



Smoking-specific experiential avoidance cognition: Explanatory relevance to pre- and post-cessation nicotine withdrawal, craving, and negative affect



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HIGHLIGHTS

- Smoking-specific experiential avoidance is a malleable cognitive vulnerability
- Experiential avoidance predicts pre-quit withdrawal, craving, and negative affect
- Reductions in experiential avoidance predict quit-day abstinence
- Less reductions in experiential avoidance predicts early cessation withdrawal

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ABSTRACT

Background: Negative-reinforcement based cognitive processes have been implicated in the maintenance of cigarette smoking. Given the expectation that smoking will attenuate aversive internal experiences, smokers may be particularly unwilling to experience or remain in contact with smoking-related distress (i.e., experiential avoidance). Yet, there is little known about a cognitive-based process termed smoking-specific experiential avoidance with regard to withdrawal, craving, or negative affect during a quit attempt.

Method: Data were collected from adult daily smokers ($n = 259$) participating in a larger smoking cessation trial. Pre- and post-quit experiences of nicotine withdrawal, craving, and negative affect were examined in terms of cognitive-based smoking-specific experimental avoidance, measured by the Avoidance and Inflexibility Scale (AIS).

Results: Results indicated that baseline smoking-specific experiential avoidance was associated with greater overall levels of withdrawal, craving, and negative affect at treatment initiation (pre-cessation). Reductions in smoking-specific experiential avoidance from baseline to quit day were associated with increased likelihood of quit day abstinence. Such reductions were also predictive of lower levels of nicotine withdrawal, craving, and negative affect on quit day. Also, less reduction in experiential avoidance was associated with experiencing greater withdrawal in the early phase of quitting.

Discussion: The impact of cognitive-based experiential avoidance pertaining to smoking impacts both pre- and post-cessation experiences in terms of negative affect, withdrawal, and smoking cravings and may represent an important treatment target.

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1. Introduction

Motivation to avoid the experience of discomfort and negative affective states is one of the strongest drivers of maladaptive drug use (i.e., negative-reinforcement model of addiction; Baker, Piper,

McCarthy, Majeskie, & Fiore, 2004; McCarthy, Curtin, Piper, & Baker, 2010). One of the clearest examples of the negative-reinforcement process is evident in cigarette smoking. While the majority of smokers report motivation to quit smoking (68.8%), only 6.2% are actually successful in maintaining abstinence (for six months or more; CDCP, 2011). Smokers are more likely to lapse and relapse to smoking after a cessation attempt in the context of experiencing high levels of negative affect (e.g., Shiffman, 2005), which is thought in part to be related to the perceived negatively-reinforcing nature of smoking (i.e., smoking will

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help me relax and feel less tense; Brandon & Baker, 1991; Kassel, Stroud, & Paronis, 2003). Indeed, *cognitive processes* are thought to explain the link between the experience of negative affect and continued drug use (Curtin, McCarthy, Piper, & Baker, 2006; Kassel, Wardle, Heinz, & Greenstein, 2010); based on the theoretical understanding that one's interpretation and appraisal of thoughts can impact the frequency and form of negative affect and behavioral responding (e.g., Nosen & Woody, 2009).

A developing line of research has focused on the role of experiential avoidance in the maintenance of various forms of psychopathology, including substance use disorders (Chawla & Ostafin, 2007; Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Rooted in negative-reinforcement theories of behavior, experiential avoidance is a cognitive-affective regulatory process wherein individuals are unwilling to experience or remain in contact with aversive internal experiences (e.g., thoughts, emotions, memories, bodily sensations, images) and attempt to control the frequency or form of the experiences and the contexts in which they occur. This cognitive avoidance strategy, however, is theorized to actually lead to increased salience and functional importance of the avoided experiences, which in turn, yield increased control efforts to avoid expected negative outcomes (Hayes et al., 2006). Specific to smoking, one's tendency to inflexibly respond to smoking urges, negative affect, or interoceptive states (e.g., with avoidant strategies) may be a marker of 'risk' for continued reliance on cigarettes and cessation difficulties via experiencing more severe cessation sequelae (e.g., withdrawal, craving, negative affect). Evidence for this type of process can be found in work on thought suppression. For example, suppression of smoking-related thoughts is a common strategy utilized by smokers attempting to quit; resulting in short-term smoking reduction, but later increases in thoughts of smoking (i.e., a rebound effect), thereby making the process of cessation more difficult (Erskine, Georgiou, & Kvavilashvili, 2010). In fact, smokers with a greater tendency to suppress thoughts (generally, non-smoking specific) report a greater number of failed cessation attempts (Erskine et al., 2010), are more likely to be an unsuccessful quitter (Toll, Sobell, Wagner, & Sobell, 2001), and are apt to report more severe craving and certain withdrawal symptoms (Erskine et al., 2010, 2012), although these latter findings have been not fully consistent in past work (Litvin, Kovacs, Hayes, & Brandon, 2012; Nosen & Woody, 2009).

When smokers are provided cognitive-behavioral smoking cessation treatment specifically aimed at promoting psychological flexibility in the context of smoking-related distress (e.g., acceptance and commitment-based treatments; Bricker, Wyszynski, Comstock, & Heffner, 2013; Gifford et al., 2004), decreases in smoking-specific experiential avoidance are associated with increased likelihood of smoking abstinence after treatment (Gifford et al., 2004, 2011). Similarly, reductions in thought suppression are associated with greater abstinence likelihood (Bowen et al., 2009). These data suggest that treatment-seeking smokers who continue to seek out opportunities to escape, avoid, or reduce distressing smoking-relevant thoughts, feelings, and bodily sensations (or more generally maintain tendencies to suppress negative thoughts) may do so by re-initiating smoking, despite their goal of smoking cessation; a pattern that is in line with the central role of 'cognitive control' in the regulation of drug use behavior (Curtin et al., 2006; McCarthy et al., 2010). Of note, while experiential avoidance can be conceptualized as a cognitive avoidance strategy, it is worth noting that a range of *behaviors* (e.g., smoking, drug use, self-harm, dysregulated eating) can be conceptualized to function similarly to cognitive avoidance strategies — that is, behaviors aimed at attempts for emotion regulation (Hayes et al., 1996).

Smoking-specific experiential avoidance has primarily been examined as a mechanism of change in smoking cessation treatment (Bricker, 2011; Bricker, Mann, Marek, Liu, & Peterson, 2010; Bricker et al., 2013; Gifford et al., 2004). More recent work has suggested that smoking-specific experiential avoidance also relates to the interplay of various emotional vulnerabilities and a host of pre-quit smoking processes (Farris, Zvolensky, Blalock, & Schmidt, 2014; Zvolensky,

Farris, Schmidt, & Smits, 2014). Collectively, the current literature suggests that smokers who engage in avoidance of smoking-related distress are at greater risk cessation difficulties, including pre-cessation risk factors (e.g., perceiving greater barriers to successful cessation, more failed prior quit attempts, more severe problematic symptoms while quitting, and greater negative-reinforcement expectancies about the outcomes of smoking) and post-cessation outcomes (i.e., increased likelihood of cessation failure). However, it is presently unknown if and how smoking-specific experiential avoidance impacts the experience of nicotine withdrawal, craving, or negative affect. Given the cognitive interpretation of affective/interoceptive states impacts the subjective experience of such states (Langdon et al., 2013; Zvolensky, Farris, Guillot, & Leventhal, in press), smokers with a greater tendency to engage in experiential avoidance when experiencing distressing smoking-related thoughts, feelings or sensations, may subjectively experience more severe nicotine withdrawal, more intense craving, and greater negative affectivity during the process of smoking cessation. It is also possible that reductions in smoking-specific experiential avoidance (increased cognitive flexibility) could increase the likelihood of quit day abstinence and lessen the perceived cognitive, affective, and interoceptive distress experienced post-cessation.

Together, the current study aimed to examine the impact of smoking-specific experiential on nicotine withdrawal, craving, and negative affect among a sample of treatment-seeking smokers who were participating in a smoking cessation treatment program. Given the experience of withdrawal, craving, and negative affect has been shown to change and impact cessation both before and after quitting (McCarthy, Piasecki, Fiore, & Baker, 2006; Strong et al., 2009, 2011), these processes were examined in two phases — pre- and post-cessation. First, it was hypothesized that higher levels of cognitive-based experiential avoidance would be associated with greater withdrawal, craving, and negative affect during the three weeks prior to quitting. Second, it was expected that greater observed reductions in experiential avoidance from pre-quit to quit day would be associated with greater likelihood of smoking abstinence on quit day. Lastly, it was hypothesized that reductions in cognitive-based experiential avoidance for smoking by quit day would be associated with lower levels of withdrawal, craving, and negative affect during the post-cessation period.

2. Material and methods

2.1. Participants

Participants in the current study were recruited as part of a larger smoking cessation and panic disorder prevention trial (clinicaltrials.gov #NCT01753141; baseline sample reported in Farris et al., 2014; Zvolensky et al., 2014). The parent trial included participants who were between the ages of 18–65 who reported smoking ≥ 8 cigarettes per day for at least the past year, with motivation to quit rated as at least 5 or higher on a 10-point scale. Exclusion criteria included current use of smoking cessation products or treatment, or regular use of other tobacco products, unstable psychotropic medication (had to be stable ≥ 3 months), no history of panic disorder (defined by the DSM-IV-TR), past-month suicidality, a history of psychotic-spectrum disorders, current pregnancy or nursing, and inability to provide informed consent. Of the 724 who were evaluated for the trial, 574 participants completed baseline assessment. Eligible participants with all available data on study predictors who attended at least one treatment session ($n = 259$; 49% female; $M_{\text{age}} = 38.13$, $SD = 3.46$) were included in the analyses for the current study. Participants primarily identified race as White (88.0%). The sample reported being never married (39.8%), married (37.5%), divorced (17.0%), separated (3.1%), and widowed (2.7%). Participants were overall well-educated: 69.2% reported completing at least part of college.

At baseline, participants averaged smoking 18.5 ($SD = 8.69$) cigarettes per day, with smoking initiation at age 14.8 ($SD = 3.44$); 30.5% of the sample indicated living in a household with another smoker.

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