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Reliability and validity of a short form of the Marijuana Craving Questionnaire

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ABSTRACT

Background: The Marijuana Craving Questionnaire (MCQ) is a valid and reliable, 47-item self-report instrument that assesses marijuana craving along four dimensions: compulsivity, emotionality, expectancy, and purposefulness. For use in research and clinical settings, we constructed a 12-item version of the MCQ by selecting three items from each of the four factors that exhibited the greatest within-factor internal consistency (Cronbach's alpha coefficient).
Methods: Adult marijuana users ($n = 490$), who had made at least one serious attempt to quit marijuana use but were not seeking treatment, completed the MCQ-Short Form (MCQ-SF) in a single session.
Results: Confirmatory factor analysis of the MCQ-SF indicated good fit with the 4-factor MCQ model, and the coefficient of congruence indicated moderate similarity in factor patterns and loadings between the MCQ and MCQ-SF. Homogeneity (unidimensionality and internal consistency) of MCQ-SF factors was also consistent with reliability values obtained in the initial validation of the MCQ.
Conclusions: Findings of psychometric fidelity indicate that the MCQ-SF is a reliable and valid measure of the same multidimensional aspects of marijuana craving as the MCQ in marijuana users not seeking treatment.

1. Introduction

Marijuana (cannabis) is the most commonly used illicit drug throughout the world (Coffey et al., 2002; Degenhardt et al., 2008; Perkonigg et al., 2008). In the United States, prevalence among the population aged 12 and older is 40% for lifetime use and 6% for past month use (Substance Abuse and Mental Health Services Administration, 2007). Across various countries, prevalence of lifetime marijuana dependence ranges from 1% to 7% (Chen et al., 2005; Coffey et al., 2002; Stinson et al., 2006; Perkonigg et al., 2008). Craving is identified as a symptom of marijuana dependence (Coffey et al., 2002) and marijuana withdrawal (Budney et al., 2004; Copersino et al., 2006; Haney, 2005). Craving is typically described as a strong drive or urge, serving to promote continued drug use (dependence symptom) or to trigger relapse during abstinence (withdrawal symptom) (American Psychiatric Association [APA], 2000; Pickens and Johanson, 1992).

Marijuana craving has been reported in individuals seeking treatment and in laboratory studies with daily marijuana users. Among adults presenting for treatment, McRae et al. (2007) found that marijuana-dependent patients reported greater levels of marijuana craving than cocaine-dependent patients reported cocaine craving. In a separate treatment sample, 93% of marijuana-dependent adults reported experiencing mild craving for marijuana, and 44% rated their past craving as severe (Budney et al., 1999). A retrospective survey of marijuana users reporting about their most recent quit attempt revealed that craving was second only to irritability in severity and frequency; more than 50% of participants indicated that craving had contributed to failed quit attempts (Budney et al., 2008). Similarly, craving was the most frequent (82%) withdrawal symptom endorsed by marijuana-dependent adolescents seeking treatment (Cornelius et al., 2008). Daily marijuana users participating in residential (Haney et al., 2004) and nonresidential (Vandrey et al., 2008) laboratory studies reported significant increases in craving during periods of marijuana deprivation. Laboratory studies have also reported increased craving in response to marijuana-related imagery scripts (Singleton et al., 2002) and visual pictures (Wolfling et al., 2008) compared to neutral stimuli.

An impediment to a full understanding of the role of craving in addiction is the lack of agreement regarding its clinical significance, meaning, and measurement (Pickens and Johanson, 1992; Sayette et al., 2000). For example, DSM-IV does not list craving as a criterion of substance dependence (APA, 2000); however, craving is an optional diagnostic criterion in ICD-10 (World Health Organization, 2005). The varied conceptualizations of craving (Heishman et al.,

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Table 1
Factor structure of the Marijuana Craving Questionnaire-Short Form.

Factor 1 (*Compulsivity*)	
2	I could not easily limit how much marijuana I smoked right now
7	I would not be able to control how much marijuana I smoked if I had some here
10	I need to smoke marijuana now
Factor 2 (*Emotionality*)	
4	I would feel more in control of things right now if I could smoke marijuana
6	If I smoked marijuana right now, I would feel less tense
9	I would feel less anxious if I smoked marijuana right now
Factor 3 (*Expectancy*)	
5	Smoking marijuana would help me sleep better at night
11	If I were smoking marijuana right now, I would feel less nervous
12	Smoking marijuana would make me content
Factor 4 (*Purposefulness*)	
1	Smoking marijuana would be pleasant right now
3	Right now, I am making plans to use marijuana
8	It would be great to smoke marijuana right now

2001) have yielded inconsistent approaches to measurement. The majority of studies described in the preceding paragraph assessed marijuana craving using single-item questions that have face validity, but precluded the determination of internal consistency and reliability (Tiffany, 1992; Wewers et al., 1990). To overcome these deficiencies, measures of craving have been developed, using one to three items assessing urges and desires (e.g., Kozlowski et al., 1996). However, neither single items nor any single measure captures the varied nature of craving experienced by individuals along the drug-dependence continuum and the range of theoretical perspectives on craving (Verheul et al., 1999; Mezinskis et al., 2001). Given the absence of a psychometrically valid instrument with which to measure such multiple dimensions of marijuana craving, we developed the Marijuana Craving Questionnaire (MCQ).

The MCQ is a 47-item multidimensional scale covering a broad range of clinically and theoretically distinct explanations of marijuana craving. In the initial validation study (Heishman et al., 2001), the MCQ was administered to 217 current marijuana smokers not seeking treatment. Exploratory and confirmatory factor analyses yielded 17 items with significant loadings on four latent constructs (factors) that characterized marijuana craving. We examined item content and correlations between factor scores and variables commonly found in marijuana studies to assign meaning to the factors: (1) *compulsivity*, an inability to control marijuana use; (2) *emotionality*, use of marijuana in anticipation of relief from withdrawal or negative mood; (3) *expectancy*, anticipation of positive outcomes from smoking marijuana; and (4) *purposefulness*, intention and planning to use marijuana for positive outcomes. The four MCQ factor subscales had respectable internal consistencies, exhibited low to moderate positive intercorrelations, and were significantly correlated with history of marijuana use and a wide range of single-item measures of craving. Singleton et al. (2002) further documented the reliability and validity of the 47-item MCQ by demonstrating internal consistency and unidimensionality of the four factors, suggesting that each factor was tapping unique dimensions of marijuana craving. The validity of the MCQ as a state measure of craving has been demonstrated by increases in factor scores after exposure to marijuana-related visual, tactile, and olfactory cues (Lundahl et al., 2007) and auditory imagery scripts that differed in the intensity of marijuana-urge content (Singleton et al., 2002).

A disadvantage of the 47-item MCQ is that it takes 7 min to complete (Heishman et al., 2001), which likely would limit its use in clinical settings where patients are assessed with numerous forms and in research studies where measures are repeated frequently. Indeed, more than one-third of participants in the initial validation study suggested eliminating item repetition. Theoretically, a shorter form of any multiple-item questionnaire can be created without reducing reliability (Tiffany et al., 2000). One approach to constructing a shorter, yet reliable, scale would be to use only the MCQ items with significant factor loadings, but even a 17-item questionnaire might prove too lengthy to administer and score. Additionally, either all or most items on two of the factors (*emotionality* and *purposefulness*) were worded negatively to reduce variance due to acquiescence and might be more indicative of participants' inattention to rating than with their response to item content. Although we included practice items to ensure that participants understood the rating scale, negatively worded items required additional calculations before summing scores for each factor.

There is no generally accepted limit to the minimum number of items required to maintain psychometric fidelity between original and brief versions of any instrument, although there is agreement that at least three indicators (items) per factor are desirable in the development and validation of multidimensional scales (Marsh and Hau, 1999). Thus, we constructed a 12-item version of the MCQ (MCQ-Short Form, MCQ-SF) by retaining 6 of the 17 items with significant factor loadings (3 items each as indicators for Factors 3 and 4) and by selecting 6 of the remaining 11 items that exhibited the greatest within-factor internal consistency (Cronbach's alpha coefficient) as indicators for Factors 1 and 2 (3 items each). We worded all items in the positive direction, consistent with development of brief versions of similarly constructed craving questionnaires (Cox et al., 2001; Heishman et al., 2008; Paliwal et al., 2008). We estimated that completion of the MCQ-SF would take about 30 s, based on results with a similar 12-item tobacco craving scale (Heishman et al., 2004, 2008).

The purpose of this study was to compare the factor structure of the MCQ-SF to that of the MCQ by administering the MCQ-SF to an independent sample of marijuana smokers who were not interested in reducing or quitting their marijuana use. We hypothesized that the MCQ 4-factor structure would be replicated in the MCQ-SF. We examined items for congruence in factor patterns and loadings between the MCQ and MCQ-SF. We also included questions about the intensity, frequency, and duration of recent marijuana craving to explore the convergent validity of the MCQ-SF.

2. Methods

2.1. Participants

Marijuana smokers ($n = 490$) were recruited from the greater Baltimore community via print, radio, and television advertisements. Inclusionary criteria were: at least 18 years old and having made at least one "serious" (self-defined) attempt to quit marijuana. Participants gave written informed consent according to guidelines for the protection of research volunteers of the U.S. Department of Health and Human Services and were paid for their participation. The NIDA Institutional Review Board approved the study.