Premeditated automaticity: the role of explicit cognition in the development of obsessive smoking

Velibor Bobo Kovač [1]
Jostein Rise [2]
Inger Synnøve Moan [3]

Abstract

The purpose of the present study was to examine the role of explicit cognitions in relation to the development of obsessive smoking passion. Data derives from a longitudinal internet survey conducted among 939 daily smokers over a period of four months. Mental representations were the strongest predictor of obsessive smoking passion (ß=.47, p<.001) followed by habit strength (ß=.25, p<.001) and number of cigarettes smoked (ß=.09, p<.01). Altogether the variables accounted for 48% of the variance in obsessive smoking passion. The results indicated that mental representations, along with automatic processes, play an important role in the prediction of obsessive smoking passion. Theoretical and practical implications of the results are discussed.

Keywords: smoking, obsessive passion, mental representations, habit

[1] Associate professor, University of Agder, Faculty of Humanities and Education, PO Box 422, 4604 Kristiansand, Norway

[2] Professor, Norwegian Institute for Alcohol and Drug Research, PO Box 565, Sentrum, 0105 Oslo, Norway

[3] Associate professor, Norwegian Institute for Alcohol and Drug Research, PO Box 565, Sentrum, 0105 Oslo, Norway

1. Introduction

The psychological processes which are responsible for the development of an addiction to e.g. cigarette smoking and the processes which eventually lead to quitting addiction are clearly asymmetric as to the assumed role of cognition (Kovac & Rise, 2008). The quitting process is conceptually related to rational decision making and successful implementation of self-regulatory actions (e.g. Osch, Lechner, Reubsaet, Wigger, & de Vries, 2008). Thus the majority of social cognition models hold that goal-directed behaviours are the product of systematic and deliberative processing in the sense that successful goal accomplishment primarily depends on motivational stability, self-regulatory competencies and effort (see Conner & Norman, 2005).

In contrast to the quitting process, the psychological mechanisms which sustain addictive behaviours are seldom associated with explicitly outlined cognitive functioning. Furthermore, the processes which underlie and facilitate execution of addictive behaviours are generally taken to occur outside the individual's consciousness (McCusker, 2001). The psychological processes which are taken to be related to addictive behaviours are predominantly associated with automatic and habitual actions in terms of simple associative strengths (stimulus-stimulus), rewarding consequences (stimulus-response-outcome), and habitual responses (automatic reactions) (see West, 2006 for a theoretical overview). In short, the dominant view in psychological theory holds that cognitions save people from doing the wrong things, e.g smoking, and more important, for the purposes of the present study, that explicit cognitions play a negligible part in development of addiction.

The aim of the present study is to explore the role of explicit cognition and deliberative processes in relation to development of smoking addiction. For this purpose we use obsessive passion (OP) as an indicator of studying smoking addiction. Although the traditional conceptions of addiction and OP should not be confused (Philippe, Vallerand, & Lavigne, 2009) in terms of psychological states, they however may even be considered to be closely related in sense that the desire of involvement is not in the control of the agent (Vallerand et al., 2003). Explicit cognitions are presently defined as conscious thoughts which involve planning, anticipation, and self-awareness regarding future actions. These cognitions are usually easily encoded, maintained, and retrieved. The present theoretical approach is different from traditional conceptualisations which tend to portray smoking as

an automatic and habitual action which lack explicit cognition (Tiffany, 1990; Stephens & Marlatt, 1987; Baxter & Hinson, 2001). Our point of departure is that an addictive behavioural pattern might, with growing experience, increase in level of cognitive abstraction in the sense that people over time tend to plan their actions and identify specific behaviours in a more global manner (Wegner, Vallacher & Dizadji, 1989). For this reason we measure people's explicit cognitions in relation to smoking which are presently called mental representations (MRs) (see Kovač & Rise, 2008 for more details), in addition to measures of past behaviour in terms of behavioural frequency (i.e. number of cigarettes smoked per day on an average) and habits (see Verplanken & Orbell, 2003 for more details). We hypothesize that MRs perpetuate smoking behaviour and, in addition to habitual and automatic responses, constitute the main process responsible for development of obsessive passion for smoking.

1.1 The theoretical background for MRs

The theoretical rationale behind the development of the MRs construct has been thoroughly described elsewhere (Kovač & Rise, 2008) but may be summed up in terms of two postulates

Firstly, there are important individual differences in how desired objects or activities, in this case smoking, are mentally represented. For instance, researchers within the delay of gratification paradigm have demonstrated that the manner in which individuals mentally represent rewards is more important for delaying gratification than the objective value of the rewards (Mischel, 1996). Mischel's suggestion is that specific situations tend to activate characteristic patterns of interrelated mental units, i.e. people enter various situations and interact with the environment with various degrees of mental readiness. According to Metcalfe and Mischel (1999) the challenge for successful self-regulation rests on the ability to enter future situations with an altered set of mental representations which inhibit the activation of the "go" responses in relation to the desired object or activity.

Secondly, there is a natural tendency for similar repetitive actions to gradually progress towards higher levels of cognitive abstraction. According to Action identification theory (Vallacher & Wegner, 1987) every particular action can be identified at different cognitive levels. Higher cognitive levels are considered to be more abstract, consisting of

comprehensive ideas which aim to preserve the "why" aspects of action. Lower levels are more concrete, consisting of detailed descriptions of action and generally aim to preserve the "how" aspects of behaviour. The theory holds that there is a natural drive upward towards higher abstraction levels. For instance, if a person smokes extensively over a long period of time there is a definite possibility that the act of smoking will be transformed into stable mental representations of smoking. Wegner and co-workers (Wegner et al., 1989) suggest "that mental representations accompany all action, serve to instigate the action in a particular direction, and are used as points of reference for the continued maintenance of the action" (pp. 198).

Building and synthesising on these ideas we propose that obsessive smoking is predominantly based on explicit and deliberative cognitions which we presently call mental representations (MRs). For the purpose of clarity we define MRs as dynamic cognitions associated with past experiences which evolve and grow in strength over time in contact with the desired object or activity.

1.2 The model

In the present model we specify the temporal sequence of events which may lead to obsessive passion for smoking in terms of 3 distinct steps.

The first step refers to repetitive contact with the behaviour or frequency of behavioural engagement as measured by number of cigarettes smoked per day. One aspect of daily cigarette smoking is that this activity produces repetitive physical movements such as lighting a cigarette, inhaling, and other physiological and psychological effects which are active as long as the stimulus (the cigarette), which produces them is present. However, the mere frequency of behavioural execution is relatively free from higher cognitive processes. The second step refers to behavioural routinization in terms of an explicit measure assessing the level of automaticity and habitualization (Verplanken & Orbell, 2003). The idea is that the effects of relatively constant behavioural performances may lead to the establishment of habitual actions. As long as the situations are stable, behaviour is easy to perform, and motivation not to perform the behaviour is lacking, the execution of behaviour will proceed in an automatic manner. Thus, the measure of habitual behaviour captures people's routines. However, similarly to step one, the behaviour is performed relatively free from deliberation and anticipation. Within the socio-cognitive paradigm,

including self-regulation theories, frequency of behavioural performance and habit are typically held responsible for the development of behaviours that are resistant to change, e.g., smoking and eating an unhealthy diet (Verplanken, Herbadi, Perry, & Silvera, 2005).

However our model includes a third step, where behavioural frequency and habit is expected to jointly form explicit cognitions or MRs of smoking. The idea is that various behaviours, particularly those which are of a similar nature, over time increase in level of cognitive abstraction. The MRs of smoking, for instance, apart from being automatically evoked by stimuli and environmental cues, might over time also become a matter of deliberate processing. The measure of smoking MRs represents an explicit measure which assesses various aspects of a person's cognitions in relation to involvement to smoking (Kovac & Rise, 2008). In this context an important distinction between habitual responses and MRs is the active role of conscious processes, e.g. in terms of premeditation in pursuing possibilities for smoking. Thus, we posit that habitual responses and simple automatic reactions in terms of behavioural frequency are mediated by MRs which represent a main process behind obsessive smoking. Finally, as a result of the three steps outlined above, smoking can eventually become an obsessive passion and indicator of (Vallerand et al., 2003). In this context we follow Orford (2001) which holds that addiction can be seen as a form of strong attachment which over time might become so excessive that it affects the quality of life and the level of control over the quitting process.

1.3 The present hypotheses

We hypothesize that obsessive passion for smoking derives from MRs, in addition to habit strength and behavioural frequency. Thus, in contrast to the traditional view within the socio-cognitive framework, we argue that the latter process also has a definite cognitive, deliberative flavour. More specifically, we hypothesize that the effect of behavioural frequency on obsessive smoking passion is mediated by the formation of habits. Finally, we hypothesize that the effect of frequency and habit on obsessive smoking passion is mediated by MRs of smoking, but that habit also contributes directly to obsessive smoking passion.

2. Method

2.1 Respondents and procedure

1439 daily smokers responded to an invitation to participate in the present study. The invitation was displayed on 15 national internet newspapers and was open for a period of 10 days. The participants were informed that their e-mail addresses would be deleted after the study was completed. Four months later, at Time 2 (T2), the follow up questionnaire was sent to the participants who completed the first questionnaire, and a total of 1024 (71.2%) responded. Eighty five participants were excluded from the final analysis due to systematic missing data. A total of 939 participants were included in the analysis. The mean age of the participants was 35.8 (SD 11.7) with a range from 15 to 74 years, and 49 % of the participants were women. The participants reported smoking for 18.6 years on an average, with an average of 13.5 cigarettes per day. To address the hypotheses regarding obsessive passion, only those who reported smoking at T2 (N=825) were included in the regression analysis. Fifty percent were women and the average age was 36 years. The participants reported smoking for 19.0 years on average, with an average of 13.8 cigarettes per day. A series of ANOVAs showed that there were no significant differences between the 415 participants who did not respond at T2 and the 1024 participants who responded at T2 on the demographic and theoretical measures taken at T1.

2.2 Measures at T1

The MRs scale (see table 1) is a uni-dimensional measure of explicit cognitions associated with smoking behaviour (for details see also Kovač & Rise, 2008). There are three distinct features of MRs. The first concerns the issue of anticipation and deliberation (items 1 and 2). In contrast to theoretical conceptualizations of habitual behaviour, actions which are high in MRs tend to occur with some degree of premeditation, i.e. although smoking is considered to be a fairly automatic and spontaneous behaviour, heavy smokers also tend to plan in advance when and where they have an opportunity to smoke. Second, the MRs of smoking are related to a number of micro-needs (item 3) i.e. well developed MRs might provide people with the sense that the act of smoking creates some of purpose and meaning in daily life. The third aspect of MRs assesses strength and importance of

cognitions which are related to smoking behaviour (items 4 and 5). We argue that these 3 aspects (anticipation, "need" satisfaction, and strength of cognitions) collectively represent the main qualities of the MRs construct. The items were rated on a 7-point response scale ranging from (1) fully disagree to (7) fully agree. A descriptive analysis revealed that the mean score of the scale was 4.1 indicating that there was no ceiling or floor effects and the items had a reasonable normal distribution of responses. Principal component analysis (PCA) with varimax rotation identified only one dimension accounting for 56 % of the variance. All items loaded strongly on the extracted component (>.66). The internal consistency was satisfactory (Cronbach's alpha (α) =.80) and the "alpha if item deleted" option indicated that none of the items should be excluded. All item-item correlations were significant at $p<.001$ level with a mean score of .44. The corrected item-total correlations ranged from .50 to .69.

Table 1. Mental representation scale

1. If I am about to go somewhere, I often wonder whether or not I am allowed to smoke there
2. I often plan my next cigarette
3. For me smoking covers many minor needs during the day (work break, time to collect my thoughts, social needs, increase quality of life, etc.)
4. Smoking is more important to me than people around me are aware of
5. Smoking is something which is strongly present in my thoughts

Note. The rating scale ranged from 1 (fully disagree) to 7 (fully agree). There was no reverse scored items.

Behavioural frequency was measured by number of cigarettes smoked per day in terms of the single question "How many cigarettes do you smoke each day, on an average" using the following categories 1-4 (1), 5-9 (2), 10-14 (3), 15-19 (4), 20-24 (5), 25-30 (6), 31+ (7). The response scale ranging from 1 to 7 was assumed to have interval level properties.

Smoking habit was assessed by a 12-item self-report habit index (SRHI; Verplanken & Orbell, 2003). Three sample items are "Smoking is something I do automatically", "Smoking is a daily routine to me"; "Smoking is something I would find hard not to do". A

7-point response scale was used ranging from (1) completely agree to (7) completely disagree. A PCA confirmed the existence of one component and the responses were thus added into a sum-score to represent a measure of smoking habit strength ($\alpha = .90$).

2.3 Measures at T2

Obsessive smoking passion was assessed by adapting the measure of obsessive passion deriving from the Passion Scale (Vallerand et al., 2003). Obsessive passion thus provides an explicit measure which assesses the strength of a person's emotions in relation to smoking. The 4 items were: "I am emotionally dependent on smoking"; "My mood depends on me being able to smoke or not"; I have difficulty imagining my life without smoking; "I have difficulty controlling my urge to smoke". The items were rated on a 7-point response scale ranging from 1 (completely disagree) to 7 (completely agree) ($\alpha = .85$). The passion scale has previously been used to assess psychological mechanisms underlying various addictive activities, e.g., gambling behaviour (Mageau, Vallerand, Rousseau, Ratelle, & Provencher, 2005).

3.0 Results

Descriptive statistics and correlations among the variables are provided in table 2. Note that only those who reported to smoke on a daily basis at T2 were included in the analysis (N=825).

Table 2. Descriptive statistics and correlations among the measures of smoking behaviour (N = 825).

Variables	1	2	3	4
1. Obsess. passion	-	.42	.57	.65
2. Frequency		-	.56	.41
3. Habit			-	.58
4. MRs				-
Mean	3.94	13.5	5.32	4.12
SD	1.69.	7.44	1.22	1.46

r > .10 p<.001

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Obsessive passion correlated significantly with behavioural frequency in terms of number of cigarettes smoked per day, habit strength, and MRs. MRs correlated significantly with behavioural frequency, and habit strength.

3.1 Predicting obsessive passion

In order to take care of the proposed temporal sequence model as outlined above, we performed a hierarchical regression analysis to predict obsessive smoking passion. The predictors were entered in three blocks: (i) behavioural frequency, (ii) habit strength, (iii) mental representations. The results are presented in table 3.

Table 3. Hierarchical regressions of obsessive passion on behavioural frequency (step 1), Habit (step 2), and MRs (step 3) (N = 825).

Step	Predictors entered	Beta	Beta	Beta
1.	Frequency	.42***		
2.	Frequency		.15***	
	Habit		.49***	
3.	Frequency			.09**
	Habit			.25***
	MRs			.47***
Adj. R^2		.18	.34	.48
F_{change}			193.48***	219.21***

*p<.05; **p<.01; ***p<.001

First, behavioural frequency accounted for 18% of the variance in obsessive passion. The addition of habit strength in the second step led to a significant increment (R2 change = .16, p<.001) in the amount of variance explained in obsessive passion reducing the size of the beta weight for behavioural frequency, from .42 to .15. This reduction of the beta weight was statistically significant, indicating mediation (Sobel test= 11.277, p<.001). In the final step, the addition of mental representations produced a significant increment (R2 change = .14, p<.001) in the amount of variance explained in obsessive passion reducing the size of the beta weight for behavioural frequency from .15 to .09 and habit strength from .49 to .25, although both weights remained statistically significant at p<.001 level.

The reduction of the beta weight for habit was found to be statistically significant, indicating mediation (Sobel test= 12.139, p<.001). The final model accounted for 48% of the variance in obsessive passion with mental representations emerging as the strongest predictor, followed by habit strength and behavioural frequency.

4.0 Discussion

The aim of the present study was to explore the idea that explicit cognitions in the form of MRs play a central role in the development of smoking passion, as an indicator of smoking addiction, beyond the traditional measures of past behaviour. Thus, the proposed theoretical model provided a good prediction of obsessive smoking passion (adj. R^2=48%). Given the causal sequence of our model, the results suggest that the strength of MRs was the most important predictor of obsessive smoking passion by having the strongest direct effect as well as mediating about half the effect of habit strength. Nevertheless, it is important to note that smoking passion received a sizeable direct influence from habit strength as well. These results indicate that MRs constitute potentially a useful measure of cognitions possessing a central role in the prediction of future obsessive smoking passion. Although the concept of MRs correlated strongly with behavioural frequency and habit, there was a clear unique variance supported by the regression analysis showing that MRs predicted smoking passion beyond the measures of automaticity. Furthermore, the finding that the effect of behavioural frequency was mediated by habit and MRs, and that the effect of habit was partially mediated by MRs indicates that the development of obsessive passion for smoking derives from two distinct processes. The first process refers to automatic and habitual processing (Bargh, 1996), which, as expected, exerted a significant direct effect on obsessive passion for smoking. This is consistent with the general view that addictive behaviours are connected to implicit cognition and learning mechanisms operating outside consciousness (McCusker, 2001). However, the role of MRs points to the novel idea that there exists a second route to the development of obsessive passion for smoking. This testifies that addictive behaviours are, in addition to being a result of automatic processes, also a result of conscious deliberation, at least in the context of smoking.

The conceptualization of MRs might have a number of theoretical implications. First, to our knowledge, this is the first quantitative study which examines the role of explicit

cognition in the prediction of addictive behaviours. As noted earlier, an individual's smoking history is commonly conceptualized and measured in terms of simple behavioural frequencies, e.g. number of cigarettes smoked per day (McMillan, Higgins, & Conner, 2005). Consequently, smoking behaviour is seldom linked to explicit cognitions (i.e. self-reports) beyond measures of frequency or automaticity (see Watters & Sayette, 2006). In contrast to traditional research practice, we posit that past actions which are associated with smoking directly involve explicit cognitions and can be assessed as such. Thus, most of the time people know what they are doing and choose their actions based on existing cognitive-emotional mind-sets and available information. This implies that repetitive actions are not necessarily stripped for cognitive processes as traditionally assumed in the psychological literature.

Second, the important theoretical point is that MRs are conceptually distinct from deliberative and normative cognitions which are typical components in the majority of social cognition models. The core assumption of these models is that human behaviour, although containing automatic elements, is based on reason (Bamberg, Ajzen, & Schmidt, 2003). The reasoned action processing path starts from higher abstraction levels which are expressed through normative and evaluative considerations and preferably ends up at lower cognitive levels, focusing on practical and achievable aspects of action. In other words, it is a top-down process which refers to a self-regulatory path on the continuum from desirability to feasibility or from cognitions to action (Gollwitzer, 1999). In contrast, the cognitions which form MRs represent a processing route which develops gradually from simple actions to congruent abstract cognitions. The formation of MRs, at least when it comes to repetitive behaviours, is a bottom-up process which starts from simple repetitive actions and develops to be a premeditated and yet automatically guided process. Thus, MRs, supported by habitual efficiency, represent a fairly stable process which over time might result in the development of excessive appetites and strong attachments.

Third, the conceptualization of MRs might have a number of practical implications for the construction of suitable interventions regarding addictive behaviours. The present idea is that MRs represent a general mechanism for the development of addiction and that it provide an alternative account of why it is so difficult to stop addictive behaviours. Thus, the strength of MRs may account for the frequent fallbacks into previous behavioural patterns which are typical for addictive behaviours. From an intervention perspective, this

suggests that successful quitting partly depends on reconstruction and reformulation of one's cognitive life associated with drug-seeking and drug-taking activities. Hence, the increased focus on reorganisation of explicit cognitions and mental representations in relation to addictive actions might improve the effects of tailored interventions aiming at preventing the activation of undesired responses. In short, in order to achieve long lasting behavioural changes, one has to reconstruct the manner in which the addictive substance is represented and encoded in tempting situations. At a societal level one also has to target the nature, strength and breadth of public symbols which facilitate growth of collective mental representations associated with the behaviour in question (Moscovici, 1981). That is, MRs constitute cognitions which are partially shared and, as such, can be targeted in traditional persuasive public health messages.

There are a few limitations of the study which warrant consideration. First, the study relies on self-report measures which are frequently criticized in the contemporary literature on the grounds that this method threatens internal and external validity. For instance, the use of self-report measures to assess smoking passion might be problematic. However, the results of a meta-analysis of 185 studies applying the theory of planned behaviour (Armitage & Conner, 2001) showed that discrepancy between observed and self-reported behaviour, although present, is not substantial (R^2=.20 and .31, respectively). Furthermore, a number of studies have successfully validated the self-report measures against more objective measures in the domain of smoking (Klesges, Klesges, & Cigrang, 1992; Patrick et al., 1994; Petitti, Friedman, & Kahn, 1981). Nevertheless, while it is difficult to obtain objective measures for constructs such as previous smoking history, it would be useful to collect more objective measures of smoking and smoking related habits. Second, future research would benefit from including additional measures of dependence in order to test the predictive value of MRs. And finally, although the MRs scale exhibit fairly good psychometric properties in terms of internal consistency, the quality of the scale could be improved on both theoretical and empirical grounds (Kovač & Rise, 2008).

In sum, in the present paper we have explored the role of the cognitive processes in development of obsessive smoking passion. We challenged the traditional idea that the continuation of an addictive behaviour, like smoking, represents a pure automatic process which occurs outside the individual's conscious attention and awareness, i.e. that addicts

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do not know what they are doing. In terms of our model we were able to show that the road to obsessive smoking is more heavily paved with more explicit cognitions, denoted mental representations of smoking, than previously considered. This suggests that behavioural attachments confer meaning for the agents who perform the behaviour in question (e.g. smokers). In this context the challenge for future research is to address the self-regulatory issues concerning formation, resistance, and alteration of MRs.

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