

UNIVERSITY OF TWENTE

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# Predictive Values of Motivational Determinants in Patients' Intention to Ceases Smoking: A Population Study of a Dutch Cessation Clinic

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Bachelor thesis

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**August 2012**

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## Abstract

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**INTRODUCTION-** Over the last decades different predictive models of health orientated behavior have been developed and applied to different subjects, including smoking. In this study an elaborated *Attitude, Self-efficacy, Social Influence Model (ASE- Model)* is combined with an elaborated Transtheoretical Model (TTM). Both are implemented in the patients of a Dutch smoking cessation clinic.

**SCOPE-** The effects of motivational determinants known from the ASE Model on the patients' intention to quit smoking are evaluated. The TTM divides the intention to cease smoking in two categories (*Stages of Change*). The ASE model assumes that the motivational determinants act as moderators, when controlled by the characteristic baseline variables of the sample. This assumption is tested. Further, the study aims to evaluate the effect of characteristic baseline variables on the motivational determinates.

**METHODES -** Information is assessed by three measurements: 1) The '*Smoking related questionnaire*' by Mudde et al., (2000) 2) *Beck's Depression Inventory*' by Beck et al., (1961) 3) *Wisconsin Smoking Withdrawal Scale (WSWS)*' by Baker at al. (1999). All subsequent statistical analyses are based on a significant *bivariate correlation*. *Binary logistic regression analysis* is applied to measure the moderating effect of the ASE Model on the '*Stages of Change*'. *Linear regression analysis* is assessed to measure the effect of the baseline variables on the motivational determinants. Differences in the groups` mean level of the motivational determinants and '*Stages of Change*', controlled by the different baseline variables, are calculated by an *analysis of variance*.

**RESULTS-** The statistical analyses demonstrate that the ASE Model cannot be applied as originally assumed. 'Self- Efficacy' is the only motivational determinant that can be used as a slight predictor for the patients' '*Stages of Change*'. It has no moderating effects. Further, 'Educational Level' has a predictive value on the '*Stages of Change*'. The linear analysis demonstrated that 19 % of the variance in the 'Self- Efficacy' scores can be explained by three baseline variables.

**CONCLUSION-**The missing results of the ASE Model and the fact that only 82% of the patients in the smoking cessation clinic can be accounted as 'Preoperators' put the categorization system of the TTM into question. The categorization system might decrease the validity of the study.

**RECOMMENDATIONS-** For further research on this subject different measurement characteristics of the dependent variables are recommended.

## Samenvatting

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**AANLEIDING-** In de afgelopen decennia zijn veel verschillende modellen die gezondheidsgedrag voorspellen ontwikkeld. In dit onderzoek wordt een gewijzigd *Attitude*, *Self -Efficacy en Social Influence Model (ASE Model)* in combinatie met een gewijzigd *Transtheoretical Model (TTM)* toegepast op patiënten van een Nederlandse verslavingskliniek.

**DOEL-** Op basis van het ASE Model worden de effecten van motiverende determinanten, gecontroleerd door de verschillenden achtergrondvariabelen, op de intentie om te stoppen met het roken gemeten. Het TTM deelt de intentie om te stoppen in twee categorieën (*Stages of Change*). Het ASE Model suggereert dat motiverende determinanten als een moderator kunnen fungeren, wanneer deze door verschillende achtergrondvariabelen gecontroleerd worden, dit wordt getest. Het tweede doel is om de effecten van de achtergrondvariabelen op de motiverende determinanten te meten.

**METHODE-** Informatie wordt verkregen door 3 vragenlijsten: 1) De *Smoking related questionnaire* van Mudde et al. (2000). 2) De *Beck's Depression Inventory* van Beck et al.(1961) en 3) De *Wisconsin Smoking Withdrawal Scale (WSWS)* van Baker et al. (1999). De statistische analyses zijn gebaseerd op een significante *bivariate correlatie*. Een *Binaire logistische regressie* analyse wordt gebruikt om het moderatie effect van de ASE determinanten op de ‘Stages of Change’ te meten. *Lineaire regressie analyse* wordt toegepast om de effecten van de achtergrondvariabelen op de motiverende determinanten te berekenen. Verschillen in het groepsgemiddelde, die gecontroleerd worden door de achtergrondvariabelen, worden met behulp van een *variatieanalyse* geëvalueerd.

**RESULTATEN-** De statistische analyses laten zien dat het oorspronkelijk ASE Model niet gebruikt kan worden. ‘Self- Efficacy’ is de enige determinant die een zwakke voorspellende waarde heeft. Het fungeert echter niet als een moderator. ‘Opleiding Niveau’ heeft een voorspellende waarde op de ‘Stages of Change’. Lineaire regressie analyse laat zien dat 19% van de variatie in het item ‘Self -Efficacy’ kan worden verklaard door drie achtergrondvariabelen. **CONCLUSIE-** De ontbrekende waarde van het ASE Model en het feit dat 82,2% van de patiënten in de groep van ‘Preoperators’ zit, leidt ertoe dat er twijfel ontstaat over het categoriseringsysteem van het TTM. Het TTM brengt de validiteit van het onderzoek omlaag. **AANBEVELINGEN-** Voor verder onderzoek over dit thema wordt aanbevolen het meetinstrument ‘intentie om the stoppen’ aan te passen (zodat de validiteit wordt verhoogd).

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## **1. Introduction**

Smoking is something most of us call a ‘bad habit’ and surely we do so for a good reason. The disadvantages of smoking are numerous and well-known. The European Commission of Health (2010) declared tobacco use as “the largest single cause of avoidable death in the EU”. The awareness of the negative effects of smoking has grown, but still, around one third of the European population continues to smoke (European Commission, 2010). Smoking associated health problems include some 695 000 smoking-related deaths each year and around half of the smokers die between 35 and 69 years old, below average life expectancy (European Commission, 2010). Life threatening diseases are surely the most concerning, but not the only possible side effects of smoking, a bad physical condition, the smell of cigarettes that continuously surrounds smokers, wrinkles, and last but not least the expense of smoking may not be forgotten. The health risk associated with smoking declines significantly, after becoming abstinent (Dorner et al., 2011). Achieving a live long abstinence is a very desirable goal from the medical and social point of view. For this reason, it is not surprising that ‘70 % of the world’s smoking population wishes to quit very much’ and ‘45% do try to quit each year’ (Bolman et al., 2012). However, the number of smokers who actually succeed is very limited and even smaller is the number of people who stay abstinent. Most relapses occur during the first week, with a relapse rate of 49-76%. After the first week the danger of relapse decreases a little but continues to be enormous. 80-90% of smokers who stay abstinent for the first week after the onset of smoking cessation start again after 3 months (Bolman et al., 2012).

To enhance the chances of a live long abstinence, the identification of characteristics that predict the success in smoking cessation is a very worthwhile goal. The identifications of such predictors may lead to the improvement of treatment strategies that enhance the changes to quit and help health care resources and physicians to give more effective advice and assistance (Dorner et al., 2011).

In the last decade research has been involved with the identification of predictors and the aspiration to improve treatment strategies. Knowledge about the factors that might either positively or negatively influence the success of smoking cessation has grown. Older age, higher economic status, and a lower dependence score have been demonstrated to enhance the changes to stay abstinent. Stress, misuse of smoking as a coping strategy, alcoholism, and the

presence of other smokers in the household have controversy effects (Bulgiba et al., 2011). Furthermore, the comorbidity between depression and smoking is well established. Research indicates that 50% of all individuals between the ages of 25-30, who experience depression, smoke (Carrigan et al., 2012).

To give individually suited and effective assistance, practitioners and smoking cessation centers do not just have to identify the key characteristics in general that support the maintenance of the smoking behavior, but also need to assign them to specific patients. In order to do it in an appropriate manner, measurements have been developed that indentify smoking related key characteristics. Well-known and frequently used measurements are the Fagerström Tolerance Questionnaire (Fagerstrom & Schneider, 1989) and its revised version, the Fagerström Test for Nicotine Dependence (Fagerström et al., 1991). Measurements for depression and other social cognitive determinants are also frequently being used to identify those key characteristics (Carrigan et al., 2012). Research indicates that factors in favor of and against smoking may not be evaluated separately, because they interrelate (Caponnetto & Polosa, 2011) Models, that evaluate the interaction of motivational determinants and their predictive value of the intention to fulfill a specific behavior, have been developed (Adjali et al., 2008). Many of them can be applied on smoking cessation intention.

## 2. Theoretical Framework

The study uses the combination of two health behavior models to evaluate the effects of motivational determinants on patients' intention to quit of a Dutch smoking cessation clinic. The Model of *Attitude, Self-Efficacy, Social Influence (ASE- Model)* predict the intention to cease smoking based on motivational determinates. The *Transtheoretical Model* categorizes the intention in *Stages of Change*, based on the strength of intention. Both models are affected by live experience, personality and other background variables. A detailed description is given in the section below (de Vries & Mudde, 1998), (DiClemente et al., 1991).

The ASE Model used in this study originates in the 'Theory of planned behavior' (TPB) by Ajzen (1991), the most common model for the prediction of health related behavior. Both models try to predict and explain behavior based on persons' motivational determinants: 'Attitude' and 'Self-Efficacy' (de Vries & Mudde, 1998) *Attitude* is referring to the general position someone has regarding a certain subject or topic (Gwaltney et al. 2002). *Self-Efficacy* can be defined as the 'confidence in one's ability to execute the performances to deal with prospective situations` (Gwaltney et al., 2002, p.1144.). Ajzen (1991) uses the term

*Perceived Behavioral Control* as substitute for ‘Self-Efficacy’. Both models are assumed to reflect past experience and obstacles in live. The third determinant varies within the two models. Ajzen (1991) implements in his model the motivational determinant ‘Subjective Norm’ as a further predictor. *Subjective Norm* indicates ‘the social pressure perceived to perform or to avoid a certain behavior’. Contrary to the ‘Theory of Planned Behavior’, the ‘ASE-Model’ considers the determinant ‘Social Influence’ as more important. *Social Influence* is broader. It indicates the social pressure regarding a specific behavior, the perceived behavior of others regarding it and the social support received to fulfill it (de Vries & Mudde, 1998). It can further be divided in two motivational sub determinants: 1) *Social Norm* mirrors the active support of others. 2) *Descriptive Norm* measures the behavior of the surrounding perceived (de Vries & Mudde, 1998). The perceived behavior and the social support have been demonstrated as especially influential in the context of smoking cessation. Close friends, family and live partner might influence the effectiveness of smoking cessation crucially (Phua, 2012).

The intention itself is measured by the categorization system of the *Transtheoretical Model (TTM)*. This model has proven to be very successful in predicting the actual change in health behavior (Prochaska et al., 2008). The TTM measures the strength of people’s intention to change a specific unhealthy behavior along a temporal dimension. It utilizes cognitive and performance based components. Based on research the TTM has found that people move through five *Stages of Change* (SOC) before they finally adopt healthy behavior or cease the unhealthy behavior: 1) Precontemplation, 2) Contemplation, 3) Preparation, 4) Action and 5) Maintenance. During the addictive behavior movement cycling and recycling is particularly involved (DiClemente et al., 1991).

A description of the COS and the TTM as used in this study is following.

*Precontemplation* is defined as the ‘Stage of Change’ when smokers do not wish to quit in the next six month but wish to quit at some point of their lives. *Contemplators* intend to change their smoking behavior within the next six month, but not in the next 31 days. *Preparers* wish to quit within the next 30 days (Prochaska et al, 2008). Smokers in category *Action* and *Maintenance* have already reached the criterion of smoke abstinence. Smokers who are categorized in the ‘Stage of Change’ ‘Action’ stayed abstinent for a time of 0 to 6 month. To range in the category of ‘Maintenance’ one has to stay abstinence for 6 month or longer (Prochaska et al., 2008).

Stage definitions vary in different versions of the model, in some performance based components are included, such as ‘Past Attempts to Quit’ (West, 2005). Within this study the categorization system mentioned above is used, with two implications. Among the population analyzed the two Stages of Change ‘Action’ and ‘Maintenance’ are not included. It is not anticipated that patients in smoking cessation clinics have reached the criteria of smoke abstinence yet. Furthermore this study assesses the two SOC ‘Contemplators’ and ‘Pre-contemplators’ as one. The same applies in regard to the population comprising the sample. It can be assumed that most of the participants are either in the ‘Preparation Stage’ or in the ‘Contemplation Stage’, the amount of ‘Pre-contemplators’ would be too small to indicate any reliable results. For the reason of simplicity this category will also be referred to as ‘contemplator’.

Prochaska et al. (1991) elaborated the TTM in regard to the subject of smoking cessation. He concluded that the TTM is a reliable predictor of a person’s success in smoking cessation. He also supports the idea that smokers, who wish to cease go through the five Stages of Change before they reach absolute abstinence. A further assumption of this model is that while going through those categories in their attempts to cease, smokers change their personal strategies and beliefs about their attempt to quit smoking. Two of those strategies and beliefs Prochaska et al. (1991) seems to be the change in ‘Self-Efficacy’ and ‘Decision Balance’.

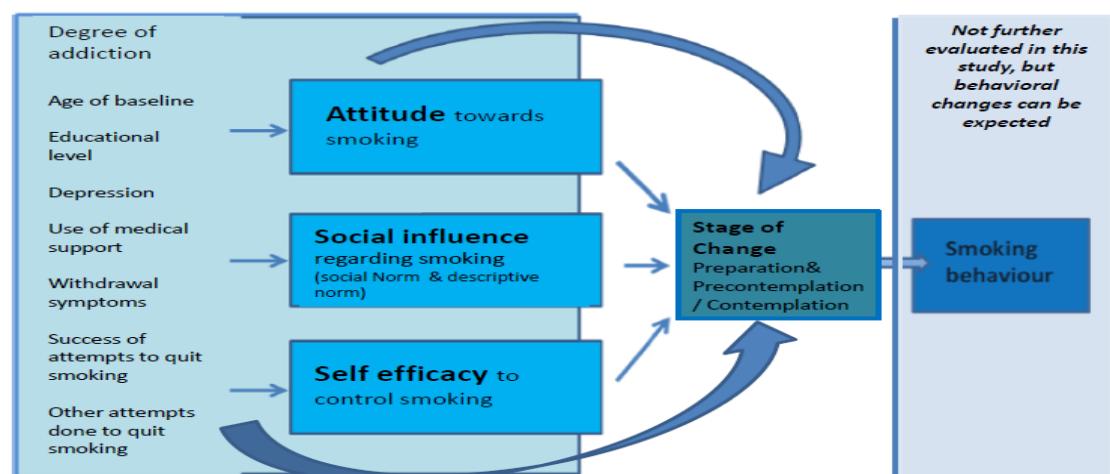
*Decision Balance* was originally assessed by Janis and Mann (1977). It measures the proportional distribution among positive and negative motivational and cognitive aspects of the decision making. It can be compared with the determinate ‘Attitude’ mentioned in the ASE Model. The TTM assumes that the distribution of negative and positive attitudes will change while going along those Stages of Change. ‘Pre-Contemplators’ feature the most negative attribute, maintainers the most positive attributes.

*Self-Efficacy* was originally based on Bandura’s (1997) construct. In this study it is assessed by the motivational determinants ‘Self-Efficacy’ of the ASE Model. Bandura considered ‘Self-efficacy’ as the most powerful determinant in the change of behavior. It predicts the initiation to perform a specific behavior, the effort put into it and the expectancy to maintain it (Maddux et al., 1982).

In both Models it is however important to notice that the constructs measured are not isolated from other effects. *Baseline variables* such as personality, educational level, age at baseline and others might have a significant effect on the compositions of the motivational determinants and on the ‘Stage of Change’. The effects of the baseline variables on the ‘Stage

of Change' can either be directly or via motivational determinants. Research indicated that a high score of depression and negative affectivity might have a decreasing influence on 'Self-Efficacy', which in turn might affect smoking behavior. *Depression* has been demonstrated as an indicator of the age's baseline of smoking behavior (Bowes et al., 1998). Socio-economic status, which includes the *Educational Level*; the general depression score and the appliance of medical support, might differ from country to country and within the county from region to region. The link between a low socio-economic status and the addiction of smoking is well established (Abrams et al., 2003). The *degree of addiction* mostly measured by the '*Fagerstrom Test for Nicotine Dependence*' (FTND) has further been demonstrated as a predictor of the intention to quit smoking (Fildor et al., 2012). The FTND developed by Fagerstrom is a 6-item measurement which intents to measure the degree of addiction. The items concern the topics 1) The time span, when the first cigarette is lighted after leaving bed 2) The difficulties not to smoke in places where smoking is forbidden 3) The cigarette that would be most difficult to give up 4) The amount of cigarettes smoked per day 5) The distribution of the amount of cigarettes smoked in the morning afterwards and 6) The interest in cigarettes while being sick. The score of the FTND can range from 1-10 and indicate the degree of addiction (Fagerström et al., 1991). A longitudinal study of the English population found out that low rate smokers are much more willing to quit than heavy smokers (Fildor et al. 2012). The FTND is also used in this study as a measurement of the degree of addiction.

A graphical demonstration of the ASE Model combined with the TTM as used in this study and the baseline variables measured are shown in Figure 1.



The aim of the study is to predict and to explain the intention to quit smoking of the clinical population comprising the sample based on motivational determinants and baseline variables in order to develop effective treatment strategies. The interest aim of this study is to support practitioners and nurses in smoking cessation clinics in their intention to support smokers to quit.

The smoking cessation clinic of the Medisch Spectrum Twente hospital (MST) in Enschede, the Netherlands, is one of many clinics who try to support smokers in their wish to cease smoking. This study seeks to 1) *identify the key characteristics of baseline variables in the patients of this smoking cessation clinic*, 2) *evaluate the effect of baseline variables on the motivational determinants* and 3) *evaluate the combined effect of the motivational determinates of the ASE model on the patients intention to quit smoking (SOC), when controlled by the baseline variable*. Based on the ASE Model and the background variables it is attempted to build a predictive model that suits the population of the MST in Enschede and helps to better understand and more efficiently support the patients of the hospital.

### **3. Methods**

#### **3.1. Sample Description and Data Collection**

All 197 participants of this study were patients of the smoking cessation clinic of the ‘Medisch Spectrum Twente’ hospital (MST) in Enschede, the Netherlands. The smoking cessation department treats patients who feel the voluntary wish to stop smoking. A transference form a physician was not a necessary requirement to become part of the program. However, it can be assumed that many of the 191 participants were strongly advised to participate in the program due to medical problems resulting from chronic smoking behavior.

Most of the data were collected in the year 2010, but to ensure an appropriate validity of the data, participants previous to this year were also included dating back to 2006. Three measurements were applied. Depending on the patients progress in their treatment the measurements were answered in different time intervals. Due to attrition not all 197 patients responded to all three measurements. In order to assure the anonymity of the participants, our knowledge about the demographic data is limited. The distribution among men and women is unknown, due to a very low response rate of this specific question. It can be assumed that

most of the patients live near the city of Enschede. The age of patients who participated in this study range from about 21 to 73 years.

The only explicit requirement to participate in this study was to attend the smoking cessation program of the clinic MST in Enschede. An implicit requirement was a sufficient command in the Dutch language, because the questionnaires were written in Dutch. Patients who had trouble answering the questions had the possibility to get language support from family, friends or staff.

All participants were asked to fill in the questionnaires by pencil and paper. Two during the admission procedure, concerning the topics smoking behavior (*'Smoking related questionnaire'* by Mudde et al., (2000)) and cognitive depression (*'Beck's Depression Inventory'* by Beck et al., (1961)). The third questionnaire was answered during the first appointment with the practitioner after the date set for smoking cessation. This questionnaire elaborates withdrawal symptoms (*'Wisconsin Smoking Withdrawal Scale (WSWS)'* by Baker at al., (1999)). Patients were informed about the possibility that their data can be used for research concerns and were asked to sign a confirmation paper. Patients were not informed about the purpose and details of the study in order to avoid social desirability and to keep further research options open.

### **3.2. Measurements:**

A variety of standardized instruments were used to measure the variables included in this qualitative survey research. Cronbach's  $\alpha$  is used to measure the reliability of every single measurement construct separately used in this study. This is done to assure the reliability of the measurement concerning the sample population. In addition, detailed descriptions of the instruments are provided below.

#### **3.2.1. Smoking Related Questionnaire**

The *Smoking Related Questionnaire* constructed by Mudde et al. (2000), was especially developed for research on smoking cessation. The measurement contains 54 different questions concerning the subtopics' of 1) Demographics 2) Age at Baseline 3) Educational Level 4) Attempts to Quit Smoking 5) Use of Medical Support in Their Attempts to Quit Smoking 6) FTND 7) Motivational Determinants of the ASE Model 8) The Intention to Quit Smoking and 9) Open-ended questions about the general 'Time of Abstinence' in a patient's life.

*Demographics* included questions about the patient's gender and age. These questions were located on the front page of the measurement, separated from the other items. The response rate is very low.

*Age at Baseline* is assessed by one item, consisting of nine different answer possibilities ranging from 'younger than eight' to 'older than fifteen'.

*Educational Level* is a single item measurement collecting information about the highest level of education the patient has.

The measurement scale *Attempts to Quit Smoking* is a five item scale that assess information about the nicotine abstinence in 1) the last week, and 2) the last 24 h. Further, it collects information about 3) the success of the last attempt to quit 4) the presence of other attempts to quit and 5) the presence of an attempt to quit smoking that lasted longer than 24h.

*Addition Level* was measured by six items using the FTND described in the theoretical framework. The patient's use of *Medical Support* in the attempt to quit smoking is assessed by one item, consisting of eight different answer possibilities concerning the medical supporter. In this study the use of medical support is analyzed as a dichotomy item. Based on this item, patients can be divided in the following groups 1) Patients who used medical support and 2) patients who did not use medial support.

*Motivational determinants* are formulated as statements and are answered on a 5 point Likert Scale. Mudde et al. based the measurement on the motivational determinants of the ASE model, including the subdivision of the motivational determinant 'Social Influence'. The measurement therefore is susceptible of four social cognitive determinants: 1) *Self Efficacy*, 2) *Social Norm*, 3) *Descriptive Norm* and 4) *Attitude* (Mudde et al., 2006).

For each determinant one example question is given. The questions are translated from Dutch into English and might include slight changes.

(1) *You feel stressed and tense. Will you be able not to smoke?*

(2) *Do your friends support you in your wish to be abstinent?*

(3) *How many of your children who live at home smoke?*

(4) *When you stay abstinent, will you be able to relax? ( Open-ended question)*

*Stage of Change* is assessed with one item measurement that can be answered on a 6-point scale. Each point indicates a different time when the patient wishes to cease smoking. For the statistical analysis this measurement item is subdivided into two categories of the intention to

quit smoking. *Preparer* wish to quit within the next 6 month, whereas *contemplators* wish to quit within the next year but not within the next 6 month (de Vries et al, 2007). The study's focus lies on specific questions regarding the patient's readiness to quit smoking.

Cronbach's  $\alpha$  of the measurement constructs range from 0.48 (social norm) to 0.892 (Self-Efficacy). The measurement scale 'Descriptive Norm' had to be excluded from further analysis due to its low reliability coefficient, but is substituted by the single item of 'The Presence of a Smoking Partner'.

The measurement (Section A1.1.) and the scoring system (Table A1 and A1a) can be found in the appendix.

### **3.2.2. Beck's Depression Inventory (BDI)**

*The Beck's Depression Inventory (BDI)* is one of the most widely used inventories for depression (Elovainio et al., 2010). It contains 21 items of the attitudes and symptoms often displayed by patients with depression. Each item can be rated on a 4-point step scale. 0 indicating 'No Agreement' and 3 indicating 'Strong Agreement'. The BDI is highly recommended as a useful screening instrument of depression. The BDI gives an estimation of the severity of the depression, but should not be used as a diagnostic instrument (Elovainio et al., 2010). Beck himself suggested a division of the scores obtained by the patients into four categories of depression severity. Low scoring points suggest a mild form of depression, higher scores suggest a more severe form (Beck, 1988). The maximum lies by 63 points. Items of the BDI. The 21 are sensitive to the following topics: (1) Mood , (2) Pessimism, (3) Sense of Failure, (4) Lack of Satisfaction, (5) Guilt Feelings, (6) Sense of Punishment, (7) Self-dislike, (8) Self accusation, (7) Social wishes, (8) Crying, (9) Irritability, (10) Social withdrawal, (11) Indecisiveness, (12) Distortion of Body Image, (13) Work Inhibition, (14) Sleep Inhibition and (15) Disturbance, (16) Fatigability, (17) Loss of Appetite, (18) Weight loss, (19) Somatic preoccupation, (20) Suicidal Wishes and (21) Loss of Libido (Beck, 1988). In this research study one additional sub question concerning the 'Weight Loss' was put into the original BDI. The sub question measures the intention to lose weight. This makes it easier to screen patients who lose weight due to the consequences of cognitive depression. The reliability coefficient Cronbach's  $\alpha$  of the BDI is very high with a value of 0.9.

The following example provides information about the general structure of the measurement items.

Question 12 : *Distortion of Body Image* (4 different answering possibilities are provided)

- *I do not have the feeling that I am less attractive than I used to be.*
- *I am worried that I look old and not attractive anymore.*
- *I have the feeling that my looks keep changing and that I have become unattractive.*
- *I have the feeling that I am very unattractive.*

The scoring system according to Beck and the questionnaire can be found in the appendix in Table A2 and Section A1.2.

### **3.2.3. Wisconsin Smoking Withdrawal Scale**

The ‘Wisconsin Smoking Withdrawal Scale’ was developed by Baker (1999) to measure the accurate assessment of the nicotine withdrawal symptoms. The 28 item questionnaire contains seven subscales, concerning the major symptom elements of the nicotine withdrawal syndrome. The subscales concern the topics: (1) Anger, (2) Anxiety, (3) Concentration, (4) Hunger, (5) Sadness, (6) Sleep and (7) Craving. Each item was scored on a 5 point Likert Scale with 0 indicating ‘Strong Disagreement’ and 4 indicating ‘Strong Agreement’. Sum scores range from 0 to 12. Cronbach’s  $\alpha$  of the sum score is very high with 0.993. The subscales have a reliability coefficient ranging from 0.81 to 0.94 points. No item had to be excluded from further analysis.

An example of the general structure of the questions is provided below.

*Question 13: I have been irritable, easily angered.*

*0=Strongly disagree*

*1=Disagree*

*2=Feel neutral*

*3=Agree*

*4=strongly agree*

The questionnaire (section A1.3.) and its scoring system (section A2.3., table A3.) can be found in the appendix.

## **4. Statistical Analysis**

Depending on the research question different statistical methods are used to answer three research questions. All statistical analyses are done with the SPSS program for Windows. In order to stay as close as possible to the data, missing values are not substituted. The sample size is reported for each measurement scale separately.

Due to the low Cronbach's  $\alpha$  in some measurement scales of the SRQ, items had to be excluded from further analysis to assure an appropriate reliability coefficient. The minimum value of Cronbach's  $\alpha$  that is accepted in this study is 0.6. The measurement scale 'Descriptive Norm' scored underneath this cut off score and had to be substituted by the item that research indicates as most significantly relevant for this measurement scale: 'The Presence of a Smoking Partner' (Phua, 2012). The appendix contains a list of all items that are excluded from its scales and therefore from further analysis (Section A3, Table A4).

### ***4.1. Descriptive Statistics***

The sum scores of the different measurement scales are calculated. Measurement scales are further divided by the items that define them. The exclusion of some scale's items lead to the infeasibility of the sum score as a descriptive measurement of the population. Mean scores are used instead as substitutes. Mean and distribution scores form the basis of the sample description. For items that are not normally distributed, median and percentile range are calculated. A list of items that define a given scale can be found in the appendix.

### ***4.2. Correlation Analysis***

*Pearson's correlation coefficient* is used to calculate the correlation of the measurement scales and single items. In research with a sample size larger than 30 individuals it is frequently used. The correlation coefficient, which ranges between -1 and 1, is an indicator of the degree of correlation. It is however important to notice that the correlation coefficient is not an indicator of a causation between the variables (Kutner et al, 2005). The correlation coefficient is a measurement of linear correlation.

#### **4.3. Regression Analysis**

Two forms of regression analysis are applied in this study.

In order to test the model as described in the theoretical framework and to answer research question 3, a *binary regression analysis* is applied. Binary logistic regression is designed to indicate the predictive values of independent variables to a dependent dichotomy variable. The following hypotheses have to be confirmed in order to verify the model. The cut-off score of significance was  $p<0.1$ .

H1) There is a significant correlation between the independent variable and the mediators (ASE determinants) (Baron & Kenny, 1986). (*Path a*)

H2) The mediator (ASE determinants) must effect the dependent variable (Baron & Kenny, 1986). (*Path B*)

H3) There is a significant correlation between the independent variable (baseline variables) and dependent variable (Stage of Change) (Baron & Kenny, 1986). (*Path c*)

H4) If the mediator ASE determines completely mediates the relationship between independent (baseline variables) and dependent variable (Stage of Change), then the effects of de independent variable on the dependent variable should be zero (Baron & Kenny, 1986).

In order to test if baseline variables might have a significant effect on the motivational determinants of the ASE Model, a *linear regression analysis* is applied. More specifically, regression analysis helps to understand how the value of the dependent variable changes due to variations in one of the independent variables, while the other independent variables are held constant. By doing so, baseline variables that have a predictive value can be discovered and their impact on the motivational determinant can be estimated (Weisberg, 2005).

#### **4.4. Analysis of Variance**

Subsequently, the effect of baseline variables on the motivational determinants of the ASE Model and the ‘Stage of Change’ are investigated using the Analysis of Variance (ANOVA). ANOVA compares mean scores of dependent variables affected by the different conditions.

Significant effects are found when the significant value obtained is smaller than the critical significant level 0.1 (Guidelines Anova, 2012).

*Univariance Analysis* is applied to support the findings of the regression analysis and to analyze the data accurately. Confident intervals are calculated, using the method of Bonferroni. The intervals show the range of mean scores of the dependent variable affected by the different factors separately (Bird, 2002). The mean score intervals do not just indicate the significance of an effect, but provide more detailed information. Based on the Bonferroni's confident intervals, predictions about the effects of different factors can be made.

## 5. Results

In this section, the results are presented based on the statistical analysis described in section four.

First, the sample is described and the key characteristics of the baseline variables of the patients in the smoking cessation clinic are identified. Second, the correlation matrix of the different measurement scales is displayed. All significant results of the subsequent analysis are based on significant correlation values within this matrix. In order to answer research question three, measurement scales that showed significant correlations were filled in a binary logistical regression analysis. Third, the results of the linear regression analyses are displayed to answer research question two. A short summary of the two regression analyses is given. Finally, the analysis of variance provides information about the differences in the mean group levels of the dependent variables used in the binary and in the linear regression analysis.

### 5.1. *Sample Description*

Table 1 presents the number of subjects that answered each eligible measurement item and scale. It shows the average values, the minimum and maximum values and the standard deviations of the normally distributed items. Median and the quartiles are indicated for items that are not normally distributed. Dichotomous variables are described by the percentage of each value.

**Table 1** Sample Description

Variables	N	Mean */ Median**	Min*/ 25 <sup>th</sup> Percentile**/ Percentage***	Max*/ 27 <sup>th</sup> Percentile**/ Percentage***	SD*
<b>Baseline variables</b>					
1.BDI*	179	0,514	0	3	0,796
2.WSWS*	94	1,79	0	4	0,356
3. Age at Baseline*	189	7,52	2	9	1,703
4.Educational Level*	188	3,54	1	7	1,831
5.Addiction Score ( FTND)*	163	2,90	0	5	1,647
6. Use of Medical Supporters***	173	-	0 (64%)	1 (36%)	-
7. Success of Attempts to Quit Smoking*	39	2,97	1	5	1,49
8. Are There Other Attempts Done to Ceases Smoking***	184	-	0 (93,5%)	1 (6,5%)	-
8a. Success of the Recent Attempt to Ceases Smoking***	117	-	0(53,3%)	1 (46, 7%)	-
8b . Time Span of Longest Time of Smoke Abstinence (days)**	145	24	25 <sup>th</sup> Percentile 24	75 <sup>Th</sup> percentile 140	-
9 . Time Span of Last Abstinence that Continued More than 24 h**	127	104	25 <sup>th</sup> Percentile 21	75 <sup>Th</sup> percentile 365	-

<b>ASE Determinants</b>					
10. Self-Efficacy*	191	0.317	-2	1.67	0.921
11. Social Norm*	191	1.65	0	3	0.789
12. Smoking Partner***	191	-	1(65%)	0(35%)	-
13. Attitude*	190	1,69	-2	3	0.874
13a. Positive Attitude*	190	9,73	4	12	1,69
13b. Negative Attitude*	190	4,38	-12	0	2,88
14 . Stage of Change	173	-	1(18,8%)	0(82,2%)	-

\*Normally distributed with Mean, Minimum and Maximum Values

\*\* Not normally distributed with Median and Percentile range

\*\*\* Dichotomous Question

173 out of 191 participants indicated their intention to quit smoking (Stage of change). 82,2% of the patients display to be in the ‘Preperation’ stage , 18,2% in the ‘Contemplation’ stage.

It can be observed that the different determinants of the ASE Model vary regarding their average score. The determinant ‘Attitude’ (1.69) has the highest score; a similar high value reaches ‘Social Norm’ (1.65). In contrast, the determinant ‘Self- Efficacy’ has the lowest score with an average of 0.317. Due to its low reliability, the scale ‘Descriptive Norm’ was not included in the analysis. It is substituted by the presence of a ‘Smoking Partner’. 65 % of the population has a smoking partner. The remaining 35% does not have a smoking partner or no partner at all.

An evaluation of the baseline variables indicates the following:

The ‘Cognitive Depression Score’ of the patients’ sample (BDI) is low with an average score of 0,514. In the Beck’s depression scoring system (for further information see table A2) the average score lies between ‘No Depression’ and ‘Moderate Depression’.

The average score of ‘Educational Level’ (3,54) indicates that the general education of the patients lies between junior secondary school and general secondary education (lower level).

The maximum score demonstrates that patients of higher educational level are also treated by the cessation clinic.

The ‘Addiction Score’, measured by the FTND, indicates a moderate addiction of the sample. This is in line with the low average score (1, 57) of the WSWS.

## **5.2. Correlation Analysis**

Table 2 demonstrates the bivariat correlation of the items and scales of this study. Furthermore, all results displayed are based on significant results of the bivariat correlation analysis.

Table 2 shows a significant correlation between the motivational determinant ‘Self-Efficacy’ and the dependent variable ‘Stage of Change’ (0.123\*). All other motivational determinants do not show any significant correlation with the dependent variable. This means that just one determinant supports the predictive value of the ASE Model. This determinant is ‘Self-Efficacy’.

However, the dependent variable (Stage of Change) shows to have intercorrelational effects with the baseline variable ‘Educational Level’. This correlation does not support the idea of the ASE Model due to its missing intercorrelation with ‘Self-Efficacy’. This way, the motivational determinant cannot act as a mediator.

Even though, the results do not show significant correlations of ‘Self- Efficacy’ with the same baseline variables as the ‘Stage of Change’, it intercorrelates with three others: 1) ‘Addiction Score 2) ‘Other Attempts to Quit Smoking’ and 3) ‘Success of Recent Attempt to Quit Smoking’. This relationship will further be evaluated within section 6.3.

Further, a noticeable result of the correlation analysis is the high intercorrelation of the motivational determinants. All motivational determinants intercorrelate.

**Table 2** Correlation table

Variable	1	2	3	4	5	6	7	7a	7b	8	9	10	11	12	13	13a	13b	1 4
1. BDI	1																	
2. WSWs	-.039	1																
3. Age at Baseline	.080	.040	1															
4. Educational Level	.063	-.111	.44	1														
5. Addiction Score	.012	.020	.024	.98	1													
6. Use of Medical Supporters	-.16 *	.006	.006	.147*	-.129	1												
7. Success of Attempts to quit	.128	-.121	.044	.52	-.0492***	.513** *	1											
7a. Other Attempts to Quit Smoking	-.212***	-.089	.064	-.213***	.037	.005	.107	1										
7b. Successfulness of Recent Attempt to Quit	-.013	-.013	.028	.147	-.455***	.095	.807**	-.149	1									
8. Longest Time of Abstinence	-.104	.047	- .140*	-.040	-.159*	.014	.74	.042	.159*	1								
9. Last Time of Abstinence that Took >24h	.009	.003	-.034	-.016	-.032	.026	.065	.051	.168	.801 **	1							
<b>ASE-Determinants</b>																		
<b>10. Smkong partner</b>	-.047	.042	.039	.049	.060	.011	.28	.011	.063	-.074	.051	1						
11. Self- Efficacy	-.011	-.109	.099	.050	-.126*	.072	-.077	.201 ***	-.312***	.104	0.083	-.105**	1					
12. Social Norm	.036	-.124	.006	.094	.044	-.005	.057	-.002	.015	.148 *	-.021	-.160**	.147*	1				
13. Attitude	-.021	-.070	.044	-.037	-.084	-.010	.044	.064	.020	.013	0.053	-.048	.424**	.176 *	1			
13a. Positive Attitude	.055	-.106	.048	.097	.101	.006	.114	-.083	.212*	.004	0.027	-.031	-.050	.123 *	.220***	1		
13b. Negative Attitude	-.048	.099	.007	-.001	-.097	-.035	.085	.098	.046	.065	.081	.022	-.356***	.120	.861*** .038	1		
<b>14. Stage of Change</b>	-.108	.030	-.013	.169**	-.127	-.003	.089	.106	-.004	-.080	.038	.068	.123*	-.04	.065 -.058	.001	1	

### **5.3. Regression Analysis**

In the following section, the model as described in the theoretical framework will be tested. The description of the statistical tools can be found in section 4.3. The analysis is based on the correlation matrix in Table 2.

#### **5.3.1. The effects of Motivational Determinants on the ‘Stages of Change’, controlled by the Baseline Variables**

The results of the binary logistical regression analysis are shown in table 3. In the section statistical analysis (4.3), four hypotheses are stated. These hypotheses are now tested. The verification of the four hypotheses is a precondition of the predictive value of the ASE Model.

**Table 3** Binary logistical Regression Model

Variable	Stage of Change (path C)		Stage of Change (Path b)	
	Sig	Odds Ratio	Sig	Odds Ratio
Educational Level	0.23	1,29	0.03	1.28
Self- Efficacy			0.09	1.40
Model	$\chi^2$ 5,61 R <sup>2</sup> .048			
	$\chi^2$ 8,32 R <sup>2</sup> .071			

H1) *Path A*: Significant correlations were found for the variables ‘Recent Attempt to Quit Smoking’, ‘Other Attempts to Quit Smoking’ and ‘Addiction Score’.

H2) *Path B*: The mediator ‘Self-Efficacy’ does affect the dependent variable ‘Stage of Change’.

H3) *Path C*: Only the baseline variable ‘Educational Level’ correlates significantly with the dependent variable ‘Stage of Change’. A correlation between the baseline variable ‘Educational Level’ and ‘Self- efficacy’ could not be found. This means, path C does not exist within this sample

H4) Based on the results of H3), H4) can be rejected.

### **5.3.2. Predicting Baseline Variables of the Motivational Determinants**

Based on the results of the correlation analysis, a linear regression on ‘Self-Efficacy’ is calculated. All other motivational determinants do not need to be assessed by a regression analysis. They did not show any significant correlation with the dependent variable ‘Self-Efficacy’.

Table 4 demonstrates the predictive value of the three correlating baseline variables with the motivational determinant ‘Self- Efficacy’ .

**Table 4:** Linear Regression Model on ‘Self- Efficacy’ with the correlating baseline variables

Dependent variable: Self- Efficacy		
Baseline variables	B	Sig
Other Attempts to Quit Smoking	.13	.280
Success of Recent Attempt to Quit	-.49	.001***
Addiction Score	-.39	.007***
F-model 5.43 with df (3,56)		
R <sup>2</sup> .24		
Adj. R <sup>2</sup> .19		
Sig .002***		

\* Significant at the 0.15 level (2-tailed)

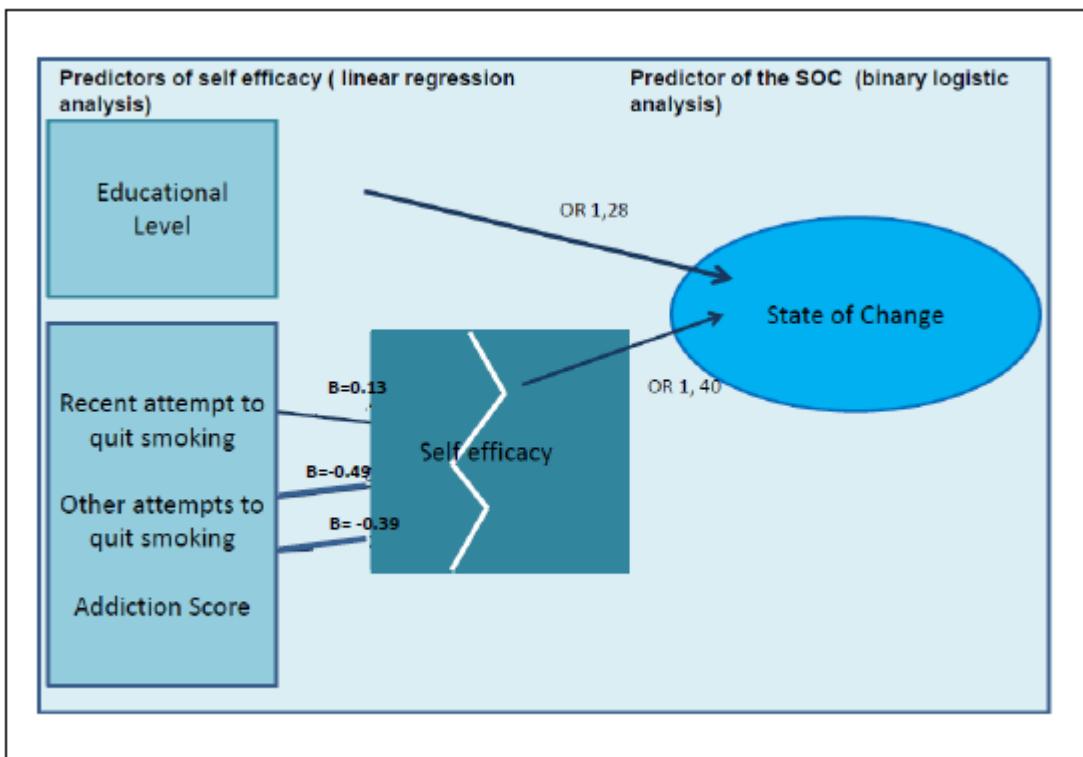
\*\* Significant at the 0.10 level (2-tailed)

\*\*\* Significant at the 0.05 level (2-tailed)

This analysis shows the most interesting results, indicating that 19 % of the motivational determinant ‘Self- Efficacy’ can be explained by the baseline variables ‘Other Attempts to Quit Smoking’ , ‘Success of Recent Attempt to Quit’ and ‘Addiction Score’ (adj. R<sup>2</sup> .192).

### **5.3.3. Summary of the Regression Analysis**

It can be concluded that the Model as suggested in the theoretical framework cannot be verified. Instead of this, a different model can be pictured based on the results of the analysis (see figure 2).



**Figure 2** Graphical demonstration of the combined results of the regression analyses.

The binary regression analysis has demonstrated that the dependent variable ‘Stage of Change’ can be partly predicted by the ‘Educational Level’ and by patient’s scores on ‘Self-Efficacy’. ‘Self’-Efficacy’ does not demonstrate to have any mediating effects but can itself be predicted by the baseline variables ‘Success of Recent Attempt to Quit Smoking’, ‘Presents of Other Attempts to Quit Smoking’ and the ‘Addiction Score’.

#### **5.4. Testing the Differences in Mean Group Levels of the Dependent Variable ‘Stage of Change’ and the Moderator ‘Self-Efficacy’.**

To test the differences in mean group levels an analysis of variance is applied to the variables ‘Stage of Change’ and ‘Self’- Efficacy, controlled by different baseline variables. Again, the analysis of variance is only applied to those baseline variables that demonstrated to be of predictive value. This analysis is done to support the results of the regression analysis. Moreover, it gives additional information about the effect baseline variables have on the ‘Stage of Change’ and ‘Self-Efficacy’.

#### **5.4.1. Analysis of Variation: Dependent Variable ‘Stage of Change’**

Table 5 demonstrates the presence of significant group differences of the dependent Variable ‘Stage of Change’ controlled by the baseline variable ‘Educational Level’ ( $p<0.5$ ). It provides information about the mean distribution in the ‘Stage of Change’ among the different levels of education.

Based on the mean values, a slight tendency of higher education going along with an increase in intention to ceases smoking can be noticed. Patients with the highest degree of education reached a mean score of 1. This number demonstrates that every patient, who went to University can be categorizes as ‘Preceptor’. Mean scores slowly decrease along with the ‘Educational Level’. This process is not linear.

**Table 5** Significance in Group differences of the dependent variable 'Sate of change'

Dependent variable: Stage of Change				
Group's mean level	Mean Square	F	Sig	
Educational Level	0.35	2,48	0.025	
Lower education	,62			
Junior secondary school	,78			
General secondary education (lower level)	,95			
General secondary education (higher level)	,89			
Pre- university education	,78			
University of professional educations	,81			
University	1,00			

#### **5.4.2. Analysis of Variation: ASE Determinant ‘Self-Efficacy’**

Table 6, demonstrates that group differences in ‘Self- Efficacy’ are of significant value when being controlled by the correlating baseline variables. These results support the predictive value of the baseline variables as calculated by the linear regression analysis. The mean score levels of the different group levels are shown. Based on the mean score levels it can be said that within this sample lower ‘Self- Efficacy’ scores go along with the unsuccessfulness of the recent attempt to quit. Furthermore, patients who have done other attempts to ceases smoking score higher on ‘Self- Efficacy’ than other patients.

**Table 6** Significance in group differences of the ASE Determinant 'Self- Efficacy'

Self- Efficacy	Groups mean	Mean Square	F	Sig
Success of recent attempt to quit		5,29	7,90	0.006
Successful	0.81			
Unsuccessful	0.28			
Other attempts to quit smoking		6,22	7,64	0.006
Present	0.26			
Absent	0.07			
Addiction score		2, 05	2,43	0.036

The mean score average of 'Self- Efficacy' divided by the five subgroups of 'Addiction' has the general tendency to decrease as 'Addiction scores' increase. This tendency is rather weak and therefore not demonstrated in Table 6.

## 6. Discussion and Conclusion

In this final section, the findings will be discussed and compared to relevant literature. Furthermore, some clinical implications will be given.

The most unexpected result of this study is the distribution of the 'Stages of Change'. Out of all 173 patients who indicated their intention to quit smoking only 82,2% intended to quit within the next month and can therefore be categorized as 'Preparators'. 18,2% indicated they wish to quit within the next 6 month, but not within the next month. In consideration of the fact that small numbers of 'Pre-contemplators' are added to this group, due to reliability reasons it can be assumed that a small percentage even intends to quit after 6 month. Common sense tells us to have different expectations of patients who attend a smoking cessation clinic. The result of this study is supported by other research that has been done on the characteristics of smokers in a smoking cessation clinic in China (Chan et al., 2009). However, the unexpected low number of 'Preparators' in the Chinese study is explained by the ignorance of the Chinese population regarding the negative effects of smoking (Chan et al, 2009). This explanation seems inapplicable within a Dutch context. The fact that many patients of smoking cessation clinics are transferred by a practitioner could be of explanatory

value. Many of them do not intent to quit smoking because they are convinced, but because they are advised to do so.

This study elaborates the effects of motivational determinants known from the ASE Model on the ‘Stages of Changes’ in patients of a Dutch cessation clinic. Both, the motivational determination and the ‘Stage of Change’ are controlled by baseline variables. Moreover, this study investigates the effect of baseline variables on the motivational determinants separately. Based on the results demonstrated in Section 4 it can be concluded that the ASE Model, as described in the theoretical framework, cannot be verified. Within this sample the motivational determinates are of no predictive value for the ‘Stages of Change’. ‘Attitude’, ‘Social Norm’ and the ‘Present of a Smoking Partner’ did not demonstrate any significant effects on the dependent variable. In contrast, ‘Self-Efficacy’ has a mildly predictive value.

The results are contradictory to most other temporary research. Other research done on this subject indicates that the motivational determinants ‘Attitude’, ‘Social Norm’, ‘Descriptive Norm’ and ‘Self-Efficacy’ have a significant effect on the intention to quit smoking (Chatzipolychroni et al., 2012). In a Norwegian study 26% of the intention to quit smoking could be predicted by the social cognitive determinants of the TPB (Kovač & Rise, 2011). It is important to notice that most research uses other definitions of the dependent variable ‘Intention to Quit’. In line with other research, ‘Self-Efficacy’ seems to have the strongest predictive value on the intention to quit smoking (Chatzipolychroni et al., 2012). Procheska en diClemente (1994) examined 187 smokers and categorized them into the five stages of the TTM. They found that higher ‘Self-efficacy’ was associated with the movement from stage ‘Precontemplation’ to ‘Contemplation’. Intercorrelation of the motivational determinants is furthermore supported by other research, based on the TPB (Dunn et al., 2011).

The finding that ‘Educational Level’ is a predictor of the intention to quit smoking is partly supported by literature. A longitudinal study of the U.S. population supports our findings. It indicates that a lower educational level can be associated with a weak intention to quit smoking (Abrams, 1995). Other research comparing family factors of male Vietnamese smokers indicates that a lower educational level has controversial effects and is associated with a stronger intention to quit smoking (Gildengorin, 2011). However, literature agrees that a low educational level is consistently associated with a high prevalence of smoking ([Centers for Disease Control and Prevention, 2007](#)).

The missing predictive value of the FTND on the ‘Stage of Change’ surprises compared to other research done on this subject. It is commonly known that the FTND is a rather permanent predictor of the intention to quit smoking and also of the ‘Stages of Change’ (Fu et al., 2011)

Even though the predictive value of the ASE Model on the ‘Stages of Change’ cannot be verified, this study has some interesting findings. It supports the idea that ‘Self-Efficacy’ might be affected by three baseline variables: ‘Addiction score’, ‘The Recent Success of Attempts to Quit’ and ‘Other Attempts Done to Quit’. Linear regression analysis indicates that 19 percent of the ‘Self- Efficacy’ scores can be explained by those variables.

A high addiction score is generally associated with a lower score of ‘Self- Efficacy’ regarding smoking cessation. This is in line with the findings of Dijkstra & Tomp (2002). They measured the effects of the FTND on physical and psychological tobacco dependence and found out that FTND is a reliable predictor of ‘Self-Efficacy’.

The study further indicated that patients who made earlier attempts to quit smoking and patients, who have been successful in their recent attempt to quit, score higher on the ‘Self-Efficacy’ scale compared to others who have not tried to cease and whose recent attempts were unsuccessful. Carefulness is recommended in the interpretation of these results. They could be bidirectional. A high score on ‘Self-Efficacy’ might not show the effect of the two variables. They might rather affect them. Many studies based on the TPB show that ‘Self-Efficacy’ influences the outcome of human plans (Ozdemir, 2010). For this reason it can be assumed that patients who belief in their skills to master the situation of smoke abstinence are more likely to attempt it and to succeed. Research on all kind of subjects demonstrates that the relationship between self-efficacy and success is mutual. The belief in the own mastery of a given situation enhances the changes to be successful. In turn, the successful handling of a given situation enhances the ‘Self- Efficacy’ (Bandura, 1982).

### ***6.1. Practical Implications***

Even though the ASE Model could not be verified as expected, the findings provide useful treatment and screening implications within the population studied. The study was designed to be highly sensitive towards the key characteristics of the baseline variables, the motivational determinates and the ‘Stage of Change’ of the patients treated in the smoking cessation clinic in Enschede. Due to the reliability analysis and the exclusion of some of the items and item scales, the study tried to stay as close to the sample as possible. On one hand, this makes it difficult to generalize the results of this study to other populations. (As mentioned in the

introduction, the composition of baseline variables, motivational determinants and the ‘Stage of Change’ can be very different in other populations. These differences make the results of this study difficult to generalize.) On the other hand, this makes it possible to provide a better treatment within the population itself.

Known that ‘Self-Efficacy’ might predict the ‘Stage of Change’, for the patients of the MST it can be recommended to bolster some patient’s ‘Self-Efficacy’ in order to reach a higher intention to quit smoking. ‘Self- Efficacy’ decreases when people accommodate to a situation they belief cannot be handled by themselves. The belief that smoking cannot be handled alone is widespread, but not true. Most smokers stop unspectacularly and alone (Becker et al., 1984). However, the belief in the impossible might be enhanced by smoking programs that place the smoker in a passive situation, dependent on the help of the practitioner. The feeling, that the situation cannot be mastered alone, grows. Therefore, programs that apply self-help modes might present the mastery of the situation in a light of the possible. This might enhance the coping strategies and the ‘Self-Efficacy’ of the patients. One effective way to enhance the ‘Self-Efficacy’ is to give small goals that can be reached. Achievements of small goals enhance ‘Self-Efficacy’ and subsequently higher goals can be set (Becker et al., 1984). Therefore, a recommendation for cessations clinics is to give the patients many small goals, they are actually able to reach.

The findings of the study might also be useful in the screening procedure for those patients, whose ‘Self-Efficacy’ needs to be bolstered. The screening procedure can be done by the assessment of the FTND and questions about ‘the Successfulness of the Recent Attempt to Quit’ and ‘The Presents of Other Attempts to Quit’. These three baseline variables can be used to give an estimation of the patient’s ‘Self-Efficacy’ at the initial appointment. The value can subsequently be used to calculate the likeliness of the patient’s readiness to quit.

A follow up study of a smoking cessation clinic, indicates that ‘subjective feeling of addiction’ is a predictor of the success of smoking cessation. A study done by Sanders et al. (1993) divided the feeling of intention in three groups of ‘slight’, ‘fair ‘and ‘extreme’. Based on the category, it was a strong predictor of the initial effect of smoking cessation and a slight predictor of the sustained effect of smoking cessation. A measurement of the subjective feelings of addiction might be useful in addition to the FNTD.

## **6.2. Limitations and Recommendations**

Like most research studies, this study is not without limitations. In this section limitations of the study are discussed and recommendations for further research on similar subjects provided.

Combinations of the ASE Model and the TTM used in this study could not be found in the literature. Therefore the result of this study cannot be compared with earlier research. However, the two models have been separately used for many research studies. The predictive value of the ASE Model became highly acknowledged during the last years. In contrast, even though it is a temporarily frequently used model the TTM has earned much criticism. The organization of different ‘Stages of Change’ as suggested by the TTM might partly account for the unexpected outcomes of this study. West (2005), who can be regarded as an opponent of the TTM criticizes the Model for the following reasons:

First of all the boundaries between the different ‘Stages of Change’ are arbitrary and not genuine. People who intend to cease within the next 30 days are accounted as ‘Preparators’. Crossing the boarder between day 30 and day 31 patients are put in a different category of ‘Stage of Change’. In consideration that such small changes can affect the outcome of the TTM in such an enormous way, the validity of the model has to be put into question (West, 2005). Secondly, the multiple respond system of the TTM implies that all individuals make coherent and stable plans. It can be assumed that people who respond to multiple questions choose the answer that agrees with their opinion the most, but it does not guarantee that the response given coincides completely with their opinion (West, 2005). West (2005) goes even further, he indicates that the TTM says no more than “people who want or plan something are obviously more likely to try to do it, and people who try are more likely to succeed than those who do not” (West, 2005,p.1037). He indicated that the TTM does not have any more explanatory value than everyone’s common sense.

His criticism put the whole concept of the TTM into questions. Based on this the validity of this study can be doubted. If the ‘Stages of Change’ have a low validity, the intention to quit smoking might be measured in an ineffective and incorrect way. The missing results of the ASE Model as a predictive model for the intention to quit smoking might lack its effects due to the dependent variable ‘Stage of Change’. This might also explain the high percentage of ‘Contemplators’. The answer system of the TTM does not give the possibility to define their

intention in a more accurate manner. It only offers the possibility to choose the answer that suits best among a continuum of time.

Different measurement criteria's about the intention to quit are necessary. Many research studies use simple 'yes or no' answer question, when evaluating the general tendency of the patient's intention to quit. Follow-up questions such as the reason why they wish to quit, their positive and negative feelings including anxiety, could lead to a more detailed picture of their readiness to quit smoking. (Abu Saleh et al.,2005)

This study is based on the idea that the 'Stages of Change' predict the success of smoking. Due to limited possibilities the accuracy of this assumption could not be tested. A follow up study that assesses the actual number of smokers that stayed abstinent could lead to treatment implications of higher value. To consider different criteria regarding the intention to quit smoking might be a valuable recommendation.

Even though it will not be mentioned anymore, the poor validity of the 'Stage of Change' has to be taken into account regarding the criticism of the measurements of depression and the withdrawal symptom

Research supposes that the depression score influence the intention of patients to quit smoking (Blosnich al al, 2012). The missing effect of cognitive depression on the intention to quit smoking might be explained by the measurement of depression as used in this study. As already mentioned, the BDI is screening for depression. The measurement was developed by Beck in 1961, based on clinical observations about the cognitions and symptoms often displayed by depressed patients. The sample of this population is expected to reach much lower scores on a depression scale than the population whom the measurement was invented for. Patients may not have reached the cut off of the score. The general tendency of smokers to have a higher score of negative affectivity has been proved in many studies. Negative affectivity is defined as an emotional status of a person that is suspicious, but not clinical relevant enough that it could be called as psychological disorder. A clinical trial found out that 20% of the patients with negative affectivity scored higher than the general population. The success of smoking cessations was reduced by negative affectivity (Cosc et al., 2009). A more sensitive measurement of negative affectivity could result in a higher value within this sample population, than the assessment of the BDI.

The missing effects of withdrawal symptoms can be explained by two factors. First of all, WSWs does not give any indication about the time span of nicotine abstinence. Research indicates that the severity of withdrawal symptoms is highest after seven days, decreased within the first month, but the craving for a cigarette increases again afterwards (Dawkins et al. 2009). The findings are in line with other research done by Bolman (2012). His work indicates a high relapse rate after about 3 month. For an accurate measurement of withdrawal symptoms, it is necessary to assess the time span of abstinence.

Secondly, the WSWs had been answered at the first appointment with the practitioner after the initiation of smoking cessation. By this time, they actually experience withdrawal symptoms. By the time the patients fill in the SRQ and answer the questions about their intention to quit, they do not feel any withdrawal symptoms. They have not stopped smoking yet. Even if the patients would be able to think about future withdrawal symptoms, it might not reflect the reality of the nicotine deprivation they will experience. The measurement, as assessed in this study, might be better suited for the research on the success of patients who already started to cease smoking. Withdrawal symptoms are known to be a significant predictor for the success of the smoking cessation (Dorner et al., 2011). A measurement about the patient's personal anxieties of smoking withdrawal symptoms might be more suited for research done in this study.

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# Appendix

## A1. The measurements

### A.1.1. *Smoking related questionnaire*

Datum : \_\_\_\_ / \_\_\_\_ / \_\_\_\_

[

Patiëntnummer : \_\_\_\_\_

Geboortedatum : \_\_\_\_ / \_\_\_\_ / \_\_\_\_

]

Naam :  mw.  hr.

\_\_\_\_\_

| Lees a.u.b. zorgvuldig de instructie door en indien u iets niet begrijpt kunt u dit vragen.

Denkt u a.u.b. niet te lang na over uw antwoorden.

#### Hoe moet u de vragenlijst invullen?

Bij de meeste vragen kunt u kiezen uit twee of meerdere antwoorden. U moet het hokje bij het gekozen antwoord aankruisen. Soms mag u daarna één (of meerdere) vragen overslaan. Dit staat dan bij de vraag vermeld. Bij sommige vragen moet u het antwoord op de stippellijn invullen. Soms kunt u meerdere antwoorden aankruisen; dit wordt dan bij de vraag vermeld. Verder zijn er vragen waarbij u moet doorhalen wat niet van toepassing is. Dit staat dan vermeld.

#### Nu volgt een aantal voorbeelden:

Bij sommige vragen kunt u kiezen uit meerdere antwoorden. U moet het hokje aankruisen dat bij uw gekozen antwoord staat. Bijvoorbeeld:

##### A. Hoe vaak kijkt u naar het journaal?

Minder dan één keer per dag

Eén keer per dag

3

7

- Twee keer per dag

Soms mag u na een bepaald antwoord een of meer vragen overslaan. Dit staat dan altijd vermeld. Hier mag u vraag C overslaan wanneer u nooit films kijkt.

**B. Kijkt u wel eens speelfilms op TV?**

- Ja  
 Nee (ga naar vraag D)

Ook komt het voor dat u het antwoord op de vraag in kunt vullen op een stippellijn of in de hokjes. Voorbeelden:

**C. Hoeveel speelfilms kijkt u gemiddeld per jaar op TV?**

..12... Speelfilms

Daarnaast zijn er vragen waarbij meerdere antwoorden mogelijk zijn. Dit staat dan aangegeven. Bijvoorbeeld:

**D. Naar welk(e) soort(en) TV programma(s) kijkt u regelmatig?**

(meerdere antwoorden mogelijk)

- Spelletjes programma's  
 Soaps  
 Actualiteiten programma's  
 Sportprogramma's

Ten slotte zijn er vragen waarbij wat niet van toepassing is moet worden doorgestreept, en waarbij op een stippellijn een bepaalde waarde moet worden ingevuld. Bijvoorbeeld:

**E. Hoe lang heeft de langste periode geduurd waarin u een TV serie heeft gevolgd?**

..4... ~~Dagen / weken / maanden~~ / jaren (Doorhalen wat niet van toepassing is)

**Dan volgen nu de vragen:**

Een aantal vragen gaat over uw ideeën over stoppen met roken. In de vragen wordt gesproken over 'blijvend niet roken'. Als u nu rookt, moet u zich voorstellen dat u bent gestopt en het niet-roken volhoudt. Als u een ex-roker bent, betekent dit dat u het niet-roken volhoudt.

**1. Als ik blijvend niet rook,**

- verbetert mijn gezondheid veel  
 verbetert mijn gezondheid

- verbetert mijn gezondheid een beetje
- verbetert mijn gezondheid niet
- weet niet

**2. Als ik blijvend niet rook, ga ik de gezelligheid van het roken**

- erg missen
- missen
- een beetje missen
- niet missen
- weet niet

**3. Als ik blijvend niet rook, wordt mijn kans op longkanker**

- veel kleiner
- kleiner
- een beetje kleiner
- niet kleiner
- weet niet

**4. Als ik blijvend niet rook, kan ik me**

- veel minder ontspannen
- minder ontspannen
- een beetje minder ontspannen
- niet minder ontspannen
- weet niet

**5. Als ik blijvend niet rook, ben ik over mezelf**

- heel tevreden
- tevreden
- een beetje tevreden
- niet tevreden
- weet niet

**6. Als ik blijvend niet rook, krijg ik**

- veel last van ontwenningsverschijnselen
- last van ontwenningverschijnselen
- een beetje last van ontwenningsverschijnselen
- geen last van ontwenningsverschijnselen
- weet niet

**7. Als ik blijvend niet rook, is dat voor de gezondheid van de mensen om me heen**

- veel beter
- beter
- een beetje beter
- niet beter
- weet niet

**8. Als ik blijvend niet rook,**

- verveel ik me veel vaker
- verveel ik me vaker
- verveel ik me een beetje vaker
- verveel ik me niet vaker
- weet niet

De volgende vragen gaan over de mensen in uw omgeving en hoe zij tegenover het roken en het stoppen met roken staan.

	sterk	gemiddeld	weinig	nee	niet van toepassing
--	-------	-----------	--------	-----	---------------------

**9. Stimuleert uw partner u om blijvend niet te roken?**

**10. Stimuleren uw kinderen u om blijvend niet te roken?**

**11. Stimuleert uw familie u om blijvend niet te roken?**

**12. Stimuleren uw vrienden u om blijvend niet te roken?**

**13. Stimuleren uw collega's u om blijvend niet te roken?**

**14. Rookt uw partner?**

Ja

Nee

Niet van toepassing

(Bijna) allemaal rokers	Meer dan de helft rokers	Ongeveer evenveel rokers als niet-rokers	Minder dan de helft rokers	(Bijna) geen rokers	Niet van toepassing
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**15. Hoeveel van uw thuiswonende kinderen roken?**

**Er zijn situaties waarin het gemakkelijk is om niet te roken. In andere situaties kan het moeilijker zijn. In de volgende vragen wordt er telkens een situatie geschatst.**

**16. Hoeveel van uw familieleden roken?**

**17. Hoeveel van uw vrienden roken?**

**18. Hoeveel van uw collega's roken?**

Kunt u aangeven of het u zal lukken om niet te roken in die situaties?

De volgende vragen gaan over wat u in de toekomst van plan bent.

**N.B. Vraag 25 alleen invullen wanneer u na de stoppoging weer rookt (u bent teruggevallen). In andere gevallen kunt u verder gaan met vraag 26.**

	Zeker wel	Waarschijnlijk wel	Neutraal	Waarschijnlijk niet	Zeker niet	Weet niet
U voelt zich gestrest of gespannen. Lukt het u dan om niet te roken?	<input type="checkbox"/>					
U bent (erg) kwaad. Lukt het u dan om niet te roken?	<input type="checkbox"/>					
U bent uit (bv. in een café op een feestje of op visite). Lukt het u dan om niet te roken?	<input type="checkbox"/>					
U voelt zich (erg) somber. Lukt het u dan om niet te roken?	<input type="checkbox"/>					
U krijgt een sigaret van uw eigen merk aangeboden. Lukt het u dan om niet te roken?	<input type="checkbox"/>					
U ziet iemand genieten van het roken. Lukt het u dan om niet te roken?	<input type="checkbox"/>					

**25. Bent u van plan te stoppen met roken in de toekomst?**

- Ja, binnen 1 maand
- Ja, binnen 6 maanden, maar niet in de komende maand
- Ja, binnen een jaar, maar niet in de komende 6 maanden
- Ja, binnen vijf jaar
- Ja, maar niet binnen 5 jaar
- Nee, niet van plan om te stoppen

Kunt u hieronder aangeven welke rookwaar u rookt en hoeveel u ervan rookt?

Rookt u sigaretten, dus niet zelf gerold?  
(meer antwoorden mogelijk)

- Ja:  Teer- en nicotine arme filtersigaretten (niet zelf gerold)
- Andere sigaretten met filter (niet zelf gerold)
- Sigaretten zonder filter (niet zelf gerold)
- Ik rook geen sigaretten

**26. Rookt u shag (zelf gerolde sigaretten of zelfgemaakte filter sigaretten)?  
(meer antwoorden mogelijk)**

- Ja:
- Zware shag
- Half zware shag
- Lichte shag
- Ik rook geen shag

**27. Hoeveel sigaretten en/of shagjes rookt u gemiddeld totaal per dag?**

..... Sigaretten en shagjes per dag

- Niet van toepassing

**28. Rookt u pijptabak?**

- Wel pijptabak
- Geen pijptabak

**29. Hoeveel pijptabak rookt u gemiddeld per week?**

- Minder dan 25 gram per week
- 25 gram of meer per week
- Niet van toepassing

**31. Rookt u sigaren of cigarillo's**

- Wel sigaren of cigarillo's
- Geen sigaren of cigarillo's

**32. Hoeveel sigaren of cigarillo's rookt u gemiddeld per week**

..... Sigaren of cigarillo's per week

Niet van toepassing

Nu volgt een aantal vragen over het ondernemen van de stoppoging.

*N.B. Als u zich in de periode na de stopdag bevindt, ga dan verder met vraag 36.*

**33. Heeft u de afgelopen 7 dagen één of meer sigaretten (en / of shagjes, sigaren, pijp) gerookt?**

Ja

Nee (ga naar vraag 36)

**34. Heeft u de afgelopen 24 uur één of meer sigaretten (en / of shagjes, sigaren, pijp) gerookt?**

Ja (ga naar vraag 37)

Nee

**35. Heeft u sinds uw stoppoging gerookt, al was het maar één sigaret of shagje, en hoe lang is dat geleden?**

Ja, korter dan 6 maanden geleden gerookt

Ja, langer dan 6 maanden geleden gerookt

Nee

Nu volgt een aantal vragen over stoppogingen die u ooit ondernam

**36. Heeft u behalve deze poging vaker geprobeerd om te stoppen met roken?**

Ja

Nee (ga naar vraag 42)

**37. Heeft u het bij zo'n poging om te stoppen met roken wel eens 24 uur of langer volgehouden om niet te roken?**

Ja ..... keer

Nee

**38. Welke hulpmiddelen heeft u wel eens gebruikt om te stoppen met roken?**

Geen hulpmiddelen gebruikt

Niet-roken cursus in de vorm van groepsbegeleiding

Niet-roken cursus in de vorm van individuele begeleiding

- Nicotine kauwgom
- Nicotine pleisters
- Nicotine neusspray
- Anti-rook pil (Zyban, bupropion SR)
- Andere hulpmiddelen of methodes namelijk .....

**39. Hoe lang heeft de langste periode geduurd waarin u gestopt was met roken (sinds u begon met regelmatig roken)?**

..... Dagen / weken / maanden / jaren (doorhalen wat niet van toepassing is)

- Weet ik niet

**40. Hoe lang duurde uw laatste poging om te stoppen met roken?**

..... Dagen / weken / maanden / jaren (doorhalen wat niet van toepassing is)

- Weet ik niet

**41. Hoe lang geleden was de laatste stoppoging die u 24 uur of langer heeft volgehouden?**

..... Dagen / weken / maanden / jaren (doorhalen wat niet van toepassing is)

- Weet ik niet

Nu volgt een aantal vragen over uw rookgewoonte.

**42. Hoe snel na het ontwaken steekt u uw eerste sigaret of shagje op?**

- Binnen 5 minuten
- 6-30 minuten
- 31-60 minuten
- Na 60 minuten

**43. Vindt u het moeilijk om niet te roken op plaatsen waar het verboden is? (bv. Bioscoop, bibliotheek, kerk, school, ziekenhuis)**

- Ja

Nee

**44. Welke sigaret of shagje zou u het moeilijkst op kunnen geven?**

De eerste 's morgens

Een andere

**45. Rookt u in de eerste uren na het opstaan meer per uur, dan gedurende de rest van de dag?**

Ja

Nee

**46. Rookt u als u ziek bent en het grootste deel van de dag in bed ligt?**

Ja

Nee

**47. Hoe oud was u toen u voor het eerst een sigaret uitgeprobeerd hebt?**

Jonger dan 8 jaar

12 jaar

8 jaar

13 jaar

9 jaar

14 jaar

10 jaar

15 jaar of ouder

11 jaar

De volgende vragen gaan over een aantal persoonlijke gegevens:

**48.Teléfono thuis .....** (evt. uw mobiele telefoonnummer)

**49.Teléfono werk .....**

**50.Beste tijd om telefonisch contact met u op te nemen?**

..... Uur (thuis) ..... Uur (werk)

**51.Wat is uw hoogste schoolopleiding ( al of niet voltooid) ?**

- Lager Onderwijs of Voortgezet Lager Onderwijs
- LBO (Lager beroepsonderwijs); bv. LEAO, LHNO, LTS
- ULO, MULO, 3-jarige HBS, MAVO
- MBO (Middelbaar beroepsonderwijs); bv. MEAO
- 5 jarige HBS, HAVO, MMS, VWO, Atheneum of Gymnasium
- HBO (hoger beroepsonderwijs)
- Universiteit, Hogeschool

**52.Wat is uw laatst uitgeoefende beroep? (N.B. Huisvrouw telt ook als beroep)**

.....

**54.Bent u daarin nu nog actief werkzaam?**

- Ja
- Nee

**Hartelijk dank voor uw medewerking!!**

### **A.1.2. Beck's Depression Inventory Questionnaire**

Lees a.u.b. zorgvuldig de instructie door en indien u iets niet begrijpt kunt u dit vragen. Denkt u a.u.b. niet te lang na over uw antwoorden.

#### **BDI vragenlijst**

Deze vragenlijst bestaat uit een aantal uitspraken die in groepen bij elkaar staan (1 tot en met 21). Leest u iedere groep aandachtig door. Kruis dan bij elke groep die uitspraak aan, die het best weergeeft hoe u zich **de afgelopen week, met vandaag erbij**, gevoeld heeft. Let er op dat u eerst alle uitspraken van een bepaalde groep leest, voordat u uw keuze maakt. Sla geen groep van uitspraken over, kruis steeds één hokje per groep aan.

1.     Ik voel me niet verdrietig.  
       Ik voel me verdrietig.  
       Ik ben voortdurend verdrietig en kan het niet van me afzetten.  
       Ik ben zo verdrietig of ongelukkig dat ik het niet meer verdragen kan.
  
2.     Ik ben niet bijzonder moedeloos over de toekomst.  
       Ik ben moedeloos over de toekomst.  
       Ik heb het gevoel dat ik niets heb om naar uit te zien.  
       Ik heb het gevoel dat de toekomst hopeloos is en dat er geen kans op verbetering is.
  
3.     Ik voel me geen mislukkeling.  
       Ik heb het gevoel dat ik vaker iets verkeerd heb gedaan dan een gemiddeld iemand.  
       Als ik op mijn leven terugkijk zie ik alleen maar een hoop mislukkingen.  
       Ik heb het gevoel dat ik als mens een volledige mislukking ben.
  
4.     Ik beleef overall net zoveel plezier aan als vroeger.  
       Ik geniet niet meer zo als vroeger.  
       Ik vind nergens nog echte bevrediging in.

Ik heb nergens meer voldoening van, ik vind alles vervelend.

5.  Ik voel me niet bijzonder schuldig.

Ik voel me vaak schuldig.

Ik voel me meestal schuldig.

Ik voel me voortdurend schuldig.

6.  Ik heb niet het gevoel dat ik ergens voor gestraft word.

Ik heb het gevoel dat ik nog wel eens gestraft zal worden.

Ik verwacht dat ik gestraft zal worden.

Ik heb het gevoel dat ik nu gestraft word.

7.  Ik voel me niet teleurgesteld in mezelf.

Ik ben teleurgesteld in mezelf.

Ik walg van mezelf.

Ik haat mezelf.

8.  Ik heb niet het gevoel dat ik slechter ben dan iemand anders.

Ik heb kritiek op mezelf vanwege mijn zwakheden of fouten.

Ik geef mezelf steeds de schuld van mijn gebreken.

Ik geef mezelf de schuld van al het slechte dat er gebeurt.

9.  Ik overweeg absoluut niet om een eind aan mijn leven te maken.

Ik overweeg wel eens om een eind aan mijn leven te maken, maar ik zou dat nooit doen.

Ik zou een eind aan mijn leven willen maken.

Ik zou een eind aan mijn leven willen maken als ik de kans kreeg.

10.  Ik huil niet meer dan normaal.  
 Ik huil nu meer dan vroeger.  
 Ik huil nu voortdurend.  
 Ik kon vroeger wel huilen, maar nu kan ik het niet meer, ook al wil ik het.
11.  Ik erger me niet meer dan anders.  
 Ik raak sneller geërgerd of geprikkeld van vroeger.  
 Ik erger me tegenwoordig voortdurend.  
 Ik erger me helemaal niet meer aan dingen waaraan ik mij vroeger ergerde.
12.  Ik heb mijn belangstelling voor andere mensen niet verloren.  
 Ik heb nu minder belangstelling voor andere mensen dan vroeger.  
 Ik heb mijn belangstelling voor andere mensen grotendeels verloren.  
 Ik heb mijn belangstelling voor andere mensen helemaal verloren.
13.  Ik neem nu nog net zo makkelijk beslissingen als vroeger.  
 Ik stel het nemen van beslissingen meer uit dan vroeger.  
 Ik heb meer moeite met het nemen van beslissingen.  
 Ik kan helemaal geen beslissingen meer nemen.
14.  Ik heb niet het gevoel dat ik er minder goed uitzie dan vroeger.  
 Ik maak me er zorgen over dat ik er oud en onaantrekkelijk uitzie.  
 Ik heb het gevoel dat mijn uiterlijk blijvend veranderd is, waardoor ik er onaantrekkelijk uitzie.  
 Ik geloof dat ik er lelijk uitzie.
15.  Ik kan mijn werk ongeveer even goed doen als vroeger.  
 Het kost me extra inspanning om ergens aan te beginnen.

Ik moet mezelf er echt toe dwingen om iets te doen.

Ik ben tot helemaal niets meer in staat.

16.  Ik slaap even goed als anders.

Ik slaap niet zo goed als vroeger.

Ik word 's morgens één tot twee uur eerder wakker dan gewoonlijk en kan moeilijk weer in slaap komen.

Ik word uren eerder wakker dan vroeger en kan dan niet meer in slaap komen.

17.  Ik word niet sneller moe dan anders.

Ik word eerder moe dan vroeger.

Ik word moe van bijna alles wat ik doe.

Ik ben te moe om ook maar iets te doen.

18.  Ik heb niet minder eetlust dan anders.

Ik heb minder eetlust dan vroeger.

Ik heb veel minder eetlust dan vroeger.

Ik heb helemaal geen eetlust meer.

19a.  Ik ben zo goed als niets afgevallen de laatste tijd.

Ik ben meer dan 2 kilo afgevallen.

Ik ben meer dan 4 kilo afgevallen.

Ik ben meer dan 6 kilo afgevallen.

19b. Ik probeer af te vallen door minder te eten:  ja  nee

20.  Ik maak me niet meer zorgen over mijn gezondheid dan vroeger.

Ik maak me zorgen over lichamelijke problemen, bijv. als ik ergens pijn voel, als mijn maag van streek is, als ik last heb van verstoppingen, etc.

Ik maak me veel zorgen over mijn lichamelijke problemen en het valt niet mee om aan iets anders te denken.

Ik maak me zoveel zorgen over mijn lichamelijke problemen, dat ik aan niets anders meer kan denken.

21.  Ik ben me niet bewust dat er de laatste tijd iets veranderd is aan mijn belangstelling voor seks.

Ik heb minder belangstelling voor seks dan vroeger.

Ik heb tegenwoordig veel minder belangstelling voor seks.

Ik heb mijn belangstelling voor seks helemaal verloren.

### **A.1.3. Wisconsin Smoking Withdrawal Scale**

Lees a.u.b. zorgvuldig de instructie door en indien u iets niet begrijpt kunt u dit vragen. Denkt u a.u.b. niet te lang na over uw antwoorden.

Beantwoordt u a.u.b. de volgende vragen op basis van hoe u zich in de afgelopen 24 uur heeft gevoeld of wat u heeft gemerkt. Baseer uw antwoorden op hoe u zich gedurende deze tijd in het algemeen heeft gevoeld. Omcirkel bij iedere vraag een cijfer.

		Zeer mee oneens	Mee onees	Neutral	Mee eens	Zeer mee eens
1.	Eten trok me niet bijzonder aan.	0	1	2	3	4
2.	Ik sliep rustig.	0	1	2	3	4
3.	Ik was gespannen of bezorgd.	0	1	2	3	4
4.	Mijn concentratieniveau was uitstekend.	0	1	2	3	4
5.	Ik werd 's nachts vaak wakker.	0	1	2	3	4
6.	Ik was ongeduldig.	0	1	2	3	4
7.	Ik voelde me uitgelaten en optimistisch.	0	1	2	3	4
8.	Ik maakte me zorgen over mijn problemen.	0	1	2	3	4
9.	Ik had vaak de sterke behoefte om te roken.	0	1	2	3	4
10.	Ik voelde me de laatste tijd kalm.	0	1	2	3	4
11.	Ik had last van het verlangen om een sigaret te roken.	0	1	2	3	4
12.	Ik voelde me droevig of gedepimeerd.	0	1	2	3	4
13.	Ik was geïrriteerd, snel boos.	0	1	2	3	4
14.	Ik wilde kunnen kauwen op tussendoortjes of snoepjes.	0	1	2	3	4

15. Ik had last van negatieve stemmingen zoals woede, frustratie en geïrriteerdheid.	0	1	2	3	4
16. Ik at veel.	0	1	2	3	4
17. Ik was tevreden over mijn slaap.	0	1	2	3	4
18. Ik voelde me gefrustreerd.	0	1	2	3	4
19. Ik voelde me hopeloos en ontmoedigd.	0	1	2	3	4

		Zeer mee oneens	Mee oneens	Neutraal	Mee eens	Zeer mee eens
20. Ik dacht veel aan roken.	0	1	2	3	4	
21. Ik voelde me hongerig.	0	1	2	3	4	
22. Ik had het gevoel dat ik genoeg slaap krijg.	0	1	2	3	4	
23. Het was moeilijk om ergens aandacht aan te besteden.	0	1	2	3	4	
24. Ik voelde me gelukkig en tevreden.	0	1	2	3	4	
25. Mijn slaap werd verstoord.	0	1	2	3	4	
26. Ik had moeite om niet aan sigaretten te denken.	0	1	2	3	4	
27. Het was moeilijk geweest om helder te denken.	0	1	2	3	4	
28. Ik dacht veel aan eten.	0	1	2	3	4	

## A.2. Scoring Systems of the Measurements

### A.2.1. Scoring System of the ‘Smoking Related Questionnaire’

**Table A1.** Scoring system of motivational determinates

Determinants	Question number	Question format	Scoring system
Social Norm	9-13	5-point Likert Scale	1=3, 2=2, 3=1, 4=0, 5=0
Descriptive Norm	14	3-choice respond format	Yes=1, all others= 0
	15-18	6-piont Likert Scale	1=4, 2=3, 3=2, 4=1, 5=0, 6=99
Self- Efficacy	19-24	6-piont Likert Scale	1=2, 2=1, 3=0, 4=-1, 5=-2, 6=0
Attitude			
Advantages of smoking cessation	1,3,5,7	5-choice respond format	1=3, 2=2, 3=1, 4=0, 5=0
Disadvantages of smoking cessation	2,4,6,8	5-choice respond format	1=-3, 2=-2, 3=-1, 4=0, 5=0

**Table A1a** Scoring system of proximal the baseline variables and the Stage of Change

Variables measured	Questions	Question format	Scoring system
Stage of change	25	6-choice response format	1=1, 2=1, 3=0, 4=0, 5=0, 6=0
Smoking behavior	26,27,29,30,31,32	Not included in the research of this study	
Attempts to quit	33,34,36,37	Yes/No question	Yes= 1, No=0
	35	3-choice response system	1=1, 2=1, 3= 0
Medical supporters	38	8-choice answer system	1=1, 2=0, 3=0, 4=0, 5=0, 6=0, 7=0, 8=0
Success of attempts to quit	39,40,41	Open questions	No scoring system
Degree of Addiction	42	4-choice response format	1=3, 2=2, 3= 1, 4=0
	43,44,45,46	Yes/No answer format	Yes=1, No=0
	28	Open Question	0-10= 0, 10-20=1 , 20-30=2, More than 30=3
	Sum score of 42-46 and 28 indicates the addiction value		0-2= very low, 3= low, 4= a little, 5= addicted, 6-10= strong
Age at a baseline	47	9-choice response format	1=9, 2=8, 3=7, 4=6, 5=5, 6=4, 7=3, 8=2, 9=1
Educational level	51	6- choice response system	1=7, 2=6, 3=5, 4=4, 5=3, 6=2, 7=1

#### **A2.2. Scoring System ‘Beck’s Depression Inventory’**

**Table A2** Scoring system of the 'Beck's depression inventory'

<b>The Beck's depression inventory scale</b>	
Every answer was scored on a 4 point Likert Scale 1=0, 2=1, 3=2, 4=3 and subsequently added.	
Score	Degree of Affective disorder
<b>0 &lt;10</b>	No or minimal depression
<b>10-18</b>	Moderate depression
<b>19-29</b>	Moderate to serve depression
<b>30-63</b>	Serve depression

#### *A2.3. Scoring System of the ‘Wisconsin Smoking Withdrawal Scale’ (WSWS)*

**Tabel A3.** Scoring system of the WSWS

Wisconsin Smoking Withdrawal Scale	
All Items are measured on a 5- point Likert Scale	1=0, 2=1, 3=2, 4=3, 5=4
Ranking from `I strongly disagree` to `I strongly agree`	0= almost no withdrawal symptoms 5= very strong withdrawal symptoms
The mean of the item gives information about the strength of withdrawal symptoms experienced.	

**A.3. Reliability of the Smoking related questionnaire.**

**Table A4.** Reliability of the measurement scales

Scale	Chronbach`s alpha	Items deleted	Chronbach`s Alpha
Items that define the scale			
<b>Attitude:</b>	<b>0.49</b>	Health Improvement	<b>0.623</b>
1.Health		Lung Cancer	
2.Improvement		Health of the surrounding	
3.Social Live			
4.Lung Cancer			
5.Ability to Relax			
6.Confidence			
7.Withdrawal			
8.Symptoms			
9.Health of the surrounding			
10.Boardness			
<b>Social Norm:</b>	<b>0.554</b>	Stimulation Partner	<b>0.608</b>
1.Support of Partner			
2 Support of Children			
3.Support of Family			
4.Support of Friends			
5.Support of Colleges			
<b>Descriptive Norm:</b>	<b>0.360</b>	Smoking Partner	<b>0.38</b>
1.Smoking Partner			
2.Smoking Children living at home		Not reliable enough scale is substituted by the item 'Presents of a Smoking Partner'	
3.Smoking Family members			
4.Smoking friends			
5.Smoking colleges			

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<b>Self-Efficacy:</b>	<b>8.45</b>	No item had to be excluded.
1.Stress		
2.Anger		
3.Sadness		
4.Cigarette Offer		
5.Watch someone enjoy		
<b>Attempts to quit smoking:</b>	<b>0.67</b>	No item had to be excluded.
1.Smoking of cigarettes in the last 7 days		
2.Smoking of cigarettes in the last 24 h		
3.Smoking of cigarettes after the attempt to quit		
4. Any earlier attempts to quit?		
5. Nicotine abstinence that lasted longer than 24 h.		
<b>Degree of addiction</b>	<b>0.63</b>	No Item had to be deleted.
1.Amount of cigarettes smoked		
2 Time span of first cigarette after getting up		
3. Difficulties not to smoke in places, where it is forbidden.		
4.Cigarette that is most difficult to give up		
5.Increased amount of smoking in the morning		
6.Smoking while being sick.		

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