

The interactive effect of anxiety sensitivity and frequency of marijuana use in terms of anxious responding to bodily sensations among youth

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Received 25 September 2007; received in revised form 2 January 2008; accepted 16 January 2008

Abstract

Marijuana use is associated with anxiety, particularly among those anxiety conditions in which panic is common. It may therefore be that risk factors for panic increase the likelihood that marijuana users will experience problematic anxiety symptoms. The current study investigated the role of one such risk factor, anxiety sensitivity (AS), or the extent to which an individual is frightened of anxiety symptoms. We examined whether AS interacts with frequency of marijuana use to increase anxious responding (using a three-minute voluntary hyperventilation procedure). The sample consisted of 153 adolescents (46.4% female) ages 11–17 ($M=14.92$, $S.D.=1.49$). As predicted, AS moderated the link between lifetime marijuana use frequency and both post-challenge physiological anxiety (as indexed by skin conductance) and post-challenge subjective anxiety in female (but not male) adolescents such that those with high AS and more frequent marijuana use demonstrated the highest level of challenge-induced fear response. This effect remained even after controlling for relevant variables (e.g., age, trait anxiety, lifetime alcohol and cigarette use). Present findings suggest AS appears to serve as an important and potentially specific anxiety-related variable that deserves serious attention as a potential vulnerability factor among frequent marijuana-using females.

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Keywords: Marijuana; Cannabis; Anxiety; Anxiety sensitivity; Biological challenge; Panic

1. Introduction

Empirical evidence indicates a link between anxiety and frequent marijuana use, marijuana-related impairment, and marijuana use disorders (Abel, 1971; Agosti et al., 2002; Buckner et al., 2007, 2006a,b, 2008; Oyefeso, 1991; Patton et al., 2002; Zvolensky et al., 2006a). The association between marijuana and anxiety

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appears strongest among anxiety conditions in which panic is common (e.g., social anxiety, panic disorder). To illustrate, social anxiety disorder (SAD) in adolescence appears to serve as a risk for marijuana dependence in adulthood (Buckner et al., 2008). Further, more frequent marijuana use is prospectively associated with panic attacks and panic disorder (Zvolensky et al., 2008) and panic attacks appear to be one of the most common consequences of marijuana use (Thomas, 1996).

Despite the link between marijuana use and certain anxiety states and disorders, little attention has been paid to individual-difference characteristics that may contribute to these relations. Given that marijuana use tends to co-occur with anxiety conditions in which panic commonly occurs, it may be that risk factors for panic increase the likelihood that marijuana users will experience problematic anxiety. One factor relevant to panic is anxiety sensitivity (AS), or the extent to which an individual fears symptoms of anxiety (Reiss and McNally, 1985). To illustrate, an individual high in AS may fear that heart palpitations signal a heart attack whereas someone low in AS may interpret the same sensations as non-threatening. AS has been found to predict panic attacks and panic disorder above and beyond relevant factors such as trait anxiety (Schmidt et al., 1997, 1999, 2006).

Given that marijuana use can produce bodily sensations such as acute changes in heart rate (O'Leary et al., 2002; Pillard et al., 1974), blood pressure (O'Leary et al., 2002), and respiratory functioning (Nahas and Latour, 1992), high AS individuals may interpret marijuana-related bodily sensations as threatening, thereby increasing the likelihood that they will experience acute anxiety and/or panic. In support of this conceptualization, marijuana use has been found to interact with AS to predict self-reported panic symptoms among young adult tobacco smokers (Zvolensky et al., 2006b). Specifically, high AS marijuana users reported the highest levels of panic symptoms and panic-related cognitions compared to high AS non-users and low AS individuals regardless of marijuana use status.

Although promising, the extant literature linking marijuana use to panic psychopathology is limited in that research to date has been conducted primarily with adults. Yet rates of marijuana use are particularly high among adolescents (Comeau et al., 2001; Johnston et al., 2004; Substance Abuse and Mental Health Services Administration, 2006). Further, the examination of the relations between marijuana use and anxiety among psychologically healthy adolescents (i.e., free from current or past Axis I psychopathology) limits the extent to which findings may be confounded. For instance, if other types of psychopathology common to marijuana use are present

in adult samples, observed relations could be due to the presence of psychopathology rather than the predictor variables of interest. Additionally, the use of a young, healthy sample allows for the examination of the relations between marijuana use, AS, and anxious reactivity prior to the point at which marijuana use problems and clinically meaningful AS and/or anxiety could interact to create a vicious cycle of marijuana use leading to increased anxiety leading to increased marijuana use to medicate anxiety reactions (Buckner et al., 2008).

The primary goal of the current study was to further clarify the role of AS in the association between marijuana use and intensity of challenge-induced anxious responding (cognitive and physical). Biological challenges (e.g., hyperventilation) are widely used procedures for the investigation of psychological and neurobiological factors associated with panic and anxiety responses (Zvolensky and Eifert, 2000). Specifically, we sought to test whether AS moderated the relation between marijuana use and anxious reactivity. We extended prior work in several ways. First, we examined challenge-induced anxiety responses (elicited by voluntary hyperventilation). Second, given data suggesting that frequent marijuana use is associated with greater levels of anxiety and panic compared to individuals who use marijuana less frequently (Oyefeso, 1991; Zvolensky et al., 2008), we examined frequency of marijuana use. It was hypothesized that even after controlling for relevant variables (alcohol use, trait anxiety, tobacco use), AS would moderate the association between frequency of marijuana use and challenge response such that individuals with the greatest frequency of marijuana use and highest levels of AS would demonstrate the greatest challenge-induced anxiety relative to frequent marijuana users with low AS and individuals with low levels of marijuana use regardless of AS. Third, in light of data indicating the relations between marijuana and anxiety is specific to females (Buckner et al., 2006a), we examined conducted analyses separately by sex.

2. Method

2.1. Participants

The sample consisted of 153 adolescents (46.4% female) ages 11–17 ($M_{\text{age}} = 14.92$, $S.D. = 1.49$) recruited through the general community. Advertising consisted primarily of flyers placed in the community (e.g., arcades, primary care offices, adolescent-oriented community centers). Advertisement booths were also set up in a local well-traveled marketplace on two separate occasions (approximately 2 months apart). The racial distribution of the sample generally reflected that of the

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