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Perceived safety and controllability of events: markers of risk for marijuana use in young adults?

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Abstract

Drawing on constructs from the trauma literature, the current study evaluated perceptions of safety and controllability of events as potential markers of risk for marijuana use. In addition, we characterized these perceptions in relation to individual level substance abuse risk factors (marijuana expectancies, impulsivity, depression, and anxiety), gender, and race. Data were collected via web survey from college students at two northeastern universities (n=228, 82.0% female). Controllability of events (CE) was rated significantly higher by Blacks than Whites. Safety/vulnerability (SV) and CE were associated with impulsivity, depression, and anxiety. CE was also associated with marijuana expectancies. Logistic regression analyses revealed a modest but significant association between SV and lifetime use even after adjusting for race, gender, age, and individual level substance abuse risk factors (odds ratio=1.10, 95% confidence intervals:1.02–1.18). No association between SV and past 3 month frequency of use or between CE and either marijuana outcome was found. Findings support a link between perceptions of safety and ever using marijuana. They further demonstrate overlap of both perceived safety and controllability of events with substance use related risk factors, and suggest that they differ by race. Additional

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Author Disclosures

Contributors

Dr. Sartor conducted the literature searches and statistical analyses and wrote the first draft of the manuscript. Dr. Foster designed the study from which data were drawn and oversaw data collection. All authors provided input on interpretation of findings and edited the manuscript. All authors have approved the final manuscript.

Conflicts of Interest

We have no conflicts of interest to declare.

studies that assess substance use more broadly and query trauma history, using larger, more diverse samples, are needed to more fully grasp the relevance of these constructs to substance use, including their potential as targets for substance abuse prevention efforts.

Keywords

marijuana use; world assumptions; marijuana use expectancies; impulsivity

1. Introduction

Assumptions about how the world operates, including perceptions of benevolence and control over events, are well recognized as influences on mental health following traumatic events (Freh, Chung, & Dallos, 2013; Janoff-Bulman, 1989; Lilly, Howell, & Graham-Bermann, 2015). Despite the possibility that these perceptions impact other problem behaviors - such as alcohol and drug use - outside the context of trauma exposure, this area of research has been largely limited to the study of post-trauma adjustment. Substance use, which has long been linked to risk taking (Leigh, 1999) and impulsivity (Cohen & Fromme, 2002; Colder & Chassin, 1997; Jentsch, et al., 2014), may be influenced in part by cognitions related to the likelihood of adverse events occurring (i.e., safety of the world) or the degree to which those events can be controlled. These cognitions may in turn impact substance use expectancies. External locus of controI, i.e., the belief that reinforcement is contingent upon fate, luck, or powerful others, which has been linked to impulsivity (Plunkett & Buehner, 2007), has rarely been examined in relation to substance use, but one of the few studies to do so found an association with adolescent marijuana use (Bearinger & Blum, 1997). Low perceived vulnerability is likely associated with engagement in potentially risky behaviors, including substance use, in much the same way that high positive and low negative substance use expectancies are associated with problem use (Patel & Fromme, 2010; Stacy, Widaman, & Marlatt, 1990). However, the pathways from perceptions of safety and controllability of events to substance use, although potentially informative for the development of intervention strategies, remain largely unexplored.

The primary aim of this college sample based pilot study was to test the hypothesis that a high degree of perceived safety and controllability of events is associated with elevated likelihood of marijuana use and heaviness of use. We focused on marijuana use in college students because of the significant increase in control over environmental exposures during the college years and the possibility that the association of perceptions of safety and control with substance use are particularly salient for use of an illicit substance. In addition, we examined the correlation of these perceptions with traits, internal states, and cognitions linked to substance use, specifically, marijuana use expectancies, impulsivity, and negative affect. Finally, we tested for potential differences in perceptions by race and gender, which, to date, have not been examined in studies other than trauma focused investigations.

2. Methods

2.1. Participants and procedures

Undergraduate students were recruited from two northeastern universities (one all-female) through in-class and on-campus advertisements for a study of health behaviors and substance use. At the first site, participants (n=114) accessed the survey through a study link and code provided through Sona Systems©, a web-based participant pool software for universities designed to facilitate study recruitment. Sona Systems© was not available at the second site, so a study coordinator provided interested students (n=156) with the study link and access code. Students at least 18 years of age who were enrolled in a Psychology course and able to read English and provide informed consent were eligible; 610 students (400 at site 1, 210 at site 2) were invited to participate. Course credit was provided as compensation. Of the 270 students who accessed the survey, 42 were excluded due to missing data, resulting in a final sample size of 228 (82.0% female; 79.3% 18–22 years of age). Reasons for declining to participate are unknown but likely include lack of need or decision to pursue other activities for course credit. The racial composition of the sample was 63.1% White, 9.5% Black, 10.4% Asian, 9.5% multiracial, and 7.7% other race. Missingness on the safety/vulnerability and controllability of events measures was unrelated to marijuana use, gender, or race.

2.2. Measures

2.2.1. Lifetime marijuana use—status was assessed by asking, ‘How old were you when you first used marijuana?’ Individuals who endorsed ‘I have never used marijuana in my life.’ were categorized as non-users; all others (61.0% of the sample) were categorized as positive for lifetime use.

2.2.2. Frequency of marijuana use in the past 3 months—was assessed with the Marijuana Use Form (Buckner & Schmidt, 2008), using a scale of 0 (<once/month, including not at all) to 11 (≥21 times/week). Due to the skewness of the distribution, we collapsed frequency into a 4-level variable (approximately quartiles): <once/month, once/month, 2–3 times/month, and ≥once/week.

2.2.3. Perceptions of controllability of events (CE) and safety/vulnerability (SV) —were assessed with the subscales of the same name from the World Assumptions Questionnaire (Kaler, 2009). The CE subscale is composed of 5 items (e.g., “You usually can know what is going to happen in your life.”, “It is ultimately up to me to determine how events in my life will happen”) and the SV subscale is composed of 6 items (e.g., “People fool themselves into feeling safe,” “Anyone can experience a very bad event”), rated on a scale of 1 (strongly agree) to 6 (strongly disagree). High scores on the CE and SV subscales indicate high perceived controllability of events and perceived safety, respectively. One item on the CE subscale was dropped due to low correlations with other items. Cronbach’s alpha was 0.82 for the CE subscale with the remaining items, 0.79 for the SV subscale.

2.2.3. Other substance use related constructs—Marijuana expectancies were assessed using the Marijuana Effect Expectancy Questionnaire, coded into negative (e.g.,

"Marijuana slows thinking and actions") and positive (e.g., "I get a sense of relaxation from smoking marijuana") expectancies subscales (Aarons, Brown, Stice, & Coe, 2001). Impulsivity was assessed using the short version of the UPPS-P Impulsive Behavior Scale (Cyders, Littlefield, Coffey, & Karyadi, 2014), which is composed of 5 subscales: sensation seeking (e.g., "I quite enjoy taking risks."), negative urgency (e.g., "When I feel rejected, I will often say things that I later regret"), positive urgency (e.g., "I tend to lose control when I am in a great mood."), lack of perseverance (e.g., "Unfinished tasks really bother me."), and lack of premeditation (e.g., "I usually think carefully before doing anything.") Depression and anxiety scores were derived from the Brief Symptom Inventory (Derogatis & Melisaratos, 1983).

2.3. Data analysis

2.3.1. Associations of perceived controllability of events and safety/vulnerability with gender, race, and substance use related constructs—

Independent sample t-tests and analyses of variance were conducted to test for potential distinctions by gender and race, respectively, in CE and SV scores. Correlations between CE and SV scores and marijuana expectancies, impulsivity, depression, and anxiety were also examined.

2.3.2. Perceived controllability of events and safety/vulnerability as predictors of marijuana use—

Binary and ordinal logistic regression analyses were conducted with lifetime marijuana use and past 3 month frequency of marijuana use, respectively. In addition to CE and SV scores, all models included gender, race, and age (dichotomized as<21 vs. ≥21 due to use of a categorical variable to assess age). Positive and negative marijuana expectancies, impulsivity subscales, depression, and anxiety were added in the second step (adjusted models).

3. Results

3.1. Associations of CE and SV scores with gender, race and substance use related constructs

As seen in Table 1, CE scores were significantly higher in Blacks than Whites but did not differ by gender. No differences in SV scores by gender or race were observed. CE scores were significantly correlated with positive and negative marijuana expectancies, depression, anxiety and 4 of the 5 impulsivity subscales. SV scores were significantly correlated with depression, anxiety, and all 5 impulsivity subscales but neither positive nor negative marijuana expectancies. The CE and SV scales were correlated at −0.35 (p<0.001).

3.2. Logistic regression analyses predicting marijuana outcomes

Results of logistic regression analyses predicting lifetime marijuana use and frequency of marijuana use in the past 3 months are reported in Table 2. A high score on SV was associated with modest elevation in likelihood of marijuana use in both unadjusted (OR=1.08, CI:1.02–1.14) and adjusted (OR=1.07, CI:1.00–1.14) models. No associations between SV and frequency of use or between CE and either marijuana use outcome were observed.

4. Discussion

Drawing on constructs widely used in studies of trauma survivors but not previously applied to substance use research, we assessed perceived safety and controllability of events as possible markers of risk for marijuana use in college students. Perceived safety was positively associated with likelihood of ever using marijuana - but not frequency of use - even after adjusting for correlated risk factors, whereas controllability of events was unrelated to either marijuana outcome. However, we found evidence that both constructs are associated with impulsivity and, consistent with the one known study to examine negative affect in relation to these measures (Kaler, 2009), negatively associated with anxiety and depression. Perceived controllability of events was additionally associated with positive and negative marijuana expectancies and varied by race, with Blacks reporting a higher level than Whites.

Perceived safety and controllability of events were highly similar in their associations with negative affect, but only the CE scale was significantly associated with marijuana expectancies and opposite directions of effect with impulsivity subscales were observed for CE and SV scales. Thus, although moderately correlated, the two scales appear to be tapping distinct constructs. Whereas expectancies about the effects of marijuana use are linked to the degree of perceived control over events – perhaps including potential consequences of use – they do not appear to reflect an overall sense of safety in the world. Interpretation of distinctions between the associations of the two scales with various facets of impulsivity is more challenging, particularly given the absence of comparable measures of perceived safety used in this area of research, but the negative associations of CE with lack of premeditation and lack of perseverance is consistent with previous studies linking impulsivity to external locus of control (Plunkett & Buehner, 2007).

Given the absence of assessment for racial differences in prior studies using these scales, we again draw from the locus of control literature to interpret the observed differences in our sample. The higher CE scores in Blacks than Whites is inconsistent with the more frequent endorsement of external locus of control among Blacks (Shaw & Krause, 2001), which is understood as reflecting disparities in power and access to resources. This inconsistency may be attributable in part to the nature of the sample in that Black college students may experience a greater sense of control over events than Blacks with lower socioeconomic background.

4.1. Limitations

Findings should be interpreted with several limitations in mind. First, the sample size, relatively small number of individuals in each of the non-White racial categories, and underrepresentation of males in the sample may have resulted in insufficient statistical power to detect lower magnitude effects, as in the case of many pilot studies. The absence of evidence for interactions between gender and CE and SV scales in supplemental analyses suggest that associations with marijuana outcomes may not vary by gender but further investigation using samples with a larger proportion of male participants is needed to address that question. Second, findings may not generalize to young adults not attending college. Third, the observed significant associations are modest and should be interpreted

conservatively as simply supporting the merit of exploring perceptions of safety and controllability of events in substance use research.

4.2. Future directions

This novel integration of trauma related constructs into the investigation of marijuana use in college students lays the foundation for the broader application of perceptions of safety and controllability of events to drug and alcohol research. Investigating other substances of abuse and conducting larger scale studies with general population based samples and, ideally, longitudinal studies that can address directions of influences, are natural next steps. The most critical next step is the incorporation of assessments of trauma and trauma associated psychopathology (e.g., PTSD, depression) into future studies. Assumptions about the controllability and safety of the world, which are known to impact risk for PTSD (Freh, et al., 2013; Lilly, et al., 2015), may similarly influence risk for problem substance use following traumatic events and thus emerge as potential targets for substance abuse prevention efforts.

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Highlights

- Perceived safety was modestly associated with elevated likelihood of marijuana use.
- Perceived controllability of events (CE) was rated higher by Blacks than Whites.
- Both CE and perceived safety were correlated with impulsivity and negative affect.
- CE was also associated with marijuana expectancies.

Table 1

Controllability of events and safety/vulnerability scores by race and gender and correlations with marijuana expectancies, impulsivity, depression, and anxiety

	>Controllability of Events	Safety/Vulnerability
	Mean (SD)	
Gender		
Female	15.64 (4.27)	15.00 (5.01)
Male	17.05 (4.07)	15.61 (6.88)
Race		
White	15.23 (4.19)	15.43 (5.28)
Black	18.29 (5.36)[a]	13.81 (6.89)
Asian	17.35 (3.43)	13.75 (4.81)
Multi-racial	16.62 (3.43)	14.10 (3.59)
Other	15.53 (4.62)	16.88 (6.61)
	Pearson's r	
Expectancies		
Positive	−0.15*	0.09
Negative	−0.25**	0.12
Impulsivity		
Sensation Seeking	0.26**	−0.15*
Negative Urgency	0.03	−0.19**
Positive Urgency	0.20**	−0.14*
Lack of Perseverance	−0.24**	0.20**
Lack of Premeditation	−0.27**	0.26**
Depression	−0.18**	−0.21**
Anxiety	−0.16**	−0.14*

[a] significantly different from Whites at $p < 0.05$;

* $p < 0.05$;

** $p < 0.01$

Table 2

Results of logistic regression analyses predicting lifetime (any) marijuana use and frequency of marijuana use in past 3 months

	Lifetime marijuana use (*n*=228)		**Frequency of marijuana use in past 3 months (*n*=139)**	
	Base	**Adjusted**	**Base**	**Adjusted**
	OR (95% confidence intervals)		**OR (95% confidence intervals)**	
Controllability of Events	1.02 (0.95–1.10)	1.07 (0.98–1.17)	1.02 (0.93–1.11)	1.02 (0.92–1.12)
Safety/Vulnerability	**1.10 (1.03–1.17)**	**1.10 (1.02–1.18)**	1.05 (0.99–1.12)	1.04 (0.97–1.12)
Age	1.22 (0.65–2.27)	1.62 (0.80–3.30)	0.50 (0.24–1.03)	0.79 (0.35–1.80)
Male gender	1.25 (0.55–2.86)	0.88 (0.33–2.30)	2.36 (0.99–5.60)	1.79 (0.68–4.66)
Race				
Black	1.46 (0.49–4.37)	1.13 (0.30–4.23)	**4.72 (1.52–14.64)**	**3.98 (1.02–15.46)**
Asian	**0.26 (0.10–0.69)**	**0.17 (0.05–0.53)**	**0.09 (0.01–0.82)**	0.13 (0.01–1.38)
Multiracial	1.47 (0.52–4.14)	1.25 (0.39–4.01)	1.16 (0.42–3.20)	0.85 (0.25–2.87)
Other race	**0.32 (0.11–0.95)**	**0.28 (0.08–0.96)**	0.64 (0.15–2.76)	1.39 (0.30–6.51)
Expectancies				
Positive	----------	**1.03 (1.01–1.06)**	----------	**1.06 (1.04–1.09)**
Negative	----------	0.98 (0.96–1.00)	----------	**0.97 (0.94–0.99)**
Impulsivity			----------	
Sensation Seeking	----------	1.06 (0.94–1.20)	----------	1.01 (0.87–1.17)
Negative Urgency	----------	0.93 (0.79–1.10)	----------	1.07 (0.90–1.28)
Positive Urgency	----------	1.10 (0.93–1.31)	----------	1.02 (0.84–1.24)
Lack of Perseverance	----------	0.97 (0.81–1.16)	----------	0.87 (0.72–1.07)
Lack of Premeditation	----------	**1.32 (1.09–1.61)**	----------	1.11 (0.91–1.34)
Depression	----------	1.06 (0.96–1.16)	----------	**0.83 (0.74–0.93)**
Anxiety	----------	1.01 (0.91–1.12)	----------	**1.16 (1.02–1.32)**

OR=odds ratio. Bold indicates statistically significant at $p < 0.05$