

# **“Pick-Klop”, a group smoking cessation game**

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# **“Pick-Klop”, a group smoking cessation game**

## **Abstract**

The study aimed at assessing the feasibility and impact of a game called “Pick-Klop” in 61 current smokers. Assessments covered the “Attitude Towards Smoking Scale” (ATS-18), the “Smoking Self Efficacy Questionnaire” (SEQ-12), the “Attitude Towards Nicotine Replacement Therapy” scale (ARNT-12), the number of cigarettes smoked per day, intention to quit smoking and stages of change. We observed significant improvements on the SEQ-12, the ARNT-12 and the ATS-18. An increase in intention to stop smoking and a reduction of the number of cigarettes smoked per day were also observed, as well as a significant improvement of the stages of change.

## **Key words**

Smoking; Smoking cessation; Cognitive behavior therapy; Motivational interviewing; Prohibitive smoking policy

## **Introduction**

Cigarette smoking is a leading cause of morbidity and mortality (Ezzati & Lopez, 2003; Peto, Lopez, Boreham, Thun, & Heath, 1992). Forty percent of smokers attempt to give up smoking each year, but most of these quit attempts are made without any help and are most frequently followed by rapid relapse (Hughes, 2003; Hughes, Keely et al., 2003). The development of new tools acceptable by a wide range of smokers should be of particular interest. The current study aimed at assessing the feasibility and impact of a game called “Pick-Klop” in current smokers.

### *Knowledge and attitude regarding the risks associated with smoking*

Even though most smokers are informed about the risks associated with smoking, this awareness does not seem to be sufficient to induce a behavioral change (Etter, Humair, Bergman, & Perneger, 2000). Additional elements are necessary to obtain change, for instance positive attitudes towards smoking cessation (Droomers, Schrijvers, & Mackenbach, 2004). The perceived advantages and disadvantages of a given behavior, along with self-efficacy and intention to change are established predictors of behavior change (Prochaska, DiClemente, & Norcross, 1992).

### *Knowledge and attitude regarding measures that can be used to stop smoking*

Despite the efficacy of nicotine replacement therapy (NRT) (Silagy, Mant, Fowler, & Lancaster, 2000), bupropion (Hughes, Stead, & Lancaster, 2003), varenicline and behavioral approaches (Stead & Lancaster, 2002), professional support and medications are used by only a minority of smokers. In addition, compliance is often poor among users of these treatments (Etter & Perneger, 2001; Millard, Waranch, & McEntee, 1992). This is probably linked to the

smokers' lack of knowledge about the efficacy and correct usage of treatments and other measures available to help them stop smoking (Hammond, McDonald, Fong, & Borland, 2004).

A modification of knowledge and attitudes towards smoking and smoking cessation treatments can thus be highly relevant. A positive attitude towards such interventions is associated with a more frequent use of these techniques, and with a greater probability to attempt to stop smoking within three months (Hammond et al., 2004).

### *Self-efficacy and smoking cessation*

Self-efficacy (Bandura, 1982) is a core concept of several theories of behavioral change (Ajzen, Brown, & Carvajal, 2004; Prochaska et al., 1992). Self-efficacy is the confidence in one's own ability to behave effectively in a given situation. It depends on past experience, the observation of other people's experience, on physiological states and on verbal persuasion (Etter, Bergman, Humair, & Perneger, 2000). It was found that self-efficacy is a strong predictor of behavior change in addition to decisional balance variables (Prochaska, DiClemente, Velicer, Ginpil, & Norcross, 1985) which further led to its combination with the transtheoretical model of change in studies related to behavior change processes. An increase in self-efficacy lowers the consumption of cigarettes (Nicki, Remington, & MacDonald, 1984) and predicts quitting in smokers (Dijkstra & Wolde, 2005). Therefore, enhancing self-efficacy could be a strategic way to act on smokers' behavior.

### *Self-help booklets, cognitive and behavioral therapy*

Self-help booklets can reach many smokers from different groups of the population and they can be distributed in different ways at a reasonable cost (Curry, Ludman, & McClure, 2003). Despite these advantages, their effectiveness has not yet been proven (Lancaster & Stead,

2002). Cognitive and behavioral therapies seem to be more effective than self-help materials or than no treatment at all (Stead & Lancaster, 2002). However, they reach out to only 5% of smokers in U. S. (Lancaster & Stead, 2002).

*“Pick-Klop”, a possible way for attitude and behavioral change*

The game « Pick-Klop » was created with the aim of offering an intermediate approach between the self-help book and cognitive and behaviour therapies.

The game “Pick-Klop” is based on cognitive, behavioral and motivational approaches to addiction. Games stimulate curiosity and an intellectual and emotional investment. They do so in a non-judging and decentred way that does not induce feelings of guilt, as players do not have to face or talk about their personal problems. Moreover, games facilitate interactions between players. Finally, games are very accessible and can be easily disseminated. Games have already been used in other fields of psychiatry (Khazaal et al., 2006).

A first assessment of this game was carried out with 51 patients hospitalized in a psychiatric hospital (Khazaal et al., 2008). In this previous report, the intention to stop smoking increased significantly after a unique “Pick-Klop” session. In this preliminary study, the clinical impact of this change in intentions was difficult to establish in the absence of a more precise description of smoking status (i.e. other measures of dependence, attitudes toward smoking, quit attempts...).

The current study aimed at assessing the feasibility and impact of four sessions of this game in current smokers, using complex outcome measures of smoking-related attitudes.

## **Method**

The study has a pre-pot-test design without control group and was approved by the Ethics commission of the Lausanne University Hospitals and the related institutional review board.

### *Participants*

To be included in the study, participants had to be adult (18-65 years) current smokers and to give written informed consent. Exclusion criteria were the following ones: acute psychotic episode, manic episode, middle or severe depressive episode, mental retardation.

Sixty-one smokers were recruited by local advertising among employees and students at the University of Lausanne, Switzerland. They played in groups throughout 4 consecutive weeks during four sessions of 1.5 hour each. Sessions were directed by a psychologist in order to assess smokers' reaction towards the game.

### *Intervention*

The aims of "Pick-Klop" are the following: 1) to inform smokers in a way that does not make them feel guilty, 2) to increase the smokers' trust in their ability to stop smoking (self-efficacy), 3) to modify the attitudes (i.e. perceived advantages and drawbacks) towards smoking and towards tobacco dependence treatments.

The game includes 291 cards with questions, each with 3 response options. The questions deal with the following items: 1) history of tobacco, 2) tobacco constituents and their physiological effects, 3) the reinforcement mechanisms of nicotine addiction, 4) smoking cigarettes as a coping strategy when facing difficulties, 5) costs of nicotine addiction and the benefits of stopping smoking, 6) processes and stages of change, as well as the cognitive and behavioral mechanisms involved in the maintenance of smoking and in behavioral change, 7) medications and treatments that help during smoking cessation.

"Pick-Klop" (a colloquial expression for 'pick a cigarette') presents several characters in different stages of change. This should make it easier for players to identify with at least some of the characters and to debate views with other participants.

Participants play in groups of 2 to 6, around a table. The game board represents a curved cigarette (as a motivational cycle) containing boxes of various colours. Players move their

pawns by throwing dices. According to the score obtained, the players place their pawns on a box which indicates the card to be drawn: the cards are white (general questions about tobacco), blue (behavioral aspects of nicotinic addiction), green (processes of change and the motivational stages), or pink (methods of change). During each session, the cards are selected by smokers randomly. So in each group, the cards used will vary. However the high number of cards in each category allows participants to explore the main aspects of smoking, and smoking cessation processes during each session. The group dynamics naturally leads the players to comment on the given questions and answers. More information about the game is available elsewhere (Khazaal et al., 2008).

### *Measures*

Assessments, which are in form of anonymous self-reports, were given by the participants to the psychologist who directed the group before the first session of the game and one month later, right after the 4<sup>th</sup> session.

The following variables were assessed before and after the four “Pick-Klop” sessions:

Fagerstrom Test for Nicotine Dependence (FTND) (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991; Pomerleau, Carton, Lutzke, Flessland, & Pomerleau, 1994), Stage of change (Etter & Sutton, 2002), Attitude Towards Smoking Scale (ATS-18)(Etter, Humair et al., 2000), Smoking Self Efficacy Questionnaire (SEQ-12)(Etter, Bergman et al., 2000), Attitude Towards Nicotine Replacement Therapy (ARNT-12)(Etter & Perneger, 2001), number of cigarettes smoked per day and the intention to quit smoking (measured on a visual analogic scale: My intention is to stop smoking some day; ratings went from “not at all” (0) to “absolutely” (10)).

SEQ-12 is a scale composed of two six-items subscales which respectively measure confidence in ability to refrain from smoking when facing internal stimuli (e.g. feeling depressed) and external stimuli (e.g. being with smokers).

ARNT-12 is a two dimensional scale that measures the perception of the advantages and drawbacks of nicotine replacement therapy.

The three subscales of the ATS-18 measure perceptions of adverse effects of smoking, psychoactive benefits of smoking and pleasure of smoking.

ATS-18, SEQ-12 and ARNT-12 were developed in French, and their psychometric properties have been published (Etter, Bergman et al., 2000)(Etter, Humair et al., 2000)(Etter & Perneger, 2001). For all scales, test-retest correlation coefficients ranged between 0.75 and 0.95, and internal consistency coefficients (Cronbach's alpha) ranged between 0.75 and 0.95.

Thus, these scales have adequate validity and psychometric performance

At post-test, participants also answered questions on opinions and satisfaction with the game.

### *Statistical analysis*

Descriptive statistics were used to summarize demographic and clinical characteristics of the study participants. Missing post-intervention data were handled by the Expectation-Maximisation (EM) method. This procedure involves multiple imputation, a simulation technique that estimates the means, the covariance matrix and the correlation of quantitative variables using an iterative process. After convergence, the missing values are then replaced by their estimated values and the completed data set can be used for analysis by standard methods. Due to strong departures from normality and variance heterogeneity, the mean differences resulting from the pretest-posttest measures were analyzed using non-parametric Wilcoxon signed-rank tests. Furthermore, marginal homogeneity tests were performed to test whether combinations of values between two paired multinomial response variables were equally likely.



## **Results**

### *Baseline characteristics*

The average age of participants was 30.7 years (SD 10.9), and 59% were women, 32.8% were students. All were daily smokers (cigarettes per day range: 2 to 60). The mean FTND score was 3.3 (SD 2.4). Participants had tried to quit smoking an average of 3.8 times (SD 3.2), with various methods such as NRT (80%) or bupropion (25%). At inclusion, 42.3% of participants were in the precontemplation stage of change (had no intention to quit smoking in the next 6 months), 38.5% in the contemplation stage (seriously considered quitting smoking in the next 6 months) and 19.2% in the preparation stage (had decided to quit in the next month) .

### *Utilization and satisfaction*

All participants (n=61) completed the baseline test as well as the first session and 52 (85%) completed the intervention as well as the last study evaluation. Five of the drop-outs occurred after the second session and four after the third one.

During the sessions, participants laughed frequently in a pleasurable ambiance. Frequently, they added personal comments in relation to the cards. They particularly liked the multiple characters involved in the game. They asked however for shorter questions and more strategic choices during the game.

### *Post-test*

At post-test, several statistically significant modifications were observed, in particular a reduction of the number of cigarettes smoked per day. The intention to quit smoking increased, as well as the perception of the advantages of nicotine replacement therapy, the perception of the adverse effects of smoking and SEQ total score and subscores (Table 1: reported the results of the non parametric tests as well as the means and standard deviations which are only descriptive statistics for ease of understanding)..

Furthermore, as shown by the marginal homogeneity test, the probability for a person to progress from the precontemplation to the contemplation or preparation stages (grouped together due to the sample size) was 54.5% after the intervention, which was significantly higher than the probability for a smoker to move down from contemplation or preparation to precontemplation (10%) ( $Z=-2.4$   $p=0.02$ ) (Table 2). A new attempt to stop smoking was reported by 16 participants (26.3%) during the intervention, but they remained smokers at the last assessment.

No statistically significant changes were observed in ATS-18 measures of psychoactive benefits of smoking and pleasure of smoking.

The completed data set resulting from the post-intervention data estimates by the EM algorithm was analyzed again. The same non-parametric tests were used; the results are in line with those obtained from the original data.

## **Discussion**

This study suggests that “Pick-Klop” is an acceptable, feasible and potentially helpful intervention to help smokers quit but although there was an improvement in motivation and increased number of attempts to quit or reduced number of cigarettes there was no effect on smoking cessation rates at post-test.

We conducted four sessions of the game in order to explore a higher number of questions than in the previous published study (Khazaal et al., 2008). Results showed that the game seemed to improve knowledge and attitudes towards NRT and increased the perception of the negative effect of smoking. Furthermore, we observed an improvement in self efficacy (confidence in ability to refrain from smoking) in both its internal and external components. These results, may explain the observed modification of stages of change, the increase in intention to stop smoking and the reduction in the number of cigarettes smoked per day.

Reducing the number of cigarettes is a predictor of smoking cessation, and even a momentary smoking reduction may be associated with future cessation (Falba, Jofre-Bonet, Busch, Duchovny, & Sindelar, 2004).

Modification of attitudes towards NRT may enhance the use of this therapy in a further attempt to quit, and increase of self-efficacy is known to predict quitting in smokers (Dijkstra & Wolde, 2005).

The lack of impact on ratings of the perceived psychoactive benefits of smoking and pleasure of smoking is possibly due to a smaller number of cards on these topics. Cards will be added or adapted in order to improve the impact of the game on these dimensions. A new version of the game including these modifications as well as several minor changes (shortening several cards) is in progress.

“Pick-Klop” seemed to improve several dimensions that are usually predictive of smoking cessation. It may serve as an “enhancer” of “behavior” change in smokers, including those who are in precontemplation stage. The study, however, has several limitations, such as the absence of a control group, as well as the absence of long-term follow-up measurement. A randomized controlled study (“Pick-Klop” vs. waiting list or brief psychoeducation) with a longer follow-up is currently in progress. Nevertheless, the study shows the possible use of “Pick-Klop” in order to modify cognitions, attitudes and behaviour linked to smoking.

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**No competing interests**

Table 1:  
Main sociodemographic and clinical characteristics of the sample before and on month after the game (4 sessions)

|   | Before<br>« Pick-Klop » | After<br>« Pick-Klop » | Results of non-<br>parametric tests |
|---|-------------------------|------------------------|-------------------------------------|
| N participants  | 61                      | 52                     |                                     |
| Age in years, mean $\pm$ S.D.                             | 30.7 $\pm$ 10.9         | -                      | -                                   |
| Gender, % women   | 59%                     | -                      | -                                   |
| Age at the beginning of smoking behaviour, mean SD        | 15.7 years $\pm$ 4.2    | -                      | -                                   |
| Cigarettes/day, mean $\pm$ S.D.                           | 13.2 $\pm$ 8.7          | 11.4 $\pm$ 7.7         | $Z=-3.9$ $p<0.0005$                 |
| FTND (0-10 score, mean, SD)                               | 3.3 $\pm$ 2.4           | -                      | -                                   |
| Intention to quit smoking (0: not at all-10: absolutely ) | 5.6 $\pm$ 2.7           | 6.5 $\pm$ 2.8          | $Z=-3.9$ $p<0.0005$                 |
| Quit attempt in past month (%)                            | 0                       | 26.3                   |                                     |
| Attitudes towards NRT (ANRT scale)                        |                         |                        |                                     |
| - Advantages of nicotine replacement therapy              | 20.3 $\pm$ 9.7          | 26.7 $\pm$ 8.5         | $Z=-4$ $p<0.0005$                   |
| - Drawbacks of nicotine replacement therapy               | 9 $\pm$ 4               | 10.4 $\pm$ 3.9         | <i>n.s</i>                          |
| - The answer is « I dont' know »                          | 2 $\pm$ 3.2             | 0.5 $\pm$ 1.3          | $Z=-2.7$ $p=0.007$                  |
| Attitudes towards smoking (ATS-18 scale)                  |                         |                        |                                     |
| - Adverse effects of smoking,                             | 39.8 $\pm$ 7.4          | 41.8 $\pm$ 7.8         | $Z=-3.1$ $p=0.002$                  |
| - Psychoactive benefits of smoking                        | 14.5 $\pm$ 3.3          | 14.6 $\pm$ 3.6         | <i>n.s</i>                          |
| - Pleasure of smoking                                     | 12.9 $\pm$ 3.9          | 12.4 $\pm$ 3.9         | <i>n.s</i>                          |
| Self-efficacy (SEQ scale)                                 |                         |                        |                                     |
| - Internal stimuli  | 14.4 $\pm$ 7.3          | 16.2 $\pm$ 5.7         | $Z=-2.9$ $p=0.004$                  |
| - External stimuli  | 13.4 $\pm$ 7.7          | 16.5 $\pm$ 7.5         | $Z=-3.4$ $p=0.001$                  |
| - Global score  | 27.6 $\pm$ 12.3         | 32.6 $\pm$ 11.8        | $Z=-3.6$ $p<0.0005$                 |

n.s.: not statistically significant

Table 2: Cross tabulation/ Stage of change (after Pick-Klop) \* stage of change (before Pick-Klop)

|                                      |  | Stage of change<br>(before Pick-Klop) |                                    | Total  |
|--------------------------------------|--|---------------------------------------|------------------------------------|--------|
|                                      |  | Precontemplation                      | Contemplation<br>or<br>Preparation |        |
| Stage of change<br>(after Pick-Klop) | Precontemplation:<br>(Had no intention to quit<br>smoking in the next 6<br>months)   | 45.5%                                 | 10.0%                              | 28.6%  |
|                                      | Contemplation: (Seriously<br>considered quitting smoking<br>in the next 6 months) or<br>Preparation (had decided<br>to quit in the next month) | 54.5%                                 | 90.0%                              | 71.4%  |
| Total                                |  | 100.0%                                | 100.0%                             | 100.0% |

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