Development and validation of the cigarette smoking consequences looming scale

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HIGHLIGHTS

- A new measure was developed for perception of consequences of smoking as looming threats.
- Factor analytic results identified physical and social consequences subscales.
- In two studies of adult smokers, the measure showed good reliability and concurrent validity.

ABSTRACT

Introduction: Experimental manipulations intended to alter cognitive appraisals of smoking-related threats may affect cigarette smoking and motivation to quit. However, no previous measure has directly assessed perceptions of smoking-related threats as increasing and coming closer in space and/or time (i.e., "looming"). The current research develops such a measure of dynamic smoking-related threat appraisal: the Cigarette Smoking Consequences Looming Scale (CSCLS).
Methods: In Study 1 (*N* = 124 daily smokers), the researchers created an initial, scenario-based version of the CSCLS and refined the measure based on factor analysis. In Study 2, 143 daily smokers completed a condensed CSCLS organized around two factors (Physical and Social consequence of smoking). In each study, participants also completed measures of dispositional looming perception, motivation to quit smoking, and smoking outcome expectancies.
Results: The CSCLS showed strong internal consistency and concurrent validity in that scores on the measure correlated as expected in both studies with a general tendency to perceive threats as looming, outcome expectancies for smoking, and motivation to quit smoking.
Conclusions: Measuring perceptions of smoking-related consequences as looming may provide greater insight into the cognitive factors associated with motivation to quit smoking, which in turn may inform communications about the risks of smoking.

1. Introduction

The prevalence of cigarette smoking in the United States declined from 20.9% in 2005 to 15.1% in 2015 (Centers for Disease Control and Prevention, 2016). Despite this continued progress, lack of motivation to quit remains a significant public health concern. Almost one-half (45%) of American smokers did not make a serious quit attempt in 2015, and one-third (32%) report not even *wanting* to stop smoking completely (Babb, Malarcher, Schauer, Asman, & Jamal, 2017). Accordingly, a better understanding of residual lack of interest in quitting among some smokers is needed.

Although multiple factors could affect willingness to quit smoking, prior research has highlighted as particularly important smokers' attitudes toward negative health consequences. The Health Belief Model (HBM; Rosenstock, 1974) proposes that likelihood of engaging in a behavior such as quitting smoking may be shaped by several beliefs: perceived susceptibility to negative effects of smoking, perceived severity of those effects, perceived benefits of quitting, and perceived barriers to quitting. Similarly, Ajzen's (1991) Theory of Planned Behavior model states that intentions to act, and subsequent actions, are influenced by perceived controllability, attitudes, and subjective norms related to the behavior. Additionally, health behavior theory indicates

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that perceived susceptibility to the consequences of a behavior is related to motivation to change that behavior (Stretcher, Champion, & Rosenstock, 1997). Empirical research based on such conceptualizations has indicated that the perception that one is vulnerable to negative smoking consequences is associated with greater readiness to quit smoking (Prokhorov et al., 2003).

In addition, many smokers underestimate their risk of developing health problems (e.g., Ayanian & Cleary, 1999; Borrelli, Hayes, Dunsiger, & Fava, 2010; Weinstein, Marcus, & Moser, 2005). Smokers who fall prey to this "unrealistic optimism" might feel less motivated to quit smoking compared with those who experience greater concern about these outcomes (Dillard, McCaul, & Klein, 2006). Additional research is needed to determine whether increasing smokers' anxiety regarding smoking-related health outcomes may adaptively increase motivation to change one's smoking behavior.

According to the looming cognitive vulnerability model (LCVM; Riskind, Williams, & Joiner, 2006), anxiety results from the perception that a particular stimulus is not just a threat, but also that the threat is increasing in magnitude or moving closer to oneself in space and/or time. This model has provided an innovative means to conceptualize anxiety and has contributed to new clinical interventions. Riskind, Rector, and Taylor (2012) described therapeutic interventions encouraging patients to imagine a threatening stimulus as "freezing" or receding in order to reduce anxiety.

Most previous research on the LCVM focuses on anxiety disorders, but the model is also potentially applicable to the area of adaptive behavioral change. Only one study to date has examined applications of the LCVM to cigarette smoking. In particular, compared with those who underwent a neutral task, smokers induced to perceive smoking-related health risks as looming reported higher state anxiety and more accessible negative outcome expectancies related to smoking immediately after the induction, as well as a lower average smoking rate at one-month follow-up (McDonald, O'Brien, Farr, & Haaga, 2010). There was also a nonsignificant trend toward greater likelihood of making a > 24-h quit attempt by one-month follow-up in the looming vulnerability (33%) condition than in the neutral (16%) condition (McDonald et al., 2010). These results suggest that while activating a sense of looming vulnerability to the physical health consequences of smoking may make smokers feel anxious, it also leads to decreased smoking rate over time. A limitation of the study, however, is that there was at the time no measure of smoking-related looming perceptions. The inference that the induction affected smoking and quit attempts by way of its impact on perceiving consequences of smoking as looming threats was therefore not directly testable. It is important for new research to identify the mechanism(s) underlying these changes.

The aim of the two studies reported in this article was to facilitate additional research applying the looming vulnerability concept to the problem of motivating smokers to quit by developing a new measure of looming perceptions of smoking-related risks, the Cigarette Smoking Consequences Looming Scale (CSCLS). The CSCLS is similar in format to a dispositional measure of looming perception, the Looming Maladaptive Style Questionnaire (LMSQ; Riskind, Williams, Gessner, Chrosniak, & Cortina, 2000), but differs from the LMSQ in that all the scenarios pertain to smoking-specific situations and risks. The measure will allow researchers to assess endorsement of specific, smoking-related, looming perceptions. Study One focused on developing the measure, while Study Two assessed validity.

2. Study one

Study one focused on developing the CSCLS, gathering initial data on its validity, and exploring its factor structure. The CSCLS was composed of scenarios in which participants evaluated the extent to which potential negative consequences of smoking were increasing in magnitude or coming closer in space or time.

2.1. Hypotheses

To begin to evaluate aspects of measurement validity, we examined whether the CSCLS correlated with measures of related constructs. We hypothesized that CSCLS total scores would correlate positively with measures of dispositional looming cognitive style, negative outcome expectancies for smoking, and motivation to quit smoking.

2.2. Participants

124 participants were recruited via newspaper and online advertisements and flyers posted on the American University campus. Inclusion criteria required that participants were (a) daily smokers, (b) 18 years of age or older, (c) able to speak and write fluently in English, and (d) United States residents. Participants were not required to be interested in quitting smoking. For both studies reported in this article, participants gave informed consent, and procedures were approved by the Institutional Review Board of American University.

2.3. Measures

2.3.1. Demographics
Participants answered face-valid questions about age, sex, ethnicity, education, employment, and annual household income.

2.3.2. Smoking history
The Smoking History Questionnaire (SHQ; Brown, Lejuez, Kahler, & Strong, 2002) was used to capture information about participants' current average smoking rate, age of first cigarette, duration of regular smoking, and history of quit attempts.

2.3.3. Nicotine dependence (FTND)
The Fagerstrom Test of Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991) is a 6-item self-report questionnaire assessing severity of nicotine dependence. This measure has demonstrated moderate internal consistency (Cronbach's $\alpha = 0.72$; Weinberger et al., 2007) and high retest reliability over 2–3 weeks ($r = 0.88$). FTND scores have been correlated with cotinine levels ($r = 0.39$) and duration in years that a participant has smoked ($r = 0.52$; Pomerleau, Carton, Lutzke, Flessland, & Pomerleau, 1994).

2.3.4. Motivation to quit smoking (CL, RFQ)
Motivation to quit smoking was assessed by the Contemplation Ladder (CL; Biener & Abrams, 1991) and the Reasons For Quitting Scale (RFQ; Curry, Wagner, & Grothaus, 1990). The CL allows participants to select a rating on a scale of 1 to 10 indicating the degree to which the participant is contemplating quitting smoking (1 = "no thought of quitting", 10 = "taking action to quit").

The RFQ instructs participants to provide a Likert scale rating indicating the personal relevance of twenty items representing common reasons that individuals quit smoking (0 = "not at all true", 4 = "extremely true"). The measure includes four subscales: Intrinsic- Health Concerns, Intrinsic- Self-Control, Extrinsic- Immediate Reinforcement, and Extrinsic- Social Pressure. These subscales have demonstrated moderate internal consistency (intrinsic subscale Cronbach's $\alpha = 0.83$; extrinsic subscale Cronbach's $\alpha = 0.75$; Curry et al., 1990).

2.3.5. Smoking outcome expectancy (SCQ-A)
The Smoking Consequences Questionnaire- Adult Version (SCQ-A; Copeland, Brandon, & Quinn, 1995) was used to assess participants' beliefs about various positive and negative outcomes associated with smoking. It is comprised of 54 Likert-scale items, grouped into ten subscales: Negative Affect Reduction, Negative Social Impression, Boredom Reduction, Stimulation/State Enhancement, Health Risk, Taste/Sensorimotor Manipulation, Social Facilitation, Weight Control, Craving/Addiction, and Negative Physical Feelings. For some analyses,