



Mindfulness-based relapse prevention for substance craving

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ABSTRACT

Craving, defined as the subjective experience of an urge or desire to use substances, has been identified in clinical, laboratory, and preclinical studies as a significant predictor of substance use, substance use disorder, and relapse following treatment for a substance use disorder. Various models of craving have been proposed from biological, cognitive, and/or affective perspectives, and, collectively, these models of craving have informed the research and treatment of addictive behaviors. In this article we discuss craving from a mindfulness perspective, and specifically how mindfulness-based relapse prevention (MBRP) may be effective in reducing substance craving. We present secondary analyses of data from a randomized controlled trial that examined MBRP as an aftercare treatment for substance use disorders. In the primary analyses of the data from this trial, Bowen and colleagues (2009) found that individuals who received MBRP reported significantly lower levels of craving following treatment, in comparison to a treatment-as-usual control group, which mediated subsequent substance use outcomes. In the current study, we extend these findings to examine potential mechanisms by which MBRP might be associated with lower levels of craving. Results indicated that a latent factor representing scores on measures of acceptance, awareness, and nonjudgment significantly mediated the relation between receiving MBRP and self-reported levels of craving immediately following treatment. The mediation findings are consistent with the goals of MBRP and highlight the importance of interventions that increase acceptance and awareness, and help clients foster a nonjudgmental attitude toward their experience. Attending to these processes may target both the experience of and response to craving.

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1. Introduction

Over the past decade, substance use disorder has been conceptualized as a chronic relapsing condition (McLellan, 2002; McLellan, McKay, Forman, Cacciola, & Kemp, 2005), where relapse has been variously defined as either the return to problematic substance use following treatment or as a process of behavior change (Brownell, Marlatt, Lichtenstein, & Wilson, 1986; Maisto, Pollock, Cornelius, Lynch, & Martin, 2003; Witkiewitz & Marlatt, 2004). A substantial amount of research over the past 20 years has focused on identifying predictors of relapse and developing treatments (including pharmacological and psychological) that may help prevent relapse. One of

the strongest predictors of relapse to emerge in both pre-clinical and clinical research studies is craving (Anton, 1999; Breese, Sinha, & Heilig, 2011; Drummond, 2001; Marlatt, 1978; Shadel et al., 2011; Sinha & O'Malley, 1999), and many of the promising pharmacotherapies and most effective psychotherapies for addiction have focused on reducing or managing substance craving. In the current paper, we review the efficacy of mindfulness-based relapse prevention as a treatment for substance use disorders and empirically examine mechanisms of action for reduction of substance craving.

1.1. Substance craving

The concept of “craving” as an essential facet of substance use disorders is generally accepted by researchers, clinicians and patients, yet operational and conceptual definitions vary widely (Anton, 1999; Potgieter, Deckers, & Geerlings, 1999; Rosenberg, 2009; Skinner & Aubin, 2010; Tiffany, Carter, & Singleton, 2000). Skinner and Aubin (2010) reviewed 18 models of craving that have emerged over the past 60 years, and concluded that while collectively the models of craving have been indispensable in the research and treatment of addictive behaviors, none of the models independently provide a complete explanation of the craving construct. For the purposes of the

Abbreviations: MBRP, mindfulness-based relapse prevention; TAU, treatment as usual; PACS, Penn Alcohol Craving Scale; AAQ, Acceptance and Action Questionnaire; FFMQ, Five Facet Mindfulness Questionnaire; ACT, Acting with Awareness subscale of the FFMQ; NONJ, Nonjudgmental awareness subscale of FFMQ; CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation; SE, standard error.

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current paper, we define craving as the subjective experience of an urge or desire to use substances. Consistent with numerous models of craving, we acknowledge that it can be experienced as intrusive thoughts and their elaboration (Kavanagh et al., 2006), an impulsive drive or motivation (Cox & Klinger, 2002), substance wanting (Robinson & Berridge, 1993), an emotional state (Tiffany & Wray, 2009), a physical sensation (Paulus, 2007), a stress response (Sinha & Li, 2007), or any other manifestation that is salient for an individual who endorses experiencing “craving” or an “urge” to use substances.

The roots of craving can be attributed to biological, affective, or cognitive motivators. Within biological models of craving, addiction is viewed as a brain disease, and the etiology of substance craving and substance use are both born out of neurobiological and physiological states (Robinson & Berridge, 1993; Wise, 1988). Craving can be reflected in neural states, as suggested by studies linking neurotransmitters such as dopamine, serotonin, and gamma-aminobutyric acid (GABA) to drug use (Johnson, Seutin, & North, 1992; Wise, 1988) and/or alcohol use (Addolorato, Leggio, Abenavoli, & Gasbarrini, 2005; Verheul, van den Brink, & Geerlings, 1999). For example, dopamine in the dorsal striatum has been associated with reported craving (Volkow et al., 2006), and GABA dysregulation has been associated with a craving drive described as a relief of tension (Addolorato, Abenavoli, Leggio, & Gasbarrini, 2005). Other biological models of craving focus on physiological withdrawal states, wherein craving can occur as interoceptive dysregulation (Goldstein et al., 2009; Paulus & Stein, 2006).

Affective models suggest that craving is an emotion that can be elicited by affective expectancies, negative affect or stress (Baker, Morse, & Sherman, 1986; Wikler, 1948). In terms of positive expectancy, craving for drug use is elicited with positive associations with the effects of drug use. With negative affect, craving is suggested to be a state elicited by the avoidance of negative affect or stress associated with withdrawal such that craving can be both the result and cause of stress (Sinha & Li, 2007). Thus, the core motivation to avoid negative affective states is the cause of craving (Baker, Piper, Fiore, McCarthy, & Majeskie, 2004). In support, stress- and negative-affect-induced states have been shown to increase craving in the laboratory (Sinha & O'Malley, 1999). Further, negative affect is one of the most frequently endorsed reasons for relapse (Brownell et al., 1986; Marlatt & Gordon, 1985). Within an affective model of craving, affective states can elicit craving or prevent individuals from inhibiting craving.

From a cognitive perspective, it is suggested that craving is rooted in cognitive processes (e.g., memory, expectancies) that reflect higher-order information processing (Tiffany, 1999) that evolve into automatic processes of use (Tiffany, 1990). For example, Marlatt posits that craving is a result of cognitive expectancies for drug use (Marlatt, 1978; Marlatt & Gordon, 1985). Stress-induced craving is an example of how cognitive interpretations of an event can trigger craving, even in a laboratory setting (Sinha & Li, 2007). Additional evidence suggests that self-efficacy is a critical factor in the relation between craving and substance use (Marlatt & Witkiewitz, 2005). Hence, cognitive models of craving clearly outline craving as a psychological process, separate from drug use, whereby craving can occur without substance use, and substance use can occur without craving (Skinner & Aubin, 2010).

While these perspectives provide unique explanations of the causes of craving, many specific models of craving are a complex amalgam of biological, affective and cognitive constructs. For example, the withdrawal model (Wikler, 1948) describes craving, or the drive to use, as a result of both a biological conditioned response to drug related stimuli, and an attempt to escape negative affective states. Additionally, the theory of neural opponent motivation identifies craving as a biological deviation from the homeostatic regulation of neurotransmitters that can be elicited by change in affective states (Koob & Le Moal, 2001, 2008).

Different perspectives on craving imply unique implications for treatment. A cognitive perspective of craving treatment might target working

memory (Houben, Wiers, & Jansen, 2011) or re-training attention to push substance cues away (Wiers, Rinck, Kordts, Houben, & Strack, 2010). An affective process perspective might focus on disrupting the association between negative affective states and the desire to use. A neurobiological perspective would be interested in directly targeting neurobiological dysfunction to impact craving (Volkow et al., 2006).

1.2. A mindfulness perspective on craving

A fourth perspective on craving, of particular interest to the present study, comes from the mindfulness literature, and the use of mindfulness-based treatments to reduce and cope with craving. Such a perspective has the potential to advance the conceptualization and the treatment of neurobiological, cognitive, and affective aspects of craving.

Mindfulness has been described as, “the awareness that emerges through paying attention, on purpose, in the present moment, and nonjudgmentally to the unfolding of experience” (pg. 145; Kabat-Zinn, 2003). While secularized in most Western treatment contexts, mindfulness meditation has roots in the Buddhist tradition. From a Buddhist perspective, craving is considered a core component of human existence, and craving and attachment are viewed as the root cause of human suffering (Bodhi, 2005). From a mindfulness perspective, we might view addiction as an effort to either hold on to or avoid cognitive, affective or physical experiences. In an effort to avoid suffering, an individual either clings onto positive states (e.g., craving the next high) or avoids negative states (e.g., seeking an escape from sadness). Mindfulness practice includes observing craving, which is considered to be a transient cognitive and affective phenomenon, just like any other experience. Thus, the intention of the practice is to bring awareness to the experience of craving and to learn to observe it without reacting and without judgment.

Another intention of mindfulness practice is to increase acceptance of one's experience, allowing one to experience his or her current physical and affective state as impermanent. In recognizing that neither positive nor negative states are enduring, an individual realizes that the effort exerted to achieve or cling to a particular state of being is not only futile, but causes suffering. The practice of accepting physical and affective states as they are in the present moment is counter to the clinging quality of craving (Breslin, Zack, & McMains, 2002). Finally, the practice of mindfulness meditation has been shown to reduce neural aspects of craving (Westbrook et al., 2011). Specifically, Westbrook et al. (2011) found that the brain regions that are typically activated during craving (including the subgenual anterior cingulate cortex) showed reduced activity during mindful attention of smoking images, as compared to looking at the smoking images without mindful attention. Furthermore, during mindful attention, there was significantly reduced functional connectivity between the subgenual anterior cingulate cortex and other regions associated with craving, including the ventral striatum and the bilateral insula. Taken together, there is evidence to suggest that mindfulness-based treatment has the potential in addressing neurobiological, cognitive, and affective aspects of craving.

1.3. Mindfulness-Based Relapse Prevention

Drawing from the Buddhist tradition, Marlatt (2002) recognized that craving and addiction could be targeted by mindfulness meditation, but that many individuals might need additional cognitive and behavioral skills for coping with high risk situations for relapse. In response to the need for integrating mindfulness meditation with cognitive-behavioral skills training for addiction, Mindfulness-Based Relapse Prevention (MBRP; Bowen, Chawla, & Marlatt, 2010; Witkiewitz, Marlatt, & Walker, 2005), was developed as an aftercare treatment program that was designed to reduce the risk and severity of relapse following intensive substance abuse treatment.

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