SMOKING REDUCTION IN ADOLESCENTS

Reduced Smoking among Adolescents in Lower Secondary Professional Education

Rilana Prenger (s0037923)

University of Twente

Psychology: Health & Safety

Co-authors : Dr. M.E. Pieterse
Dr. L.C.A. Christenhusz

Date: May 16th, 2007

Summary

Cigarette smoking is the leading preventable cause of premature death in our society. The health benefits of smoking cessation are considerable and well-documented. However, quit rates in smoking cessation research, in which total abstinence is required, are disappointing. Therefore, alternative strategies for harm reduction, like smoking reduction, are emerging. In the present study, a 'smoking reduction' intervention; a reduction in the number of cigarettes smoked a day among continuing smokers, has been introduced. Smoking reduction was studied among smoking adolescents, aged 14-16 years. These students all followed lower secondary professional education, as most smokers of this age are in this education level. This study involves a school-based intervention with a follow-up of four weeks, handling a single group pretest-posttest design. The intervention consisted of 3 group meetings. For quantitative analyses a questionnaire was used, containing the prototype/willingness model and the ASE-model, to examine how these variables contribute to the reduction of smoking among adolescents. Adolescents' smoker prototypes, self-efficacy, social pressure, subjective norms, attitudes and nicotine dependence were examined at baseline and at the end of the intervention to identify the determinants of reduced smoking. Also, the effects of the intervention on the determinants were examined. Furthermore, participants were asked to use a diary or logbook to self-monitor their smoking behavior. Observations were made to support the quantitative result. The primary outcomes were the intentions to reduce or quit, smoking reduction, and the CO-comparisons.

All subjects were assigned to the same treatment: they all were asked to reduce their smoking by using the provided reduction strategies and CO-feedback. Twenty-seven daily smoking students from 2 different schools participated in the intervention. Results show that 7 out of 19 students (37%) reduced their smoking behavior in the four weeks during the intervention. The CO-measurements confirm this results. Two of the students actually did quit (11%). Remarkable is the low perceived similarity between the students themselves and someone of their own age reducing his/ her smoking behavior. Furthermore, positive intervention outcomes are refusal self-efficacy and social pressure.

Despite the fact that not all students were intrinsically motivated, 37% changed their smoking behavior. However, the population in this study was small. Further research should focus on a larger population. Also, a randomized controlled trial is recommended for further

research. Furthermore, CO-measurements as a feedback instrument are recommended, while it seemed to serve as a motivator for reducing smoking.

Samenvatting (Dutch summary)

Roken is de voornaamste, te voorkomen oorzaak van vroegtijdig overlijden in onze maatschappij. Toch zijn cijfers van onderzoek naar stoppen met roken teleurstellend. Daarom verschijnen er alternatieve strategieën voor schade beperking of 'harm reduction', zoals minderen met roken. In dit onderzoek is een interventie voor gecontroleerd rookgedrag geïntroduceerd; een reductie in het aantal sigaretten dat per dag wordt gerookt onder dagelijkse rokers. Gecontroleerd rookgedrag is onderzocht onder rokende adolescenten, van 14-16 jaar oud. Deze adolescenten volgen allemaal het VMBO, in welk opleidingsniveau zich de meeste rokers van deze leeftijd bevinden. Deze op scholen gebaseerde interventie met een follow-up van vier weken, hanteerde een single group pretest-posttest design. De interventie bestond uit 3 groepsbijeenkomsten. Voor kwantitatieve analyses is een vragenlijst gebruikt, waarin het prototype/willingness model en het ASE-model zijn opgenomen, om te onderzoeken hoe de variabelen bijdragen aan gecontroleerd roken onder adolescenten. De reductie prototypes van rokers, eigen effectiviteit, sociale druk, subjectieve normen, attitudes en nicotine afhankelijkheid zijn onderzocht aan het begin en het eind van de interventie om de determinanten van gecontroleerd roken te identificeren. Ook zijn de effecten van de interventie op deze determinanten onderzocht. Leerlingen zijn gevraagd om een dagboek bij te houden, met als doel zelf hun rookgedrag te controleren. Observaties zijn gemaakt om kwantitatieve resultaten te onderbouwen. De primaire uitkomsten waren de intenties om te minderen of te stoppen met roken, het gecontroleerd roken, en de CO-vergelijkingen.
Alle proefpersonen zijn gevraagd te minderen met roken met behulp van de aangeleverde reductie strategieën en CO-feedback. Van 2 verschillende scholen hebben 27 dagelijks rokende leerlingen deelgenomen aan de interventie. Zeven van de 19 leerlingen (37%) hebben hun rookgedrag verminderd tijdens de interventie, wat werd bevestigd door de CO-metingen. Twee leerlingen zijn zelfs gestopt met roken (11%). Opvallend is de lage ontvangen gelijkenis tussen de leerlingen zelf en iemand van hun eigen leeftijd die zijn/ haar rookgedrag verminderd. Andere positieve uitkomsten van de interventie zijn de eigen effectiviteit om een verleiding te weerstaan en sociale druk uit de omgeving.
Ondanks het feit dat niet alle leerlingen intrinsiek gemotiveerd waren, heeft 37% het rookgedrag verminderd. Vanwege de kleine steekproef zou nader onderzoek zich moeten

richten op een grotere steekproef. Ook wordt een gerandomiseerde gecontroleerde steekproef aanbevolen. Tevens worden CO-metingen, voornamelijk als feedback instrument, aanbevolen, omdat het leerlingen motiveerde hun rookgedrag te verminderen.

Preface

Within the framework of my master these in the theme '*Health & Safety'*, I started in October 2005 with the task '*Reduced smoking among adolescents in lower secondary professional education'*. This issue seemed not to be studied much in the literature, especially not in this specific school direction. Reduced smoking, a form of harm reduction, seemed to be an emerging trend in literature of smoking cessation. However, most research about smoking is aimed at adults. I was curious what the results of reduced smoking among adolescents would be. The past year I have studied this issue, from which you will find the design, results and discussion in this article. A questionnaire is used based on the prototype/willingness model combined with the ASE-model. Also, CO-measurements, a manual with strategies and tips, and a diary/ logbook are incorporated to get insight in reduced smoking among adolescents. The execution of the study described here has not been possible without the co-operation of the students and coordinators of the two high schools who participated in the study. These two schools are 'Vechtdal College Ommen' and 'Vechtdal College Dedemsvaart' from Overijssel, the Netherlands. I am thankful for this. Also, I would like to thank the co-authors dr. M.E. Pieterse and dr. L.C.A. Christenhusz for their critical insights and their valuable advices.

Reduced Smoking among Adolescents in Lower Secondary Professional Education

Epidemiology of smoking

Cigarette smoking is the leading preventable cause of premature death in our society. Smoking was responsible for 20.000 deaths in 2003 in the Netherlands. Among people aged over 20 years, smoking can be accounted for about half of total death because of lung cancer, chronic obstructive pulmonary disease (COPD), coronary hart diseases and strokes. About 15% of the total death in the Netherlands can be attributed to smoking (www.rivm.nl).

In 2004, 28% of the adults smoked: 31% men and 25% women. Most adult smokers are between 35 and 55 years (www.rivm.nl). 23% of the adolescents smoked within the past four weeks and 15% smoked daily in 2005. Almost half of the youth (44%) between 10 and 19 years old has ever smoked. The percentage of daily smokers is comparable among boys (16%) and girls (15%). Most smokers are found in the school type 'lower secondary professional education' at the age of 14-16 years old; 38% smoked in the past four weeks and 28% smoked daily (Stivoro, 2005). Sussman, Dent, Severson, Burton & Flay (1998) showed that 55 to 65% of 12 to 18 year-old smokers report having tried to stop smoking. This suggests a tendency among adolescents to reduce, limit, or stop their smoking. Also, Lantz, Jacobson, Warner, Wasserman, Pollack, Berson et al. (2000) noted that about 74% of occasional youth smokers (smoking from time to time, not daily) and 65% of daily youth smokers (smoking every day) have a desire to quit, but rarely succeed while trying to quit. They suggest that adolescents are unfamiliar with the concept of smoking cessation programs or other tools or methods that support quit attempts, or are not interested in seeking help or services in attempting to quit, including help from physicians (Lantz et al., 2000). This implies that new strategies are required to assist youth with cessation. One area of potential intervention is developing harm reduction strategies to help adolescents to limit or minimize their smoking (Johnson, Kalaw, Lovato, Baillie & Chambers, 2004).

Youth smoking

Most research about smoking is aimed at adults. However, the cycle of tobacco dependence typically begins with the initiation of tobacco use during adolescence. Current research shows

that very few people initiate smoking or become habitual smokers after the adolescence (Lantz et al., 2000). Also, the earlier a person begins to smoke cigarettes, the more likely it is that he or she will continue smoking as an adult (Sussman et al., 1998).

The experience of youth smoking seems to be complex. Adolescents often wonder what smoking is like, and although they are tempted to try smoking, they are unaware about what engaging in smoking will mean to them. Most adolescents, who experiment with smoking, do not intend to become addicted to tobacco. They want to remain 'in control' of their tobacco use. The notion of control plays an important role in tobacco use and dependence. Emerging tobacco dependence can be the consequence of loss of autonomy; if discontinuing tobacco use is no longer an effortless exercise of free will. Perceptions of self-control have been linked to making changes in behavior that decrease health risks, such as smoking cessation. A consideration of the role of control can lead to considering intermediate treatment goals to tobacco abstinence for young smokers. The youth describes experimenting with tobacco as a normal part of adolescence. This suggests that interventions that focus on harm reduction rather than those exclusively on prevention and cessation might be more relevant to the experiences of the adolescents (Johnson et al., 2004). However, the aim still is smoking cessation with reduction as a mean to the end.

Johnson et al. (2004) conducted a study on adolescents to illustrate the ways in which adolescents come to recognize their loss of autonomy and how they make sense of it. These authors distinguished three phases of the process of regaining control over tobacco. The first phase in the process involved determining whether smoking is a problem. Adolescents did this at different ways; they defined the line of acceptable tobacco use, monitored their tobacco use, or tried to understand their longing to nicotine. The second phase is often brief and involved gaining a sense that someone had crossed the line and that one's smoking is out of control. This occurs with the experience of physical symptoms, which are associated with smoking. Once they thought they had crossed the line, they began the third phase: that of implementing strategies to control tobacco use. Adolescents described different strategies they employed when they sought to limit their smoking. Some of these strategies involved using external cues for smoking to help regain control over their smoking habit. These focused on defining what acceptable smoking behavior is. As a result of implementing strategies, the youth gained greater insights regarding their tobacco use. Not all youths engage in this process. Some adolescents who experimented with smoking never came close to losing control. The key strategies the youths describe to limit smoking are: deciding to refrain from

buying, setting daily or weekly limits for cigarette consumption, limiting the situations for smoking, cutting out unnecessary cigarettes, 'taking a puff or two' or half-butting and delay smoking. Some youths also describe ways to substitute for smoking. These took several forms: chewing gum, eating food, and keeping their hands busy. Other participants described smoking marijuana or cigars as substitutes for cigarettes. Other approaches concerned: getting help, taking advantage of transitions (for example the New Year) and quitting together with more people. Finally, the fourth and last phase is about reconstructing the line. In experimenting with different strategies to gain control over their tobacco use, adolescents developed a sense of what does or what does not work for them. In this process, adolescents often reestablish the line of acceptable tobacco use (Johnson et al., 2004).

Building on adolescents' natural propensity to control their smoking might have implications for individual and public health. Adolescence presents a critical opportunity for learning and enhancing control behaviors and self-efficacy before smoking routines become permanently established. Youths identify a level of tobacco use that they consider to be unacceptable and they also create lines of acceptable smoking that they consider to be achievable and consistent with their everyday realities. Adolescents have been reported to respond to abstinence-based intervention education with increased smoking (Hamilton, Cross & Resnicow, 2000). Using strategies that parallel the experiences of adolescents of controlling tobacco might serve to limit the difficulties of resistance or lack of motivation (Johnson et al, 2004).

Reduced smoking

The health benefits of smoking cessation are considerable and well-documented. Efforts to diminish the harmful effects of tobacco use by preventing initiation of smoking and encouraging smoking cessation have had limited success (Godtfredsen, Holst, Prescott, Vestbo & Osler, 2002). Despite development of new smoking cessation strategies and increasing insight into factors of smoking onset, cessation, and relapse, the success rate regarding long-term smoking abstinence has been disappointing. It has been estimated that less than 50% of the smokers will quit permanently, including participants in assisted smoking cessation programs as well smokers who quit spontaneously (Godtfredsen, Prescott, Osler & Vestbo, 2001). Therefore, 'harm reduction' strategies are emerging. One such non-cessation approach is 'smoking reduction', meaning a reduction in the number of

cigarettes smoked per day among continuing smokers. Other ways of harm reduction are smoking cigarettes that contain less tar or are made less harmful and using alternative products that contain nicotine (Willemsen, 1999).

Reduced smoking is one of several non-cessation 'harm reduction' approaches to smoking that have been discussed in the developed countries for several reasons (Hughes, 2000). It is important to understand that there may be different ways in which smoking reduction can be achieved. It may involve periods of abstinence or a reduction in number of cigarettes consumed daily. Also reduced smoking can be used as a method to achieve cessation, but also as a goal itself. The ultimate objective is simply to reduce exposure to tobacco smoke (West, 2000, Willemsen, 1999).

It is debatable whether reduction is an acceptable alternative for smoking cessation. Reduction might at least be a solution for smokers unable to quit. One common argument is that smokers cannot significantly reduce their smoking and maintain this reduction over time (Hughes, Cummings & Hyland, 1999). This argument is based on the observation that smokers, who are trying to stop smoking smoke a few cigarettes per day, must go back to smoking the same number of cigarettes per day as prior to their attempt to quit (Hill, Weiss, Walker & Jolley, 1988). However, clinicians and others often do not realize this observation is based on a selected subset of smokers: smokers were so dependent that they failed despite treatment and who were usually told that reduced smoking was impossible (Hughes et al., 1999).

However, there is evidence that smokers can initiate and maintain reductions. For example, Meyer, Rumpf, Schumann, Hapke & John (2003) show a study where reduction was more likely to be maintained for up to 12 months, than smoking cessation. Subjects were assessed at baseline (n=4075) and two follow-up moments, at 30 (n=913) and 36 months (n=786). This study showed that attempts to reduce smoking are common and at least as frequent as quit attempts, even when reduced smoking is explicitly operationalized as an intentional behavioral change. Glasgow, Klesges, Klesges, Vasey & Gunnarson (1985) showed a controlled smoking treatment study in which participants were followed two and a half years. The study was conducted on 48 participants, using behavioral methods for smoking cessation, without nicotine replacement medications. The results showed a significant reduction of number of cigarettes, percentage of the cigarette smoked, and measures of nicotine content and carbon monoxide levels in two and a half years follow-up. Also, Hughes et al. (1999) conducted a study using the Community Intervention Trial

(COMMIT); a randomized, controlled trial in 11 matched pairs of communities to test the effectiveness of a multifaceted intervention on smoking cessation. The intervention was designed to encourage health care providers to promote smoking cessation counseling and office management systems, to encourage institutional changes at work sites and other organizations to support smoking cessation, to promote participation in smoking cessation assistance in the community, and to increase awareness of smoking as a major public health problem. Smoking reduction was not promoted here. Approximately 2420 subjects at baseline were enrolled to a telephone survey. The cohort was re-interviewed two and four years later. They found 21% of the subjects maintaining their reduction in smoked cigarettes per day after four years.

A second argument against smoking reduction is that encouraging smoking reduction might increase the risk of undermining smoking cessation efforts. Reduction may have given smokers an easy way out and a false sense of dealing with their smoking (Hughes et al., 1999). However, some have made the converse argument (Hill et al., 1988; Hughes et al. 1999; Fagerström, Tejding, Westin & Lunell, 1997) . Reduction could increase self-efficacy about gaining control over one's smoking and thus promote cessation attempts . One study showed that the chance of smoking cessation in participants who had cut down to 1-9 cigarettes per day at the end of a smoking cessation treatment, is equal to those who did not reduce (Hill et al., 1988). This study contained a smoking cessation course among 1326 participants. This result shows that reduction does not undermine cessation, while reduction has no negative influence on future quit attempts. Hughes et al. (1999) also showed no significant differences in future quit attempts between quitters and reducers. Also, in a study of four weeks where subjects took nicotine replacement medications on smoking reduction, 93% of the subjects reported they were even more likely to give up smoking as a consequence of reduction in the intervention. The attitude towards reduction as a good method to quit smoking, was positive in 92% of the subjects (Fagerström et al., 1997).

A third argument against smoking reduction is that reduced smoking does not imply a decrease in toxin exposure. A large prospective cohort study with almost 16 years follow-up found no significant differences in mortality from all causes between subjects who reduced their smoking considerably and subjects who continued to smoke heavily (Godtfredsen, Holst, Prescott, Vestbo & Osler, 2002). Their results suggest that smoking reduction is not associated with a decrease in mortality from tobacco-related diseases. Reduced smoking perpetuates exposure, and still shows an elevated disease risk compared with non-smoking.

Furthermore, the relative risk of cancer due to smoking even as few as one to nine cigarettes a day has been reported to be at least several times that of non-smokers. However, there is also evidence supporting the hypothesis that reduced smoking leads to a decrease in toxic exposure, which mediates a decrease of the smoking-related mortality and morbidity (Hughes, 2000). Hughes states that if one believes that smoking causes morbidity and mortality in a dose-related manner then, it must follow that reducing smoking reduces risk. Also, Fagerström, Teijding, Westin & Lunell (1997) note that for most disorders there is a dose-response relationship, meaning the heavier the cigarette consumption, the larger the risk.

A fourth argument against smoking reduction is that this leads to compensated smoking. The harm-minimizing effects of reduced smoking could be inhibited because of compensatory smoking, leading to an increased toxin exposure per cigarette (Meyer et al., 2003). Hill et al. (1988) also note that habitual smokers compensate for reduced consumption by taking in more toxins per cigarette, probably by inhaling deeper and taking more puffs. This phenomenon is also known as compensated smoking. Simmons, Connett, Nides, Lindgren, Kleerup, Murray et al. (2005) found in their smoking reduction study, among 1,980 smokers with mild-to-moderate COPD, that smoking reduction has an unpredictable and limited impact on lung function decline and symptom prevalence when compared with smoking cessation. They suggest compensatory changes in smoking behavior may account for this findings.

To get insight in reduced smoking among adolescents, theories about (the onset of) adolescent smoking are needed. When understanding how adolescents respond to different determinants concerning smoking, probably more knowledge about reduced smoking can be obtained.

Theory

Research concerning the causes of the onset of smoking and the opportunities for prevention of smoking behavior among youths, contains many theoretical models. Petraitis, Flay & Miller (1995) describe 14 theories of adolescent substance use. According to Pieterse (2005) these models can be classified in five subcategories: 1) models directed on cognitive-affective factors, 2) models based on social learning theory, 3) sociological theories concerning

conventional bond and social attachment, 4) theories directed at intrapersonal characteristics and 5) an integral model that combines the concepts of previous models.

Models which focus on cognitive-affective factors, like Fishbein and Ajzen's theory of reasoned action (Ajzen & Fishbein 1980), try to explain the most direct causes of (the onset of) smoking, such as attitudes, perceived social norms, intentions and other expectancy-value concepts. These concepts are also called proximal determinants, because of the assumption that other distal influences direct behavior only through influencing the proximal determinants. However, these models do not contain self-efficacy, which seems to have an important influence on smoke behavior (DeVries, 1993). Another example of this subcategory is the prototype/willingness model. This model from Gibbons & Gerrard (1995/ 1997) is a dual-processing model of health behavior, specially directed to adolescents. The assumption of the model is that many initial risk behaviors from adolescents are a reaction to circumstances that stimulate risk-taking. There is no intention or planning of this behavior. This model is different from other models because a distinction has been made between two paths and two proximal antecedents. The first path is the 'reasoned path'. In this is reflected that some risk behavior is intentional, even with young adolescents. Positive attitudes and supporting subjective norms lead to intentions or planning of the behavior. Risk behavior here is the result of a reasoned process. The second path that is distinguished is the 'reaction path'. Since it seems that the relation between intention and behavior with adolescents is weak, there are other predictors incorporated in the model. Adolescents are often in situations where risk behavior is stimulated, such as drinking, smoking and unsafe sex. When they are in these situations, not the intention, but the willingness to take a risk is the deciding factor. This 'willingness' means: the willingness to interfere in risk behavior in situations that stimulate this behavior. This is associated with the perceived image of the type of person who is interfering in the risk behavior. In adolescence, social images play an important role and persons are also very sensitive to the impact of their behavior on those images. Adolescents are aware that risk behavior has social consequences and can change the perceptions of others about themselves (Gerrard, Gibbons, Stock, Vande Lune & Cleveland, 2005). Research from Blanton, Gibbons, Gerrard, Conger & Smith (1997), in which this model was applied on adolescents between the ages of 15 and 18, shows that a positive prototype, meaning positive perceived images about smokers, predicts the willingness to smoke. This predicted also a higher amount of smokers after one year. Gerrard et al. (2005) also reported in their study, in which this model was applied at pre-adolescents (about ten years old), that positive images

are associated with the willingness to smoke and actual smoking within the peer group after two years. In this study there were four antecedents distinguished: context, upbringing, academic orientation and risk taking in general. It was found that these antecedents all have influence on the image that children have, only the context has a more mediating effect, not a direct effect. The correlations were respectively .13, -.25, -.25 and .27. Also Dutch research shows that prototypes of peers are related to the willingness and intention from adolescents to smoke or drink (Spijkerman, van den Eijnden, Vitale & Engels, 2004). They demonstrated that adolescents hold ambivalent and rather negative perceived images about smoking and drinking peers. They found positive associations between aspects of prototypes, such as 'well adjusted' and 'attractive', and intentions to perform risk behaviors, except a negative association for the prototype factor 'rebelliousness'. This negative association means that young people who regard daily-smoking or weekly-drinking peers as rebellious are less inclined to engage in smoking or drinking behavior. Furthermore, they showed that prototypes of smoking and drinking peers contributes to the explanation of the young persons' willingness and intention to smoke or drink. The more positive the prototype of smoking peers, the more chance adolescents start smoking. Regression analyses demonstrated that all factors of both prototype scales were related to respondents' willingness to smoke or drink. For smoking a positive association was found for the factors 'well adjusted' (.09), 'cool' (.07) and 'attractiveness' (.02), although this last factor was not significant. A negative association was found for the factor 'rebelliousness' (-.15). This relation was even found when tested together with variables of the theory of planned behavior. The assumption that prototypes play an important role in adolescents' decisions to engage in smoking and drinking behavior, next to other social-cognitive variables, is supported by this findings. However, this study's objective is to reduce smoking, which is planned behavior. Reduced smoking is planned behavior and does not depend on situations that facilitate risky behaviors. When using this model, behavioral willingness should be deleted, because that concept is aimed at unplanned behavior. The dependent variable could in this case be intention.

Models based on the social learning theory also presume the influence of cognitive factors, but focus on the social environment. Cognition and behavior are formed through observation and imitation of others' behavior. This is reinforced by (social) rewards and results in positive expectations by the individual. Examples of these models are Bandura's theory (1986) and De Vries' ASE-model (1993). The last model is a combination of the first two subcategories. The ASE-model contains the concepts attitude, social influences and

self-efficacy, and is an expansion of the 'Theory of Planned Behavior' from Ajzen (1988). According to the ASE-model a young person has more chance to develop healthy behavior when he has a positive attitude towards healthy alternatives of behavior, thinks that he/ she contains the skills to carry out this behavior (self-efficacy) and receives support from the social environment. Those proximal determinants lead to the intention to behave healthy. However, external influences (distal determinants) are bounded to behavior, in that they influence the determinants. Because of this they have an indirect influence on behavior. The external influences are for example personality characteristics, coping styles, demographic and genetic factors (De Vries, 1993).

Sociological theories, like Elliot's social control theory (1989), about conventional bond and social attachment assume that the behavior of a young person depends on the way in which they feel concerned with conventional values and have a close relationship with their family. A low concern with the society and weak family bonds lead to more deviant behavior, to which also substance use can be accounted.

Theories directed at intrapersonal characteristics, like Kumpfer's social ecology model (Kumpfer & Turner, 1991),contain stable personality characteristics, more variable affective states and skills. Many of these models also contain variables about social influences. Young persons react differently to smoking behavior, depending of their personality characteristics. Mostly biological factors belong to this category.

The last category contains integral models, like Jessor's Problem-behavior theory (Jessor, Donovan & Costa, 1991), that combine concepts from previous models. Cognitive-affective, learning, devotion and attachment, and intrapersonal constructs are integrated in one model (Pieterse, 2000). While smoke reduction among adolescents is a relative new concept to study, an integral model with more determinants could give a better view about which determinants concern smoke reduction among adolescents.

This reduction study

In this study, the prototype/willingness model and the ASE-model were integrated to examine how these variables contribute to the reduction of smoking among adolescents between 14 and 16-years-old from lower secondary professional education. These theories both have an immediate effect on behavior. Adolescents' smoker images, self-efficacy, social pressure, subjective norms and attitudes were examined at baseline, and at the end of the intervention

to identify the behavioral determinants of reduced smoking. Also, the effect of the intervention on the behavioral determinants was examined. All variables were applied to the reduction of smoking. Our primary outcome measure was smoking reduction. Smoking reduction was defined as reducing smoking to a maximum of five cigarettes a day (Simmons et al., 2005). The following specific hypotheses were examined:

1. The variables are positively changed after the intervention. A positive change in this context is an increased self-efficacy, a more positive attitude towards smoke reduction, a more positive intention to stop or reduce smoking in the future, a more positive subjective norm towards quitting or reducing smoking, more social pressure towards reducing and a more positive prototype of peers who have reduced their smoking behavior.
2. The intention to reduce smoking in the future will be increased after the intervention.
3. Students will reduce their smoking to a maximum of five cigarettes a day during the intervention.
4. The intention to quit smoking in the future will be increased after the intervention.
5. CO-values will be reduced, following a reduction of the smoke behavior during the intervention.

Methods

Subjects and design

A single group pretest-posttest design was employed for this intervention, with four weeks follow-up. All subjects were assigned to the same treatment; they all were asked to reduce their smoking, with help from given strategies and CO feedback. Subjects also self-monitored several aspects of their smoking behavior. The most important outcome measures were smoking reduction, the intentions to reduce and quit and the CO-value development.

The intervention's objective was to reach about 50 students. Because of school exams and participation in other projects, many schools did not want to cooperate. The sample consisted of 27 smoking adolescents in Overijssel, in the Netherlands (Table 3). The intervention was performed at two highschools, one at Dedemsvaart (Vechtdal College), the other at Ommen (Vechtdal College). The content of the intervention was exactly the same at

both schools. There was one difference between the settings where the intervention took place. At one school a teacher was present, but he did not interfere with the intervention at all. At the other school, only the students and the experiment leader were present. The students are taking the course lower secondary professional education. This group of students is chosen, because of the high amount of smokers in this group, compared to other study directions. Only daily smokers were included in this study, because the intervention is about substantial reduction. For this, only regular smokers could be included in the study.

Students were collectively informed about the purpose and content of the intervention. For analyses of determinants from the questionnaire seven participants were excluded, because they showed either missing values or inconsistent answering patterns. For analyses of CO-values, one student was excluded for not being present. The second CO-measurement excluded four students. For analyses at baseline, all students were included, 45% were boys and 56% were girls. The age of the participants ranged from 14 to 16 years (median = 15) (Table 3).

Intervention

The intervention involved a four weeks follow-up smoking reduction program targeted at adolescents, which is school-based. Strategies for smoking reduction were offered and the participants were asked to apply the reduction strategy they find attractive during the intervention period. Students also received a comprehensive manual, containing written information on all aspects of the intervention, including the strategies and a diary or logbook which should be filled out every day. The intervention consisted of three meetings with a during of approximately one hour. Table 1 shows the activities during the meetings. The contents of each meeting are described below:

Meeting 1: The first meeting started by completing the questionnaire (see measurements/ Appendix A) by the students. After this an introduction of the study was given. Students were told the purpose of the study is to try to reduce their current smoking behavior. There were no obligations; the students were asked to *try* to reduce their smoking behavior to a maximum of five cigarettes a day or to quit. To get optimal gain for health, students were also educated about the principle of compensated smoking behavior. The course of the intervention and the manual were roughly explained. Practical information about the intervention could be found in the manual and was also explained to the students.

This meeting ended with the measurement of the CO-values in the respiration. Any questions from students about the intervention were answered at the end of the meeting.

Meeting 2: The second meeting served as a follow-up session. Students were asked if they had reduced their smoking behavior and if they eventually had been able to quit smoking. Also the most favorite strategies were discussed. The purpose of this meeting was for students to exchange their experiences and to stimulate each other to reduce their smoking behavior. During this meeting the second CO-measurement took place. The diaries of the past two weeks were taken in and any questions could be answered at the end of the meeting.

Meeting 3: This last meeting served as the closure of the intervention. At the beginning the questionnaire was filled out by the students for the second time. Also the third and last CO-measurement was implemented. The rest of the meeting served as an evaluation. How did they think about reducing their smoke-behavior at the closure of the intervention? Was it hard or easy? What are their thoughts about quitting in the future? At the end of the meeting the diary of the past two weeks were taken in.

Table 1

Activities during the meetings

	Initial orientation meeting	**Meeting 1/ baseline**	**Meeting 2**	**Meeting 3/ closure**
Providing information/ reaching out documents	x	x	x	x
Questionnaire		x		x
CO-measurement		x	x	x
Evaluation			x	x
Observation	x	x	x	x

Qualitative preliminary investigation

To get insight in the smoking behavior of 14-16 years old students from lower secondary professional school, a preliminary investigation was carried out. Five students were asked about their smoking habits and how they would feel about reducing their smoking behavior. Also they were asked which strategies would help them to reduce their smoking behavior. The most frequently mentioned strategy was to leave the cigarettes at home. Other strategies students reported were chewing gum, smoking half cigarettes, smoking on preset times and

not asking other people for cigarettes. The students all thought that they were able to reduce to five cigarettes a day.

Manual: tips and strategies

To support students with the reduction of their smoking behavior, a manual was developed with 19 tips and strategies for reduction (Appendix B). These strategies are based on the conversations with smoking youth (qualitative preliminary investigation) and on the "Moos-methode', a method to reduce smoking slowly, based on a personal schedule (de Raadt, 2004). During the intervention, students could select their favorite strategies from the manual that would help them to reduce their smoking behavior. Practical information about the intervention was described in the manual as well.

Recruiting participants

Participants for this intervention were recruited at high schools. Inclusion criteria and exclusion criteria are shown in Table 2. Possibilities for recruiting students and the intervention were discussed, during an appointment with a teacher/ coordinator lower secondary professional education from the school. The purpose was to reach the students in the lessons. During this initial orientation meeting of ten minutes, a brief overview of the project was presented, and subjects were allowed to ask questions and to decide whether or not to participate. Information about the study itself was kept to a minimum, so that the students were not influenced at onset of the intervention by this information. The students have been told that the study is about smoking but it was emphasized that the students did not need to have an desire to quit smoking; the study is about changing their intentions to quit or reduce smoking. For participating in the invention, four rewards of 20 Euro were offered to the students. To make chance of it, students should fully participate in the intervention, meaning they must fill out both questionnaires, complete all CO-measurements and hand in their diary. Actual reducing their smoking behavior was not a condition. Students could sign up for the study with the experiment leader, the teacher or through e-mail.

Table 2

Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Daily smoker	Occasional smoker
14-16 years old	
Following lower secondary professional education	

Measurements

Measurements were taken at baseline (prior to the intervention) and at two and four weeks of follow-up. As shown in Table 1, measurements regarding CO-values and the observations were carried out at every measurement moment. The logbook or diary should be kept up with during the four weeks of the intervention to self-monitor the students' smoking behavior.

During the study a written questionnaire was used, which consisted of 33 items (Appendix A) and was filled out before and after the study during the meetings of the students. A questionnaire from Spijkerman et al. (2004) was used representing the prototype/ willingness model, and components of the ASE-Model (DeVries, 1993), background information and the Fagerström Test for nicotine dependency were added. The components of the questionnaire are described below.

Prototypes. Prototype scales were constructed on the basis of the questionnaire from Spijkerman (2004). From this scale the items concerning attractiveness were removed, because there were no significant effects in the research of Spijkerman et al. (2004). The scale for prototypes of daily-smoking peers contained 20 items asking to what extent the presented characteristics (i.e. cool, listens to parents, dates often etc.) would fit the typical peer who reduces his/ her smoking behavior. Answers could be given on a five-point scale (1= *not at all* to 5= *very much*) ($\alpha = .92$). Alpha's for these scales are derived from research of Korte (2006). Also, a scale for prototypes of the participant self was included in the questionnaire. This scale contained 20 items asking to what extent the presented characteristics would fit themselves. The difference between these two scales results in the prototype similarity; the extent to which the prototype scale of a peer their own age who reduced his/ her smoke behavior corresponds with the scale for prototypes of the participant self ($\alpha = .89$).

Measures derived from the ASE-model (De Vries, 1993) consisted of attitudes, social pressure and subjective norms towards reduced smoking, self-efficacy and future intentions to

quit or reduce smoking. Willingness is not included in this study, because this study is about planned behavior (reduction).

Attitudes. Attitudes towards reduced smoking were measured by a scale as applied in research by Spijkerman (2004). Attitudes toward daily smoking were here translated into attitudes towards reduced smoking. The scale for attitudes contained ten items asking to what extent the presented characteristics (i.e. normal, pleasant, harmless, healthy, etcetera) would fit their attitude towards reduced smoking for themselves. Answers could be given on a five-point scale (1= *not at all* to 5= *very much)* ($\alpha = .82$).

*Social pressure and descriptive norm***.** Social pressure towards reduced smoking and smoking cessation were measured for friends and classmates. The scale for social pressure contained four items asking to what extent the students feel pressured by friend and/ or classmates to quit or reduce smoking. Scores for social pressure towards reduced smoking and smoking cessation consisted of the total sum scores on the two scales for friends and classmates ($\alpha = .87$). Describing items are also included of the amount on friends and classmates who are smoking. These two items together form the social variable 'descriptive norm'. Answers could be given on a five-points scale (1= *totally disagree* to 5= *totally agree*) for this two variables.

Subjective norms. Subjective norms toward reduced smoking were measured for friends, classmates, parents and brothers and sisters by means of three items asking to what extent friends, classmates, parents and brothers and sisters regarded reduced smoking as 'normal', 'good' or 'pleasant'. For family an item was added asking to what extent the family regarded reduced smoking as 'healthy'. Scores for perceived norms towards reduced smoking consisted of the total sum scores on the four scales for parents', friends', classmates' and brothers' and sisters' norms. Answers could be given on a five-point scale (1= *totally disagree* to 5= *totally agree*) ($\alpha = .83$ for friends and classmates and $\alpha = .88$ for family).

Self-efficacy. Self-efficacy was defined as adolescents' beliefs about their ability to maintain reducing their smoking under several circumstances. For example: '*It is hard for me if I can not smoke when my friends do'*. These five items were based on the items for perceived behavioral control from the questionnaire from Spijkerman (2004). Answers could be given on a five-point scale (1= *totally disagree* to 5= *totally agree*) (α = .78).

Intention to smoking cessation and reduced smoking. Intentions to quit smoking were measured by two items asking to what extent participants thought they would quit smoking in (1) the future, and (2) four weeks (the during of the intervention). Intentions to reduce smoking were measured by two items asking to what extent they thought they would reduce smoking in (1) four weeks, and (2) six months. A general intention item was also included asking the participants how they feel about reducing their smoking behavior with a maximum of five cigarettes a day. This item was included, because this was the goal of the intervention. Answers could be given on a five-point scale (1= *not at all* to 5= *very much*).

Carbon monoxide (CO) levels. Breath samples were analyzed using the 'piCO-lo Smokerlyzer®' (Bedfont Scientific Ltd, England). The 'piCO-lo Smokerlyzer' provides an easy way to determine the instant results of CO-levels in the respiration. In contrast with, for example 'salivary cotinine', samples do not have to be analyzed in a laboratory, but CO-levels can immediately be determined by reading of the display from the Smokerlyzer. No specialist technical knowledge or skills are required for using the device. It gives the smoker visible proof of the damaging CO levels, and motivates smokers to quit or reduce, also because there can be motivating feedback attached to the CO-levels (piCO-lo Smokerlyzer®, Bedfont Instruments, Kent, UK). To minimize problems due to the relatively short half-life of CO in the body, additional information was registered during the CO-measurements (e.g. time since the last cigarette was smoked, and total number of cigarettes smoked that day). In the analyses of the CO-measurements there was controlled for this additional information, because it could probably influence the CO-values (Crowley, Andrews, Cheney, Zerbe & Petty, 1989).

Procedure

As described previously, subjects self-monitored several aspects of their smoking behavior, using a diary for daily registration. Records were kept of number of cigarettes smoked a day, how much cigarettes they intended to smoke a day and strategy used when trying to reduce smoking. Also there has been asked why there were (not) able to reduce their smoking behavior. The purpose is to give the students a realization of their smoking behavior and it also gives data for this study.

The first CO-measurement took place after filling out the questionnaires in the first meeting. Students were told individually how they should use the CO monitor. Students were asked to exhale completely, inhale fully and hold their breath for 30 seconds. After that, they had to exhale slowly in the CO monitor. Values could vary from zero (non-smoker) to 80 ppm (heavy smoker). The CO-values were written down, together with the time since the last cigarette was smoked and the amount of cigarettes smoked that day prior to the measurement. Students were told their CO-value, with the purpose to stimulate them to lower their value in the next measurement. When the value was low, and not encouraging to lower the value at the next measurement, students were given positive feedback and were told they should maintain this low value. When a higher value was measured, there was emphasized that the intervention is about reducing their smoking behavior and students were asked again to try to reduce their smoking. With the CO-measurements, students were also given the idea that the experiment leader could see if they lie about their amount of smoked cigarettes a day, which should be noted in the logbook/ diary. This procedure was repeated at the second and third meeting.

The questionnaire asked subjects to respond to items as described previously. The questionnaire consisted questions based on an integrated model of the prototype/ willingness model and the ASE-model. During the meetings the questionnaires were handed out. Students were given 15 minutes to complete the form. They were asked to fill out the questionnaire individually. After the questionnaires were completed, the experiment leader took in the forms.

Observations were made during the meetings in the intervention. Valuable information students gave or behavior that had been observed was noted so it could be used when some results needed further explanation. Reactions about the intervention in general, other strategies, reactions about the CO monitor, questionnaires and the manual were noted. This data was used for the qualitative analyses.

Data analyses

The most important outcome measures are the within subject comparisons, in which baseline and post-test results are compared: the intention to quit or reduce smoking and the comparisons of the CO-values at baseline, the second meeting and the third meeting. The primary outcomes were: intention to reduce or quit, self-reported reduction in number of cigarettes smoked daily as compared to baseline, and reduction in breath CO measurements. For the analyses, successful smoking reduction was defined in two different ways. First, reduction was defined as the self-reported status of having reduced the past four weeks during the intervention in categories of ten cigarettes a day. Only a shift from a respectively higher to a lower category was accepted as reduction. Second, reduction was defined as the self-reported status of having reduced since the start of the intervention (regardless of the amount of cigarettes reduced) by smoking less cigarettes in the past four weeks during the intervention. These definitions were used for analyses of differences between reducers versus non-reducers. While the definition of reducers or non-reducers was more accurate based on the item if the students smoked more, the same or less the past four weeks during the intervention, the second definition (the self-reported status of having reduced since the start of the intervention, regardless of the amount of cigarettes reduced by smoking less the past four weeks) was managed in the following analyses.

Secondary outcomes involved the other variables in the questionnaire: prototypes, attitudes, social pressure, descriptive norm, subjective norms, and self-efficacy. To analyze the questionnaires and the CO-measurements SPSS 12.0.1 for Windows (SPSS Inc., 2006) was used. To evaluate the effects of the intervention paired samples t-tests were used on the determinants of the questionnaires. Every component of the questionnaire was compared at baseline and post-test, as well as the sum score of each determinant. Differences on gender, school and reducers versus non-reducers were also analyzed, using One-way ANOVA and GLM Univariate. GLM Univariate analyses the differences between the groups at post-test, controlling for the determinants at baseline. The CO-measurements were analyzed by using paired-sampled t-tests. Three t-tests were executed here: baseline versus first measurement, baseline versus second measurement, and first versus second measurement. Also, Pearson's correlation is computed to establish the strength of the relation between the measurements and two potential confounders (time till last smoked cigarette, and amount of cigarettes smoked that day until the measurement). GLM Univariate was used to control for the

confounders and CO-measurement at baseline. Finally, the diary/ logbook and the observations were qualitatively analyzed. For all analyses a confidence interval of 95% was used. Some analyses also handle a significance level of $p < .10$, because of the explorative design of this study and the small sample size. The focus is on emerging trends in the data.

Results

Baseline characteristics of the sample

At baseline, 27 students from two different high schools (Vechtdal College Ommen and Vechtdal College Dedemsvaart) participated in the intervention. Nineteen students completed both questionnaires; 23 students completed questionnaire 1 and 23 students completed questionnaire 2. The sample of 27 students comprised 56% (15) female students with a mean age of 15. All students were in the third class of lower secondary professional education. 26% (7) followed 'theoretische leerweg', 44% (12) followed 'kaderberoepsgerichte leerweg' and 30% (8) followed 'basisberoepsgerichte leerweg'.

One student subscribed after the first meeting; she heard from another student about the intervention and liked to participate. Although she was only 14-years-old, this student was included. Of the 27 participants, 8 students dropped out of the program due to not filling out the questionnaires at both times or not being present at the CO-measurements.

Every student smoked at least one cigarette a day. 37% of the students were smokers for one to two years. Nicotine dependence was measured by a short version of the Fagerström Tolerance questionnaire of Nicotine Dependence (Heatherton et al., 1991). The mean score of the students was 3.35 (2.33) (range 0-10). Two students had a nicotine dependence score higher than six which indicates that they can be classified as nicotine dependent. When students were asked how much they would smoke if they would reduce their smoking behavior, 30% (7) of the students thought about five cigarettes a day. For the intervention, the guideline was to reduce their smoking behavior to a maximum of five cigarettes a day, and all participants had the intention to reduce to this amount. Baseline characteristics of the sample are described in Table 3.

Table 3

Sample characteristics at baseline (n=27)

	Relative (absolute)		Mean/ Median (SD)
Gender (male/ female)	44% (12) / 56% (15)		
Age (min./ max.)	14/ 16		Median=15 (0.6)
Lower secondary professional education – levels of education*	26% (7)	'Theoretische leerweg'	
	0 %	'Gemengde leerweg'	
	44% (12)	'Kaderberoepsgerichte leerweg'	
	30 % (8)	'Basisberoepsgerichte leerweg'	
Length smoking	22% (5)	six months - one year	(four missings)
	44% (10)	one - two years	
	35% (8)	longer than two years	
Nicotine dependence (range 0 -10) (Fagerström)	9% (2)	nicotine dependent (score>6)	M=3.35 (2.3) (four missings)
	91% (21)	nicotine independent (score<6)	
Intention to reduce smoking to five cigarettes a day or less	0%	certainly not	(four missings)
	0%	probably not	
	22% (5)	maybe	
	48% (11)	probably	
	30% (7)	certainly	
Quit smoking in the future	0%	certainly not	(four missings)
	4% (1)	probably not	
	52% (12)	maybe	
	31% (7)	probably	
	13 % (3)	certainly	
Smoking behavior (last four weeks)	44% (12)	0-10 cigarettes a day	
	44% (12)	11-20 cigarettes a day	
	4% (1)	21-30 cigarettes a day	
	9% (2)	31 or more cig. a day	

Note: *Education levels lower secondary professional education (high-low)

Intervention outcomes

Self-reported smoking

For these analyses, eight students were excluded. They showed either missing values or did not fill in the questionnaire at all. First, a paired sampled t-test was used for analysis of smoking behavior of the past four weeks in categories of ten cigarettes a day. No significant effect was found, although the mean at post-test was lower than at pretest (Table 4).

Students were also asked at post-test if they smoked more, the same or less in the past four weeks compared to the past six months. 17% (3) smoked more after the intervention, 52% (10) reported to smoke the same amount of cigarettes a day compared to the last six months, 30% (6) smoked less after the intervention. A paired sampled t-test showed no significant effect.

Third, a paired sampled t-test was used for analysis of *nicotine dependence*. The Fagerström test was used to define the amount of nicotine dependence (see baseline characteristics of the sample). No significant effect was found here. Smoking behavior and nicotine dependence tended to show a favorable decrease, however not statistically significant.

Table 4

Self-reported smoking (n=19)

	Mean pre-test (SD)	**Mean post-test (SD)**	**t value**	**P value (two-tailed)**
Smoking behavior (past four weeks in categories)*	1.79 (0.8)	1.53 (0.8)	1.157	.262
Nicotine dependence (Fagerström)	3.32 (2.0)	3.11 (2.3)	.676	.508
Smoking behavior (past four weeks, regardless of amount of cigarettes smoked)**	.05 (0.6)	.26 (0.7)	-.940	.360

Note: * Scale: 1 = 0 - 10, 2 = 11 - 20, 3 = 21 - 30, 4 = 31 or more cigarettes smoked a day. ** Scale: -1 = more, 0 = the same, 1 = less cigarettes smoked a day.

CO-measurements

No significant effects were found for the total population on CO-measurements (Table 5).

Table 5

CO-measurements for total population

	Mean at pre-test (SD)	Mean at post-test (SD)	P value (two-tailed)
COb - COII**	8.70 (3.4)	8.26 (2.8)	.498
COb - COI*	8.65 (3.3)	8.58 (4.6)	.933
COI - COII**	8.57 (4.8)	8.26 (2.9)	.692

Note: *26 participants **23 participants. COb = CO-measurement at baseline, COI = second CO-measurement, COII = CO-measurement at post-test.

When selecting the students who self-reported reduced smoking (i.e. shifted from a higher to a lower response category of 21-30 to 11-20 or to 0-10), one significant effect (p= .032) was found for the measurements of CO at baseline (COb) and the second measurement (COI). The means showed a significant reduction at COI from 9 ppm to 6.5 ppm. However, at COII (post-test) the means were about the same when compared to COI, but still lower than at COb (Table 6a). Reduction was based on how much cigarettes participants smoked the past four weeks. It should be noted that students could only answer in categories of ten cigarettes a day. Students who, for example, reduced from ten to five cigarettes a day were defined as non-reducers in this analysis, as the remained classified in the same category. Only a shift from a higher respective category to a lower category was defined as reduced smoking. Six of the 19 students (32%) that filled out both questionnaires were selected as students who were successful reducers according to this criterion.

Table 6a

CO-measurements when students self-reported reduced smoking (i.e. shifted from a higher to a lower response category of 21-30 to 11-20 or to 0-10) in categories of ten cigarettes a day (n=6)

	Mean at pre-test (SD)	Mean at post-test (SD)	P value (two-tailed)
COb – COII	9.00 (3.1)	7.00 (4.0)	.203
COb – COI	9.00 (3.1)	6.50 (4.3)	.032*
COI – COII	6.50 (4.3)	7.00 (4.0)	.636

* $p< 0.05$

However, reduction in this study could also be defined as the self-reported status of having reduced since the start of the intervention (regardless of the amount of cigarettes reduced). This item was measured at post-test. Seven of the 19 students (37%) that completed both questionnaires satisfy this criterion. Although no significant effects were found here, the effect at first follow-up (COI) reported in table 6a is supported by the COI-decrease on this reduction-criterion.

Table 6b

CO-measurements among students with a self-reported status of having reduced since the start of the intervention, regardless of the amount of cigarettes reduced, by smoking more, the same or less during the intervention (n=7)

	Mean at pre-test (SD)	**Mean at post-test (SD)**	**P value (two-tailed)**
COb - COII	9.57 (4.0)	9.00 (3.1)	.649
COb - COI	9.57 (4.0)	7.86 (3.7)	.303
COI - COII	7.86 (3.7)	9.00 (3.1)	.356

In this study we tried to correct for the time until the last cigarette smoked and the amount of cigarettes smoked that day in the CO-measurements. For these analyses all students were included. Results show higher correlations of these two confounders with COI, both of which in the expected direction: COI is higher when the time till last cigarette smoked, and amount of cigarettes smoked were incorporated in the analysis. Also for the confounder 'amount of smoked cigarettes prior to measurement', both the CO-measurements at baseline and post-test reached statistical significance (Table 7).

Table 7

Pearson's correlation for CO-measurements

	Time till last smoked cigarette	**Amount of smoked cigarettes prior to measurement**
COb (n=27)	.07 (p=.369)	.38* (p=.026)
COI (n=26)	-.39* (p=.024)	.67**(p< .000)
COII (n=23)	-.22 (p=.158)	.39* (p=.033)

Note: *Correlation is significant at the 0.05 level (one-tailed). **Correlation is significant at the 0.01 level (one-tailed).

To give an indication of the differences between reducers and non-reducers concerning the CO-values, GLM Univariate (ANCOVA) was used. For the analysis of COb, there has been

corrected for the time till the last smoked cigarette and the amount of cigarettes smoked that day prior to the measurement. The analysis of COI and COII was corrected for the measurement at baseline and both confounders. No significant effects were found here for reducers versus non-reducers.

Behavioral determinants of reducers versus non-reducers

As described above, reduction in these analyses was based on if the students self-reported having reduced since the start of the intervention, regardless of the amount of cigarettes reduced, by smoking less the past four weeks. Results are outlined in Table 8 to give an indication of the differences between the two groups. To compare the results per group, one-way-ANOVA was used for these analyses.

Table 8

Results for reducers versus non-reducers (self-reported) (n=19)

At baseline **(Range min- max)**	**Reducers mean (SD) (n=7)**	**Non-reducers mean (SD) (n=12)**	**F-value**	**P value (two-tailed)**
Intention (4 – 20)	13.86 (1.9)	13.17 (2.1)		.479
Self-efficacy (5 – 25)	16.29 (2.0)	16.33 (3.4)		.973
Attitude (10 – 50)	33.71 (7.2)	38.08 (6.3)		.184
Prototype (20 – 100)	49.71 (10.9)	57.75 (8.2)	3.329	.086†
Social pressure (4 – 20)	11.43 (4.5)	8.92 (3.0)		.164
Subjective norm (18 – 90)	19.86 (1.9)	20.17 (2.1)		.753
Nicotine dependence (0 – 10)	2.86 (1.9)	3.58 (2.2)		.468
Prototype similarity (20 – 100)	28.14 (22.9)	12.83 (18.1)		.125

† $p<0.10$

(Table continues)

Table 8 ***(continued)***

Results for reducers versus non-reducers (self-reported) (n=19)

At post-test **(range min - max)**	**Reducers mean (SD) (n=7)**	**Non-reducers mean (SD) (n=12)**	**F-value**	**P value (two-tailed)**
Intention (4 – 20)	13.71 (2.6)	12.08 (2.7)		.215
Self-efficacy (5 – 25)	14.57 (4.3)	16.67 (4.3)		.321
Attitude (10 – 50)	37.43 (4.9)	35.00 (6.0)		.380
Prototype (20 – 100)	51.71 (9.5)	53.33 (10.8)		.747
Social pressure (4 – 20)	12.57 (2.9)	9.83 (2.9)	3.985	.062†
Subjective norm (18 – 90)	19.71 (1.5)	19.25 (2.7)		.679
Nicotine dependency (0 – 10)	2.00 (1.4)	3.75 (2.5)		.113
Prototype similarity (20 - 100)	22.14 (18.1)	10.00 (12.3)	3.045	.099†

†p<0.10

Table 8 indicates three marginal effects for this groups. For prototype at baseline, social pressure at post-test, and prototype similarity at post-test a favorable effect was observed of p<.10. Remarkably, the mean for prototype at baseline is more positive for students who did not reduce smoking.

To see how reducers and non-reducers are accompanied by the results of the different determinants, GLM Univariate was used. The differences for reducers and non-reducers were computed here for the determinant at post-test, when correcting for the measurement at baseline. Results are outlined in Table 9. One marginal effect was found in these analyses. Estimated marginal means in these analyses show that the mean for the determinant nicotine dependency was significantly lower for participants who reduced their smoking behavior at post-test than for students who failed to reduce (p= .097) (Table 9).

Table 9

Effect of the intervention on behavioral determinants of reducers versus non-reducers (n=19)

	Estimated marginal mean reducers (SE)	**Estimated marginal mean non-reducers (SE)**	**F-value**	**P value (two-tailed)**
Intention	13.55 (1.0)	12.18 (0.8)		.298
Self-efficacy	14.60 (1.5)	16.66 (1.1)		.289
Attitude	37.37 (2.3)	35.04 (1.7)		.438
Prototype	54.87 (3.56)	51.49 (2.7)		.474
Social Pressure	11.81 (0.9)	10.28 (0.7)		.218
Subjective Norm	19.74 (0.9)	19.24 (0.7)		.662
Prototype similarity	19.44 (5.5)	11.58 (4.1)		.286
Nicotine dependence	2.40 (0.5)	3.52 (0.4)	3.110	.097†

Note: Reducers n=7, non-reducers n=12. †p<0.10.

Variables moderating intervention effects

To test whether differences between the two participating schools and between gender contributed to intervention effects, both groups of students were compared. For schools, one significant effect was found (p<.05). The results for the post-test of prototypes, when controlled for prototype at baseline, showed a significant difference of p=.05 (F= 4.697). The school of Dedemsvaart has a lower mean (47.32 (SD 3.1)) compared to Ommen (55.90 (SD 2.3)). In Dedemsvaart, the students responded less favorably to the intervention than the school of Ommen, as far as their smoking reduction prototype is concerned.

For gender, one marginal significant difference was found. The results for the post-test of attitudes, when controlling for attitudes at baseline, indicated a significant difference of p=.051 (F=4.441). The mean for girls (38.192 (SD 1.6)) was here higher than the mean for boys (31.956 (SD 2.2)). This implicates that the girls responded more favorably to the intervention than the boys, as far as their smoking reduction attitude is concerned.

Behavioral determinants of the intervention

Intentions. To analyze how the determinants changed during the intervention for the total population, paired sampled t-tests were used. Eight students were excluded; they didn't fill out the questionnaire at both times.

Table 10a

Intentions (n=19)

Range 1 – 5 (min – max)	**Mean pre-test (SD)**	**Mean post-test (SD)**	**t-value**	**P value (two-tailed)**
Intention to quit smoking within four weeks	2.32 (0.7)	2.26 (0.7)		.826
Intention to reduce smoking within four weeks (at least 50%)	3.63 (0.6)	3.00 (0.9)	2.721	.014*
Intention to reduce smoking within six months (at least 50%)	3.84 (0.8)	3.68 (0.8)		.454
Quit smoking in the future	3.63 (0.8)	3.74 (0.9)		.578
Intention total (range 4 – 20)	13.42 (2.0)	12.68 (2.7)		.264

* $p<0.05$

One significant difference was found for the variable 'intention' (Table 10a). For the intention to reduce smoking within four weeks the significance was $p<.05$. Remarkably, this intention was higher at baseline. The sum score of the variable 'intention' indicated no significant effects for this construct. To analyze how the above significant effect differs between reducers and non-reducers, paired sampled t-tests were used on this item for reducers and non-reducers. Table 10b shows that the non-reducers accounted for the significant effect ($p= .005$).

Table 10b

Intention *to reduce smoking within four weeks for reducers and non-reducers*

Range 1 – 5 (min – max)	**Mean pre-test (SD)**	**Mean post-test (SD)**	**t-value**	**P value (two-tailed)**
Reducers (n=7)	3.57 (0.5)	3.43 (0.8)		.736
Non-reducers (n=12)	3.67 (0.7)	2.75 (0.9)	3.527	.005*

*$p<0.05$

Attitudes. For attitudes, no significant differences were found. Although the means at baseline in most cases tended to be slightly more positive than means at post-test. The sum score of the variable 'attitude' also showed no significant effects for this construct (Table 11).

Table 11

Attitudes (n=19)

Range 1 – 5 (min – max) Reduced smoking is for me..	**Mean pre-test (SD)**	**Mean post-test (SD)**	**t-value**	**P value (two-tailed)**
Normal	3.42 (0.9)	3.21 (0.9)		.429
Pleasant	3.05 (1.2)	3.21 (1.0)		.546
Harmless	3.63 (1.2)	3.37 (1.2)		.573
Not risky	3.79 (1.0)	3.58 (1.1)		.531
Healthy	3.79 (1.2)	3.95 (1.2)		.625
Good	4.00 (1.2)	4.11 (0.9)		.755
Sociable	2.26 (1.1)	2.79 (1.0)		.135
Smart	3.95 (1.1)	3.84 (1.0)		.790
Cheap	4.16 (1.3)	3.84 (1.2)		.461
Better for my condition/ shape	4.42 (0.8)	4.00 (1.2)		.202
Attitude total (range 10 - 50)	36.47 (6.8)	35.89 (5.6)		.788

Prototype. For prototype, one marginal effect was found (Table 12a). The item '*someone who reduced his/ her smoke behavior is.. cool*' reached a marginal significance ($p<.10$). The mean at post-test was lower, meaning the students perceived, someone who reduces his/ her smoking behavior is less cool, after they participated in the intervention. The score of almost every item was less favorable after the intervention, although these unexpected differences did not reach statistical significance.

Table 12a

Prototype (n=19)

Range 1 – 5 (min – max) Someone who reduced his/ her smoke behavior is..	**Mean pre-test (SD)**	**Mean post-test (SD)**	**t-value**	**P value (two-tailed)**
Cool	3.00 (0.9)	2.63 (0.7)	1.794	.090†
Looking sturdy	2.68 (0.9)	2.42 (0.5)		.235
Thinking of his/ her future	3.89 (0.7)	3.37 (1.0)		.126
Healthy	3.89 (0.8)	3.68 (0.9)		.429
Forward	2.21 (0.9)	2.21 (0.8)		1.000
Having the guts	2.84 (1.2)	2.58 (1.0)		.438
Trying hard at school	2.42 (1.0)	2.26 (0.9)		.578
Spending a lot of money	2.32 (1.1)	2.47 (1.0)		.546
Often courting a girl/ boy	2.21 (1.0)	2.21 (0.9)		1.000
Interesting	2.47 (0.8)	2.32 (0.9)		.506
Sporty	2.89 (1.2)	3.11 (0.7)		.408
Sociable	2.58 (0.9)	2.68 (0.8)		.667
Not spending much time at home	2.32 (0.9)	2.42 (0.6)		.607
Belonging to the group	2.47 (0.8)	2.47 (0.8)		1.000
Listening good to his/ her parents	2.53 (0.8)	2.32 (0.9)		.360
Having lots of self-confidence	3.05 (0.9)	2.79 (0.7)		.205
Enjoying life	3.00 (0.9)	2.95 (0.6)		.804
Having a lot of friends	2.63 (0.8)	2.68 (0.7)		.749
Honest	2.95 (1.0)	2.63 (0.6)		.285
Popular	2.42 (0.8)	2.53 (0.6)		.429
Prototype total (range 20 – 100)	54.79 (9.8)	52.74 (10.1)		.363

†$p < 0.10$

At post-test these items about the student's peers were compared to the same characteristics they gave themselves; the prototype similarity. The extent to which the prototype scores of a peer their own age who reduced his/ her smoke behavior corresponds with the scores the participants give themselves on the same characteristics, has been measured here. Four students were excluded from this analysis, because they did not fill out the questionnaire or showed missing values at post-test. At this point, they had already participated in the intervention to reduce their smoking behavior. Many significant effects were found, meaning

the participants viewed themselves as different than someone else their own age reducing his/ her smoking behavior; the perceived similarity is low. Table 12b indicates the significant items.

Table 12b

Prototype similarity (n=23)

Range 1 – 5 (min – max) **I think, I am…**	**Mean prototype**	**Mean self**	**t-value**	**P value (two-tailed)**
Cool	2.70 (0.9)	3.17 (0.9)	-1.751	.094†
Looking sturdy	2.43 (0.6)	2.83 (0.9)	-1.817	.083†
Forward	2.30 (0.8)	2.91 (1.0)	-3.480	.002*
Having the guts	2.61 (0.9)	3.22 (0.8)	-2.440	.023*
Trying hard at school	2.39 (0.9)	3.30 (1.0)	-2.749	.012*
Interesting	2.39 (0.9)	3.09 (0.9)	-2.286	.032*
Sociable	2.74 (0.8)	3.65 (0.9)	-3.761	.001*
Belonging to the group	2.48 (0.8)	3.39 (1.0)	-3.431	.002*
Listening to his/ her parents	2.48 (0.9)	3.04 (1.0)	-2.129	.045*
Having lots of self-confidence	2.87 (0.7)	3.35 (0.9)	-1.910	.069†
Enjoying life	3.04 (0.7)	3.65 (1.0)	-2.179	.040*
Having lots of friends	2.78 (0.7)	3.78 (0.8)	-4.592	.000*
Honest	2.70 (0.6)	3.70 (0.9)	-4.796	.000*
Popular	2.61 (0.6)	3.26 (0.9)	-2.812	.010*

*$p<0.05$ †$p<0.10$

Self-efficacy. For self-efficacy, one significant effect of interest was found (Table 13). The item '*refusing a cigarette when I've been offered one is hard for me'* was perceived as less hard at post-test than at baseline. The total self-efficacy scale did not change for the whole population. Only the refusal self-efficacy suggested a favorable shift during the weeks of intervention.

Table 13

Self-efficacy (n=19)

Range 1 – 5 (easy – hard)	**Mean pre-test (SD)**	**Mean post-test (SD)**	**t-value**	**P value (two-tailed)**
It's hard for me if I can not smoke when my friends do	3.89 (0.7)	3.68 (1.3)		.331
Refusing a cigarette when I've been offered one is hard for me	3.74 (1.1)	3.11 (1.3)	2.118	.048*
Keeping reducing my smoking is hard	3.21 (0.9)	3.42 (1.0)		.331
Thinking of a good reason to refuse a cigarette is hard	2.68 (0.9)	2.47 (1.0)		.408
Keeping up with my smoking behavior is hard	2.79 (1.1)	3.21 (1.1)		.279
Self-efficacy total (range 5 – 25)	16.32 (2.87)	15.89 (4.32)		.650

*$p<0.05$

Social pressure. Most participants reported that many of their friends smoke. Only one participant did not agree on this item. For classmates, more variance was observed.
The participants were also asked if they thought that their friends and classmates wanted them to stop or reduce their smoking. The mean scores indicated that these adolescents perceived low social pressure to reduce smoking from friends or classmates at baseline (Table 14). Although not significant, these score at post-test tend to be consistently favorable.

Table 14

Social pressure (n=19)

Range 1 - 5 (min – max) Sometimes I've the feeling that..	**Mean at pre-test (SD)**	**Mean at post-test (SD)**	**t value**	**P value (two-tailed)**
My friends want me to reduce my smoking	2.68 (1.2)	2.95 (0.9)		.287
My friends want me to stop smoking	2.53 (1.1)	2.74 (1.0)		.429
My classmates want me to reduce my smoking	2.37 (1.1)	2.53 (1.0)		.482
My classmates want me to stop smoking	2.26 (1.1)	2.63 (0.9)		.130
Social pressure total (range 4 – 20)	9.84 (3.8)	10.84 (3.1)		.148

Subjective norm. The subjective norm had not significantly changed after participating in the intervention. The means were high at pre-test and post-test except for the item whether their surroundings thought reduced smoking is sociable. These items were mostly answered negatively, meaning that the subjective norm does not favor reduced smoking. Also the total score of the subjective norm-scale showed no significant effects.

Diaries

Of the 27 students, five participants handed in the diaries. None of them were completely filled in. The most commonly reported strategies were not to smoke during bicycling and to chew gum or to eat lollipops. Reported strategies that were not in the manual included not thinking about smoking, not buying any cigarettes or just stop smoking.

The amount of cigarettes they planned to smoke within 24 hours varied across and within these students. Most reports from these five students indicated that they planned to smoke five cigarettes per day (64%), consistent with the outline of the intervention. Remarkably, 19% of the reported amount of planned cigarettes a day was zero. Furthermore,

one student reported a planned amount of 13, 14, or 15 cigarettes a day. The other amounts were three (1%) and four (1%) cigarettes a day.

Table 15

Reported strategies (n = 5)

Reported Strategies from the manual	Self-reported strategies
No smoking on the bicycle	Not thinking about smoking
Chewing gum or eating lollipops instead of smoking	Not buying any cigarettes
Avoiding smokers and places where people smoke	Stop smoking
Leave tobacco at home	Closing a bet with another smoker
Postpone smoking by, for example, going outside	
Conscious thinking about reducing	
No smoking at home	
Smoking at pre-set times	

Observations

Observations were made during the intervention. The most striking observation was that some students were very cooperative and motivated, but most students seemed to have subscribed to the intervention so they could be absent from classes. These students were not always paying attention, did not take the instructions serious and did not hand in the diary or in some cases the questionnaire. Also, most students mentioned that they just begun smoking and were not really thinking about quitting. Students reported reducing was more attractive to them than quitting, but they were not very enthusiastic.

Furthermore, a few students reported during the meetings that reducing was too hard; they would rather quit. They had problems with monitoring their smoking behavior; there were to many events were they smoked more than five cigarettes per day, for example on Saturday night, stress, family circumstances, party's and holidays. Two students actually self-reported to have *quit* during the intervention.

The manual and the diary were judged negatively by most students. Especially the diary was boring according to the participants. They did not feel like filling in the diary every day. Most students also did not use the manual to help them reduce smoking. They reported they could reduce on their own; they did not need tips and strategies. Some illustrations: '*What is the use of the manual, you just have to reduce smoking*' and '*I am not going to read all that, I can think of some strategies on my own'*.

However, the CO-measurements were a success. Students found the CO monitor interesting and could not wait to be measured. Also they did their best to lower the amount of the last measurement, by smoking less during the period to the next measurement. Students asked each other for their CO-value to see how it could be compared to their own CO-value. They were very interested in what the value meant for their smoking behavior and for their health. With the CO-monitor, there was a manual which gave meaning to the CO-values of the measurements. Students could look into this to establish the meaning of their value. This stimulated them to lower their CO-value at the next measurement.

Discussion

The main aim of this study was smoking reduction among adolescents, aged 14-16 years old. Of the daily smoking students, who filled out both questionnaires, 37% (7/19) reduced their smoking behavior. Two students (11%) actually quitted smoking after participation. Reduction was defined as the self-reported status of having reduced since the start of the intervention (regardless of the amount of cigarettes reduced), by smoking less during the intervention. Because only five students handed in the diary, the self-reported amount of reduction could not be checked. Therefore, any reduction (compared to the start of the intervention) was regarded as the main outcome here, while the intervention's objective was to reduce to a maximum of five cigarettes a day. Furthermore, the intention at baseline to reduce to five cigarettes a day was determined positive for all students.

Analyses of self-reported smoking, which consisted of 1) the degree of nicotine dependence as measured by the Fagerström questionnaire, 2) number of cigarettes smoked the past four weeks in categories of ten cigarettes a day, and 3) having smoked more, the same or less cigarettes a day for the past four weeks compared to baseline, showed no significant effects between baseline and post-test for the total population. However, all three measures did show a tendency towards reduced smoking at follow-up.

Furthermore, determinants were analyzed for differences between baseline and post-test. The overall intention construct showed no significant difference between pre- and posttest, but the intention to reduce smoking within four weeks shows a significant effect between baseline and post-test for the whole population. This intention had decreased at

post-test. The intention to quit smoking in the future tended to remain equal at post-test. Reducer prototype similarity showed many significant effects. Also, the self-efficacy construct showed one significant item of 'refusal self-efficacy', with a more favorable mean at post-test. These effects will be discussed in the next sections.

Behavioral effects

Seven out of 19 students in this study reported to have reduced their smoking behavior to some extent (37%). This means that more than 1/3 of the sample reduced in amount of cigarettes a day. Johnson et al. (2004) already noted that adolescents have a 'natural propensity to control their smoking'. Most adolescents, who experiment with smoking do not intend to become addicted to smoking. Johnson et al. describe ways in which adolescents come to recognize their loss of autonomy and how they make sense of it. They describe three phases, the third phase begins when adolescents thought they had crossed the line. Adolescents are, in this phase, implementing strategies to control tobacco use. The present study corresponds to this particular phase by offering adolescents strategies to control their tobacco use, with additional CO-feedback. By experimenting with different strategies to gain control over their smoking, adolescents might develop a sense of what does or does not work for them. However, not all youth engage in this process. That would explain why not more students reduced their smoking.

Another important result of this study was that two students actually did quit smoking. Some authors have made the argument that reduction may give smokers an easy way out and a false sense of dealing with their smoking (Hughes et al., 1999). However, the present study shows that reduction does not always undermine smoking cessation. By asking these students to reduce their smoking, they probably have been stimulated to quit. It is also possible that these students already had planned to quit smoking and the intervention gave them a good opportunity to prelude on this. Some students reported that they thought quitting was easier for them than reducing. They reported that when having reduced, they mostly have cigarettes with them or have to face situations where they must explain why they do not smoke at that time, and on another moment do. When they do not smoke at all, these situations can be avoided by just saying they have quit smoking. It is likely that for these students, reduction was not the most proper strategy. They were therefore advised to pursue total smoking cessation in stead of reducing. Also, the intention to quit smoking in the future has remained

equal of baseline compared to post-test. Here it can also be seen that reduction of smoking behavior has at least no negative influence on future quit attempts.

CO-measurements were taken at all meetings. For the total population, no significant differences between baseline, measurement after two weeks, and post-test (four weeks), were found but the observed means were slightly lower at all moments compared to baseline. To analyze the CO-results for students who reduced during the intervention, two definitions of reduction were applied. First, reduction was defined as how much the participants smoked the past four weeks, in categories of ten cigarettes a day. Only a shift from a higher category to a lower category was defined as reduced smoking. Six of the 19 students were selected as students who reduced their smoking behavior during the intervention, following the above mentioned definition of reduction. One significant difference between CO at baseline and CO after two weeks was found, which indicates a significant reduction from the start of the intervention till the first measurement. An explanation for the non-significance between the measurement after two weeks and post-test could be that students reduced their smoking behavior from baseline till the first measurement after two weeks, and after that remained the same amount of cigarettes, so no significant result has been found at the CO-measurement after four weeks. This explains also the non-significance between baseline and post-test; the effect size is too small, because of the assumed stabilization after two weeks. If the second definition (self-reported reduction since the start of the intervention (regardless of the amount of cigarettes reduced), by smoking less during the intervention compared to baseline) was used, no statistical significance were found between baseline, the measurement after two weeks, and post-test. However, the means were lower at all moments compared to baseline. This definition has been used for further analyses, because this was assumed to be more valid. A shift to a lower category can ignore reducers who for example reduced from ten to five cigarettes a day. The second definition contains all reducers, regardless of the amount of cigarettes reduced. When using this definition, seven out of 19 students (37%) were selected as student who reduced their smoking behavior. However, only three out of six students from the first definition are incorporated in this second definition. Together with the finding that the means of the CO-measurements were lower at all moments compared to baseline, this intervention can be evaluated positively. More than 1/3 of the students who fully participated in the intervention reduced their smoking behavior, which seems to be supported by the CO-measurements. This indicated that the intervention probably has worked for these students, although no control group has been used.

Although the CO-values did not show statistical significant effects, the CO-measurements were a success, when used as a feedback instrument: observations turned out that the CO-measurements seemed to stimulate the participants to reduce and maintain their reduction. Students were enthusiastic about the device en seemed to be motivated to lower their value at the next measurement. Also, they asked each other for their values and seemed to be proud if they were measured a lower value.

In this study we tried to correct for the time till the last cigarette smoked and the amount of cigarettes smoked that day prior to the CO-measurements. But does breath CO relate to smoke intake and can it therefore be used as a measurement of smoke intake? Crowley et al. (1989) found in their Chest Clinic survey no correlation between CO and reported number of cigarettes smoked that day, and no correlation between CO and time since last cigarette. However, smokers differ in the amount of smoke consumed per cigarette; some take many drags and inhale deeply, while others do neither. The harm-minimizing effects of reduced smoking could be inhibited because of compensatory smoking, leading to an increased toxin exposure per cigarette (Meyer et al., 2003). Hill et al. (1988) also note that habitual smokers compensate for reduced consumption by taking in more toxins per cigarette, probably by inhaling deeper and taking more puffs. This could influence the CO-measurements by indicating a higher value due to this phenomenon. Henningfield, Stitzer & Griffiths (1980) also found little relationship between CO and cigarettes smoked a day in comparisons across different subjects, presumably because of the difference in inhalation patterns. But when those investigators made repeated measures in the same subjects, who smoked more or fewer cigarettes on different days, there was a significant correlation between number of cigarettes smoked and breath CO. However, in this study, students were instructed to reduce their smoking behavior; the smoking patterns should change. Compensatory smoking could exist here, but can not be complete, while correlations have been found. Results in this study showed a more strong correlation between the amount of cigarettes smoked that day till the measurement. For COI both predictors (amount of cigarettes smoked prior to measurement (p=.024) and time till last smoke cigarette (p<.000)) were significant. This can be explained by the significant effect of the CO-measurements between baseline and COI. Students had significantly reduced their smoking behavior at the first measurement, so the confounders show a significant correlation. However, this study contains a low amount of participants, so only trends could be described. But it seems that

breath CO is a good measure of recent smoke intake among smokers, when correcting for time till last smoked cigarette and amount of cigarettes smoked prior to the measurement.

Predictors of reduction

Comparing the effects of reducers and non-reducers on the CO-measurements, while correcting for the CO-measurement at baseline, amount of cigarettes smoked prior to the measurement, and time till last smoked cigarette, no significant difference in CO level was found. An explanation for this observation could be that the students compensated for smoking less cigarettes by taking more puffs, or inhaling more deeply (compensated smoking), despite the warning (in the manual) they received about this behavior.

When analyzing the behavioral determinants for reducers versus non-reducers, one remarkable marginal effect was found. The means for the measurement of reducer prototype at baseline appeared to be higher for non-reducers. This means that non-reducers had a more positive prototype at baseline of peers who reduced their smoking behavior, compared to the reducers. According to the prototype/ willingness model of Gerrard et al. (2005) a positive prototype of a peer who quits smoking predicts the intention to quit smoking. However, this study is about reduced smoking. This result indicates that a positive reducer prototype does not predict reduced smoking. However, in this study two students quit smoking during the intervention. It could be that these students think as negatively about reduced smoking as students who remained smoking. These two students cover 29% of the reducers in this intervention, so this probably accounts for the marginal effect for non-reducers.

Also, for social pressure measured at post-test, a marginal effect was found. Non-reducers show a less favorable mean for social pressure to reduce smoking compared to reducers. According to the ASE-model of DeVries (1993), high social pressure to quit smoking predicts smoking cessation. The results from this study show that social pressure to reduce smoking also predicts reduced smoking.

Prototype similarity at post-test shows a marginal effect with a less favorable mean for non-reducers. This means that these students regard themselves as less similar to peers who reduce their smoking behavior when compared to the students who reduced their smoking behavior during the intervention. According to the prototype/ willingness model, a high perceived similarity for smoking cessation leads to a higher willingness to quit smoking. Here, it is indicated that this does also account for reduced smoking.

Comparison between groups on the behavioral determinants and nicotine dependence was done for reducers versus non-reducers. Reducers versus non-reducers showed no significant effects, when correcting for the measurements of the determinants at baseline. One marginal significant effect was found on nicotine dependence. Nicotine dependence at post-test was lower for students who reduced compared to students who had not reduced during the intervention. In this analysis there was corrected for nicotine dependence at baseline. Nicotine dependence reduced if the amount of cigarettes smoked was reduced. This means that the students who have reduced their smoking behavior, also became less nicotine dependent. The favorable shift in nicotine dependence for reducers can serve as some kind of validation of the self-reported reduction of these students. However, two students had quit smoking during the intervention. It could also be that these students accounted for the marginal significant effect on nicotine dependence.

For comparison between schools on the behavioral determinants and nicotine dependence, one significant difference was found for reducer prototype; how the students thought about a person their own age reducing his/ her smoking behavior. The school of 'Dedemsvaart' showed a less favorable mean score compared to the school of 'Ommen'. An explanation could be that these students regard smoking cessation as more healthy than reduced smoking and because of this have a less favorable image of peers who reduce their smoking behavior. Another explanation could be the distribution of the sample. Ten students (37%) participated in the intervention from the school of 'Dedemsvaart' compared to 17 (63%) students from the school of 'Ommen'. Probably some students from the school of 'Dedemsvaart' were negative about the prototypes of a reduced smoker, which effects could not be mediated by other students, because of the small sample. These students could have accounted for the less favorable mean score on reducer prototype, compared to the school of 'Ommen'.

Comparisons of gender on the behavioral determinants and nicotine dependence showed one marginal significant effect for attitude. Girls in this study have a more favorable attitude about reduced smoking than boys. However, of the seven students who reduced their smoking behavior, four were boys and three were girls. Also, of these three girls, two had actually quit smoking during the intervention. These results indicate that attitudes do not predict reduced smoking for girls very well. However, only trends could be described, because of the small sample.

Other effects on behavioral determinants

The intention to reduce smoking within four weeks showed a significant effect for baseline compared to post-test for the total population. The intention has decreased at post-test. This can be explained by the objective of the intervention. For students to participate in the intervention, it was the purpose that they tried to reduce their smoking behavior. Although the students did not know the exact objective of the intervention, they were already informed that de study was about smoking and that is was not necessary to quit. At the end of the intervention the need for the intervention to change their smoking behavior was not there anymore. Some already had reduced or quitted, so they do not have to reduce in the future. It can also be that some participants experienced reduced smoking as hard or not right for them and do not want to reduce again in the near future. When analyzing the intention to reduce smoking within four weeks for non-reducers, results show a significant effect of p= .005, with a lower mean at post-test of 2.75 (SD 0.9), compared to baseline (M = 3.67 (SD 0.7)). For reducers this effect is p= .736. This shows that the non-reducers accounted for the significant effect. Probably this result means that the non-reducers did not experience reduced smoking positive, and therefore do not want to try to reduce their smoking behavior again in the next four weeks.

Prototypes (regarding the image of a reduced smoker) showed no significant differences between baseline and post-test for the total population, but prototype similarity did at post-test. The reducer prototype was found to be less favorable than the image they gave themselves. Many significant effects were found on item level, meaning the participants viewed themselves as different as someone their own age reducing his/ her smoking behavior; the perceived similarity was low. Subjects in this study generally perceived themselves as clearly different from the prototype of a reduced smoker their own age. According to the 'social comparison theory' of Festinger (1954) people evaluate themselves through comparisons with similar others (Brehm, Kassin & Fein, 2002). This resulted in the participants viewing themselves as being more positive on *every* item of the scale, compared to their peers, who have reduced smoking. This low perceived similarity will, according to the prototype/ willingness model (Gerrard et al., 2005), decrease the willingness to reduce smoking behavior in these adolescents in case of a reducer prototype. Unfortunately, willingness could not be measured in this study, while this intervention is about planned behavior as described in the introduction. However, more than 1/3 (37%) reduced their smoking behavior during the intervention, so this seems not to be the case in this study. One

explanation could be that the students are very self-serving, and that they think they are better in all items compared to peers (self-enhancement). Brehm et al. (2002) note that many people see positive traits as more self-descriptive than negative ones, rate themselves more highly than they rate others and rate themselves more highly than they are rated by others. Another explanation could be that observations showed that the students did not always take the questionnaire serious, which could have resulted in very positive images of themselves. A third explanation could be that the students had problems with the questionnaire. The teacher of 'Ommen' declared that some items could be too hard for the students, because they were asked the items in terms of a third person. Further research should take this observation into account when developing a questionnaire for this age and education level. Fourth, students could have perceived the prototype of a reduced smoker as negative. Also, two students did quit during the study; they could have perceived a reduced smoker as negative as students who remained smoking the same amount of cigarettes a day. The image of themselves is not negative, so the prototype similarity, which compares the image of themselves to the image of peers who reduced their smoking, is relatively high.

The significant item '*refusing a cigarette when I have been offered one is hard for me'*, which is an item of the self-efficacy construct, also called *refusal self-efficacy* (Petraitis et al., 1995), showed a lower mean at post-test. This positive change from baseline to post-test in the total population suggests that the students acquired skills to deal with social pressure during the intervention. Several studies have found support for the independent role of refusal self-efficacy. In particular, DeVries and colleagues (DeVries, Dijkstra, & Kuhlman, 1988; DeVries, Kok, & Dijkstra, 1990; Kok, DeVries, Muddle, & Strecher, 1991) have reported that adolescents' beliefs in their abilities to resist pressures to smoke added significantly to the prediction of cigarette use. However, in this study adolescents already were smoking. The reduction program could have contributed to the refusal self-efficacy, by the collective character of this intervention. The students all know each others point of view, so it is easier for them to behave according their choice to reduce. This finding probably has a positive influence on future quit attempts, while these students now have more abilities to resist pressures.

Strategies for smoking reduction

The diaries used in the intervention seemed to be unsuccessful. Only five participants handed them in, and none of them were completely filled in. Still, it gave an impression of the most

favorite strategies to reduce smoking among the students. The most common reported strategies were: not to smoke during bicycling, chewing gum, or eating lollipops. Probably these strategies are chosen, because these strategies fit to the lifestyle of the students. Also, not thinking about smoking, not buying any cigarettes or just stop smoking were mentioned, although these strategies were not offered in the manual. Further research could incorporate these strategies by adding these strategies as possible techniques.

Limitations

Remarkably, only two students were found nicotine dependent according to the Fagerström Test of Nicotine Dependence. Therefore, it seems unlikely that the remaining students failed reducing because of heavy withdrawal symptoms. It is obvious here, that nicotine dependence does not play the only role in failing a smoking reduction program. However, research suggests that the Fagerström Test of Nicotine Dependence may be an imperfect measurement, especially for adolescents. Guillon, Crocq & Bailey (2007) suggest that it may measure consumption rather than dependence. For instance, the question *'how many cigarettes a day do you smoke'*, which can contribute up to three points out of a possible total score of ten, may produce inconstant answers in adolescents, contrary to chronic smokers who already have established habits. In that case, another type of measurement of nicotine dependence should be used. Nonnemaker, McNeely & Blum (2006) suggest in their study another type of measurement. Cigarette smoking was defined as a three-category variable based on the number of days students reported smoking cigarettes during the previous 30 days. These categorizations are motivated by stages in development of adolescent smoking (Mayhew, Flay & Mott, 2000). All these models assume that developmental stages of smoking onset exist. However, there are some differences in stages definitions and terminology. In study of Nonnemaker et al. (2006) no cigarette use was defined as not having smoked in the past 30 days. Experimental smoking was defined as having smoked on 1 – 19 days, regular smoking as having smoked on 20 – 30 days of the previous 30 days. These categorization probably would fit the adolescent smoker more, because adolescents often have just began smoking and do not have established habits as measured in the Fagerström Test of Nicotine Dependence. Another explanation could be that the sample in the present study does not reflect a representative population. However, the mean score in the present study was 3.4 (SD 2.3) which resembles the mean score in the study of Collins & Moolchan (2006) among 572 adolescent smokers, which was 3.2 (SD 1.3).

Furthermore in this study, the objective was to reduce smoking to a maximum of five cigarettes a day. According to Simmons et al. (2005) a reduction to five cigarettes a day has been shown (for heavy smokers) to significantly affect the annual rate of decline in forced expiratory volume (FEV1). Presumably, at such low threshold of smoking amount, smokers are no longer able to compensate for the reduced intake of nicotine by changing their smoking technique. It is debatable whether or not this amount of cigarettes a day is reasonable for every smoker. When a heavy smoker reduces from twenty to five cigarettes, is this comparable to someone who smokes seven cigarettes a day and reduces to five? It seems easier to reduce a lower amount of cigarettes a day, because in this case withdrawal symptoms will be kept to a minimum. But should we take this into account for further research? Research should find a way in which the phenomenon of compensated smoking can be diminished, so people can reduce to for them reasonable amounts of cigarettes when cooperating in research. On the other hand, Hughes (2000) states that smoking causes morbidity and mortality in a dose-related manner, so it must follow that reducing smoking reduces risk. The less someone smokes, the more harm reduction will follow. In this case, everyone should reduce to an as low amount as possible, but in reality it probably is easier to realize an individually (for the smoker) suitable amount to reduce.

The objective of this study was to reach about 50 students. Unfortunately, only 27 students participated in the intervention. For most analyses, eight students were excluded, because they did not fill in the questionnaires at both times. The results are based on 19 participants. The participants were not very representative of the population; the number of participants was too low. Only trends could be described, but should be interpreted with care. Because of school exams and participation in other projects, many schools did not want to cooperate. That is why the project could better be done in the beginning of the school year.

The overall motivation was a problem in this project. In interventions about smoking cessation or smoking reduction, motivation from the participants is very important. When they are not motivated enough, they will give up earlier, especially when smoking is a mental and physical addiction to them. In this study, however, more than 1/3 of the students reduced their smoking. This could probably be attributed to the building on the experiences of the adolescents, by focusing on the finding from Johnson et al. (2004) that adolescents have a natural propensity to control their smoking. In this study we tried also motivating the adolescents by offering a reward for participating. However, observations turned out that there still was a lack of motivation among the students. Also, the participants could be absent

from the regular classes by participating in the project. This could also be seen as some kind of reward. It is possible that by giving them a reward for participating, the interest in the project and especially their own motivations has been undermined. However a difference should be made between intrinsic and extrinsic motivation. Intrinsic motivation originates in factors within a person. People are intrinsically motivated when they engage in an activity for the sake of their own interest, challenge, or enjoyment. In contrast, extrinsic motivation originates in factors outside the person. People then engage in an activity as a means to an end, for benefits like money, grades, or recognition etceteras. An 'overjustification effect' could appear; the tendency for intrinsic motivation to diminish for activities that have become associated with reward or other extrinsic factors. By offering a reward to the students, their intrinsic motivations could be undermined (Brehm, Kassin & Fein, 2002). It is possible that in this study, the natural propensity of adolescents to control their smoking behavior has been undermined by the rewards. By taking this in consideration, the result that 37% actually has reduced their smoking behavior tend to be very positive.

Another explanation for the failure of 2/3 of the students to reduce their smoking, could be '*ego depletion'*. This phenomenon includes the temporary exhaustion from the available energy a person has. Many studies report that people, who complete two successive control-tasks, perform worse on the second control-task. Self-control appeals to a central energy resource which is afterwards temporally exhausted (Alberts, Martijn & de Vries, 2006). Muraven, Tice & Baumeister (1998) propose the '*self-control strength model'*. The implication of this model is that many different forms of self-control draw on a common resource, or self-control strength, which is quite limited and hence can be depleted readily. When the adolescents have to face with another goal that requires self-control, the same resource that is necessary for smoke reduction could already be depleted. The success or failure of self-control depends on the person's level of self-control strength. Also, tasks that require more self-control are more affected by depletion than tasks that require less self-control. (Muraven & Baumeister, 2000). To resolve this problem, this kind of interventions probably could better be done in the beginning of the school year, or in school vacations. Reduction requires self-control and because many forms of self-control draw on a common resource, a for self-control quiet period can possibly improve results on smoking reduction. Also, it is remarkable that two students actually had quit smoking, while the objective of the intervention was to reduce smoking. It could be that reduced smoking requires more self-control than smoking cessation. When reduced, students have to control

themselves to smoke a few cigarettes a day and to not relapse in their old habits. Reduced smokers often have cigarettes with them and have to face situations in which they should explain why they are smoking at one time and not on another. With smoking cessation, people can just say that they have quitted. When having quitted, self-control will also be required, but probably not to the same extent as reduced smoking.

Conclusions and recommendations

In conclusion, the present study showed that adolescents *can* reduce their smoking behavior and even quit, when following an intervention aimed at smoking reduction. More than 1/3 of the students reduced their smoking, from which two students actually did quit when using a follow-up of four weeks. Also the CO-measurement support this finding, as well as the measured nicotine dependence among the students who reduced their smoking behavior. Building on the adolescents' own experiences and natural propensity to control their smoking behavior seemed to have a positive influence. Also, after the intervention their intention to quit smoking in the future has remained equal, so no negative influence on future quit attempts were evoked because of reduced smoking. This finding is positive, because smoking cessation still should be the ultimate objective of any smoking reduction program. Reduction should serve as an intermediate effect to cessation, which can be drawn from this results. Some determinants did increase after the intervention and some remained equal, but due to the small amount of participants only trends could be described. Further research should be based on a larger population with a randomized controlled trial and concentrate on long-term effects of smoking reduction among adolescents. Also, more school directions should be considered. Most smokers were found in the lower secondary professional education direction, who seemed hard to motivate for the intervention. Perhaps this could be different at other school directions, so important differences could help to solve problem with motivation and reduction. The present study recommends CO-measurements as a feedback instrument. Students in this study were very enthusiastic about the CO monitor, so CO-measurements could stimulate students to reduce or quit smoking. Although no significant effects were found, the means of smoking behavior and CO-measurements both were lower at post-test. Probably a larger population could confirm these outcomes. Also, certain strategies could be used, although they should not be put in a manual for this age-group and education level. Maybe a CD-ROM will evoke more positive reactions, or some other medium that interests the adolescents. Finally, further research should consider other ways of measuring cigarette

smoking among adolescents, for example a categorization as described in Nonnemaker et al. (2006). The Fagerström test of nicotine dependence probably is not very suitable for adolescent smokers.

References

Alberts, H., Martijn, C. & de Vries, N.K. (2006). Over zelfcontrole: Voorbij de grenzen van beperkte energie. *De Psycholoog, 41(11),* 588-593.

Bandura, A. (1986). *Social foundations of thought and action: a social cognitive theory*. Englewood Cliffs: Prentice Hall.

Blanton, H., Gibbons, F.X., Gerrard, M., Conger, K.J. & Smith, G.E. (1997). The role of family and peers in the development of prototypes associated with health risks. *Journal of Family Psychology, 11,* 1-18.

Brehm, S.S., Kassin, S.M. & Fein, S. (2002). *Social Psychology* (5th ed.). Boston: Houghton Mifflin Company.

Collins, C.C. & Moolchan, E. T. (2006). Shorter time to first cigarette of the day in menthol adolescent cigarette smokers. *Addictive Behaviors, 31*, 1460-1464.

Crowley, T.J., Andrews, A.E., Cheney, J., Zerbe, G. & Petty, T.L. (1989). Carbon monoxide assessment of smoking in chronic obstructive pulmonary disease. *Addictive Behaviors, 14,* 493-502.

DeVries, H. (1993). *Determinanten van gedrag*. In V. Damoiseaux, H.T. van der Molen & G.J. Koks (Eds.), Gezondheidsvoorlichting en gedragsverandering (pp. 109-132). Assen: Van Gorcum.

DeVries, H., Dijkstra, M. & Kuhlman, P. (1988). Self-efficacy: The third factor besides attitude and subjective norm as a predictor of behavioural intentions. *Health Education Research, 3*, 273-282.

DeVries, H., Kok, G. & Dijkstra, M. (1990). Self-efficacy as a determinant of the onset of smoking and interventions to prevent smoking in adolescents. *European Perspectives in Psychology, 2,* 209-222.

Fagerström, K.O., Tejding, R., Westin, A. & Lunell, E. (1997). Aiding reduction of smoking with nicotine replacement medications: hope for the recalcitrant smoker? *Tobacco Control, 6*, 311-316.

Gerrard, M., Gibbons, F.X., Stock, M.L., Vande Lune, L.S. & Cleveland, M.J. (2005). Images of smokers and willingness to smoke among African American pre-adolescents: An application of the prototype/willingness model of adolescent risk behavior to smoking initiation. *Journal of Pediatric Psychology, 30(4),* 305-318.

Glasgow, R.E., Klesges, R.C., Klesges, L.M., Vasey, M.W. & Gunnarson, D.F. (1985). Long-term effects of a controlled smoking program: A 2½ year follow-up. *Behavior Therapy, 16*, 303-307.

Godtfredsen, N.S., Holst, C., Prescott, E., Vestbo, J. & Osler, M. (2002). Smoking reduction, smoking cessation, and mortality: A 16-year follow-up of 19,732 men and women from the Copenhagen Centre for Prospective Population Studies. *American Journal of Epidemiology, 156(11),* 994-1001.

Godtfredsen, N.S., Prescott, E., Osler, M. & Vestbo, J. (2001). Predictors of smoking reduction and cessation in a cohort of Danish moderate and heavy smokers. *Preventive Medicine, 33*, 46-52.

Guillon, M.S., Crocq, M.A. & Bailey, P.E. (2007). Nicotine dependency and self-esteem in adolescents with mental disorders. *Addictive Behaviors, 32*, 758-764.

Hamilton, G.R., Cross, D. & Resnicow, K. (2000). Occasional cigarette smokers: Cue for harm reduction smoking education. *Addiction Research, 8*, 419-437.

Heatherton, T.F., Kozlowski, L.T., Frecker, R.C. & Fagerström, K.O. (1991). The Fagerström test for nicotine dependence: A revision of the Fagerström Tolerance Questionnaire. *British Journal of Addictions, 86*, 1119-1127.

Henningfield, J.E., Stitzer, M.L. & Griffiths, R.R. (1980). Expired air carbon monoxide accumulation and elimination as a function of number of cigarettes smoked. *Addictive Behaviors, 14*, 493-502.

Hill, D., Weiss, D.J., Walker, D.L. & Jolley, D. (1988). Long-term evaluation of controlled smoking as a treatment outcome. *British Journal of Addiction, 83*, 203-207.

Hughes, J.R. (2000). Reduced smoking: an introduction and review of the evidence. *Addiction, 95* (Supplement 1), S3-S7.

Hughes, J.R., Cummings, K.M. & Hyland, A. (1999). Ability of smokers to reduce their smoking and its association with future smoking cessation. *Addiction, 94*(1), 109-114.

Jessor, R., Donovan, J.E. & Costa, F.M. (1991). *Beyond adolescence: problem behavior and young adult development*. Cambridge (England): Cambridge University Press.

Johnson, J.L., Kalaw, C., Lovato, C.Y., Baillie, L. & Chambers, N.A. (2004). Crossing the line: Adolescents' experiences of controlling their tobacco use. *Qualitative Health Research, 14(9),* 1276-1291.

Kok, G., DeVries, H., Muddle, A.N. & Strecher, V.J. (1991). Planned health education and the role of self-efficacy: Dutch research. *Health Education Research, 6*, 231-238.

Korte, J. (2006). Factoren van invloed op gecontroleerd rookgedrag bij jongeren. Bachelorthese, University of Twente.

Kumpfer, K.L. & Turner, C.W. (1991). The social ecology model of adolescent substance abuse: Implications for prevention. *International Journal of Addictions, 25*, 435-463.

Lantz, P.M., Jacobson, P.D., Warner, K.E., Wasserman, J., Pollack, H.A., Berson, J., et al. (2000). Investing in youth tobacco control: A review of smoking prevention and control strategies. *Tobacco Control, 9,* 47-63.

Mayhew, K.P., Flay, B.R. & Mott, J.A. (2000). Stages in development of adolescent smoking. *Drug and Alcohol Dependence, 59,*(Supplement 1), S61-S81.

Meyer, C., Rumpf, H.J., Schumann, A., Hapke, U. & John, U. (2003). Intentionally reduced smoking among untreated general population smokers: prevalence, stability, prediction of smoking behaviour change and differences between subjects choosing either reduction or abstinence. *Addiction, 98*, 1101-1110.

Muraven, M. & Baumeister, R.F. (2000). Self-Regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin, 126(2),* 247- 259.

Muraven, M., Tice, D.M. & Baumeister, R.F. (1998). Self-Control as limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology, 74(3)*, 774-789.

Nonnemaker, J, McNeely, C.A. & Blum, R.W. (2006). Public and private domains of religiosity and adolescent smoking transitions. *Social Science & Medicine, 62*, 3084- 3095.

Petraitis, J., Flay, B.R., Miller, T.Q. (1995). Reviewing theories of adolescent substance use: Organizing pieces in the puzzle. *Psychological Bulletin, 117(1),* 67-86.

Pieterse, M. (2000). Tabaksgebruik door jeugdigen. In Keijsers, J.F.E.M, & Vaandrager, L. (eds.). *Gezond leven: -stand van zaken en voorstel voor programmering (HII.7; pp 161-188)*. Den Haag: ZorgOnderzoek Nederland.

Rijksinstituut voor Volksgezondheid en Milieu (2005). Hoeveel mensen roken? Retrieved October 10th, 2006 from http://www.rivm.nl.

Rijksinstituut voor Volksgezondheid en Milieu (2005). Roken: kort en bondig. Retrieved October 10th, 2006 from http://www.rivm.nl.

Simmons, M.S., Connett, J.E., Nides, M.A., Lindgren, P.G., Kleerup, E.C., Murray, R.P. et al. (2005). Smoking reduction and the rate of decline in FEV1: results from the Lung Health Study. *European Respiratory Journal, 25(6),* 1011-1017.

Spijkerman, R., van den Eijnden, R.J.J.M., Vitale, S., Engels, R.C.M.E. (2004). Explaining adolescents' smoking and drinking behavior: The concept of smoker and drinker prototypes in relation to variables of the theory of planned behavior. *Addictive Behaviors, 29*, 1615-1622.

Stivoro (2005). Roken, de harde feiten. Retrieved October 10th , 2006 from http://www.stivoro.nl.

Sussman, S., Dent, C.W., Severson, H., Burton, D. & Flay, B.R. (1998). Self-initiated quitting among adolescent smokers. *Preventive Medicine, 27*, A19-A28.

West, R. (2000). Addressing regulatory barriers to licensing nicotine products for smoking reduction. *Addiction, 95* (Supplement 1), S29-S34.

Willemsen, M.C. (1999). Nicotineverslaving: is harm reduction mogelijk en wenselijk? *Tijdschrift voor Alcohol, Drugs en andere Psychotrope stoffen, 24*, 57-73.

Appendix A: Questionnaire

Vragenlijst 'Minderen met roken bij adolescenten'

2006

Dit onderzoek wordt uitgevoerd door studenten psychologie in opdracht van de Universiteit Twente

Uitleg van de vragenlijst

Dit is een vragenlijst over minderen met roken en allerlei dingen die daarmee te maken hebben. Dankzij jouw medewerking hopen we straks een beter beeld te krijgen over minderen met roken.

Op de vragenlijst staat een nummer dat gekoppeld gaat worden aan jouw naam. Dit is nodig om de antwoorden van deze keer te koppelen aan de antwoorden van een eventueel vervolgonderzoek. Niemand, dus ook niet je ouders, leraren of klasgenoten, zal te weten komen wat jij hebt ingevuld.

Het invullen van de vragen

- Lees alle vragen goed en sla geen vragen over.
- Kruis bij elke vraag 1 antwoord aan.
- Vul de vragenlijst met pen in.

Je geeft het antwoord aan door een kruisje te zetten in het hokje dat past bij jouw antwoord.

Bijvoorbeeld: Hoe vaak luister je naar de radio?

- nooit
- af en toe
- regelmatig
- altijd

Veel succes met invullen en alvast bedankt voor het meedoen!

A. Algemene Vragen

Vraag 1. Ben je een...			
☐	Jongen	☐	Meisje

Vraag 2. Wat is je leeftijd?
Leeftijd: .. jaar

Vraag 3. In welke klas zit je?	
☐	Tweede klas
☐	Derde klas
☐	Vierde klas

Vraag 4. In wat voor soort klas zit je nu?	
☐	Theoretische Leerweg
☐	Gemengde leerweg
☐	Kaderberoepsgerichte leerweg
☐	Basisberoepsgerichte leerweg

B) Roken

Vraag 5. Welk van de volgende uitspraken past het beste bij jou? (je mag maar één hokje aankruisen)	
☐	Ik rook tenminste één keer per dag.
☐	Ik rook niet dagelijks, maar tenminste één keer per week.
☐	Ik rook niet wekelijks, maar tenminste één keer per maand.
☐	Ik rook minder dan één keer per maand.
☐	Ik probeer roken af en toe uit.
☐	Ik ben gestopt nadat ik een tijd minstens één keer per week heb gerookt.
☐	Ik ben gestopt, ik rookte altijd minder dan één keer per week.
☐	Ik heb roken wel eens uitgeprobeerd, maar ik rook nu niet meer.
☐	Ik heb nooit gerookt, zelfs niet één trekje.

Vraag 6. Hoe lang rook je al?	
☐	Minder dan een half jaar
☐	Tussen een half jaar en één jaar
☐	Tussen één jaar en twee jaar
☐	Langer dan twee jaar

Vraag 7. Hoeveel sigaretten of shagjes heb je in de laatste vier weken per dag gerookt?	
☐	0-10
☐	11-20
☐	21-30
☐	31 of meer

Vraag 8. Rookte je de afgelopen vier weken meer, evenveel of minder dan in het half jaar daarvoor?	
☐	Meer
☐	Evenveel
☐	Minder

Vraag 9. Hoe lang nadat je 's ochtends wakker wordt steek je je eerste sigaret of shagje op?	
☐	Binnen 5 minuten
☐	6-30 minuten
☐	31-60 minuten
☐	Na 60 minuten

Vraag 10. Vind je het moeilijk om niet te roken op plaatsen waar het verboden is? (bijvoorbeeld bioscoop, bibliotheek, kerk, school, ziekenhuis)	
☐	Ja
☐	Nee

Vraag 11. Welke sigaret of welk shagje zou je het moeilijkst kunnen opgeven?	
☐	De eerste 's morgens
☐	Een andere

Vraag 12. Rook je in de eerste uren na het opstaan meer per uur, dan tijdens de rest van de dag?	
☐	Ja
☐	Nee

Vraag 13. Rook je als je ziek bent en het grootste deel van de dag in bed ligt?	
☐	Ja
☐	Nee

Vraag 14 Denk je dat je <u>in de toekomst</u> zult gaan stoppen met roken?				
Zeker niet	Waarschijnlijk niet	Misschien	Waarschijnlijk wel	Zeker wel
☐	☐	☐	☐	☐

Vraag 15. Stel, je bent <u>geminderd met roken</u>. Hoeveel sigaretten of shagjes rook je dan per dag?
…… sigaretten of shagjes

Vraag 16. Zou je willen minderen tot maximaal 5 sigaretten of shagjes per dag?				
Zeker niet	Waarschijnlijk niet	Misschien	Waarschijnlijk wel	Zeker wel
☐	☐	☐	☐	☐

De volgende vragen gaan over minderen met roken. Hiermee wordt bedoeld dat je <u>tenminste de helft minder gaat roken</u> dan dat je nu doet. Stel, je rookt nu 20 sigaretten of shagjes per dag. Als je zou minderen zou dat betekenen dat je dan maximaal 10 sigaretten of shagjes per dag rookt.

Vraag 17. Denk je dat je...

	Zeker niet	Waar-schijnlijk niet	Misschien	Waar-schijnlijk wel	Zeker wel
a) ... binnen vier weken zult stoppen met roken.	☐	☐	☐	☐	☐
b) ...binnen vier weken zult gaan minderen met roken (dus tenminste de helft minder roken dan nu).	☐	☐	☐	☐	☐
c) ...binnen een half jaar zult gaan minderen met roken.	☐	☐	☐	☐	☐

Vraag 18. <u>Minderen met roken</u> vind ik voor mezelf…

(kruis bij elke regel het hokje aan dat jouw mening het beste weergeeft)

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Normaal	☐	☐	☐	☐	☐
b) Plezierig	☐	☐	☐	☐	☐
c) Onschadelijk	☐	☐	☐	☐	☐
d) Ongevaarlijk	☐	☐	☐	☐	☐
e) Gezond	☐	☐	☐	☐	☐
f) Goed	☐	☐	☐	☐	☐

g) Gezellig	□	□	□	□	□
h) Slim	□	□	□	□	□
i) Goedkoop	□	□	□	□	□
j) Beter voor mijn conditie	□	□	□	□	□

Vraag 19. Hoe denk je over iemand van jouw leeftijd die is <u>geminderd met roken</u>?

Geef hieronder aan of deze kenmerken volgens jou passen bij iemand van JOUW LEEFTIJD die <u>is geminderd</u> met roken (Kruis bij elk kenmerk het hokje aan dat bij jouw antwoord hoort)

Ik vind dat hij/zij…

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Cool is	□	□	□	□	□
b) Er stoer uit ziet	□	□	□	□	□
c) Aan zijn/haar toekomst denkt	□	□	□	□	□
d) Gezond is	□	□	□	□	□
e) Brutaal is	□	□	□	□	□
f) Lef heeft	□	□	□	□	□
g) Goed zijn/haar best doet op school	□	□	□	□	□
h) Veel geld uitgeeft	□	□	□	□	□
i) Vaak verkering heeft	□	□	□	□	□
j) Interessant is	□	□	□	□	□

Vervolg vraag 19. Hoe denk je over iemand van jouw leeftijd die is <u>geminderd met roken</u>?

(Kruis bij elk kenmerk het hokje aan dat bij jouw antwoord hoort)

Ik vind dat hij/zij…

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
k) Sportief is	☐	☐	☐	☐	☐
l) Gezellig is	☐	☐	☐	☐	☐
m) Weinig thuis is	☐	☐	☐	☐	☐
n) Bij de groep hoort	☐	☐	☐	☐	☐
o) Goed naar zijn/haar ouders luistert	☐	☐	☐	☐	☐
p) Veel zelfvertrouwen heeft	☐	☐	☐	☐	☐
q) Van het leven geniet	☐	☐	☐	☐	☐
r) Veel vrienden heeft	☐	☐	☐	☐	☐
s) Eerlijk is	☐	☐	☐	☐	☐
t) Populair is	☐	☐	☐	☐	☐

Vraag 20. Bij deze vraag ga je ervan uit dat je bent <u>geminderd met roken</u>.

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Zelf niet roken als mijn vrienden wel roken, is voor mij heel moeilijk.	☐	☐	☐	☐	☐
b) Een sigaret of shagje weigeren als	☐	☐	☐	☐	☐

ik die aangeboden krijg, is voor mij heel moeilijk.					

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
c) Blijvend minderen met roken is voor mij heel moeilijk	□	□	□	□	□
d) Een goede reden bedenken om een sigaret of shagje te weigeren, is voor mij heel moeilijk	□	□	□	□	□
e) Bijhouden hoeveel ik al heb gerookt is moeilijk voor mij	□	□	□	□	□

Vraag 21a. In mijn klas zijn veel jongens en meisjes die roken.

Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
□	□	□	□	□

Vraag 21b. Veel vrienden en vriendinnen van mij roken.

Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
□	□	□	□	□

Vraag 22a. Ik heb wel eens het gevoel dat mijn beste vrienden of vriendinnen willen dat ik <u>minder met roken</u>.

Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
□	□	□	□	□

Vraag 22b. Ik heb wel eens het gevoel dat mijn beste vrienden of vriendinnen willen dat ik stop met roken.

Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
□	□	□	□	□

Vraag 22c. Ik heb wel eens het gevoel dat mijn klasgenoten willen dat ik <u>minder met roken.</u>

Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
□	□	□	□	□

Vraag 22d. Ik heb wel eens het gevoel dat mijn klasgenoten willen dat ik stop met roken

Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
□	□	□	□	□

Vraag 23. Als ik ben <u>geminderd met roken</u>, dan vinden <u>mijn beste vrienden en/of vriendinnen</u> dat…

(kruis bij elke regel het hokje aan dat de mening van jouw beste vrienden en/of vriendinnen het beste weergeeft)

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Normaal	□	□	□	□	□
b) Goed	□	□	□	□	□
c) Gezellig	□	□	□	□	□

Vraag 24. Als ik ben <u>geminderd met roken</u>, dan vinden <u>mijn klasgenoten</u> dat...

(kruis bij elke regel het hokje aan dat de mening van je klasgenoten het beste weergeeft)

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Normaal	□	□	□	□	□

b) Goed	□	□	□	□	□
c) Gezellig	□	□	□	□	□

C) Overige vragen

De volgende vragen gaan over ouders/verzorgers en broers/zussen.

Als je geen vader of moeder meer hebt, vul dan 'heb ik niet' in. Als je niet bij je biologische ouders woont, maar bijvoorbeeld in een pleeggezin, denk dan bij het beantwoorden van de vragen aan de mensen bij wie je nu woont. Als je geen broers en/of zussen hebt, vul dan ook 'heb ik niet' in.

Vraag 25. Rookt je moeder?

☐	Nee, mijn moeder heeft nooit gerookt.
☐	Nee, mijn moeder heeft vroeger wel gerookt, maar ze rookt nu niet meer
☐	Ja, mijn moeder rookt af en toe wel eens.
☐	Ja, mijn moeder rookt dagelijks 1-5 sigaretten of shagjes
☐	Ja, mijn moeder rookt dagelijks 6-15 sigaretten of shagjes
☐	Ja, mijn moeder rookt dagelijks meer dan 15 sigaretten of shagjes
☐	Heb ik niet → ga door naar vraag 27

Vraag 26. Als ik ben <u>geminderd met roken,</u> dan vindt <u>mijn moeder</u> dat…

(kruis bij elke regel het hokje aan dat de mening van jouw moeder het beste weergeeft)

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Normaal	☐	☐	☐	☐	☐
b) Goed	☐	☐	☐	☐	☐
c) Gezellig	☐	☐	☐	☐	☐
d) Gezond	☐	☐	☐	☐	☐

Vraag 27. Rookt je vader?	
☐	Nee, mijn vader heeft nooit gerookt.
☐	Nee, mijn vader heeft vroeger wel gerookt, maar hij rookt nu niet meer.
☐	Ja, mijn vader rookt af en toe wel eens.
☐	Ja, mijn vader rookt dagelijks 1-5 sigaretten of shagjes.
☐	Ja, mijn vader rookt dagelijks 6-15 sigaretten of shagjes.
☐	Ja, mijn vader rookt dagelijks meer dan 15 sigaretten of shagjes.
☐	Heb ik niet → ga door naar vraag 29.

Vraag 28. Als ik ben geminderd met roken, dan vindt mijn vader dat…

(kruis bij elke regel het hokje aan dat de mening van jouw vader het beste weergeeft)

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Normaal	☐	☐	☐	☐	☐
b) Goed	☐	☐	☐	☐	☐
c) Gezellig	☐	☐	☐	☐	☐
d) Gezond	☐	☐	☐	☐	☐

Vraag 29. Hoeveel broers/zussen heb je?	
☐	Eén broer of zus
☐	Twee broers en/of zussen
☐	Drie broers en/of zussen
☐	Vier of meer broers en/of zussen
☐	Heb ik niet → ga door naar vraag 32.

Vraag 30. Roken je broer(s) en/of zus(sen)? Mijn broer/ zus …

(Bij deze vraag kun je per broer of zus het antwoord invullen. Heb je 1 broer of zus, dan vul je alleen de eerste kolom in. Heb je meer dan 3 broer(s) en/of zus(sen), vul dan de antwoorden in voor je oudste broers en/of zussen)

	Broer/ zus 1		**Broer/ zus 2**		**Broer/ zus 3**
☐	Heeft nooit gerookt	☐	Heeft nooit gerookt	☐	Heeft nooit gerookt
☐	Heeft vroeger gerookt, nu niet meer	☐	Heeft vroeger gerookt, nu niet meer	☐	Heeft vroeger gerookt, nu niet meer
☐	Rookt af en toe wel eens	☐	Rookt af en toe wel eens	☐	Rookt af en toe wel eens
☐	Rookt dagelijks 1-5 sigaretten of shagjes	☐	Rookt dagelijks 1-5 sigaretten of shagjes	☐	Rookt dagelijks 1-5 sigaretten of shagjes
☐	Rookt dagelijks 6-15 sigaretten of shagjes	☐	Rookt dagelijks 6-15 sigaretten of shagjes	☐	Rookt dagelijks 6-15 sigaretten of shagjes
☐	Rookt dagelijks meer dan 15 sigaretten of shagjes	☐	Rookt dagelijks meer dan 15 sigaretten of shagjes	☐	Rookt dagelijks meer dan 15 sigaretten of shagjes

Vraag 31. Als ik ben <u>geminderd met roken</u> dan, vinden <u>mijn broer(s) en/of zus(sen)</u> dat…
(kruis bij elke regel het hokje aan dat de mening van jouw broer(s) en/of zus(sen) het beste weergeeft. Wanneer ze niet dezelfde mening hebben, geef dan de mening van degene waar jij je het meest van aantrekt)

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Normaal	☐	☐	☐	☐	☐
b) Goed	☐	☐	☐	☐	☐
c) Gezellig	☐	☐	☐	☐	☐
d) Gezond	☐	☐	☐	☐	☐

Vraag 32. Hieronder staan nog een aantal uitspraken. Kun je aangeven of deze uitspraken bij jou passen?
(Kruis bij elke uitspraak het hokje aan dat bij jouw antwoord hoort)

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Als ik iets leuk vind, dan doe ik het gewoon, ook als ik hierdoor in de problemen kom.	☐	☐	☐	☐	☐
b) Ik voel me onprettig als ik iets doe wat niet mag.	☐	☐	☐	☐	☐
c) Ik vind het spannend om dingen te doen waar mensen van opkijken.	☐	☐	☐	☐	☐

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
d) Ik vind het leuk om moeilijk of lastig te zijn.	□	□	□	□	□
e) Ik doe geen dingen die me in problemen kunnen brengen.	□	□	□	□	□
f) Als mij iets verboden wordt, heb ik juist de neiging om het wel te doen.	□	□	□	□	□
g) Ik vind het leuk om dingen te doen die niet mogen.	□	□	□	□	□

Vraag 33. Welke eigenschappen vind jij bij JOU zelf passen?

(Kruis bij elke eigenschap het hokje aan dat bij jouw antwoord hoort)

Ik vind van mezelf dat ik...

	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
a) Cool ben	□	□	□	□	□
b) Er stoer uit zie	□	□	□	□	□
c) Aan mijn toekomst denk	□	□	□	□	□
d) Gezond ben	□	□	□	□	□
e) Brutaal ben	□	□	□	□	□
f) Lef heb	□	□	□	□	□
g) Goed mijn best doe op school	□	□	□	□	□
h) Veel geld uitgeef	□	□	□	□	□
i) Vaak verkering heb	□	□	□	□	□
j) Interessant ben	□	□	□	□	□

Vervolg vraag 33. Ik vind van mezelf dat ik...					
	Helemaal mee oneens	Mee oneens	Weet ik niet	Mee eens	Helemaal mee eens
k) Sportief ben	□	□	□	□	□
l) Gezellig ben	□	□	□	□	□
m) Weinig thuis ben	□	□	□	□	□
n) Bij de groep hoor	□	□	□	□	□
o) Goed naar mijn ouders luister	□	□	□	□	□
p) Veel zelfvertrouwen heb	□	□	□	□	□
q) Van het leven geniet	□	□	□	□	□
r) Veel vrienden heb	□	□	□	□	□
s) Eerlijk ben	□	□	□	□	□
t) Populair ben	□	□	□	□	□

Opmerkingen

Als je nog opmerkingen hebt over het onderzoek of de vragenlijst dan kun je die hieronder kwijt.

……

……

……

……

……

……

……

Je bent nu klaar met het invullen van de vragenlijst. Wil je voor de zekerheid nagaan of je alle vragen hebt ingevuld?

Hartelijk dank voor je medewerking!

Appendix B: Manual and Diary/ Logbook

Minderen met roken

onder jongeren van 14 - 16 jaar

– –

Handleiding voor de deelnemers

April 2006

Voorwoord

Fijn dat je bereid bent je rookgedrag te verminderen. Alvast bedankt voor je medewerking! Het is niet alleen beter voor je gezondheid, maar je draagt nu ook bij aan wetenschappelijk onderzoek! Jullie kunnen nu iets betekenen voor het onderzoek op het gebied van roken. Daarnaast valt dit onderzoek onder het afstuderen van mijn opleiding aan de Universiteit Twente en hoop ik met dit onderzoek mijn studie goed af te ronden. Ik ben daar vierdejaars studente aan de opleiding 'Psychologie' in de richting 'Veiligheid en Gezondheid', waar dit onderzoek goed binnen past.

Tijdens dit onderzoek zul je proberen je rookgedrag te verminderen tot maximaal vijf sigaretten per dag. Je kunt dus blijven roken, alleen minder dan je gewend bent. Het onderzoek duurt vier weken en zal beginnen op 25 april 2006. In deze periode kom je drie keer naar een bijeenkomst voor het uitwisselen van ervaringen, het invullen van een korte vragenlijst, het inleveren van het 'rookdagboek' en de afname van CO-metingen (longinhoud). Hoe dit allemaal in zijn werk gaat lees je in deze handleiding. Het geeft achtergrondinformatie over het onderzoek, het programma van het onderzoek en nuttige informatie en tips over het minderen met roken die je tijdens het onderzoek nog eens rustig kunt nalezen.

Daarnaast vind je achter in de handleiding een 'rookdagboek', waarin je je eigen rookgedrag moet bijhouden. Zo kun je zelf de vooruitgang bekijken!

Ik wens jullie veel succes en sterkte bij het minderen van roken. Ik hoop samen met jullie meer te weten te komen over het minderen van roken. Daarnaast kunnen jullie ook nog een beloning ontvangen. Onder de serieuze deelnemers zal 4 keer een bon van 20 euro worden verloot. Dus laten we hopen op een goed en succesvol onderzoek!

Met vriendelijke groet,

Rilana Prenger

1. Het onderzoek

Er zijn al veel onderzoeken gedaan naar de mogelijkheden, kansen en gevolgen van stoppen met roken. Er is echter nog maar weinig bekend over de mogelijkheden en gevolgen van *minder* roken. Er wordt voorspelt dat minder roken een positieve invloed heeft op de gezondheid. Elke sigaret minder levert winst op voor de gezondheid, omdat het in ieder geval geen verdere schade aanbrengt. Daarnaast zijn er nog veel meer voordelen te noemen van het minderen met roken.

In dit onderzoek wordt gekeken of minderen van roken ook echt kan lukken, en op welke manieren dit het beste kan. Er wordt namelijk vaak gesproken over dat je alleen kunt stoppen, en dat minderen met roken sowieso niet lukt. De verleiding zou hierdoor te groot worden, waardoor je toch weer meer gaat roken. Samen met jullie wil ik onderzoeken of minderen met roken toch mogelijk is. Hierbij worden jullie meningen en ervaringen zeer op prijs gesteld. Er wordt jullie gevraagd vier weken lang je rookgedrag proberen te verminderen tot maximaal vijf sigaretten per dag. Om het makkelijker te maken, staan in deze handleiding verschillende strategieën beschreven die je kunnen helpen bij het minderen van roken. In totaal zullen er drie bijeenkomsten plaatsvinden. Hieronder staat in een schema aangegeven wanneer deze bijeenkomsten zijn. In deze bijeenkomsten gaan er een aantal dingen gebeuren. In de eerste en de laatste bijeenkomst wordt jullie gevraagd een korte vragenlijst in te vullen. Hiernaast zal in alle bijeenkomsten jullie uitgeademde lucht worden gemeten aan de hand van een CO-meting. Met deze meting kunnen we bekijken hoeveel sigaretten jij hebt gerookt. De koolmonoxide (CO) wordt hier gemeten in je uitgeademde lucht. Dus het is vooral belangrijk dat je eerlijk blijft over het aantal sigaretten die je rookt. Er wordt jullie namelijk ook gevraagd een ‘rookdagboek’ bij te houden. Deze is te vinden achter in de handleiding. Per dag moet het aantal gerookte en geplande sigaretten worden ingevuld. Daarnaast ben ik erg benieuwd welke strategieën jullie gebruiken om je rookgedrag te verminderen. Tenslotte wordt jullie in de bijeenkomsten gevraagd ervaringen uit te wisselen en jullie mening te geven.

Als je niet wilt dat je ouders of je leraren weten dat je rookt, is dat geen probleem. Zij hoeven niet te weten dat je meedoet aan dit onderzoek. Je gegevens worden anoniem verwerkt, zodat je naam niet terechtkomt bij personen die het niet mogen weten.

Na dit onderzoek hopen we meer te weten zijn gekomen over de mogelijkheden om te minderen met roken en welke strategieën hierbij kunnen helpen. Jullie kunnen hieraan een belangrijke bijdrage leveren. Heb je ideeën over bepaalde strategieën of heb je een mening over het minderen met roken, laat je dan horen tijdens de bijeenkomsten! Onder de deelnemers wordt 7 keer een bon van 20 euro verloot. Je moet dan wel serieus het dagboek bijhouden en naar de bijeenkomsten komen. Mocht het je niet lukken om 5 sigaretten per dag te roken, wees niet gevreesd, elke sigaret minder levert winst op!

	Week 1	**Week 2**		**Week 3**	**Week 4**	
1e bijeenkomst			2e bijeenkomst			3e bijeenkomst
Uitleg dagboek	Dagboek	Dagboek	Inleveren dagboek	Dagboek	Dagboek	Inleveren dagboek
CO-meting			CO-meting			CO-meting
Vragenlijst						Vragenlijst
Vragen?			Ervaringen			Ervaringen

2. Verschillende reductietechnieken

Hieronder volgt een lijst met strategieën of technieken om je te helpen je rookgedrag te verminderen. Je kunt van tevoren één of meerdere strategieën uitkiezen, waarmee je in de periode van vier weken gaat werken. Misschien heb je zelf nog een beter idee, noteer deze dan in de laatste rij van het dagboek en vermeld deze in de bijeenkomsten. Lees de strategieën eerst rustig door en bedenk welke strategie het beste bij jou past. Het is een goed idee om met de eerste twee strategieën te beginnen. De eerste kun je gebruiken om voor jezelf te weten hoeveel sigaretten je nu eigenlijk rookt. Met de tweede strategie kun je je rookpatroon langzaam afbouwen.

1. Er bewust mee bezig zijn

Om bewust met het roken bezig te zijn, kun je op de eerste dagen beter eerst bekijken hoeveel sigaretten je nu eigenlijk rookt. Dit kan door middel van het rookdagboek in te vullen. Zodra je ziet hoeveel je eigenlijk rookt, kun je bepalen hoeveel je moet minderen om tot vijf sigaretten per dag te komen. Om tot dit aantal te komen is het handig om de tweede strategie te gebruiken.
Ook kun je bewust met de verandering van je rookgedrag bezig zijn door er veel over te praten. Dit praten gebeurt sowieso tijdens de bijeenkomsten tijdens het onderzoek, maar praat er ook met andere mensen over. Dit kun je doen met je leeftijdsgenoten, maar ook met je ouders of andere personen.

2. Telkens één sigaret van je rookpatroon wegstrepen

Misschien had je een vast patroon waarop je je sigaretten rookte. Door af en toe één sigaret van je patroon weg te strepen, is dit een goede manier om minder te roken. Zo kun je bijvoorbeeld ’s ochtends in de pauze niet meer roken of na het eten geen sigaret roken. Door elke week een vast aantal van je sigaretten weg te strepen, zal je na een tijdje veel minder roken.

3. Maak een lijstje met nadelen van het roken

Iedereen weet dat er nadelen zitten aan roken. Maar welke nadelen voor jou het grootst zijn, verschilt per persoon. Om minder te gaan roken, kun je de nadelen van roken die jij het

belangrijkst vindt eens opschrijven. Misschien vind jij het niet zo belangrijk dat je huid sneller ouder wordt, maar wel dat roken veel geld kost. Als je trek hebt in een sigaret, kun je het lijstje met nadelen er eens bij pakken. Waarschijnlijk heb je dan minder zin in je sigaret. Je kunt daarentegen ook een lijstje maken met voordelen van het minderen met roken. Hierbij kun je denken aan je gezondheid, je portemonnee of de verslaving die je eigenlijk niet wilt hebben.

4. Slechts enkele trekjes van sigaret nemen

Bij deze techniek rook je elke sigaret voor de helft op en doe je deze weer terug in je pakje. Als je dan weer zin hebt in een sigaret, kun je de andere helft oproken. Op deze manier kun je je rookgedrag verminderen tot de helft.

5. Niet meer in huis roken

Door met jezelf af te spreken niet meer in huis te roken, rook je automatisch minder. Je zult nu minder snel een sigaret opsteken en er meer over na denken. Als je een sigaret wilt roken, moet je namelijk eerst uit je 'luie' stoel komen.

Als je niet meer in huis rookt, heb je daar ook geen rookaccessoires meer nodig. Asbakken, aanstekers, sigaretten, shag enzovoorts kunnen je alleen maar aan roken herinneren en de zin in een sigaret groter maken. Ruim dus alles op wat met roken te maken heeft en leg je sigaretten bij de deur waar je naar buiten kan.

Misschien helpt het ook als je een poosje niet meer op de plaats komt, waar je anders je sigaretje rookte in huis. Doordat je er aan gewend bent, zal die plek de zin in een sigaret vergroten. Ga deze plek dus in het begin uit de weg, zodat het minder moeilijk wordt de nieuwe plek te verlaten voor het roken van de sigaret.

6. Steun van anderen

Steun van anderen kan helpen om minder te gaan roken. Je kunt tegen je klasgenoten, ouders, vrienden, vriendinnen, teamgenoten vertellen dat je bent geminderd met roken. Vraag hen eens wat ze ervan vinden en laat hen weten dat je het leuk van vinden als ze je hierbij zouden helpen. Als je het moeilijk vindt om niet te roken als andere mensen wel roken, kun je hen ook vragen niet te roken waar jij bij bent. De mensen om je heen kunnen je vervolgens aanmoedigen een bepaalde sigaret niet op te steken, complimentjes geven als het goed gaat en motiveren om je geminderde rookgedrag vol te houden.

Een andere techniek is om *niemand* te vertellen dat je wilt gaan minderen met roken. Vooral bij minderen met roken, in tegenstelling tot stoppen, kunnen mensen het vaak niet begrijpen waarom je het ene moment geen sigaret rookt en het andere moment weer wel. Om niet telkens te hoeven uitleggen dat je minder rookt en niet bent gestopt, is het een manier om juist niemand te vertellen over je plannen.

7. Op vaste tijden roken

Je kunt ook je sigaret op een vaste tijd roken. Het aantal sigaretten kun je gelijkmatig over de dag verdelen door de sigaretten op een vaste tijd te roken. Zo kun je bijvoorbeeld alleen in de schoolpauzes roken en er 's avonds nog eentje nemen. Je kunt het aantal sigaretten die je nu rookt door twee delen en dan bepalen om welke tijd je die wilt roken. Ook kun je maar een paar sigaretten per dag meenemen als je weggaat, zodat je ook niet meer kunt roken. Je zult na een poosje gaan wennen aan de tijden waarop je je sigaret rookt, waardoor het minderen na een tijdje geen probleem (meer) is.

8. Niet meer op de fiets roken

Ook het niet meer roken op de fiets kan je rookgedrag verminderen. Veel jongeren steken op de fiets nog even een sigaretje op. Deze zijn vaak niet echt 'lekker' en brandt erg snel op. Door niet meer op de fiets te roken, zul je al een paar sigaretten per dag minder roken.

9. Rookruimtes/ rokers vermijden

Als je rokende mensen ziet, heb je vaak sneller zin in een sigaret. Door rookruimtes op school, het station enz. te vermijden, kan je dit voorkomen. Je kunt bijvoorbeeld in de pauze binnen blijven, zodat je minder snel zin hebt in een sigaret. Ook door op feestjes met niet-rokers te praten, zul je minder snel een sigaret opsteken

10. Bij weggaan van huis de tabak thuis laten liggen

Je kunt ook minder roken door je sigaretten bij het verlaten van huis thuis laten liggen. De sigaretten op de fiets en op school worden dan niet meer gerookt. Je moet dan wel sterk zijn om geen sigaretten van anderen aan te nemen. Misschien is dit ook niet zo moeilijk, omdat anderen vaak een andere merk sigaretten roken die jij niet zo lekker vindt. Als je het moeilijk hebt, kun je denken aan de sigaret die je thuis weer gaat roken. Probeer wel met jezelf af te spreken dat je er dan één rookt.

11. Hulpmiddelen

Je kunt ervoor kiezen om het minderen makkelijker te maken door het gebruik van nicotinetabletten, nicotinepleisters of nicotinekauwgom. Misschien ben je dit ook wel niet nodig, doordat je geen ontwenningsverschijnselen hebt. De hulpmiddelen houden het nicotinegehalte op niveau, zodat je geen ontwenningsverschijnselen zult hebben. Het is wel belangrijk dat je na een paar weken ook gaat minderen met deze hulpmiddelen, zodat de trek in een sigaret ook langzaam minder wordt. Een nadeel is wel dat je dit zelf zult moeten betalen, als je de hulpmiddelen wilt gebruiken.

12. Het roken telkens uitstellen door bijv. naar buiten te gaan

Elke sigaret kun je ook op een later moment roken. Als je dit de hele dag volhoudt, zul je per dag minder roken. Dit uitstellen kan gedaan worden door wat anders te gaan doen. Je kunt bijvoorbeeld je huiswerk gaan maken, gaan sporten, met vrienden bellen, maar je kunt ook even naar buiten gaan (zonder sigaretten of shag). Je bent dan in de frisse buitenlucht en je kunt afleiding zoeken in de dingen die op straat gebeuren. Probeer telkens andere afleidingen te zoeken en schrijf deze op. Als je dan weer zin hebt in een sigaret, kun je het lijstje met afleidingen erbij pakken om zo weer een sigaret uit te stellen.

13. Zorg dat je kauwgom of lollies bij je hebt

Als je zin hebt in een sigaret, geeft het een vervelend gevoel als je er geen één kunt roken. Daarom kun je op zo'n moment ook een kauwgompje nemen of een lolly eten. Op deze manier heb je toch wat in je mond, waarbij je dan geen sigaret kunt roken. Het geeft afleiding tot de zin om een sigaret te roken, en het 'lege' gevoel blijft uit. Als je helemaal gezond wilt doen, kun je natuurlijk ook een stuk fruit eten.

14. Ga niet meer 'bietsen'

Het is verleidelijk om een sigaret aan een ander te vragen, als je eigen sigaretten op zijn. Om minder te roken, kun je dit 'bietsen' ook niet meer doen. Rook alleen uit je eigen pakje, en als deze op is, rook je gewoon even niet. Het is vervelend om telkens een ander te vragen om een

sigaret. Daarom is dit ook een makkelijke manier om minder te roken, vooral omdat je simpelweg gewoon geen sigaretten meer hebt.

15. Spaar je sigaretten op, zodat je de volgende dag meer kunt roken

Er zijn altijd dagen waarop je meer rookt dan anders. Hierbij kun je denken aan dagen waarop je uitgaat, een verjaardag hebt of met vrienden op stap gaat. Op deze momenten is het moeilijk om geen sigaret op te steken. Je vrienden en kennissen om je heen roken wel, terwijl jij juist minder wilt roken. Daarom is het een manier om de dag ervoor of erna nog minder te roken. Je 'spaart' je sigaretten eigenlijk op, om het volgende moment weer wat meer te roken. Zo blijft je rookgedrag toch nog in evenwicht en kun je blijven minderen met roken.

16. Bewaar je laatste sigaretten tot het einde van de dag

Het is een goed idee om de laatste sigaretten van de dag uit te stellen tot het moment vlak voor het slapen gaan. Als je aantal sigaretten die je wilde roken op die dag op zijn, krijg je vaak een behoefte om te roken, alleen door eraan te denken dat je sigaretten op zijn. Bewaar je een aantal sigaretten tot het einde van de dag, dan zul je hier geen problemen mee hebben.

17. Beloon jezelf

Als je minder rookt, zul je ook meer geld overhouden. Je hoeft niet zoveel sigaretten te kopen, dus het geld kun je voor iets anders gebruiken. Misschien is er wel iets wat je graag wilt hebben, zoals bijvoorbeeld een CD van je favoriete popgroep, een concertkaartje, of een kaartje voor de voetbalwedstrijd van je favoriete club. Het geld dat je overhoudt, door minder te roken, kun je opsparen zodat je uiteindelijk jezelf kunt belonen voor het minderen van roken.

18. Zoek kleine bezigheden die je helpen te ontspannen

Als je aan het leren bent voor een toets of de hele middag aan je scooter of fiets sleutelt, ga je voor de afleiding vaak even een sigaret roken. Het geeft je het idee dat je even kunt ontspannen en dat je even wat afleiding hebt op momenten dat je je niet meer goed kunt concentreren. Zoek andere dingen waar je afleiding in kunt vinden. Je kunt hierbij denken aan

even tv kijken, een tijdschrift erbij pakken of even bellen naar je vrienden. Op deze manier doe je toch even wat anders, zonder dat je een sigaret hoeft te roken.

19. Geef niet op!

Het kan gebeuren dat het een aantal dagen niet (meer) lukt om te minderen met roken. Geef dan vooral niet op! Begin de volgende dag gewoon weer opnieuw met het minderen met roken en laat je niet ontmoedigen door die paar ‘slechte’ dagen. Elke sigaret minder is beter voor je gezondheid. Dus bedenk je dat je vooral niet bent mislukt in je poging om te minderen! Je hoeft niet weer van voren af aan te beginnen, je gaat gewoon verder waar je gebleven was.

Enkele tips en aanwijzingen

Compenserend rookgedrag

Wanneer iemand minder gaat roken, is het wel belangrijk dat je je sigaretten op dezelfde manier rookt, dan als je al deed. Een veel voorkomend probleem bij minderen met roken is het zogenaamde 'compenserende rookgedrag'. Hiermee wordt bedoeld dat mensen de neiging hebben om de rook dieper in te ademen en meer trekjes van de sigaret te nemen, als ze minderen met roken. Dit compenserende gedrag levert geen winst voor de gezondheid op, ook al rook je minder sigaretten op een dag! Belangrijk is om hier direct op te letten als je gaat minderen met roken. Je kunt je dit gedrag namelijk makkelijk aanleren en dat zou zonde zijn. Het is wel de bedoeling dat je gezondheid er op vooruit gaat, dus probeer hier op te letten.

Blowen

Het kan zijn dat je naast sigaretten, ook jointjes rookt. Let wel op dat hier ook tabak in zit! Elke joint geldt dan ook als een sigaret. Tel deze jointjes dus ook mee in het aantal sigaretten die je rookt per dag en probeer hier eventueel ook in te minderen. Maximaal vijf sigaretten per dag, betekent hier dus maximaal vijf sigaretten en/ of jointjes per dag.

3. Rookdagboek

Hieronder volgt het dagboek dat je vier weken lang tijdens het onderzoek moet bijhouden. Hierin kun je aangeven hoe het met je rookgedrag gaat. Het dagboek bestaat uit vier kolommen die je dagelijks moet bijhouden. Vragen die in het dagboek voorkomen zijn: hoeveel sigaretten heb je gerookt? Hoeveel sigaretten was je van plan om te roken? Welke strategie heb je gebruikt?

Het bijhouden van het dagboek is eenvoudig. Het is de bedoeling dat je elke dag aangeeft hoeveel sigaretten je die dag hebt gerookt. Dat je doe met behulp van het zogenaamde 'rookdagboek'. Als je meer sigaretten hebt gerookt dan je van plan was te roken, wordt je ook gevraagd te vertellen waarom het je niet is gelukt het geplande aantal sigaretten te roken. In de laatste kolom moet je de gebruikte strategie invullen. Heb je een strategie uit de handleiding gebruikt? Geef dan alleen het nummer aan die staat voor de strategie. Heb je zelf een strategie bedacht? Beschrijf deze dan in de laatste kolom. Als je niet genoeg ruimte hebt kun je ook aan de achterkant of ernaast doorgaan.

Als je het dagboek toch niet begrijpt of andere problemen hebt met het bijhouden van het dagboek, kun je even een mailtje sturen naar: rilanaprenger@hotmail.com.

Rookdagboek – Week 1 **Begin: …….dag …-…-2006**

	Hoeveel sigaretten heb je gerookt?	Hoeveel was je van plan om te roken?	Indien je meer hebt gerookt dan je wilde roken: Waarom is het niet gelukt?	Welke strategie heb je gebruikt? (aangeven met nummer van strategie uit de handleiding. Als je een andere strategie hebt gebruikt, beschrijf deze dan hieronder)
Maandag				
Dinsdag				
Woensdag				
Donderdag				
Vrijdag				

Zaterdag				
Zondag				

Rookdagboek – Week 2 **Begin: …….dag …-…-2006**

	Hoeveel sigaretten heb je gerookt?	Hoeveel was je van plan om te roken?	Indien je meer hebt gerookt dan je wilde roken: Waarom is het niet gelukt?	Welke strategie heb je gebruikt? (aangeven met nummer van strategie uit de handleiding. Als je een andere strategie hebt gebruikt, geef dat dan hieronder aan)
Maandag				
Dinsdag				
Woensdag				
Donderdag				
Vrijdag				

Zaterdag				
Zondag				

Rookdagboek – Week 3 Begin: …….dag …-…-2006

	Hoeveel sigaretten heb je gerookt?	Hoeveel was je van plan om te roken?	Indien je meer hebt gerookt dan je wilde roken: Waarom is het niet gelukt?	Welke strategie heb je gebruikt? (aangeven met nummer van strategie uit de handleiding. Als je een andere strategie hebt gebruikt, beschrijf deze dan hieronder)
Maandag				
Dinsdag				
Woensdag				
Donderdag				
Vrijdag				

Zaterdag				
Zondag				

Rookdagboek – Week 4 **Begin: …….dag …-…-2006**

	Hoeveel sigaretten heb je gerookt?	Hoeveel was je van plan om te roken?	Indien je meer hebt gerookt dan je wilde roken: Waarom is het niet gelukt?	Welke strategie heb je gebruikt? (aangeven met nummer van strategie uit de handleiding. Als je een andere strategie hebt gebruikt, beschrijf deze dan hieronder)
Maandag				
Dinsdag				
Woensdag				
Donderdag				
Vrijdag				

Zaterdag				
Zondag				