the current study, unprotected sex refers specifically to having sex without a *condom*.

1.1. Substance use and risky sexual behavior

The link between RSB and both alcohol (Cooper, 2002; Scott-Sheldon et al., 2016) and marijuana (Bryan et al., 2012) is well-documented. However, in examining whether substance type (marijuana vs. alcohol) or substance use patterns (marijuana and alcohol vs. marijuana or alcohol) differentially relate to RSB, results are conflicting as to whether alcohol (Kerr, Washburn, Morris, Lewis, & Tiberio, 2015) or marijuana (Ritchwood, DeCoster, Metzger, Bolland, & Danielson, 2016) use is more closely related to RSB, or whether dual use further increases risk for RSB (Green et al., 2017; Metrik, Caswell, Magill, Monti, & Kahler, 2016). One explanation for unique associations across substance use patterns may be related to peer affiliation, as there are different peer groups across substance type (e.g., alcohol vs. marijuana users). Thus, substance-using peer networks/connections may influence opportunities for RSB or adaptation of unique social norms (Sussman et al., 2007). Of relevance to the current study, individuals' affiliation with substance-using peers may influence both opportunities for unprotected sex and perceived risks regarding unprotected sex.

1.2. Risk perceptions of unprotected sex

Literature examining associations between substance use and sexual risk perceptions is sparse and outdated (Hingson, Strunin, Berlin, & Heeren, 1990; Lawrence & Crosby, 2000). Further, no research has examined whether risk perceptions regarding unprotected sex, specifically sex without a condom, vary across substance use patterns. This is important because risk perceptions are linked to actual behavior, including unprotected sex (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Janz & Becker, 1984). Those who perceive more risk of having unprotected sex, as well as higher risk of STIs and HIV, report less unprotected sex (Gurvey, Adler, & Ellen, 2005; Matson, Chung, Huettner, & Ellen, 2014). The current study broadly focuses on perceived risk of unprotected sex, encompassing perceived risk of HIV, STIs, or pregnancy. Considering that many sexual health and HIV interventions focus on changing individuals' beliefs about unprotected sex (Albarracín et al., 2005), understanding risk perceptions across substance use patterns could help to better tailor HIV/STI prevention.

The current study examined whether perceived risk of unprotected sex is linked to substance use patterns among adolescents and young adults. We examined alcohol use, marijuana use, and dual alcohol and marijuana use, as these are the most commonly used substances among youth (SAMHSA, 2013). We hypothesized that dual alcohol and marijuana use would be linked to (1) higher likelihood of having sex without a condom compared to alcohol or marijuana use only and (2) lower perceived risks of having sex without a condom.

2. Method

2.1. Participants and procedure

Participants ($n = 144$; Mage = 18.77, SD = 3.4; 73.9% female; 63% Black/African American; 89.5% heterosexual; Table 1) were adolescents (age 12–17) and young adults (18–25) randomly sampled from local schools and community events to complete a community needs assessment regarding local HIV and substance abuse prevention services. All procedures were approved by the IRB. After obtaining informed consent and parental assent (under age 18), participants completed a 30-min self-administered survey and were compensated with \$25 gift cards.

Table 1
Sample demographics and study variables.

	Adolescents ($n = 65$)	Young adults ($n = 79$)	Total
Age	15.94 (1.99)	21.1 (2.41)	18.77 (3.4)
Gender			$\chi^2 = 6.24^*$
Males	36.9% (24)	18.5% (15)	26.7% (39)
Females	63.1% (41)	81.5% (66)	73.3% (107)
Race			$\chi^2 = 26.01^{**}$
Caucasian	12.3% (8)	49.4% (40)	32.9% (48)
Black/African American	83.1% (54)	46.9% (38)	63.0% (92)
Asian/Indian	–	1.2% (1)	0.7% (1)
Biracial	1.5% (1)	2.5% (2)	2.1% (3)
Hispanic	7.9% (5)	5.0% (4)	6.3% (9)
Alcohol use frequency (days used in previous month) ^a	5.43 (10.86)	6.72 (6.35)	6.56 (6.96)
Marijuana use frequency (days used in previous month) ^a	7.23 (8.35)	11.75 (11.41)	9.71 (10.23)
Unprotected sex at last sexual intercourse (% , n) ^b	20% (6)	24.2% (16)	22.9% (22)
Perceived risk of unprotected sex	2.43 (0.79)	2.23 (0.86)	2.32 (0.83)

Note. Values are M (SD) or % (n). $N = 144$. * $p < 0.05$. ** $p < 0.01$.

^a Sample range of minimum and maximum values for number of marijuana and alcohol use days in the past month was 0–30.

^b These percentages are based on the total number of individuals in the sample who reported ever having sex. $N = 96$ participants total reported ever having sex ($n = 30$ adolescents and $n = 66$ young adults).

2.2. Measures

2.2.1. Unprotected sex

One item asked whether individuals used a condom at their last sexual intercourse (0 = *condom used*, 1 = *no condom used*). Individuals who had never engaged in sexual intercourse were excluded from analyses.

2.2.2. Risk perceptions

One item asked “How much do people risk harming themselves when they have sex without a condom?” (1 = *no/slight risk*, 2 = *moderate risk*, 3 = *great risk*).

2.2.3. Substance use

Two items asked individuals the number of days in the past month they (1) used marijuana and (2) drank at least one alcoholic drink.

Separate continuous variables were created to measure frequency of alcohol and marijuana use, and a mean-centered marijuana x alcohol use interaction term represented dual use. Dual use refers to individuals who reported using both marijuana and alcohol in the past month, not simultaneous use specifically.

2.3. Statistical analyses

We conducted logistic regressions using SPSS 24.0 to examine associations between substance use patterns and (1) unprotected sex and (2) perceived risk of unprotected sex. Adolescents and young adults were included together in analyses, but we included status (0 = adolescent, 1 = young adult) as a predictor to account for important developmental differences between groups.¹ We used logistic regression with unprotected sex as the dependent variable and used multinomial logistic regression with perceived risks as the dependent variable and “great risk” as the reference category. Independent variables were entered as follows in both models: (1) status, (2) gender, (3) race, (4) marijuana use, (5) alcohol use, and (6) alcohol x marijuana.

¹ We assessed these models separately in young adults and adolescents, but due to low base rates of sexual behavior among adolescents, there was not enough power to examine these groups separately. Running analyses with young adults only showed similar results to those presented here.

Table 2
Binary logistic regression with unprotected sex as dependent variable.

		b	SE	p	OR	95% CI
Step 1	Status	0.60	0.59	0.31	1.81	0.55, 5.77
	Gender	0.45	0.62	0.47	1.57	0.48, 5.66
	Race	0	0	0.26	1.0	1.0, 1.0
Step 2	Marijuana use	0.08	0.04	0.05	1.08	1.0, 1.18
Step 3	Marijuana use	0.04	0.06	0.53	1.04	0.92, 1.17
	Alcohol use	0.25	0.07	0.001	1.28	1.11, 1.48
Step 4	Marijuana use	0.03	0.07	0.65	1.03	0.90, 1.19
	Alcohol use	0.25	0.08	0.002	1.29	1.10, 1.52
	Alcohol x Marijuana	0.01	0.03	0.65	1.01	0.96, 1.08

Note. $N = 96$. Only individuals who reported ever having sex are included in analyses. b = unstandardized regression coefficient. OR = odds ratio. Unprotected sex was coded as 0 = protected sex and 1 = unprotected sex. The alcohol x marijuana use interaction term was calculated based on mean-centered continuous values of alcohol and marijuana use. Status, race, and gender are not listed in Step 2–4 in order to consolidate space as these variables were not significant at any step.

3. Results

3.1. Substance use and unprotected sex across the sample

Individuals on average reported using marijuana 9.71 days ($SD = 10.23$) and alcohol 6.56 days ($SD = 6.96$) over the past month (7.5% and 21.9% reported any past month marijuana and alcohol, respectively); 11% reported using both marijuana and alcohol in the past month. Of those who reported ever having sex ($n = 96$, 67.6%), 22.9% reported unprotected sex at last intercourse (Table 1).

3.2. Prediction of unprotected sex

Alcohol use was significantly related to unprotected sex ($b = 0.25$, $p < 0.01$, $OR = 1.28$); more frequent drinking was linked to a higher likelihood of unprotected sex. Neither status, race, marijuana use, nor marijuana x alcohol use were related to unprotected sex (p 's > 0.05 ; Table 2).

3.3. Prediction of risk perceptions

The interaction of alcohol x marijuana use was significant; those who reported using both alcohol and marijuana use were more likely to perceive less risk of having sex without a condom (moderate risk: $b = 0.06$, $p = 0.04$, $OR = 1.07$; no/slight risk: $b = 0.07$, $p = 0.03$, $OR = 1.07$). There were no differences in perceived risk across marijuana or alcohol use only (moderate risk: $b = -0.01$ and $b = 0.01$; no/slight risk: $b = -0.03$ and $b = 0.02$; p 's > 0.05). Neither status nor race were related to perceived risk of unprotected sex (p 's > 0.05 ; Table 3).

4. Discussion

The study examined associations between different substance use patterns and unprotected sex and perceived risk of unprotected sex. Contrary to hypotheses, only alcohol use was related to unprotected sex. Further, there was a significant relationship between dual alcohol and marijuana use and perceived risk of unprotected sex, such that those who used both alcohol and marijuana use had lower perceived risks of unprotected sex.

To our knowledge, this is the first study to examine whether different substance use patterns are differentially linked to risk perceptions of unprotected sex. This is important because risk perceptions influence behavior, and many successful HIV prevention programs focus on changing beliefs/perceived risks, and in turn, reducing unprotected sex (Albarracín et al., 2005). Results showed a significant association between dual marijuana and alcohol use and lower

Table 3
Multinomial logistic regression with perceived risk of unprotected sex as dependent variable.

		b	SE	p	OR	95% CI
No/Slight risk	Status	0.16	0.56	0.77	1.18	0.39, 3.53
	Race	-1.48	2.21	0.50	0.23	0.003, 17.26
	Gender	0.14	0.58	0.81	1.15	0.37, 3.62
	Alcohol use	0.02	0.08	0.81	1.02	0.87, 1.19
Moderate risk	Marijuana use	-0.03	0.10	0.72	0.97	0.80, 1.17
	Alcohol x Marijuana	0.07	0.03	0.03	1.07	0.39, 3.53
	Status	-0.35	0.46	0.45	0.71	0.29, 1.74
	Race	-1.75	2.18	0.42	0.17	0.002, 12.53
	Gender	-0.46	0.47	0.34	0.64	0.25, 1.60
	Alcohol use	0.01	0.08	0.88	1.01	0.87, 1.18
	Marijuana use	-0.01	0.08	0.95	1.0	0.85, 1.17
	Alcohol x Marijuana	0.06	0.03	0.04	1.07	1.0, 1.13

$N = 144$. "Great risk" of having sex without a condom was entered as the reference category compared to "moderate risk" and "slight/no risk." Positive coefficients signify higher likelihood of no/slight risk or moderate risk over great risk. Status, gender, and race were entered as categorical variables. Alcohol and marijuana use frequency were entered as continuous variables.

perceived risk of unprotected sex, suggesting that those who engage in more substance use (i.e., both alcohol and marijuana) perceive less risk of unprotected sex. This is consistent with the idea of peer affiliation and that use of different substances reflects participation and identification with unique peer groups (Sussman et al., 2007). Thus, individuals who use both marijuana and alcohol may be part of unique peer groups (alcohol-using vs. marijuana-using groups), and they may adapt social norms from different groups that may have additive or augmentative effects on sexual risk perceptions. It may also be that those engaging in more substance use are affiliating with similar peers who are engaging in more risky behavior.

It is interesting there were unique associations between substance use patterns and perceived risks vs. actual unprotected sex. Only alcohol use was related to unprotected sex, consistent with previous findings that alcohol use was more closely related to unprotected sex over and above marijuana use (e.g., Kerr et al., 2015). Unique environmental or situational factors associated with drinking may increase an individual's opportunities for unprotected sex (Cooper, 2002). There are also likely unique social norms associated with alcohol-using peer groups (Staras, Tobler, Maldonado-Molina, & Cook, 2011), which in turn influence behavior; however, findings do not support this.

The alcohol-myopia theory may explain the association between alcohol and unprotected sex, as well as the discrepancy in associations between substance use patterns and perceived risks vs. actual unprotected sex. Based on the theory, pharmacological effects of alcohol (i.e., reduced cognitive processing) diminish an individual's ability to process more distal cues, such as sexual risk perceptions, and instead focus on more immediate, salient cues, such as sexual arousal (Steele & Josephs, 1990). In fact, individuals report lower perceived sexual risks and greater intentions to engage in unprotected sex while under the influence of alcohol (Davis, Hendershot, George, Norris, & Heiman, 2007; Scott-Sheldon et al., 2016). Therefore, even though an individual may perceive unprotected sex as risky, under the influence, this may not be salient.

Findings also highlight inconsistency across the literature in the relationship between risk perceptions and unprotected sex (Albarracín et al., 2001). Despite evidence that risk perceptions influence unprotected sex (Matson et al., 2014), other evidence argues that other variables (e.g., condom negotiation skills) are better predictors of actual behavior (e.g., Parsons, Halkitis, Bimbi, & Borkowski, 2000; Sheeran, Abraham, & Orbell, 1999). As this was the first study to examine perceived risks across substance use patterns, future research should continue to examine how risk perceptions and other factors influence actual behavior across substance use patterns.

5. Limitations

Despite the novelty of the study, the single-item measure of perceived risk of unprotected sex limited understanding of risk perceptions across contexts, such as specific risks (e.g., HIV/STI risk) or partner characteristics. Additionally, we examined unprotected sex at last intercourse, which may not reflect one's typical condom use patterns (Hensel, Stupiansky, Orr, & Fortenberry, 2011), and is also not consistent with the past month time frame of measured substance use. The current study was cross-sectional and the sample size was small, and although findings are consistent with the alcohol-myopia theory, future research should examine temporal relationships between risk perceptions, unprotected sex, and unique substance use patterns as well as relationships between risk perceptions and unprotected sex across substance use patterns. Future research with larger, racially/ethnically diverse samples should examine patterns of substance use, perceived risks and unprotected sex separately in young adults vs. adolescents to examine potential group differences.

6. Conclusion

To our knowledge, this is the first study to examine associations between substance use patterns and perceived risk of unprotected sex and unprotected sex. Findings demonstrate that dual substance use is linked to lower perceived risks of unprotected sex compared to alcohol or marijuana use only. Despite this finding, only alcohol use was related to unprotected sex, thus further research is needed to better understand unique substance use patterns and associations with risk perceptions and unprotected sex and other RSB. These findings offer important clinical implications; many successful sexual health preventions target attitudes/perceived risks of unprotected sex, which in turn influence behavior (Albarracín et al., 2005). Further, it may be important to consider unique substance use patterns in tailoring preventions/interventions, as there may be unique social norms across different substance use groups or unique situational factors that may differentially influence risk.

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