Factors underlying smoking relapse prevention: results of an international Delphi study

I. Elfeddali¹,²*, C. Bolman¹,³, I. Mesters¹,⁴, R. W. Wiers⁵ and H. de Vries¹,²

¹School for Public Health and Primary Care (Caphri) and ²Department of Health Promotion and Health Education, Maastricht University, PO Box 616, 6200 MD Maastricht, The Netherlands, ³Department of Psychology, Open University of the Netherlands, 6419 AT Heerlen, The Netherlands, ⁴Department of Epidemiology, Maastricht University, PO BOX 616, 6200 MD Maastricht, The Netherlands and ⁵Department of Developmental Psychology, University of Amsterdam, 1012 WX Amsterdam, The Netherlands

*Correspondence to: I. Elfeddali. E-mail: iman.elfeddali@gvo.unimaas.nl

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Abstract

No definitive picture of the factors determining smoking relapse exists, and many smoking relapse prevention programmes have only modest behavioural effects. This study aims to identify the level of consensus among and compare the opinions of two groups of experts (researchers and coaches who provide smoking cessation courses) regarding factors already studied in relation to smoking relapse, factors that have not yet been addressed and ideas on how to improve prevention programmes. A three-round Delphi method was employed. In the first round, 15 researchers completed an electronic questionnaire on factors associated with relapse. The results were used to develop a structured questionnaire for the second round, which was completed by 47 researchers and 61 coaches. The second-round results were then presented to the same experts in the third round, enabling them to re-rate their answers. Results revealed high consensus on some factors already identified as predicting relapse (e.g. self-efficacy), new factors (e.g. action planning) and several methods to improve prevention programmes. Generally speaking, the researchers and coaches provided similar suggestions. The results paint a picture of the current state of knowledge on relapse-related factors and point the way to areas for further research.

Introduction

Smoking is the most important preventable behavioural cause of premature death and disability worldwide. In The Netherlands, >25% of cancer-related deaths before the age of 70 result from smoking [1]. Approximately 28% of Dutch adults smoke [2], with more men (31%) doing so than women (25%). At least 63% have unsuccessfully tried to quit one or more times [2]. Similarly, 70% of smokers worldwide want to quit smoking [3], but only 7% of all attempts are generally successful [4] and multiple quit attempts are needed even then [5, 6]. Relapse rates are particularly high during the first weeks of an attempt [7, 8].

Several studies regarding smoking relapse have been conducted. Ockene et al. [9] emphasized being older, male and married; smoking fewer cigarettes per day and for fewer years and having a lower addiction level, more previous quit attempts, higher motivation to quit and higher self-efficacy as preventive factors of smoking relapse. Moreover, according to the relapse prevention (RP) model of Marlatt and Gordon [10], risk
factors for relapse include covert (e.g. lifestyle imbalances, urges and cravings) and immediate (e.g. high-risk situations) determinants. In addition, empirical studies mention self-efficacy, smoking outcome expectancies, craving levels, nicotine dependence, withdrawal symptoms, stress, depression, negative affect (NA) and gender [11–34] as associated with smoking relapse. For some of these factors, various studies have yielded conclusive findings; for others, there are only inconclusive findings.

Conclusive findings have positively associated relapse with low self-efficacy, positive smoking outcome expectancies, high craving levels and high nicotine dependence [11,14–16, 18, 19, 30, 32]. With respect to inconclusive findings, however, one review found a positive association between withdrawal symptoms and relapse in only 6 of 15 studies [35]. Furthermore, Brown et al. [22] suggested that relapse might not be predicted by the withdrawal symptoms themselves but by the NA associated with these symptoms. The literature is also inconclusive when it comes to the role of NA (including feelings of depression) and stress. Several prospective and retrospective studies [12, 20, 22, 26, 28,36–38] have positively associated relapse with NA and stress, whereas in one prospective study, daily changes in NA and stress did not predict the first lapse on the following day; yet, a rapid and immediate increase in NA did precede lapsing on that day [31]. Regarding gender, being female is associated with smoking relapse in some studies [9, 21, 34] but not in others [13, 17].

Other factors have received relatively less emphasis. Although the concept of planning is not new, the role of making action and coping plans in preventing smoking relapse has only recently received attention [17, 39, 40; I. Elfeddali, C. Bolman, M.J. Candel et al., submitted for publication]. Action plans are sets of sub-goals in which thoughts, feelings and actions are aimed towards attaining a certain goal [23, 41], whereas coping plans set out how the individual will deal with risky situations for (re)lapse, such as going to a bar [42]. Next, some studies (such as a meta-regression analysis of 11 smoking-related studies [43]) have indicated that implicit cognitions (e.g. attentional bias) may also play a role [44–46]. Implicit cognitions are defined as indirect measures or procedures in which constructs such as attitudes are indirectly derived from behaviour (e.g. reaction times) [47]. This suggests that smokers’ attention is unconsciously drawn to smoking-related stimuli, which causes cravings and subsequent relapse. Finally, the evidence to date does not support the effectiveness of relapse prevention programmes, which remain scarce in any case [48, 49].

As the factors determining relapse are clearly not yet fully understood, this study was set up with four objectives: to gain an overview of factors that researchers and coaches (giving smoking cessation courses) consider as important for smoking relapse, to identify their opinions of relatively new concepts such as action planning and implicit cognitions, to identify factors that they feel should be included in relapse prevention programmes and to compare their opinions on the factors involved to examine how far the scientific findings to date have been translated to daily practice. For this purpose, we used a three-round Delphi method (a method to structure communication processes on a certain problem area among expert groups: see Methods below).

In this study, ‘relapse’ is defined as smoking more than five cigarettes after a quit attempt. This is in line with the Russell Standard for outcome criteria in smoking cessation trials [50].

### Methods

The Delphi method—a technique for structuring communication processes among many individuals to gain consensus on certain subjects [51]—has proved valuable in providing insight into health-related issues [52–54]. It begins with an open-ended questionnaire investigating selected experts’ opinions on a certain topic. The results are used to make a structured second-round questionnaire, which is presented to a larger group of panel members. Finally, this group re-evaluates the second-round outcomes in the third round [53, 55]. This iterative approach allows participants to adjust their opinions when needed, and they obtain feedback from
the research team on the group results after each round [52, 54, 56]. Experts remain anonymous to exclude conformity biases.

Two groups of experts participated to our study: (i) researchers from the field of smoking cessation and relapse prevention and (ii) coaches giving smoking cessation courses.

**First round**

*First-round procedure and participants*

The participants for the first round were selected by the members of our project advisory board, which consisted of international and national researchers from the field of smoking cessation and relapse prevention. The members were asked to list the most important experts (according to them) from their own network using the following criteria: (i) the experts have experience in the field of smoking cessation and relapse prevention and (ii) the experts come from various fields (e.g. medical, health promotion, etc). This resulted in a list of 30 experts. These 30 smoking cessation and relapse prevention experts were invited to participate. Non-responders received a reminder after 3 weeks. Eight Dutch and seven non-Dutch experts (N = 15; 50% response rate) from various professional backgrounds (e.g. medicine, health promotion, pharmacology and psychology) participated. Coaches were sought only for subsequent rounds, as some first-round participants indicated that not all researchers have practical experience in training groups, and thus, the inclusion of coaches may be worthwhile. Hence, the later addition of the coaches.

*First-round questionnaire*

The first-round Internet-based questionnaire had nine open-ended questions, all aimed at eliciting the factors important for smoking relapse. These stemmed from three overarching themes. The first aimed to identify the factors that the researchers considered important in this context (‘Which factors do you think are associated with smoking relapse?’). The second focused on the role of constructs that have received relatively less attention in smoking relapse prevention and on the potential importance of goal setting, action plans and implicit cognitions (e.g. ‘How should action plans be used to successfully prevent smoking relapse?’). We provided definitions (the same as those provided in the introduction) of the latter two concepts, as they may have been unknown for some respondents. The final theme related to factors that the researchers felt should be integrated into smoking relapse prevention programmes.

*First-round analyses*

The answers resulted in a long list of various terms for comparable factors. In line with De Vet’s Delphi study [52], three different researchers grouped different terms for the same factors into one variable separately to exclude interpretation bias.

**Second round**

*Second-round procedure and participants*

The aim here was to gain a quantitative overview of the factors that researchers and coaches associate with relapse and insight into the level of consensus on these factors within and between the groups. This round started 3 months after the first, with reminders sent after 3 weeks.

*Researchers’ group.* The researchers were identified using our project advisory board’s contacts and names derived from a PsycINFO and Medline literature search, using the keywords ‘smoking relapse’ and ‘smoking relapse prevention’. The search resulted in 176 published papers (including double hits). We selected the first authors of papers published from 2004 onwards but excluded papers about specific groups, like pregnant women, and those only about smoking cessation. This resulted in 150 researchers (including participants from the first round), of whom 47 (31% response rate) participated in the second round. The second-round questionnaire was emailed with a link and user account to access the questionnaire. The researchers were invited to participate in the second round (and also the third round, as is common practice in Delphi studies).

Although we did not measure reasons for refusal, emails from some of the targeted researchers indicated that a lack of time was a likely factor.
Coaches' group. This group consisted of coaches professionally licensed by the Dutch Foundation for a Smoke-Free Future (Stivoro) to give smoking cessation courses. Stivoro emailed our invitations to 247 coaches. Those who agreed to participate (N = 61; 25% response rate) were emailed a user account and link to the questionnaire. Approximately 85% had a higher vocational educational background in nursing; a few had a psychology degree. All had received training from Stivoro to give smoking cessation courses.

Second-round questionnaire
The coaches’ questionnaire was in Dutch, while the researchers’ questionnaire was in English to accommodate the international experts involved. The questionnaires were otherwise identical. For this second round, they consisted of 6 parts with 44 statements, 9 open-ended questions and 1 multiple-choice question (Table I). The items in the first part were derived from the literature and the answers to the open-ended questions from the first round. The second, third, fourth and fifth parts were, respectively, about goal setting, action plans, implicit cognitions and relapse prevention programmes and also included items resulting from the first round. For all statements (except that referring to the time frame needed for successful relapse prevention), answers were given on a 7-point Likert scale (1 = totally agree to 7 = totally disagree); it was also possible to answer ‘I don’t know’.

General relapse predictors. The first part included 20 items with 17 statements about factors potentially associated with relapse. Participants were asked to rate how far they agreed with the statements (e.g. ‘being female is associated with relapse’) and whether they considered the factors mentioned as important relapse predictors. Two open-ended questions followed on the role of personality and emotions. A final open-ended question then asked participants to list the five most important relapse predictors.

Goal setting. The second part contained five closed-ended statements about the importance of goal setting and how to accomplish it successfully.

Action planning. The third part contained eight closed-ended statements about the role of action planning and how to achieve it successfully.

Implicit cognitions. The fourth part contained five closed-ended statements about the role of implicit cognitions in relapse prevention and one open-ended question allowing the respondent to elaborate on other important aspects of implicit cognitions.

Smoking relapse prevention programmes. The fifth part consisted of 14 items: 9 questions focusing on whether the concepts mentioned (e.g. skills training) should be included in relapse prevention programmes and 5 open-ended questions (2 seeking in-depth information about a given statement and 3 asking whether education- and gender-specific items should be included in relapse prevention programmes and if so, which).

Time frame. A final multiple-choice question asked about the time (duration of an intervention) needed for successful smoking relapse prevention. The answers were given using the following answer categories: 1 = a couple of days, 2 = a couple of weeks, 3 = 1–5 months, 4 = 6 months, 5 = one year, 6 = two years and 7 = five years.

Second-round analyses
The closed-ended statements were analysed using median scores to characterize the score above and below which 50% of the answers fell and interquartile deviations (IQDs) to represent the data spread. The measure for the data spread was used to analyse whether consensus was reached on a certain statement. The IQD is the distance between the 25th and the 75th percentiles, with a smaller value indicating a small data spread. An IQD <1 is considered to be good consensus on a 7-point scale, meaning that 50% of all cases fall within 1 point of one another [56]. Differences in consensus between the researchers and the coaches were analysed using Wilcoxon signed-rank sum tests.

Third round
Third-round procedure and participants
The researchers (N = 47) and coaches (N = 61) were invited to participate in the third round 3
Table I. Second- and third-round results of the 'researchers' and 'coaches' groups per item

<table>
<thead>
<tr>
<th>Part 1. factors associated with relapse*</th>
<th>Researchers</th>
<th>Coaches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Second round</td>
<td>Third round</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Mdn</td>
</tr>
<tr>
<td>Being female is associated with relapse</td>
<td>44</td>
<td>3.5</td>
</tr>
<tr>
<td>There is no association between being younger and relapse</td>
<td>45</td>
<td>6</td>
</tr>
<tr>
<td>A high number of years' smoking is associated with relapse</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>Relapse is associated with a high addiction level</td>
<td>46</td>
<td>2</td>
</tr>
<tr>
<td>Craving is associated with relapse</td>
<td>46</td>
<td>2</td>
</tr>
<tr>
<td>The number of unsuccessful quit attempts is NOT associated with relapse</td>
<td>43</td>
<td>5</td>
</tr>
<tr>
<td>Low abstinence self-efficacy is associated with relapse</td>
<td>44</td>
<td>2</td>
</tr>
<tr>
<td>Having positive outcome expectations of smoking is associated with relapse</td>
<td>43</td>
<td>2</td>
</tr>
<tr>
<td>Relapse is associated with negative emotions</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>Open: if you think negative emotions are associated with smoking, what kind of emotions do you mean?</td>
<td>43</td>
<td>2</td>
</tr>
<tr>
<td>Depression after smoking cessation is associated with relapse</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>There is no association between relapse and personality</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>Open: if you think personality is associated with relapse, what kind of personality do you mean?</td>
<td>43</td>
<td>2</td>
</tr>
<tr>
<td>Relapse is associated with high stress levels</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>Having psychosocial problems is associated with relapse</td>
<td>45</td>
<td>6</td>
</tr>
<tr>
<td>Relapse is not associated with the presence of smokers in the social environment</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>Not having adequate coping strategies is associated with relapse</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>Relapse is associated with lack of motivation</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>Not using pharmacological aids is associated with relapse</td>
<td>45</td>
<td>3</td>
</tr>
<tr>
<td>Open: top five of predictors of relapse</td>
<td>43</td>
<td>2</td>
</tr>
</tbody>
</table>

Part 2: Goal setting*

Goal setting plays an important role with regard to relapse

Effective goal setting can be achieved by …

| Setting specific, concrete, proximal goals | 42 | 2 | 1 | 59 | 2 | 1 |
| Setting challenging goals | 42 | 4 | 3 | 38 | 4 | 2.25 | 60 | 3 | 1.75 | 50 | 3 | 1 |
| Setting realistic and attainable goals | 43 | 2 | 1 | 60 | 1.5 | 1 |
| Being committed to the goal | 42 | 2 | 1 | 59 | 1 | 1 |
### Table I. Continued

<table>
<thead>
<tr>
<th>Table I. Continued</th>
<th>Researchers</th>
<th>Coaches</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Second round</td>
<td>Third round</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Mdn IQD</td>
</tr>
<tr>
<td>Part 3: action plans*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action plans are very important in relapse prevention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action plans should aim at</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifying risky situations</td>
<td>45 2 1</td>
<td>60 1 1</td>
</tr>
<tr>
<td>Bringing risky situations for certain individuals to light</td>
<td>45 2 1</td>
<td>60 1 1</td>
</tr>
<tr>
<td>Users' commitment to the action plan</td>
<td>43 2 2 0</td>
<td>60 1 1</td>
</tr>
<tr>
<td>Developing coping strategies for risky situations</td>
<td>45 2 1</td>
<td>60 1 1</td>
</tr>
<tr>
<td>Practicing coping skills for risky situations</td>
<td>44 2 1</td>
<td>60 2 1</td>
</tr>
<tr>
<td>Making emergency plans to deal with weak moments or even relapse</td>
<td>45 2 1</td>
<td>60 2 1</td>
</tr>
<tr>
<td>Evaluating success/failure (e.g. why did relapse occur, what can be changed in</td>
<td>45 2 1</td>
<td>60 1 1</td>
</tr>
<tr>
<td>order to prevent relapse, which factors contributed to successful abstinence?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part 4: implicit cognitions*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implicit cognitions are very important in relapse prevention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implicit cognitions are especially important for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gathering information about anticipatory cognitions</td>
<td>32 3 2</td>
<td>53 2 1</td>
</tr>
<tr>
<td>Gathering information about functional cognitions</td>
<td>31 3 1</td>
<td>53 2 1</td>
</tr>
<tr>
<td>Mediating urges and craving</td>
<td>35 2 1</td>
<td>58 2 1.25</td>
</tr>
<tr>
<td>Bringing to light what leads people when they are not conscious of their actions</td>
<td>36 2 1</td>
<td>57 2 1</td>
</tr>
<tr>
<td>Open: something else?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part 5: relapse prevention programmes*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The following concepts should definitely be included in relapse prevention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive and behavioural coping skills</td>
<td>42 1 1</td>
<td>60 2 1</td>
</tr>
<tr>
<td>Skills training</td>
<td>40 2 1</td>
<td>60 2 1</td>
</tr>
<tr>
<td>Identifying risky situations</td>
<td>42 2 1</td>
<td>60 1 1</td>
</tr>
<tr>
<td>Emergency plans to deal with moments of weakness</td>
<td>41 2 1</td>
<td>60 1 1</td>
</tr>
<tr>
<td>Preparation for failure</td>
<td>40 2 2.75</td>
<td>38 2 1</td>
</tr>
<tr>
<td>Recognition of early-relapse warning signs</td>
<td>42 2 1</td>
<td>60 1 1</td>
</tr>
<tr>
<td>Intensive support</td>
<td>42 3 2</td>
<td>38 2 2</td>
</tr>
<tr>
<td>Open: if you think intensive support should be included, what kind of support do</td>
<td></td>
<td></td>
</tr>
<tr>
<td>you mean?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacotherapy</td>
<td>42 2 3</td>
<td>38 2 2</td>
</tr>
</tbody>
</table>
months after the second round. A reminder was sent to non-responders after 3 weeks. In total, 39 of the 47 researchers (83% response rate) and 52 of the 61 coaches (85% response rate) participated. The aim of this round, in line with the Delphi method (see the first paragraph of the Methods section), was to gain more consensus on the statements by presenting the second-round results in a questionnaire and giving the participants a chance to re-rate their answers on the basis of the summary of expert opinions. Each median answer from the second round was written in capital letters and the IQD score appeared after each statement (see Third-round questionnaire below).

Third-round questionnaire
The second-round questionnaire built on the second-round results of each participant group was used as the third-round questionnaire. Information on interpreting the results was provided. Items on which the participants already showed consensus were excluded, as were the open-ended questions. The researchers’ and coaches’ questionnaires consisted of 15 and 8 closed-ended questions, respectively. Participants were asked to fill out the questionnaire and to re-rate their answers based on the second-round results.

Third-round analyses
Again, agreement and consensus were measured using median scores and IQD. Wilcoxon signed-rank tests were used to analyse the changes in consensus between the second and third rounds for both groups separately.

Results
The results showed how much consensus had been reached on the outlined factors, as well as the discrepancies and similarities in the expert opinions. In-depth information on the open-ended questions is reported below.
First-round results
The first round yielded 45 closed-ended and 9 open-ended relevant items for the second-round questionnaire. Table I shows the second-round questionnaire, including all determinants mentioned in the first round.

Second-round results
The second-round results provided insight into the level of expert consensus (IQD ≤ 1), implying conformity, on a certain answer. Median scores (Mdn) were given to show whether there was agreement (Mdn < 3) or disagreement (Mdn > 5) within the item on which consensus was reached, with a score of 4 indicating neutrality.

Second-round researchers’ results
Consensus (IQD ≤ 1) was reached on 30 of the 45 items (see Table I). For 29 of these, the researchers reached consensus by way of agreeing (Mdn < 3) with the item. These included the positive association between relapse and a high number of years of smoking, high addiction level, craving, low abstinence self-efficacy, positive outcome expectations of smoking, negative emotions, depression, high stress levels, psychosocial problems and inadequate coping strategies.

The results also indicated that goal setting, action planning and implicit cognitions were seen as important factors in relapse prevention. According to the researchers, effective goal setting could be reached by committing to and setting specific and realistic goals. They pointed out that in action planning, one should aim at identifying risky situations, developing coping strategies for these situations, practising the coping strategies and making emergency plans in case of failure. Finally, the results showed that success and failure need to be subsequently evaluated.

Implicit cognitions were mentioned as important in mediating urges and cravings and in providing information about how people are unconsciously led by their implicit associations. In this section, which consisted of five statements, 20–35% of the researchers answered ‘I don’t know’.

Cognitive and behavioural coping skills, skills training in general, emergency plans, the identification of risky situations and the recognition of early-relapse warning signs were seen as key aspects of successful relapse prevention programmes.

For one item in Part 1, consensus was reached by way of disagreement (Mdn > 5) with the item. However, the negative formulation of the sentence (‘relapse is NOT associated with the presence of smokers in the social environment’) implied that the experts agreed with the association between relapse and the presence of smokers in the social environment.

Second-round coaches’ results
The coaches’ group results are depicted in Table I. In this group, consensus (IQD ≤ 1) was reached on 37 of the 45 items and agreement (Mdn < 3) on 35 of those 37. The coaches reached consensus not only on all statements as the researchers but also on concepts like the association between relapse and personality/a high number of cigarettes smoked. Commitment to the action plan was seen as important, and consensus was also reached on the role of implicit cognitions in gathering information. In this section, 3–12% of the coaches answered ‘I don’t know’. Intensive support and the evaluation of success and failure were seen as important for successful relapse prevention in addition to the factors already mentioned in the researchers’ group. Finally, consensus was reached about the time span of 1 year being needed to successfully prevent relapse. Coaches disagreed that there is NO association between relapse and personality and that relapse is NOT associated with the presence of smokers in the social environment. Thus, they were of the opinion that personality and smokers in the environment do matter.

Similarities and differences between the researchers’ and coaches’ groups
Many similarities were observed in the researchers’ and coaches’ opinions, although the statistical data showed a non-significant (z = −1.774, P = 0.076) difference between the overall consensus in the two groups. Therefore, more consensus was reached by
the coaches than by the researchers. Comparing both groups’ consensus in each part of the questionnaire separately revealed no significant differences.

**Open-ended questions**

The open-ended questions highlighted several unique factors mentioned by only some experts. Anger management for male smokers, weight management for female smokers, social support, relaxation training, the use of multiple sensory modalities and the use of visually attractive information for low-socioeconomic status (SES) smokers were suggested as possible key factors in preventing relapse in these particular groups.

**Third-round results**

**Third-round researchers’ results**

In the third round, the researchers reached consensus (IQD ≤ 1) on 40 of the 45 items and agreement on 34 of those 40 (Mdn < 3; see Table I). Besides the items mentioned in the second round, consensus was reached on the positive association between relapse and lack of motivation and on the importance of developing coping strategies for risky situations, while some consensus was reached by agreeing on the association between relapse and not using pharmacological aids. Both preparation for failure and evaluation of success and failure were seen as important for successful smoking relapse prevention programmes.

On four items, consensus was reached by way of disagreement (Mdn > 5). In addition to the factors mentioned in the second round, the researchers disagreed that there is no association between relapse and being younger, the number of unsuccessful quit attempts and personality, suggesting that these concepts do matter. Lastly, the researchers were neutral about the associations between relapse and being female and the function of implicit cognitions in gathering information about functional cognitions.

**Third-round coaches’ results**

In this group, consensus was reached on 43 of the 45 items (see Table I): consensus by agreement for 39 and consensus by disagreement for 4 of these 43 items. In addition to the factors mentioned in the second round, the coaches reached consensus on the association between relapse and lack of motivation, the importance of setting specific, concrete goals, the importance of preparation for failure and the inclusion of pharmacotherapy in successful prevention programmes. They disagreed about the association between relapse and being female, and there was some disagreement about the absence of an association between relapse and unsuccessful quit attempts.

After the third round, there were still some items on which no consensus had been reached. The researchers fell short of consensus on the importance of setting challenging goals for successful goal setting, gathering information about anticipatory cognitions as a function of implicit cognitions, the time span needed to successfully prevent relapse and the importance of intensive support and pharmacotherapy in successful smoking relapse programmes. The coaches fell short of consensus on the association between relapse and being younger/not using pharmacological aids.

**Differences in consensus between the second and third rounds**

Compared with the second round, the third round showed an overall significant increase in the importance of setting specific, concrete goals, the time span needed to successfully prevent relapse and the importance of intensive support and pharmacotherapy in successful smoking relapse programmes. The coaches fell short of consensus on the association between relapse and being younger/not using pharmacological aids.

**Discussion**

Our first objective was to identify factors important for smoking relapse using expert opinions. Our findings correspond with those reported by Ockene et al. [9]. The experts associated being younger; female; smoking a high number of cigarettes per
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day and for many years and having a high addiction level, previous quit attempts, lack of motivation to quit and low self-efficacy with relapse. Comparable results were found among the coaches, although they did not reach consensus on the association between relapse and being younger. In addition, both expert groups reached consensus for stress, depression and NA; the literature, in contrast, is ambivalent regarding these factors. Our experts associated high stress levels with relapse, this time in line with previous studies [22, 26, 28]. It has been reported that people with a history of depression are vulnerable to relapse [57], including because they experience more abstinence symptoms [37]. Gilbert et al. [58] demonstrated that some predictors of smoking relapse are also markers of NA. Furthermore, more cigarettes are smoked during NA periods [59], and NA has been positively associated with (re)lapse [20, 29]. Yet, the direct association between relapse and NA remains unclear and thus still requires further research [60]. In general, however, our findings are in line with the RP model of Marlatt and Gordon [10] in terms of the importance of negative emotional states, self-efficacy, urges and overall stress levels.

Our second aim was to obtain an overview of expert opinions of relatively new, but potentially important, factors concerning relapse. Both expert groups reached strong consensus on the importance of goal setting and action planning in relapse prevention. This supports a previous study which showed that abstinence was related to high levels of sub-goal achievement (as the latter fostered increased self-efficacy) and that abstainers set fewer goals but achieved more of them than smokers [61]. Our findings also support an earlier Dutch study in which action planning was shown to protect against relapse [17]. Still, despite the consensus on action plans, more research is needed to investigate which plans and goals can feasibly or should be set (Borrelli [61], for example, suggests that setting many goals may be counterproductive). Consensus was also reached on the importance of implicit cognitions in relapse prevention, yet their working mechanisms were not fully understood by either group: 3–12% of coaches and 20–35% of researchers answered ‘I don’t know’ to this question. The fact that implicit cognition is a broad construct may have caused some confusion here, and the high percentage of researchers answering ‘I don’t know’ might be explained by their being more aware of the issues surrounding its definition.

Our third aim was to identify key factors to include in prevention programmes. Both expert groups confirmed the importance of training in coping and other skills, developing emergency plans to deal with lapses and identifying risky situations. Unlike the researchers, however, the coaches were keen to include intensive support in cessation programmes. They also estimated that 1 year is needed to quit successfully, whereas the researchers did not reach consensus on a time span. Future research could thus examine the contribution of intensive support and the approximate time needed to quit. Furthermore, the researchers fell short of consensus on the importance of pharmacotherapy in relapse prevention programmes but reached consensus on the association between relapse and not using pharmacological aids (whereas the coaches indicated precisely the reverse). These differing viewpoints might result from coaches focusing more on prevention programmes rather than relapse predictors. Stead et al. [62] conclude that nicotine replacement therapies (NRT) help smokers to quit but that relapse rates might rise after the treatment. NRT as well as non-nicotine pharmacotherapy (e.g. Buproprion) [9, 17, 63] has been associated with higher smoking abstinence. However, reviews call for more research into the role of NRT in smoking relapse given that NRT has to date mostly been studied in small samples and usually as an add-on to Buproprion [48, 62].

Although the Delphi method yielded useful information on the experts’ opinions of the factors and the consensus reached by each group, it has some methodological limitations. First, the number of experts consulted was necessarily limited; their opinions are thus not necessarily representative. Second, we only invited first authors for participation, who might not always have been the ‘expert’. To ameliorate this, we asked the participants to inform us if they felt they did not have enough
expertise to answer the questions. Similarly, the researchers were selected based on their participation in relapse prevention studies. This may have introduced bias and thus potentially threaten the generalizability of the results. Third, the comparison between the researchers and coaches might be confounded by the fact that the coaches were a more homogenous (as they all received the same training) national group, while the researchers were a more international and potentially more heterogeneous group. Moreover, we did not have any information with regard to the practical experience of the coaches, the time that has lapsed since they were trained and the differences in experience between the coaches. Nevertheless, this study yields an impression of the similarities and differences of opinion between experts from the practice-based versus ‘theoretical’ fields. Another limitation may be the low response rates, which could have biased the results. However, the response rates mentioned represent the percentage of experts who responded to our first invitation, not the experts we lost to follow-up. Moreover, these rates increased progressively, rising to ~80% in the third round. This indicates that we lost few experts to follow-up, which is an important precondition for the success of Delphi studies [64]. Additionally, other Delphi studies have showed comparable response rates in the second round [52, 65]. On a different note, another possible limitation may be that the inclusion of questions on relatively new factors, such as implicit cognitions, may have prompted experts to respond more positively. Yet this study nevertheless gives a preliminary overview of the experts’ opinions with regard to these factors. Next, it may also be seen as a limitation that only researchers participated in the first round. The inclusion of coaches could have resulted in a different list; yet in the second round, the coaches did not indicate that they felt any items were lacking. Finally, the opinions of highly experienced experts might have been underestimated, as the opinions of all experts were equally weighted in the analyses.

Despite these limitations, the present study shows that experts from the scientific- and practice-based fields of smoking relapse agree on the role of smoking many cigarettes per day and for many years; being female; having a high addiction level, previous attempts to quit, having a low motivation to quit and low self-efficacy, and depression, NA and stress. However, the coaches did not reach consensus on the role of being younger or the use of pharmacological aids. Second, relatively new factors like goal setting, action planning and implicit cognitions were seen by both groups as important for smoking relapse prevention. Hence, although some of these have already been incorporated into relapse prevention programmes, the lack of evidence-based interventions emphasizing their importance implies a need to further develop and test these strategies. Third, both experts groups agreed on the importance for relapse prevention programmes of training coping and other skills, developing emergency plans to deal with lapses and identifying risky situations. Further promising factors were also identified via open-ended questions: anger management for male smokers, weight management for female smokers and relaxation training, multiple sensory modalities and visually attractive information for low-SES smokers. This may imply a need for future research to test the impact of these factors. More research should also examine the role of pharmacotherapy in relapse prevention, as neither the literature nor the experts were clear on its effects. Fourth, the two groups displayed far more similarities of opinion than differences, suggesting that knowledge transfer between them is reasonably successful. The most apparent differences concerned the roles of being younger and of not using pharmacological aids as predictors of relapse, as well as the importance of pharmacological aids and social support in relapse prevention programmes. This suggests that the translation of research findings to practice regarding these factors may not be optimal and/or findings from practice are not optimally communicated to researchers and that more attention and/or research is needed to demonstrate the effects of these factors. Finally, although not within the scope of this study, more research should analyse the effects of combining various strategies. Dismantling studies will help show which components are most effective and for whom.
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Conflict of interest statement

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