Examining the Relationships between Mindfulness and Tobacco Craving Factors

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Abstract

Background. Relationships between mindfulness and general craving have been documented. However, there is still no data regarding relationships between mindfulness and the different craving factors.

Methods. Using data from an online survey among hospital workers smoking tobacco in France (n=127), we performed linear regression models with the four craving factors as outcomes, and dispositional mindfulness as explanatory variable.

Results. After adjusting for nicotine dependence, mindfulness was negatively associated with general craving and three out of four craving factors (emotionality, compulsivity and purposefulness, but not expectancy).

Conclusions. These results support the implementation of mindfulness-based interventions in the context of tobacco cessation attempt.

Introduction

Research on mindfulness as a treatment for substance use disorder is proliferating with promising results (1,2). Specifically, some observational and interventional studies suggested an effect of mindfulness on craving and subsequent substance use (3–6). Noticeably, mindfulness seemed to attenuate substance craving through a moderating effect on negative affect (7,8). Recently, Mallik et al.'s, from a sample of patients who completed treatment for substance use disorders, suggested that both mindfulness and psychological flexibility contributed to variance in substance craving, while controlling for severity dependence (9). Such a putative role of mindfulness in craving management have also been highlighted for tobacco smoking (5,10). As for other substances, mindfulness seemed to impact craving at least partly through negative affect modulation (11,12). Moreover, mindfulness training may be effective for smoking cessation by decoupling the association between craving and smoking (13). As stronger tobacco craving is associated with poorer smoking cessation outcomes (14,15), there is a need to fully elucidate the potential role of mindfulness in craving attenuation in order to optimize mindfulness-based interventions for tobacco cessation.

However, all the aforementioned studies assessed craving using unidimensional measures. Even when assessed through multiple-item questionnaire, the varied nature of craving experienced by individuals cannot be captured through a single measure (16–18). To overcome this limitation, a multidimensional self-report instrument to assess craving has

been developed (19), and validated for tobacco craving (20). To date, there is no data regarding the relationship between mindfulness and each of the four factors conceptualizing craving (20). Yet, exploring such relationships may highlight a different influence of mindfulness on each factor, thus providing new elements regarding the modulation of substance use by mindfulness. Such differentiated influence may also imply a different responsiveness of participants to mindfulness-based interventions according to their craving profile.

The current study explored the relationships between trait mindfulness and the different tobacco craving factors in a sample of French hospital workers smoking tobacco.

Materials and methods

Data were derived from an online survey conducted in April-June 2020 among people working in two hospitals located in Southern France. Participants were reached through their professional email address, and there were no further inclusion criteria than being a tobacco smoker. Participants had to provide consent online to access the survey. Age was characterized by belonging to one of five age groups. The Fagerström Test for Nicotine Dependence (FTND) (21) and the French version of the 12-item Tobacco Craving Questionnaire (FTCQ-12) (22) were administered to participants reporting current tobacco use. The FTCQ-12 comprises 12 items (for instance 'If I were smoking now I could think more clearly') rated on a Likert-type scale from 1 (strongly disagree) to 7 (strongly agree). Each factor included 2 to 4 items. General and factor craving scores were calculated as the mean rating of their constituting items (leading to scores ranging from 1 to 7). The four factors are: (a) emotionality, or smoking in anticipation of relief from withdrawal symptoms or negative mood, (b) expectancy, or anticipation of positive outcomes from smoking, (c) compulsivity, or a lack of control over tobacco use, and (d) purposefulness, or intention and planning to smoke for positive outcomes (20).Participants also completed the Mindful Attention Awareness Scale (MAAS) (23,24). The MAAS is a 15-item, single-factor structured scale. Each item (for instance 'I could be experiencing some emotion and not be conscious of it until some time later') is scored between 1 ('almost always') and 6 ('almost never'). The overall score is the mean of the scores for the 15 items (i.e. ranging from 1 to 6), with a higher value denoting greater mindfulness. Cronbach's alpha was computed for general and factor craving scores, and the MAAS and FTND scores. Associations between the MAAS score and craving scores were investigated using separate linear regression models with robust standard errors, for the general craving score and the four craving factors as outcomes, with and without adjustment for the FTND score. The MAAS and FTND scores

were tested as continuous explanatory variables. The threshold for statistical significance was set at α = 0.05. All analyses were performed with the Stata version 14.2 for Windows (StataCorp, College Station, Texas, USA) software.

Results

Twelve participants were excluded because of incomplete FTCQ-12 item filling. Our study sample consisted in 127 tobacco smokers (18.9% male, 35.4% in the age group 31-40 years), with a median [interquartile range (IQR)] MAAS score of 3.73 [3.13 – 4.53], a median [IQR] FTND score of 2 [0-4], and a median [IQR] general craving score of 3.25 [2.67 – 4.17]. The profession category most represented was 'direct contact profession other than physician', with 57 (46.0%) participants, followed by 'administrative profession' (26.6%), 'engineering, logistics and technical functions' (16.9%) and 'physician' (10.5%).

Cronbach's alpha was of 0.913 for the MAAS score, 0.6269 for the FTND score, 0.835 for the general craving score, 0.824 for emotionality, 0.674 for expectancy, 0.697 for compulsivity and 0.375 for purposefulness (which included only two items). Regarding the profession category of the participants, 10.2% were physicians, 44.9% were other healthcare professionals, 26.0% worked in administration, and 16.5% had engineering, logistic and technical functions. Three quarter of them lived in a house (vs. in an apartment), and 21.3% lived alone.

In the regression models, the MAAS score was negatively associated with all craving scores, except for expectancy score, including after adjustment for the nicotine dependence score (**Table 1**).

Discussion

To our knowledge, it is the first time that mindfulness is explored in relation with craving factors among tobacco smokers. Our results suggest that, for tobacco use, mindfulness is negatively associated with general craving and three of the four craving factors (i.e. emotionality, compulsivity, and purposefulness, but not expectancy). Results regarding general craving are in line with previous studies (5,9). Results regarding the four validated factors capturing fully the theoretical and experiential breadth of the concept of craving are original. However, they are in line with previous observations on the relationship between mindfulness and emotion regulation (25) and compulsivity (26). Mindfulness is also likely to inhibit the automatic development of intentions and plans related to smoking for positive outcomes (i.e. purposefulness) by limiting mind wandering (27). Such results imply

that mindfulness has a large impact on craving as a phenomenon, embracing almost all its dimensions. Those result also imply that modulating trait mindfulness is likely to impact tobacco craving in virtually all craving profile (i.e. whatever smokers' respective values for each factor), and thus support the implementation of mindfulness-based interventions to increase trait mindfulness in the context of tobacco cessation attempt.

Trait mindfulness was not associated with the expectancy factor, i.e. anticipation of positive outcomes from smoking. It means that tobacco users with high expectancy may be less responsive to increased mindfulness in terms of craving reduction and subsequent tobacco use. Therefore, other types of intervention (alone or in combination with mindfulness-based interventions) may be more suitable for them, such as cognitive behavioural therapy, to help them fulfil their expectancies through other ways and/or to change their beliefs. Therefore, assessing craving profile of smokers may be of help in the future to determine which interventions are most effective for whom (28). As smoking expectancies are associated with motivation to quit (29), our results also suggest that ensuring a sufficient motivation level before implementing mindfulness-based interventions for quitting is as necessary as for other types of interventions.

Affect management is a strong component of smoking expectancies (30–32). However, as one study previously found a negative correlation between MAAS and negative affect reduction expectancies (without reference to craving) among daily smokers (33), duplication of our results would be needed to ensure their generalizability.

Previous findings supported the four-factor model of craving for other substances such as alcohol (34), amphetamine (35), cocain (36), heroin (37) and cannabis (19). As expectancies related to those substances may differ from those related to tobacco, there is a need to confirm our results in the context of craving for other substances. As we used a single-dimension scale to assess mindfulness, further research is needed to test for specific association between mindfulness facets and craving factors.

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Declaration of interest statement

Authors declare no competing interest.

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Table 1: Associations between mindfulness and tobacco craving scores (unadjusted and adjusted linear regression models, n=127)

	General craving score		**Emotionality score**		**Expectancy score**		**Compulsivity score**		**Purposefulness score**	
	Model 1: unadjusted associations between MAAS score and craving scores									
	Coef. [95% CI]	*p-value*	Coef. [95% CI]	*p-value*	Coef. [95% CI]	*p-value*	Coef. [95% CI]	*p-value*	Coef. [95% CI]	*p-value*
MAAS score	-0.29 [-0.49; -0.09]	*0.005*	-0.29 [-0.53; -0.05]	*0.019*	-0.11 [-0.39; 0.18]	*0.464*	-0.40 [-0.67; -0.13]	*0.004*	-0.39 [-0.63; -0.15]	*0.002*
	Model 2: associations between MAAS score and craving scores adjusted for nicotine dependence score									
	aCoef. [95% CI]	*p-value*	aCoef. [95% CI]	*p-value*	aCoef. [95% CI]	*p-value*	aCoef. [95% CI]	*p-value*	aCoef. [95% CI]	*p-value*
MAAS score	-0.35 [-0.56; -0.14]	*0.001*	-0.39 [-0.65; -0.12]	*0.005*	-0.15 [-0.46; 0.16]	*0.329*	-0.47 [-0.75; -0.19]	*0.001*	-0.39 [-0.65; -0.14]	*0.003*
FTND score	0.09 [-0.00; 0.19]	*0.051*	0.06 [-0.06; 0.17]	*0.323*	0.14 [0.01; 0.28]	*0.034*	0.11 [-0.02; 0.23]	*0.106*	0.07 [-0.06; 0.20]	*0.275*

FTND, Fagerström Test for Nicotine Dependence; MAAS, Mindful Attention Awareness Scale; Coef., regression coefficient; aCoef., adjusted regression coefficient; CI, confidence interval.