



Can attitudes about smoking impact cigarette cravings?☆



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HIGHLIGHTS

- Laboratory exposure to smoking and stress imagery induced cigarette craving.
- Favorable smoking attitudes predicted higher craving levels.
- Result support a link between smoking-related attitudes and motivation to smoke.

ARTICLE INFO

Keywords:

Smoking consequences questionnaire
Attitudes
Negative consequences
Cigarette craving
Cue-induced craving

ABSTRACT

Cigarette cravings, especially those in response to environmental stressors and other smoking-related triggers (e.g., passing by a favorite smoking spot), are important contributors to smoking behavior and relapse. Previous studies have demonstrated significant individual differences in such cravings. This study explores the possibility that attitudes about smoking can influence the experience of cigarette craving. Consistent with classical theories of the links between cognition and motivation, we predicted that smokers who exhibit more favorable attitudes towards smoking would have greater cravings. Daily smokers ($n = 103$, mean age = 41.8 years, 33% female) were instructed to imagine smoking, stress, and neutral scenarios. Cravings were measured prior to and after each exposure. Participants also completed an abridged version of the Smoking Consequence Questionnaire (SCQ) that had them rate the: 1) desirability and 2) likelihood, for eighteen separate negative smoking consequences (e.g., “The more I smoke, the more I risk my health”, “People will think less of me if they see me smoking”). Findings revealed that favorable attitudes about the consequences of smoking, as measured by the SCQ-desirability index, significantly predicted cigarette cravings. Findings suggest that individual attitudes toward smoking may play an important role in better understanding cigarette cravings, which may ultimately help identify targets for more efficient and effective cognitive/attitude-based interventions for smoking cessation.

1. Introduction

Cigarette smoking is a major public health concern worldwide. Estimates from the U.S., suggest that cigarette smoking is responsible for up to 20% of all deaths each year (U.S. Department of Health & Human Services, 2014). Despite the recognized negative health consequences of smoking, approximately 15% of adults from the U.S. reported in 2015 that they were currently smoking. (Jamal et al., 2016). Furthermore, while many smokers express the desire to quit, smoking cessation success rates are between 4 and 7% on any given attempt without assistance (American Cancer Society, 2014). Accumulating evidence has found that individual differences between smokers are critical in elucidating the underlying mechanisms of smoking initiation, maintenance and cessation (McClellon, Kozink, & Rose,

2008; Shiffman, Brockwell, Pillitteri, & Gitchell, 2008; Vink, Willemsen, & Boomsma, 2005). In particular, research focusing on cognitive and attitudinal factors has found that smokers who substantially minimize their perceptions of health-related smoking risks following a quit attempt are more likely to relapse (Gibbons, McGovern, & Lando, 1991).

Prior studies have demonstrated that smokers hold diverse perceptions about their own smoking risks. For instance, although they acknowledge that smoking increases health risks, many smokers minimize the magnitude of these risks—especially when comparing their own risk to that of other smokers (Weinstein, 1998). Besides perceptions of disease risk, other attitudes about the pros and cons of smoking have also been shown to predict smoking behavior. For example, Halpern-Felsher, Biehl, Kropp, and Rubinstein (2004) found that smoking was

☆ Supported by NIH Grant #R34 DA031327; No conflicts of interest to report.

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negatively correlated with perceived negative consequences (e.g. bad breath, smelling of smoke) and positively correlated with perceived benefits (e.g. feeling relaxed, popularity). Accordingly, other studies have suggested that smokers—especially those who smoke daily and/or are nicotine-dependent—strongly believe that smoking improves mood, ability to cope with stress, and social enhancement; and, while they maximize the benefits of smoking, they deemphasize negative smoking consequences—including the unpleasant side effects and addictiveness (Arnett, 2000; Hendricks & Brandon, 2005; Mullennix, Kilbey, Fiscaro, Farnsworth, & Torrento, 2003; Pokhrel & Herzog, 2015).

Government guidelines have suggested that primary physicians should specifically address potential negative smoking consequences in order to motivate smokers to quit (Fiore et al., 2008). Similarly, public health campaigns often depict smoking consequences in an attempt to discourage initiation and to encourage cessation (Durkin, Brennan, & Wakefield, 2012; Wakefield, Flay, Nichter, & Giovino, 2003). Indeed, adolescents from the United States who minimized the long-term consequences of smoking were found to be more than three times more likely to initiate smoking (Song et al., 2009). Similarly, they were more than twice as likely to initiate smoking if they underestimated short-term consequences of smoking in comparison to their peers. Brandon and Baker (1991) and others (e.g., McCoy et al., 1992; Seigers & Terry, 2011) found that, compared to non-smokers and ex-smokers, daily and occasional smokers of college age rated negative consequences as less likely to occur. Analogous results have been observed abroad (Aryal, Petzold, & Krettek, 2013; Piko, 2001).

Motivations to quit and treatment outcomes have also been negatively associated with perceived risks (Copeland & Brandon, 2000; Costello, Logel, Fong, Zanna, & McDonald, 2012; Gibbons et al., 1991; Lipkus, Green, Feaganes, & Sedikides, 2001; McKee, O'Malley, Salovey, Krishnan-Sarin, & Mazure, 2005; Wetter et al., 1994). For example, McKee et al. (2005) observed that smokers who perceived risks of smoking as more likely had greater pretreatment motivation to quit. Gibbons et al. (1991) demonstrated that following a quit attempt, relapsers had significantly lowered their perceptions of smoking risks from their original rating prior to cessation, while abstainers' perceptions remained the same. Taken together, these findings demonstrate the important role of risk perceptions in smoking cessation.

An independent literature has highlighted the importance of drug craving as a contributor to the maintenance of drug use, as well as quit failure (Conklin et al., 2015; Erlich & Bovbjerg, 2004; Franken, 2003; Pickens & Johanson, 1992; Piasecki, 2006; Tiffany & Wray, 2012). For example, Killen and Fortmann (1997) found that craving was a significant predictor of relapse in a combined sample of > 2600 smokers from three separate cessation studies. In addition to these “tonic” levels of craving, research has consistently demonstrated that smokers exhibit powerful “phasic” craving reactions in response to being exposed to smoking paraphernalia (Carter & Tiffany, 1999), and when under stress (Sinha, 2009). Ubiquitous presence of cues and stressors in the environment, and their attendant phasic cravings, has been postulated as another important contributor to smoking cessation failure (Ferguson & Shiffman, 2009). Although many theories of cue- and stress-induced craving have been advanced, including biological models (Robinson & Berridge, 1993), cognitive models (Tiffany, 1990), and conditioning models (Siegel, 1983; Stewart, De Wit, & Eikelboom, 1984), little research has been done to evaluate the potential role of attitudinal factors on craving. The possibility that attitudes and beliefs about drugs predict craving is generally consistent with a number of classical theoretical models of behavior, including Festinger's (1957) Cognitive Dissonance Theory and Ajzen's (1985) Theory of Planned Behavior (see also Armitage & Conner, 2001). Indeed, these theories highlight the importance of attitudinal factors as predictors of behavior. As one example, using the Theory of Planned Behavior, Spijkerman, van der Eijnden, Vitale, and Engels (2004) found that attitudes toward smoking and drinking predicted willingness and desire to drink in the future. Similarly, in an experimental study, Simmons, Webb, and

Brandon (2004) found that increasing cognitive dissonance about the benefits of smoking increased intentions to quit. What has received less attention, however, is the possibility that attitudes are related to actual urges for drug use, which may in turn be the driving force behind the resultant motivated behavior. The influence of smoking attitudes on cravings may be particularly salient when facing a specific smoking trigger (e.g., smoking cue, stress) that activates motivation to smoke. Consistent with this possibility, one study found that explicit positive smoking reinforcement expectancies predicted cue-induced craving (Palfai, 2002). Another study found that implicit positive attitudes about smoking were related to “tonic” craving levels (Waters et al., 2007). To our knowledge, however, no study has explored how negative smoking attitudes influence cravings in dependent adult smokers.

In this study, we aimed to evaluate the possible relationship between self-reported attitudes about the negative consequences of smoking and cravings. Our primary hypothesis was that smokers who exhibited more favorable attitudes towards smoking would have: 1) higher basal levels of cigarette cravings, 2) higher levels of cravings when exposed to smoking cues, and 3) higher levels of cravings when exposed to stress.

2. Methods and materials

2.1. Participants

Advertisements posted in and around a medical center in New York City were used to recruit cigarette smokers to a study of attitudes about smoking and cigarette craving. Participants had to be at least 23 years old, had been smoking at least 10 cigarettes per day for the past 5 years (minimum purchase age at the time of the study was 18) and met the criteria for DSM-IV diagnosis of nicotine dependence (American Psychiatric Association, 1994). Exclusion criteria were: 1) current treatment for smoking cessation, 2) a history of other substance abuse, and 3) a history of hospitalization for major mental illness. Inclusion and exclusion criteria were described in detail in the advertisements, and all respondents to the ads met screening criteria. Six respondents left messages indicating interest in participating, but could not be reached. A total of 110 eligible participants were enrolled in the study, and 7 did not return for the second session, yielding a final sample of 103 participants. Each participant was compensated \$40 for completing the study.

2.2. Measures

2.2.1. Background questionnaires

Participants completed a demographic questionnaire assessing age, gender, ethnicity and education. In addition to demographic information, participants also completed a face-valid smoking history questionnaire, including items assessing the number cigarettes smoked per day, age at initiation, years smoked, and number of quit attempts.

2.2.2. Fagerstrom Test of Nicotine Dependence (FTND)

The 6-item FTND was used to assess the degree of participants' nicotine dependence. The FTND is a valid and reliable instrument (Heatherton, Kozlowski, Frecker & Fagerstrom, 1991), and has been widely used in the smoking literature.

2.2.3. Smoking Consequences Questionnaire - Adult (SCQ-A)

The Smoking Consequences Questionnaire (SCQ) is a well-established tool that measures smokers' beliefs and attitudes about positive and negative consequences of smoking—both long- and short-term. Originally developed by Brandon and Baker (1991) for college-aged individuals in the United States, the questionnaire has since been modified and validated to measure perceptions in adult populations in the U.S. and abroad (Cepeda-Benito & Reig Ferrer, 2000; Copeland, Brandon, & Quinn, 1995). The initial questionnaire consisted of 50-

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