



The Metacognitions about Smoking Questionnaire: Development and psychometric properties



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HIGHLIGHTS

- The MSQ has good predictive and divergent validity, and temporal stability.
- Metacognitions appear a better predictor of smoking than outcome expectancies.
- Assessing metacognitions using the MSQ may aid treatment.

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ABSTRACT

Objectives: Recent research has suggested that metacognitions may play a role in smoking. The goal of the current set of studies was to develop the first self-report instrument of metacognitions about smoking.

Method: We conducted three studies with samples of smokers ($n = 222$, $n = 143$, $n = 25$) to test the structure and psychometric properties of the Metacognitions about Smoking Questionnaire and examined its capacity to predict smoking behaviour.

Results: Exploratory and confirmatory factor analyses supported a four-factor solution: positive metacognitions about cognitive regulation, positive metacognitions about emotional regulation, negative metacognitions about uncontrollability, and negative metacognitions about cognitive interference. Internal consistency, predictive and divergent validity, and temporal stability were acceptable. The metacognition factors correlated positively with daily cigarette use and levels of nicotine dependence, and contributed to the prediction of these outcomes over and above smoking outcome expectancies.

Conclusions: The Metacognitions about Smoking Questionnaire was shown to possess good psychometric properties, as well as predictive and divergent validity within the populations that were tested. The metacognition factors explained incremental variance in smoking behaviour above smoking outcome expectancies.

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1. Introduction

In the metacognitive model of psychopathology Wells and Matthews (1994, 1996) advanced the idea that psychological dysfunction is linked to maladaptive metacognitions. Metacognitions refer to knowledge or beliefs about one's own cognitive system and factors that affect its functioning and regulation (Wells, 1995). According to Wells (2000) metacognitions in the knowledge domain can be usefully divided into

two broad sets: (1) positive metacognitions about control strategies that impact on inner events such as "Rumination will help me get things sorted out in my mind" or "If I worry I will be prepared"; and (2) negative metacognitions concerning the significance, controllability and danger of inner events, such as "It is bad to have certain thoughts" or "I cannot stop ruminating".

Metacognitions have been found to be associated with a wide array of psychological and behavioural problems (for a full review see Wells, 2009, 2013) including addictive behaviours such as alcohol use (e.g. Clark et al., 2012; Spada, Caselli, & Wells, 2009; Spada & Wells, 2005, 2006, 2008, 2009, 2010), gambling (e.g. Lindberg, Fernie, & Spada, 2011; Spada, Giustina, Rolandi, Fernie, & Caselli, 2014), and problematic Internet use (Spada, Langston, Nikčević, & Moneta, 2008). Within the

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area of smoking, two preliminary studies (Nikčević & Spada, 2008; Spada, Nikčević, Moneta, & Wells, 2007) have found evidence of: (1) a positive association between negative metacognitions (lack of cognitive confidence and beliefs about the need to control thoughts) and nicotine use that is independent of negative emotions; and (2) an independent contribution (over negative emotions) of beliefs about the need to control thoughts towards category membership as a nicotine dependent smoker.

Further research undertaken by Nikčević and Spada (2010) has identified the existence of specific positive and negative metacognitions about smoking. Positive metacognitions about smoking have been conceptualised as a specific form of outcome expectancy likely to play a central role in motivating individuals to engage in smoking as a means of cognitive-emotional regulation. Examples of positive metacognitions about smoking include: "Smoking helps me to think things through" or "Smoking helps me to feel less pressure". Negative metacognitions about smoking have been conceptualised as beliefs concerning the uncontrollability of smoking and smoking-related thoughts (e.g. "I cannot stop thinking about cigarettes"), and the perceived negative impact of smoking on self-appraisal and cognitive functioning (e.g. "Smoking is a sign of my low will power"). These metacognitions are thought to play a crucial role in the perpetuation of smoking by becoming activated during and following a smoking episode, and triggering negative emotional states that compel a person to use more (Nikčević & Spada, 2010; Spada, Caselli, & Wells, 2013).

The current study builds on these findings by presenting the development and preliminary validation of a self-report instrument designed to assess metacognitions in smoking. We hypothesized that this newly developed instrument would have a significant association with daily cigarette use and severity of nicotine dependence and that this relationship would be maintained when controlling for smoking outcome expectancies, a related but separate construct to metacognitions. The development of this self-report instrument may facilitate further quantitative research investigating the role of specific metacognitions involved in the activation, perseverance and escalation of smoking. It may also provide a first tool to identify individuals with this type of metacognitive profile.

2. Study 1: construction of Metacognitions about Smoking Questionnaire (MSQ)

2.1. Method

2.1.1. Participants

A sample of 222 individuals (131 female) agreed to participate in the study which was approved by the ethics committee of a London (United Kingdom) university. For purposes of inclusion participants were required to: (1) be 18 years of age or above; (2) consent to participate; (3) understand spoken and written English; and (4) define themselves as 'smokers'. The mean age of the sample was 33.1 years ($SD = 11.5$) and the age range was 18 to 66 years. The sample was 75.4% White, 13.1% Black, 9.5% Asian, and 2.0% of mixed ethnicity. Participants' mean scores on daily cigarette use, the Fagerström Test of Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991), age of inception of cigarette use and numbers of years using cigarettes were, respectively, 11.2 cigarettes ($SD = 8.3$), 2.9 ($SD = 2.6$), 16.7 years ($SD = 3.9$) and 15.4 years ($SD = 10.4$).

2.1.2. Materials

Items representing positive and negative metacognitions about smoking were derived from data collected in an earlier semi-structured interview study (Nikčević & Spada, 2010), from the authors' clinical experience, and from deductions based on the metacognitive model of psychopathology (Wells, 2009). The items selected as positive metacognitions about smoking concerned the usefulness of smoking in: (1) controlling cognition ("Smoking helps me to focus my mind"); and

(2) controlling emotion ("When I get upset smoking comforts me"). The items selected as negative metacognitions about smoking concerned: (1) the uncontrollability of smoking and smoking-related thoughts ("I cannot control my urge to smoke"); and (2) judgments relating to the cognitive interference caused by smoking and smoking-related thoughts ("My thoughts about cigarettes interfere with my functioning"). A total of 48 items were framed in terms of statements to which participants reported the extent of their agreement on a 4-point Likert-type scale ("Do not agree", "Agree slightly", "Agree moderately", "Agree very much").

2.1.3. Procedure

Participants were recruited from a number of work places (a university, a hospital, several schools) using e-mail lists and advertisements. A web link directed the participants to the study website. The first page of the study website explained the purpose of the study as: "To develop a self-report instrument to assess beliefs people hold about smoking". Participants were then directed, if consenting to participate in the study, to a second page containing basic demographic questions and the self-report instrument. On completion participants were asked to click on the "Submit" button. Once participants had clicked on "Submit", their data was forwarded to a generic postmaster account. This ensured that participants' responses were anonymous. A second submission from the same IP address was not allowed so as to avoid multiple submissions from the same participant.

2.2. Results

A principal components method of factor extraction was performed on the scores of the original 48 items. The Scree test suggested a four factor solution (eigenvalues of 16.6, 5.5, 4.0 and 2.2). Items were assessed as indicators of the latent variables using Varimax rotation. The four factors together accounted for 59.9% of variance. Items which loaded less than 0.4 on any factor were discarded, as were items that loaded on two or more factors. If an item loaded more than 0.4 on one factor, and failed to load onto the other factors, but was within approximately 0.2 of the loading on the first factor, it was also discarded. This procedure was followed in order to exclude items that influenced more than one factor. Only the five items that loaded on each factor were selected to define a brief final version of the self-report instrument. The revised self-report instrument consisted of 20 items. The factor loadings and communalities of the individual items are presented in Table 1. Internal consistencies (homogeneity) were determined by computing Cronbach's alpha. This coefficient was 0.92 for factor 1, 0.88 for factor 2, 0.85 for factor 3, and 0.93 for factor 4. All items showed correlations above 0.7 on their own factor and above 0.5 with the instrument. Inter-correlation between factors ranged from 0.21 to 0.50.

Two factors referred to positive metacognitions about the usefulness of smoking in regulating cognition and emotion. We termed these factors 'positive metacognitions about cognitive regulation' (PM-CR) and 'positive metacognitions about emotional regulation' (PM-ER). The third factor referred to the uncontrollability of smoking and smoking-related thoughts. We termed this factor 'negative metacognitions about uncontrollability' (NM-U). The fourth factor referred to the impact and intrusiveness of smoking and smoking-related thoughts on cognitive functioning. We termed this factor 'negative metacognitions about cognitive interference' (NM-CI).

3. Study 2: confirmation of the factor structure and preliminary examination of the predictive and divergent validity of the MSQ

We conducted a second study to confirm the factor structure and test the predictive ability of the MSQ factors. In accordance with the metacognitive model of psychopathology, positive metacognitions about smoking should be involved in the initiation of smoking. Conversely negative metacognitions about smoking may play a role in

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