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The influence of smoking cessation interventions on the smoking prevalence and intention to quit for different subgroups

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Abstract

Academic and Societal Relevance: Little is known about the influence of smoking cessation interventions on intentions to quit. For governments, nationally and internationally, this study is highly relevant for policy-making to increase knowledge about effects of smoking cessation interventions on intentions to quit smoking. **Objective:** The objective of this thesis is to determine the influence of smoking cessation interventions on the intention to quit smoking and smoking prevalence for differences in sex, age-categories and socio-economic status in the Netherlands between 2000 and 2010. **Methods:** The obtained data for intentions to quit and smoking prevalence are available for different sex, age-categories and socio-economic status from Stivoro. Linear Regression analysis was used to determine the influence of smoking cessation interventions on the intentions to quit. **Results:** Increasing smoking cessation interventions have led to higher intentions to quit smoking for both males and females however these intentions have not led to decreasing smoking prevalence for females between after 2008. Looking at differences between age-categories we can determine that increasing smoking cessation interventions have led to higher intentions to quit smoking. However for the 15-19 age-category these rising intentions to quit have not resulted in a decreasing smoking prevalence for that age-category. Increasing smoking cessation interventions have had increasing effects on the intentions to quit smoking for high, middle and low socio-economic groups, however the gap in smoking prevalence between high and low socio-economic groups widened. **Conclusion:** For many different subgroups cessation interventions have led to increasing intentions to quit smoking and decreasing smoking prevalence, except for females, the 15-19 age-category and low socio-economic status groups.

Keywords: smoking cessation interventions, intention to quit smoking, smoking prevalence, linear regression, Netherlands

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1. Introduction

1.1 Background

Smoking is a worldwide phenomenon and governments of many different countries have implemented different smoking cessation interventions to diminish their smoking prevalence. Nowadays, it is widely studied and well-known that smoking is a risk factor and can result in different kind of diseases. The task of governments to diminish their smoking prevalence is of main importance for the public health in a country. Still nowadays, unfortunately many deaths are due to smoking related diseases. This is why policy-making towards smoking, is an important measure to diminish the smoking prevalence, and as an outcome diminish the smoking related diseases and deaths.

If we look to the Netherlands in particular we see that different smoking cessation interventions have been implemented and the task to promote public health is even recorded in the Dutch Constitution:

Article 22 paragraph 1: "The government shall take measures to promote public health"

The sentence stated above stems from the Dutch Constitution and confirms one of the tasks of the Dutch government. In this sense the Dutch government is obliged to change policies and interventions in favor of the health of the Dutch population.

Focusing on the Netherlands, the Dutch government has some tools to influence the prevalence of smokers and indirectly the number of people with smoking-related diseases.

Beside the price of tobacco, which consists mostly of excises in the Netherlands, regarding to smoking only from 1990 onwards policies and interventions have been implemented in the Netherlands. These policies and interventions have resulted in a decrease in the smoking population.

When we look at figure 1.1 we can determine the smoking prevalence of males and females in the Netherlands between 1990 and 2005. The 3 indicated spots are different policies and interventions that have been undertaken to diminish the smoking prevalence. The blue line indicates men whereas the grey line indicates women and the green line the total smoking prevalence. Especially between 1990 and 2000 we see that the smoking prevalence remains relatively stable at about 34% of the total population. After 2000 the smoking prevalence is significantly decreasing and in that case it is more interesting to look at the influence of policies and interventions that have been implemented between 2000 and 2010 to give a more actual view. In this sense it is more useful to look at different policies and interventions that have been implemented between 2000 and 2010, because they have showed to be more effective in terms of diminishing the smoking prevalence in the Netherlands.

Grafiek 1: Prevalentie rokers (15 jaar en ouder) sinds 1990

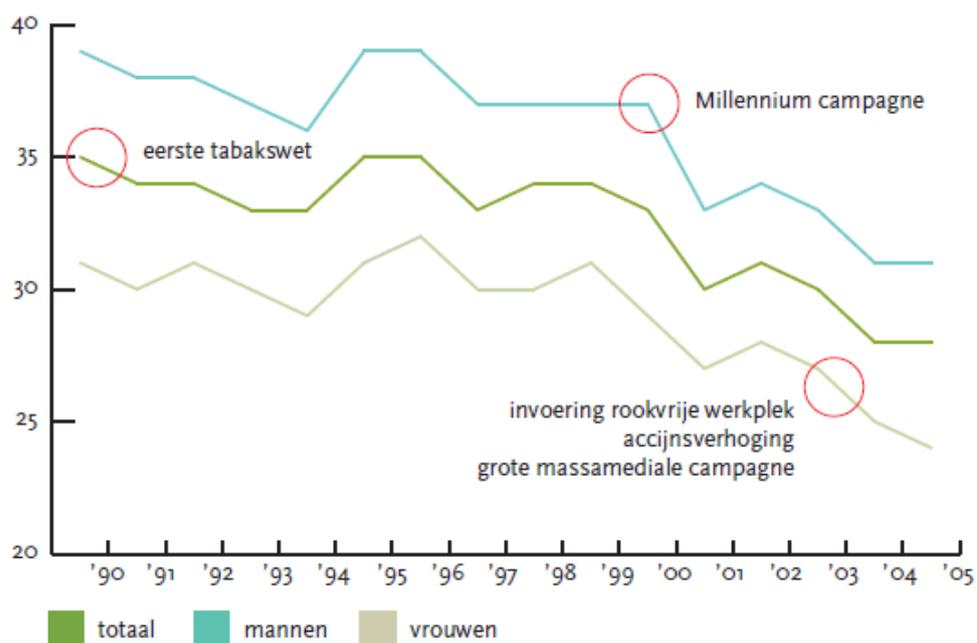


Figure 1.1 Smoking Prevalence Netherlands 1990-2005 (Stivoro, 2011)

1.2 Societal and Academic Relevance

When we look at research that has been undertaken towards the influence of smoking cessation interventions on the smoking prevalence lots of research has been done. However these studies look mainly on influences of smoking cessation interventions on the total smoking prevalence, whereas smoking cessation interventions can have different outcomes for different subgroups. It is possible that smoking cessation interventions are helpful in diminishing the smoking prevalence for high socio-economic groups, whereas these interventions have little result for low socio-economic groups. This study will try to pinpoint if smoking cessation interventions have had these results for all different groups.

Besides that, little research has been done in order to see how smoking cessation interventions change the intention to quit smoking. The intention to quit smoking can be a helpful predictor for the total smoking prevalence, so it is also important how smoking cessation interventions affect the intentions to quit smoking. This study will try to determine what the influence of smoking cessation interventions is on the intention to quit smoking for different subgroups. These intentions for different subgroups, sexes, age-categories and socio-economic groups are not widely studied. That is where this study adds something to the existing body of knowledge

For governments, nationally and internationally, this study is highly relevant to increase knowledge about cessation interventions and their effects for different subgroups. Smoking is a worldwide phenomenon and governments of many different countries implement different interventions to diminish their smoking prevalence. This study gives information about the influence of smoking cessation interventions on the intention to quit smoking for different subgroups and besides that looks at the relation between the intentions to quit and the smoking prevalence. For governments in this case, it is highly relevant to see how intentions to quit are changing when different policies and interventions are implemented and what does this change in the smoking prevalence for particular subgroups.

1.3 Objective and Research Questions

Objective: To determine the influence of smoking cessation interventions on the smoking prevalence and the intention to quit smoking for different sexes, age-categories and socio-economic status groups in the Netherlands between 2000 and 2010.

Research questions:

1. What has been the influence of smoking cessation interventions on the smoking prevalence and intention to quit in the Netherlands between 2000 and 2010?
2. What has been the influence of smoking cessation interventions on the smoking prevalence and intention to quit for males and females in the Netherlands between 2000 and 2010?
3. What has been the influence of smoking cessation interventions on the intention to quit smoking and smoking prevalence for different age-categories in the Netherlands between 2000 and 2010?
4. What has been the influence of smoking cessation interventions on the intention to quit smoking and the smoking prevalence for different socio-economic status groups in the Netherlands between 2000 and 2010?

1.4 Structure of thesis

This thesis is divided into chapters to structure the research being done. Chapter 2 starts with the theoretical framework at which different close-linked theories will be implemented in the study. It continues with literature review in which papers and articles of closely-linked studies show similarities or differences in their conclusions. Chapter 2 continues with hypotheses and a conceptual model which schematically views the research being done.

In chapter 3 the methodology will be discussed divided into the used data, the study population and outcome measures. In chapter 4 the different results and findings of the research will be discussed divided into the effects of policies and interventions on the smoking intention of different sexes, age-categories and socio-economic status groups between 2000 and 2010.

In chapter 5 the different conclusions will be summarized, followed with a discussion and recommendations for further research.

2. Theoretical Framework

2.1 Introduction

In this chapter different theories will be used in order to link this study with academic literature. The four different theories that will be used are helpful in explaining patterns in smoking behavior and helpful in answering the research questions that have been stated in chapter 1.3. These theories will be discussed in chapter 2.2 and are background information for the conceptual model which makes use of the different theories. Besides that literature will be discussed that have linkages with the stated research questions. In the literature review, different studies will be summarized in order to see what the results are of previous studies about the influence of smoking cessation on the intention to quit smoking and the smoking prevalence. Based on this literature, hypothesis will be stated in chapter 2.4. These hypotheses will be assumed or rejected with this study, to see how this relates to other studies.

2.2 Theories

2.2.1 Cigarette Epidemic

Several theories which regard to smoking have been discussed in many studies worldwide. One of the theories which can be useful and linked with this study is the theory by Lopez. A descriptive model of the cigarette epidemic has been presented by Lopez et al. (1994) and the cigarette epidemic is identified as the most important factor of premature death in developed countries. The model of the cigarette epidemic and the transition through the various stages is characterized as follows:

- Prevalence: the percentage of the adult population who smoke regularly
- Consumption: the amount smoked per adult in a given period, e.g., per year
- Mortality: due to smoking the number of deaths attributed to smoking, by age, sex, and classified cause of death.

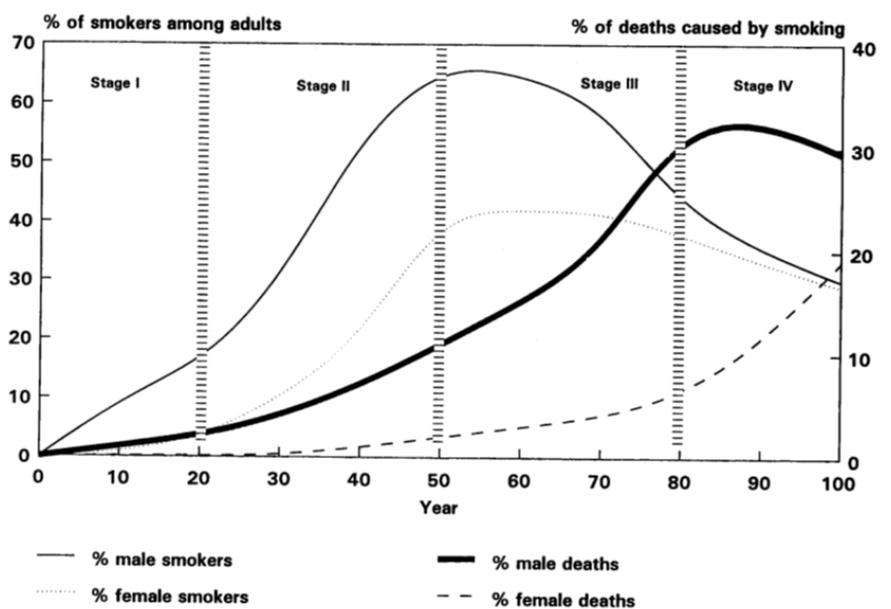


Figure 2.1 Cigarette Epidemic (Lopez et al., 1994)

As we can see in figure 2.1, the first stage defines the beginning of the smoking epidemic with male prevalence of smokers less than 15% and female prevalence of smoking less than 10%. The adult consumption of cigarettes is relatively low, but mostly consumed by males. Death and disease to smoking are not evident. This brief initial phase lasts about 1 or 2 decades.

In stage 2 the prevalence of smokers among men continues to rise rapidly to 50-80% of the population. The prevalence of smokers among women lags 1 or 2 decades behind which means that the prevalence is increasing rapidly 1 or 2 decades later. Tobacco control activities during this stage are not developed and education about hazards remains small of size. In the end of this stage, the use of cigarettes is already causing 10% of male deaths but still comparatively few among woman.

In the third phase the prevalence among men starts to decline from 60% to 40% and this may takes 3 decades, however the prevalence of smokers among woman is declining slowly. The dominant characteristic of this stage is the rapid rise of mortality among smokers. At this stage implementing policies and interventions by governments are favorable. Smoking free places are not yet common, however programs of preventing smoking at schools are introduced. At this stage, smoking is changing from socially acceptable behavior to socially abnormal behavior.

In the last phase the smoking prevalence among both sexes is declining more or less parallel. About 20-40 years after the peak of smokers in the population, female prevalence have only declined by 10-15 percent to about 30%, but the male prevalence is still expected to be higher (about 35%). The rise in male mortality will peak in this period, possibly around 30-35% of all deaths. Within a decade after reaching this peak, the proportion of smoking mortality in the population will heavily decline thereafter.

After 20-30 years in this stage, the mortality levels caused by smoking peak at around 20-25% among woman. Thereafter, smoking attributable mortality for both sexes would progressively decline.

In this last phase, issues for smoke-free personal environment become evident. The demand for smoking free work places is rising. Policies are needed to address the nicotine-dependent smokers, who want to quit smoking but are unable to do so. Social differences can occur and may even widen. At this stage the demand for effective policies and interventions is high.

This theory can be useful in determining in which phase the Netherlands is in comparison to other countries who have been implementing other policies and interventions. However it will not identify differences in age groups or socio-economic status groups, it can be useful in order to get insights in smoking prevalence among developed countries and also for gender differences regarding to smoking.

2.2.2 Trans Theoretical Model

Another theory that can be linked with this study comes from Prochaska and Di Clemente (1998). In their study they identified the problem that a model of intentional human behavior change was not yet used. By assessing the stages change in certain behavior, identification of groups was made possible. The model shows people's intentions to change their behavior and is also known as the Trans Theoretical Model (TTM). The different groups of people can be subdivided into 5 groups: pre-contemplators, contemplators, preparers, action, and maintenance.

Linked with smoking pre-contemplators are groups of people who are:

- Planning to quit smoking within 5 years
- Planning to quit somewhere in the future but not within the next 5 years

Contemplators are groups of smokers who are:

- Planning to quit smoking within 1 year

Preparers were groups of smokers who are:

- Planning to quit smoking within 1 month

Groups of smokers who already quit smoking and came to action have:

- Quit smoking for no more than 3 months
- Groups of smokers who maintained to quit smoking:
- Quitted smoking for longer than 3 months

After the situation of maintenance, people can both get a relapse and become a pre-contemplator, contemplator or preparer again, or people terminate from the group as being a smoker. This situation of behavior change is illustrated in figure 2.2

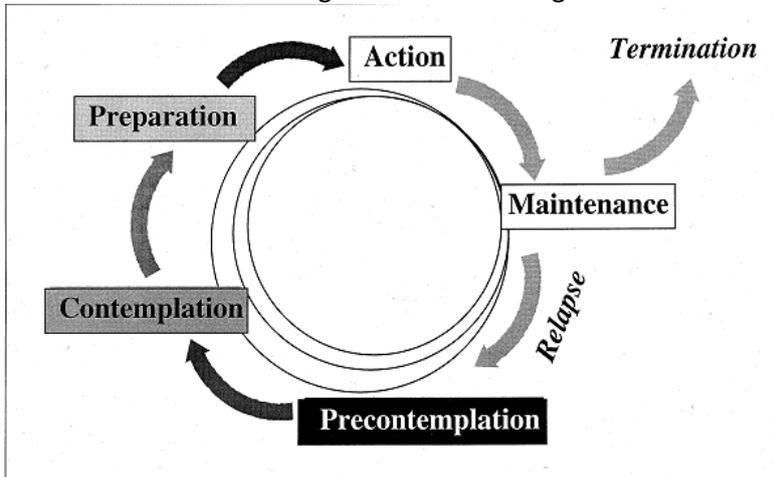


Figure 2: Spiral Model of Smoking Cessation

Figure 2.2 Stages of Behavior Changes (Prokhorov et al., 1997)

This theory can be linked with the study. In this study we mainly look at the implementation of different policies and interventions and the intention to quit smoking. When we look at figure 2.2 we see the stages at which an individual can be in. The share of people that are in these different stages is changing over time and also changes with the implantation of implemented policies and interventions. Did the implementation of policies and interventions cause a significant decrease in the smoking prevalence, or at altered the intention to quit smoking?

2.2.3 Health Belief Model

The last theory that will be used in order to determine the influence of policies and interventions, and micro determinants on the smoking prevalence in the Netherlands between 2000 and 2010 is the Health Belief Model by Janz et al. (1984).

In their chapter they discuss the Health Belief Model in which health related behaviors has to be changed or maintained. The Health Belief Model (HBM) is identified into 6 different key components. The different components are focused on smoking behavior where the actual Health Belief Model can be based on more health related issues. For this research the components of the Health Belief Model can be understood as following:

Perceived Susceptibility: The risk factor of smoking resulting in the chance of getting a condition of higher health care spending, disability in the form of for example lung cancer or cardiovascular diseases.

Perceived Severity: Belief of somebody how serious a condition and consequences of health care spending, disability in the form of for example lung cancer or cardiovascular diseases are.

Perceived Benefits: Somebody's believe in the efficacy of the advised action to reduce risk or seriousness of impact.

Perceived barriers: Somebody's belief about the tangible and psychological costs of the advised action to quit smoking.

Cues to action: Strategies to activate one's readiness to quit smoking

Self-Efficacy: Somebody's confidence in one's ability to take action to quit smoking.

With linkages between the HBM components the objective of identifying and explaining patterns of smoking behavior in the Netherlands will be investigated.

Individual perceptions exist towards smoking of cigarettes. However the chance whether a person wants to quit smoking is depending on several causes. The first is the perceived susceptibility and perceived severity: Smoking causes cancer and cardiovascular diseases for example. If a person believes that the chance of getting such a condition is low, he or she is not likely to quit smoking. Also the status of the condition and its consequences are of main importance. If the person thinks the condition won't be that serious the chance of change in behavior, which is objected as smoking, will not change either. However the perceived severity and susceptibility are embedded in modifying factors: The age, sex, ethnicity, personality, socioeconomics and knowledge can alter the perceived threat of disease. Cues to action such as education, symptoms and media can change the perception towards smoking which can again change the smoking behavior. In this case, cues to action are also provided by the Dutch government and other institutions. Advertisements of smoking are banned by the Dutch government and for example health insurances are paying back the money which is spent on medications related to quit smoking. However the last part is related to the likelihood of action: It is likely that when the perceived benefits are higher than the perceived barriers, behavior will change. Then, the perceived benefits for quit smoking can be better health conditions, saving of money while on the other hand side perceived barriers, for example nicotine dependency and habit can result into long-lasting prevalence.

2.2.4 Macro Micro Theory Coleman

The last theory that can be used in order to get insights in the prevalence of smoking in the Netherlands is presented by Coleman (1990). A schematic model of his work on macro to micro links is presented in figure 2.3.

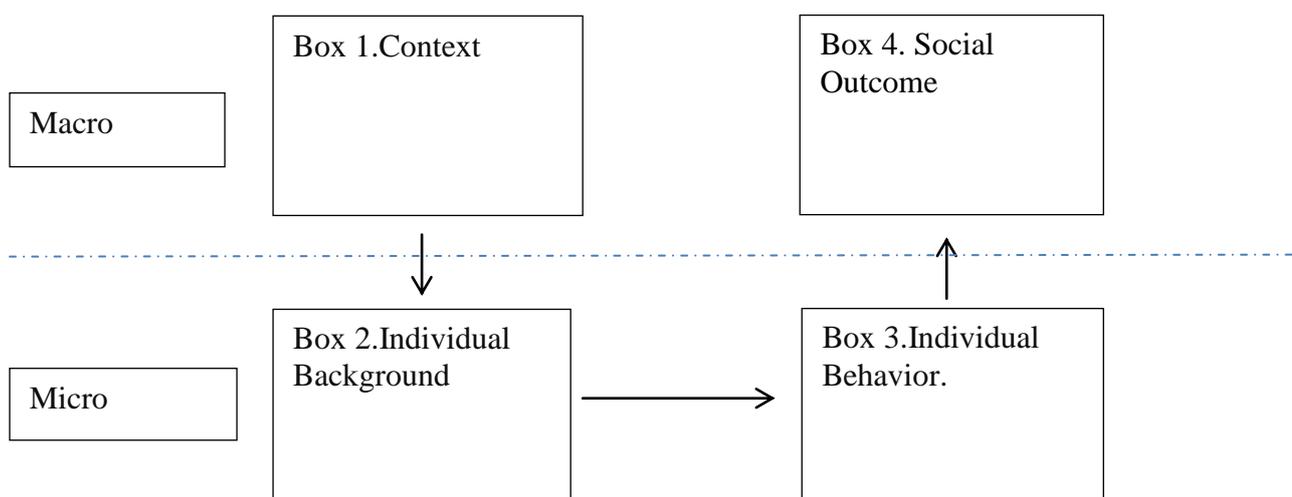


Figure 2.3 Social theory by Coleman.

In figure 2.3, box 1 views the macro context and represents macro conditions. Box 2 represents the individual background, the micro conditions. The micro conditions can be seen as independent variables in assumptions of individual background. The attitudes and subjective norm are also coming in by the individual background. The arrow in between Box 1 and Box 2 represents assumptions how social conditions affect these individual variables. Box 3 represents micro outcomes, which is the

actual description of the individual behavior. The arrow in between Box 2 and Box 3 represents assumptions about regularities of individual behavior or a theory. The arrow in between Box 3 and 4 represents assumptions on how the behavior of the actor generates outcomes on the macro level.

If we base this theory on smoking behavior and example of a result is presented in figure 2.4. It shows the social theory of Coleman based on smoking behavior

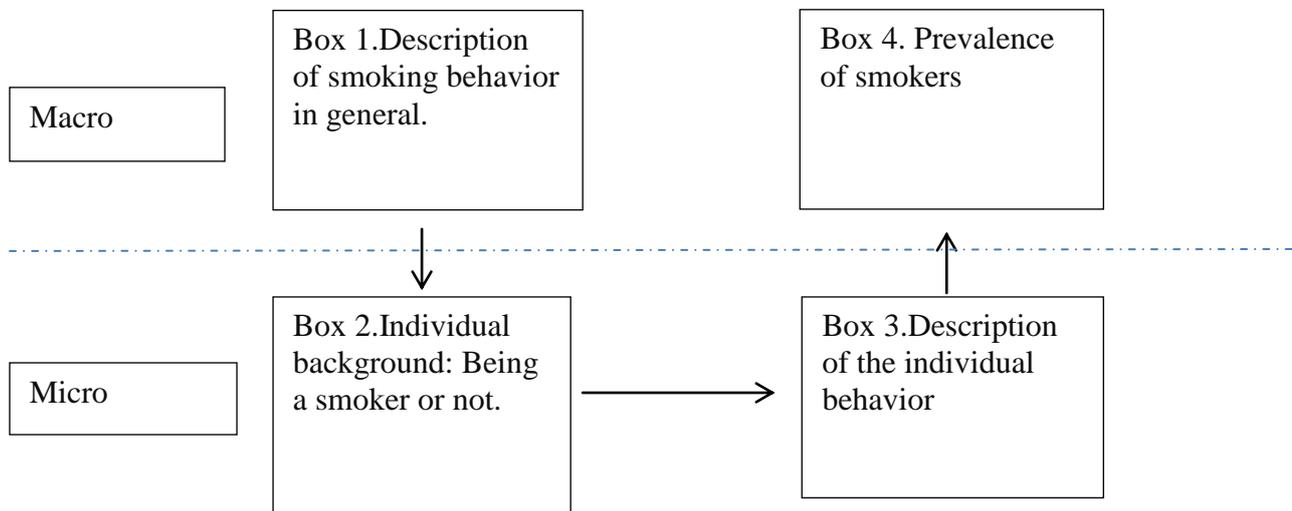


Figure 2.4 Smoking behavior based on Coleman (1990)

In box 1 the macro conditions is the description of the smoking behavior in general. The second box shows the individual background of the individual. Descriptions about the person such as being a smoker or not determines the individual background. The arrow in between box 1 and 2 can represent smoking taxes and regulations from institutions on smoking can be seen as constraints that affect the feasible alternatives on the individual level. In box 2 the attitudes and subjective norm, defined by Fishbein and Ajzen (1975) as beliefs about certain social behavior and how others affect the outcomes of this behavior come in as well.

Box 3 represents the description of the individual behavior. A certain choice of alternatives has been made to determine to smoke or not to smoke and based on individual background and regulations and taxes this behavior can be changed. Based on the description of the third box, the individual behavior will result into a social outcome which can be seen as the total smoking prevalence.

2.3 Literature Review

In the literature review we will try to discuss different closely linked studies that have been investigated in the past. Nationally and internationally many studies have been investigated about the implementation of different smoking cessation interventions. One way to structure countries and compare countries with their different policies and interventions concerning smoking is the Tobacco Control Scale: A high score on the TCS means that a country undertakes many measures and interventions to discourage smoking (Joossens and Raw, 2006)

Different measures that can be undertaken can either result in changes in demand and supply of tobacco and they can change the smoking prevalence in a country. However, following Joossens and Raw (2011), between 2004 and 2010 the Netherlands was one of the countries with the biggest drop on the Tobacco Control Scale. This drop on the Tobacco Control Scale has to be seen in comparison to other countries where more policies and interventions were implemented in the same time

period. Martinez-Sanchez et al. (2010) found that in countries highly ranked on the Tobacco Control Scale, generally fewer people do smoke and Schaap et al. (2008) found that in these countries more people quit smoking.

Research based on policies and interventions in the Netherlands have been carried out by Prins and Willemsen (2004). Based on European Union regulations, the Dutch Government is trying to diminish the smoking population. However Prins and Willemsen also commented that steps for the Government can be made in prohibiting smoking in hotels, cafés and restaurants but also in a system of compensation for aid to quit smoking. After 2008, more policies and interventions have been implemented and one of them was the prohibition of smoking in hotels, cafés and restaurants. Nagelhout et al. (2009) found that after the implementation of these interventions more people tried to quit smoking and also did this successfully.

More literature of the influence of policies and interventions on the smoking prevalence has been carried out by Chaloupka and Warner (1999). Although not in the Netherlands, they investigated how especially increasing taxes for tobacco reduce the smoking prevalence and reduce the consumption of tobacco. This study was held in the USA. They also examined the research accompanying efficiency concerns about smoking taxation debates, but also contributions to employment, tax revenues and trade balances. The influence of smoking cessation interventions on the smoking prevalence is also underlined by Brownsen (1995).

Besides that also Wakefield et al. (2008) found that increases in price of cigarettes and tobacco control mass-media campaigns are critical for reducing the population smoking prevalence. However the intentions to quit smoking are also changed when more smoking cessation interventions have been implemented. The influence of policies and interventions on smoking behavior have been widely studied and one meta-analysis by Wilson et al. (2012) showed that increasing tobacco prices had a high effect on the smoking prevalence, whereas smoking bans in public places and anti-tobacco mass media campaigns had a moderate effect on the smoking prevalence. Limited effects on the smoking prevalence were caused by the effects of health warning labels and bans on advertising and sponsorship.

Based on this literature we can conclude that especially the increasing prices for cigarettes show their effectiveness on diminishing the smoking prevalence.

Hammer & Carlson (2004) found that smokers who have the intent to quit smoking are more likely to quit smoking if a stricter regulation is implemented. This means that when more smoking cessation interventions have been implemented the intentions to quit smoking also increase.

For the relationship between the intention to quit smoking and the smoking prevalence Hughes et al. (2004) found that intention to quit smoking can change in a short time period and is easily influenced by several factors. This means that also policies and interventions can change the intention to quit smoking at different points in time.

When we look at the influence of smoking cessation interventions on the intention to quit for different subgroups (in our study: sex, age-categories and socio-economic status) several studies can be linked with this study. Gender differences regarding to smoking shows that women of all ages, including teenagers, appear to have been less responsive to health publicity than have men but more responsive to price. Gritz et al. (1996) found that possible gender differences in smoking cessation were caused by physiological, psychological and behavioral factors such as differential sensitivity and tolerance to nicotine, fears to gain weight, need for social support self-efficacy (confidence in ability to quit) and stage of change (readiness to quit smoking).

Fiore et al. (1989) found that smoking prevalence is decreasing for both males and females, however the differences in initiation, more than cessation, are primarily responsible for the converging trend of smoking prevalence rates among males and females.

The influence of smoking cessation interventions on the intention to quit smoking for different age-categories has been carried out by Clark et al. (1997). They stated that the effectiveness of smoking cessation programs might be improved by matching interventions to a smoker's age and stage in the smoking cessation process. The different stages are discussed in chapter 2.2.2.

Kviz et al. (1995) concluded that smokers of all ages are equally appropriate targets for smoking cessation interventions. In that case, smoking cessation interventions have similar outcomes for different age-categories in terms of diminishing the smoking prevalence.

Focusing on differences of smoking in age categories, evidence from Zeegers and Blokstra (2011) showed that between 2000 and 2010 a cohort faced decreasing smoking prevalence so more people quitted smoking than started smoking.

For the Netherlands Bouwens et al. (2007) found that after the age of 16 the number of people that starts smoking is only a small part of the group who already start smoking before age 16.

Recommendations by Bouwens et al stated that more policies and interventions are needed in order to diminish the people that start smoking, especially for the young age groups.

When looking at differences in smoking prevalence for people with different socio-economic status the following literature has been found. Men and women in lower socioeconomic groups are more responsive to changes in the price of cigarettes than are those in higher socioeconomic groups. Main et al. (2008) stated that in countries with a mature smoking epidemic, as we see in most Western countries, smoking is persistently associated with lower socio-economic status. Main et al. concluded that preliminary results showed that increases in the price of tobacco per unit have the potential to decrease smoking related health inequalities.

Looking at the influence of smoking cessation interventions on the intention to quit smoking for different socio-economic status groups Townsend et al. (1994) found that real price increases could narrow the differences between socio-economic groups in smoking and the related inequalities in health. Studies in the United States proved that persons of low economic status groups still have to feel the advantages of policies and education of the health consequences of cigarette smoking (Escobedo and Peddicord, 1996).

2.4 Conceptual Model

In order to structure this study and to schematically view the research that will be done a conceptual model has been made which is shown in figure 2.6.

The conceptual model shows how different determinants influence the intention to quit smoking and how the intention to quit smoking results in the smoking prevalence in the Netherlands between 2000 and 2010.

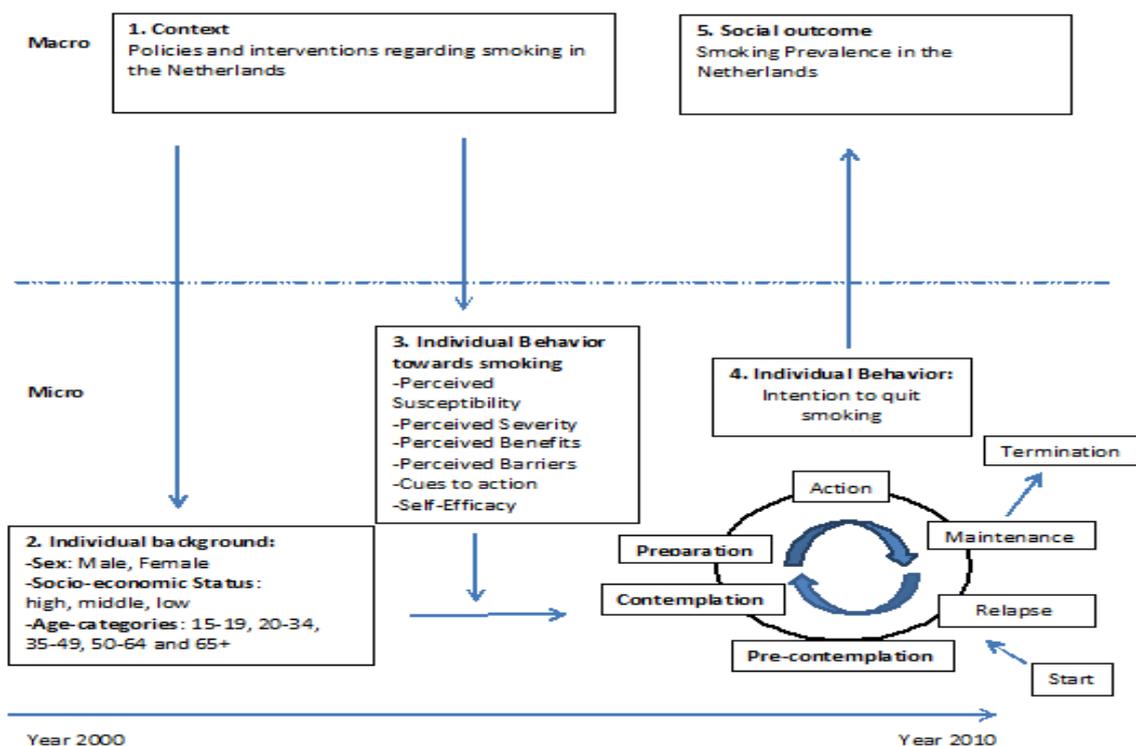


Figure 2.6 Conceptual Model

In order to explain the conceptual model the objective of this thesis will first be stated. The objective is to determine the influence of smoking cessation interventions on the intention to quit smoking and the smoking prevalence for different subgroups in the Netherlands between 2000 and 2010. When we look to the conceptual model, which is showed in figure 2.6 we see that a macro and micro division has been made, that shows linkages with the Coleman theory. The Coleman theory talks about linkages between the institutional level that affect the individual behavior on the micro level. However the individual behavior is different, depending on the individual background. When we cluster all individual behavior, we have a social outcome on the macro level.

In this study the context of this study are the different implemented smoking cessation interventions. These smoking cessation interventions have an influence on the individual behavior, which is here intention to quit smoking (box 4). However these intentions to quit can be different for people from different individual backgrounds. In this study the main focus is on the individual background divided in sex, age-categories and socio-economic status groups. These are indicated in box 2. However, not only smoking cessation interventions are influencing the individual behavior. Also the health belief model concepts can change the intention to quit smoking. When somebody's perceived barriers to quit smoking are higher than the perceived benefits, that person is not very likely to change his behavior, even when stricter regulations and smoking cessation interventions have been implemented. This also affects the individual behavior and this is indicated in box 3.

When we look at box 4 in the conceptual model, we see big similarities with the Trans Theoretical Model which is discussed in chapter 2. The individual behavior here are intentions to quit smoking , however in this study we will mainly look at the influence of cessation interventions on the intention to quit smoking for pre-contemplators, contemplators and preparers (indicated in bolt). This means that in this research we will not look at smoking cessation interventions and their influence on people who came to action and maintained to quit smoking.

The link between box 4 and box 5 is the intention to quit smoking for all individuals together and these have an social outcome on the macro level. The social outcome here is measured as the smoking prevalence. This means that in this study we will also look at the relation of the intentions to quit smoking with the smoking prevalence for different subgroups.

The bottom arrow shows the years 2000 and 2010. That is the time-frame in which the data is gathered for the analysis.

2.5 Hypothesis

Based on the literature some hypothesis will be stated in order to test our own study.

Following Babbie (2007), a hypothesis is a basic statement that is tested in research. Babbie stated: Typically a hypothesis states a relationship between two variables. Because a hypothesis makes a prediction about the relationship between the two variables it must be testable so you can determine if the prediction is right or wrong when you examine the results obtained in your study. Now we first summarize the main research questions and linked with them the hypothesis will be given based on evidence from other research. So based on the research questions the hypothesis will be given to test whether the results from own research show similarities with the literature.

The objective of this thesis is to determine the influence of smoking cessation interventions on the smoking prevalence and the intention to quit smoking for different age-categories, gender and socio-economic status between 2000 and 2010 in the Netherlands. Below the research questions are stated followed by hypothesis based on the literature review.

Research questions:

1. What has been the influence of smoking cessation interventions on the smoking prevalence and intention to quit in the Netherlands between 2000 and 2010?

Based on literature we can hypothesize that smoking cessation interventions have a diminishing effect for the smoking prevalence and an increasing effect for intentions to quit between 2000 and 2010 in the Netherlands. Throughout the years 2000 to 2010 more smoking cessation interventions have been implemented and in the literature these interventions have led to a decrease in the smoking prevalence (Wakefield et al, 2008; Brownson et al., 1995; Chaloupka & Warner, 1999; Nagelhout, 2009). That relation between rising intentions to quit smoking and decreasing smoking prevalence due to smoking cessation interventions have been discussed by Willemsen (2005), Wilson (2012) and Hammer & Carlsson (2004).

2. What has been the influence of smoking cessation interventions on the smoking prevalence and intention to quit for males and females in the Netherlands between 2000 and 2010?

Based on the literature we can hypothesize that smoking cessation interventions have an increasing effect on the intention to quit smoking for males and females and a decreasing trend for the smoking prevalence between 2000 and 2010 in the Netherlands. Although, the smoking prevalence is decreasing at a higher rate for males than for females (Fiore et al.,1989).

3. What has been the influence of smoking cessation interventions on the intention to quit smoking and smoking prevalence for different age-categories in the Netherlands between 2000 and 2010?

Based on the literature review we can hypothesize that smoking cessation interventions have an equal distributed increasing effect on the intention to quit smoking for different age-categories

between 2000 and 2010. Kviz et al. (1995) investigated that smokers of all ages are equally appropriate targets for smoking cessation interventions.

4. What has been the influence of smoking cessation interventions on the intention to quit smoking and the smoking prevalence for different socio-economic status groups in the Netherlands between 2000 and 2010?

Based on the literature we can hypothesize that smoking cessation interventions have an increasing effect on the intention to quit smoking, but a higher effect on low socio-economic status groups in comparison to middle and high socio-economic status groups. This is because Main et al. (2008) stated that men and women in lower socioeconomic groups are more responsive to changes in the price of cigarettes than are those in higher socioeconomic groups. And as we will see later, the price of cigarettes is increasing between 2000 and 2010. This means that when these smoking cessation interventions increase, the intentions to quit also increase and the smoking prevalence will decrease.

3. Methodology

3.1 Study Design

The objective of this thesis is to determine the influence of smoking cessation interventions on the intention to quit and smoking prevalence for different sexes, age-categories and socio-economic status. This will be done by conducting a quantitative study with secondary data from Stivoro. Stivoro is an independent institution in the Netherlands that gives information about smoking for education purposes (Stivoro, 2012). In their Continuous Survey on Smoking Behavior they ask annually approximately 15,000 people about their smoking habits. The data is considered to be reliable because of new measuring methods and high numbers of respondents (Harbers, 2012)

The obtained data that will be used in this thesis are percentages of pre-contemplators, contemplators and preparers for the different subgroups sex, age-categories and socio-economic status. This study will both be descriptive and explanatory. In the first research question we will first describe the different smoking cessation interventions that have been implemented from 2000 until 2010 in the Netherlands. Looking at the smoking cessation interventions and their links with intentions to quit and smoking prevalence, gives an explanation. This will be done for the research questions 2, 3 and 4 which are about the influence of smoking cessation interventions on the intention to quit and the smoking prevalence for the different subgroups (sex, age-category and socio-economic status).

3.2 Ethical Considerations

Ethical considerations have to be made towards smokers aged under 16. Following the Dutch law, people under 16 are not allowed to smoke. However because of the used secondary data, the respondents are anonymous. Anonymity is achieved when neither the researcher nor the reader can identify the given response with a given respondent.

3.3 Study Population

The study population consists of Dutch males and females who smoke and are aged 15 and above in the years 2000 until 2010. The age of the study population is categorized in the following age groups: 15-19, 20-34, 35-49, 50-64 and 65+. Also characteristics of sex (divided in males and females) and socio-economic status groups (divided in high, middle and low) can be obtained and will be studied. By use of this study population, divided into different subgroups, the intentions to quit will be obtained, and explanations will be given how these intentions to quit relate with the smoking prevalence for that particular subgroup.

3.4 Outcome Measure

One outcome measure of this study is the smoking prevalence, divided into subgroups of age, gender and socio-economic status. The smoking prevalence can be interpreted as the number of daily smokers per 100 in the population. An individual was considered to be a daily smoker when he or she has smoked at least a cigarette in the last 3 days. The other outcome measure is the intention to quit smoking divided in preparers, contemplators and pre-contemplators.

A preparer is a person who smokes and has as intention to quit smoking within one month.

A contemplator is a person who smokes and has as intention to quit smoking after one month but within half a year.

A pre-contemplator is a person who smokes and has as intention to quit smoking within 0.5 and 5 years. The different smoking cessation interventions will be discussed in chapter 4.2

The different subgroups that will be used in this analysis are different sexes, age-categories and socio-economic status. Sex refers to the biological differences between males and females and the

data is obtained for males and females. The different age-categories that will be used are 15-19, 20-34, 35-49, 50-64 and 65+. These age-categories are chosen in order to get a useful comparison between groups.

The subgroup of socio-economic status needs a broader description. Until 2006 a combination of job and education defined the socio-economic status whereas after 2006 only education defined the socio-economic status. The reason for the change is that constructs like job and education were used as a proxy, however they did not contain the useful information anymore. That is why after 2006 only education is used (Hartman, 2010)

3.5 Data Limitations

The intention to quit smoking is another variable that is important. However the categories for the variable intention to quit smoking have been changed between 2000 and 2010, which obliges to merge categories. The categories “wants to quit smoking within one year” and “wants to quit smoking within 5 years” have been merged and the same counts for the categories “don’t know”, “don’t want to quit smoking” or “don’t want to quit smoking within 5 years”. This makes the following different possibilities available:

1. Preparer: Wants to quit smoking within a month
2. Contemplator: Wants to quit smoking after a month but within half a year
3. Pre-contemplator: Wants to quit smoking after half a year but within 5 years
4. Don’t know/ Don’t want to quit smoking/ Doesn’t want to quit smoking within 5 years

When we look to the data which involves socio-economic status, we have to take in mind that the definition of groups has been changed. The data until 2006 considered a division in socio-economic status with education and job, however after 2006 only education determined in which group a respondent would be in.

3.6 Method

By conducting a linear regression analysis models will be given about the intentions to quit for different subgroups. The linear regression is a appropriate way to analyze the intentions to quit. The reason for the choice of regression stems from the fact that the price of cigarettes and tobacco is of linear trend. This is shown in figure 3.1. The reason for taking the price of cigarettes and tobacco as determinant for analysis is underlined by different studies that have been done. Chaloupka and Warner (1999) and Wilson (2012), stated that increasing taxes and prices for cigarettes are highly effective in diminishing the smoking prevalence. That is why linear regression analysis is an appropriate analysis method.

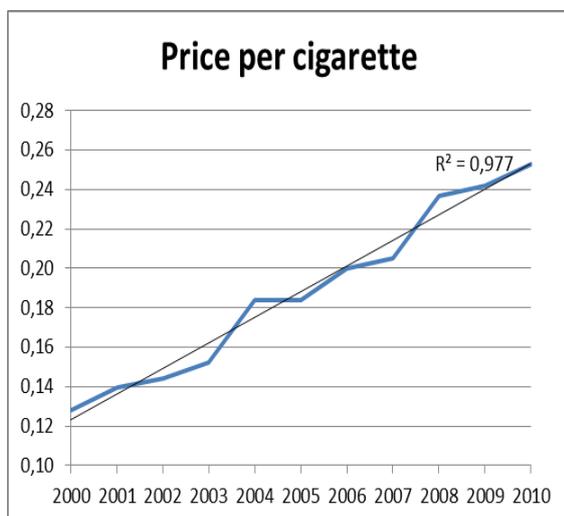


Figure 3.1 Increase in price (euro's)

4 Results and findings

4.1 Introduction

In this chapter we will discuss the influence of policies and interventions on the percentages of people that want to quit smoking between 2000 and 2010. Persons that want to quit smoking are divided into 3 groups: preparers, contemplators and pre-contemplators. Besides that, percentages are available for different sexes, age-categories and socio-economic status, so for all groups we will look how the percentages differ with increasing years (and the increasing policies and interventions). Besides that, linkages will be given between the intentions to quit and the smoking prevalence for that particular subgroup. However before the analysis, we will first start with the different smoking cessation interventions that have been implemented in the Netherlands between 2000 and 2010.

4.2 Smoking cessation Interventions

4.2.1 National policies and interventions regarding to smoking in the Netherlands

Partly based on recommendations from other institutions worldwide, for example the WHO, the Netherlands have implemented several policies and interventions regarding to smoking.

In this situation it is interesting what the Netherlands have undertaken in terms of policies and interventions and what have been the results for the smoking prevalence in the Netherlands.

Because of the growing awareness that smoking causes different kind of diseases, from 1990 onwards different policies and interventions have been implemented. The discouragement of smoking and the protection of non-smokers occur by use of a combination of different interventions listed below.

- Law, maintenance and policies
- Information and education
- Signaling, advice and help to quit smoking
- Influence on the social and physical environment

Changes in the price of Tobacco are implemented in the first mentioned combination of law, maintenance and policies.

Focusing on the Netherlands, the first Tobacco Law which was implemented in 1990 was the first intervention regarding to smoking. After that moment until now, several policies and interventions have been adapted, implemented and changed in order to diminish the smoking prevalence in the Netherlands. However, beside the fact that diminishing the smoking population is (following the ministry of VWS, 2011) an aim which is less important than diminishing the number of people with deadly diseases caused by smoking, it is still an important measure that shows how people react when certain policies and interventions have been implemented.

The first Tobacco Law consisted of several articles that mainly entailed the following intervention: Smoking inside buildings owned by the government is forbidden. This comprises also institutions for sport, education, healthcare and social services.

From 1990 until 2002 no big interventions have been implemented, which resulted in a decrease in the smoking prevalence. However a big media campaign which was held in order to let people quit smoking was an intervention which showed to be extremely successful. A study by Westerik et al. (2009) has showed the importance of this mass-media campaign. The total smoking prevalence in the Netherlands diminished with 4 % in one year.

Several other interventions have been adapted after 2002 on and will be discussed chronologically.

A prohibition on advertising and sponsoring of tobacco products was implemented in November 2002. Advertising bans on television were already implemented in other countries at that time. Two months later, on the first of January in 2003 several other interventions followed such as the advertising bans in newspapers and journals. Also persons younger than 16 were not allowed to buy tobacco and sales of packages less than 19 cigarettes were not allowed anymore. More restrictions towards the selling of tobacco at government institutions were implemented at that time. The result was that sales of tobacco at government institutions were completely prohibited from then on.

More interventions followed regarding the rights of the non-smoker at the first of January 2004. Beside the right for smoking-free public transport, the right for a smoking-free workplace came into play. At the same time restrictions towards the amount of toxins, nicotine and carbon monoxide inside cigarettes and shag came into play and changed the content of tobacco.

The next change in policies and interventions were implemented 4.5 years later. These interventions followed in July 2008, when smoking inside hotels restaurants and cafés, sport clubs and museums , shopping malls, airports and congress centers were completely prohibited (Storm, 2008)

4.2.2 Changes in price or taxes related to smoking between 2000 and 2010

Beside the policies and interventions that have already been discussed, one major intervention which influences the smoking prevalence is the price of Tobacco. The price of Tobacco has been changed many times, and has been proved to be of major importance in many studies.

If we take a look at our time frame, from 2000 until 2010 the price of tobacco has been changed 3 times by the government: the years 2004, 2008 and 2010. Especially the year 2004 resulted in a clear sharpening of the price: the price for a package of cigarettes of 25 pieces and a package of shag (50 grams) increased by 80 cents to €4.60 (CBS, 2005). This change in the price of tobacco was a result of the increasing discouragement of smoking by the government because the price of cigarettes increased mainly because of increase in excises rather than increase in production costs.

By the year 2009 a package of cigarettes of the most favorite brand which included 19 cigarettes costs €4.50 and rose to €4.60 in 2010. Regarding to shag the price for the most favorite brand remained stable at €5.50 however the content of a package decreased from 50 grams to 47.5 grams.

Especially the costs of excises on cigarettes have been raised, and make the cigarette packages more expensive. The costs of excises are about 55%, the costs for production about 25% and the costs for taxes about 20% of a package of cigarettes.

When we look at the development in prices per cigarette we can see an increasing trend in the price. Here is chosen for prices per cigarette of the most popular packages, however the content per package changed from 25 to 19, which makes comparisons in the price per cigarette more logical. In figure 4.1 a view of the development of the price between 2000 and 2010 has been given.

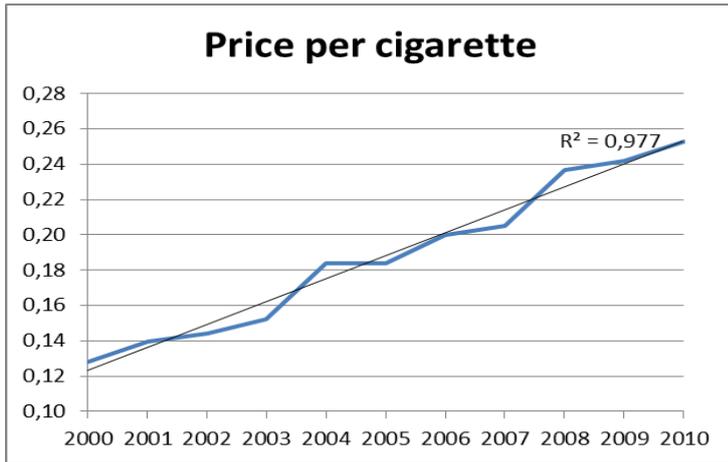


Figure 4.1 Development of the price per cigarette between 2000 and 2010 in euro's (SRB, 2010).

When we look at the trend in the price per cigarette we see that this follows an almost linear increasing trend.

4.3 Link total smoking prevalence and intention to quit

In this part we will first look at the link between the total intentions to quit and the smoking prevalence. This is depicted in figure 4.2

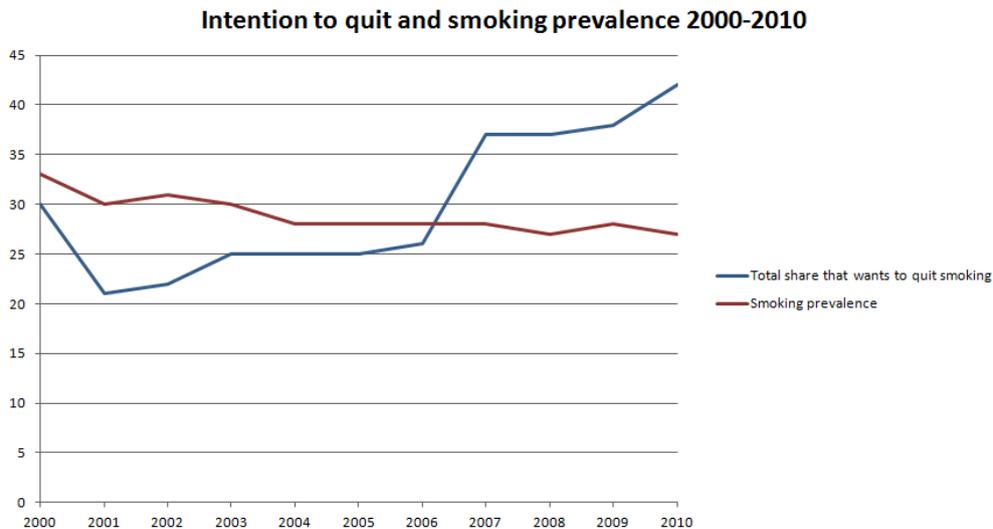


Figure 4.2 Intention to quit and smoking prevalence 2000-2010 in percentages.

When we look to figure 4.2 we see that when more smoking cessation interventions have been implemented the total smoking prevalence, indicated with the red line, decreases. The blue line, which indicates the total share that wants to quit smoking, is increasing when more smoking cessation interventions have been implemented. The total share that wants to quit smoking is the total of percentages of preparers, contemplators and pre-contemplators. This shows that people's intentions are rising when more smoking cessation interventions are implemented and this has resulted in a slight decrease in smoking prevalence between 2000 and 2010 in the Netherlands. The percentages however, do not show how many persons they actually entail. To make clear about how many persons we are talking a factsheet has been given in table 4.1. This factsheet shows population characteristics about the Dutch (smoking) population.

| Factsheet Year 2010 | | | |
|---------------------|------------|---------|-------|
| | abs. | % | N |
| Total Population | 16,575,000 | 100.00% | 18755 |
| Smoking Population | 4,508,400 | 27.2% | 5179 |
| Ever smoked | 5,768,100 | 34.8% | |
| Never smoked | 6,298,500 | 38.0% | |
| Starters | 70,331 | 1.56% | |
| Pre-contemplators | 2,614,872 | 58% | |
| Contemplators | 631,176 | 14% | |
| Preparers | 586,092 | 13% | |
| Quitters | 71,233 | 1.58% | |

Table 4.1 Factsheet Dutch (smoking) population 2010.

4.4 Intention to quit in sex differences

The different smoking cessation interventions have been discussed before and now we will look how these interventions changed the intentions to quit for differences in sex (males and females). We will first start by looking at males and females who prepare.

4.4.1 Intention to quit smoking sex: Preparing

In this part we will start with making a regression analysis that shows how the different years, with their policies and interventions, influence the percentage of smokers, divided by males and females from 2000 until 2010. We will first start with males who prepare to quit smoking. Preparing to quit smoking means, that the person wants to quit within one month. The result of the regression analysis is shown in table 4.2

| | intention preparer | | | R | contemplator | | | R | precontemplator | | | R |
|----------|--------------------|-------|-------|-------|--------------|-------|-------|-------|-----------------|-------|-------|-------|
| | constant | B | sig | | constant | B | sig | | constant | B | sig | |
| males | 4,045 | 0,773 | 0,000 | 0,936 | 6,136 | 0,755 | 0,000 | 0,891 | 8,364 | 0,418 | 0,256 | 0,375 |
| females | 5,318 | 0,664 | 0,001 | 0,866 | 7,591 | 0,718 | 0,000 | 0,930 | 10,000 | 0,418 | 0,408 | 0,278 |
| N=56.472 | | | | | | | | | | | | |

Table 4.2

We can see from table 4.2 that the constant is 4,045%. This means that about 4% of male smokers have the intention to prepare to quit smoking. However as we can see from the B-coefficient by year, which is 0,773, the percentage increases by this number with an increase of 1 year. This means that there is a positive relationship between the variable year and percentage. In this sense we can also say that increases in policies and interventions regarding smoking that have been implemented more and more between 2000 and 2010, are changing the percentage of males that are preparing to quit smoking. The significance level, shown with sig., 000, indicates that there is a linear relationship between the two variables (the null hypothesis is considered to be significant when $p < 0.05$). In that sense it is also interesting to look how the regression analysis would look like when we take females who prepare to quit smoking. The result of that regression analysis is shown in table 4.2 in the bottom row.

When we look at the bottom row of table 4.2 we see that the constant for females that prepare to quit smoking starts with 5.318 %. The B-coefficient of females, who have as intention to prepare to quit smoking, is 0.664 which means that with every increase of 1 year the percentage of females that prepare to quit smoking will increase by 0.664% as well. The significance level of 0.001 shows that

there is a linear relation between the variable year and the percentage of females that are preparing to quit smoking.

This means that also for woman, there exists a positive relationship between the variable year and the percentage of females that are preparing to quit smoking. In other words, also woman are sensible for changes in policies and interventions regarding to smoking, because we see that with increasing years (with increasing policies and interventions regarding smoking) the percentage of females that are preparing to quit smoking is rising.

Interesting and eye-catching thing is that the B-coefficient of females is lower than the B coefficient of males which shows that women are less sensible to the variable Year (which involves the different policies and interventions regarding smoking in that particular year). However this difference is not significant.

4.4.2 Intention to quit smoking sex: Contemplators

When we look to the variable sex, divided into males and females, and we take as intention to contemplate, we see that the constant for males is 6.136% compared to 7.591% for females. Contemplators are here defined as persons who want to quit smoking within half a year, but after one month. We see that for both sexes the variable year is significant which is indicated in the row sig. The Beta-coefficient of males and females is quite similar (for males 0.755 and for females 0.718) which means that one extra year will increase the percentage of contemplators. In both cases the R, which shows how well the model fits the data is high. We see that the R is 0.891 for males (89.1%) and 0.930 for females (93%).

4.4.3 Intention to quit smoking sex: Pre-contemplators

Looking at the pre-contemplators, persons who want to quit smoking after half a year but 5 years, we see that the percentages are higher for males and females in comparison to male and female preparers and contemplators. The constant for males starts at 8.364% and with every increase in year this percentage will rise by 0.418 per year. However the significance level shows us that for both males and females there is no linear relationship between the variable year and people who are pre-contemplators. This indicates that policies and interventions that have been implemented between 2000 and 2010 do not have a significant linear relationship with the percentage of smokers that are pre-contemplating because the significance level indicated for males and females in table 4.2 for pre-contemplators are respectively 0.256 and 0.408. This is higher than the level of 0.05 to reject the null hypothesis. All together we can make the following figure that shows how the percentages of preparers, contemplators and pre-contemplators differ between 2000 and 2010 divided for males and females. This is showed in figure 4.3a and 4.3b.

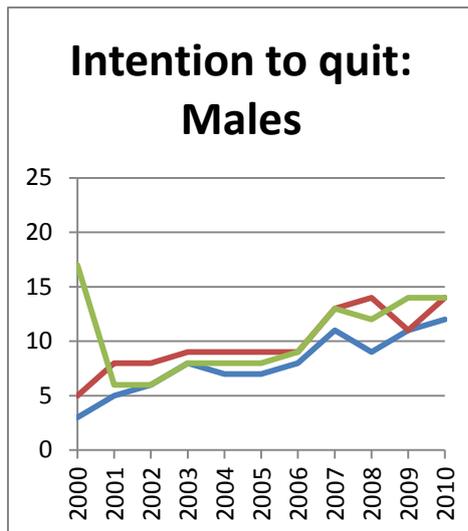


Figure 4.3a

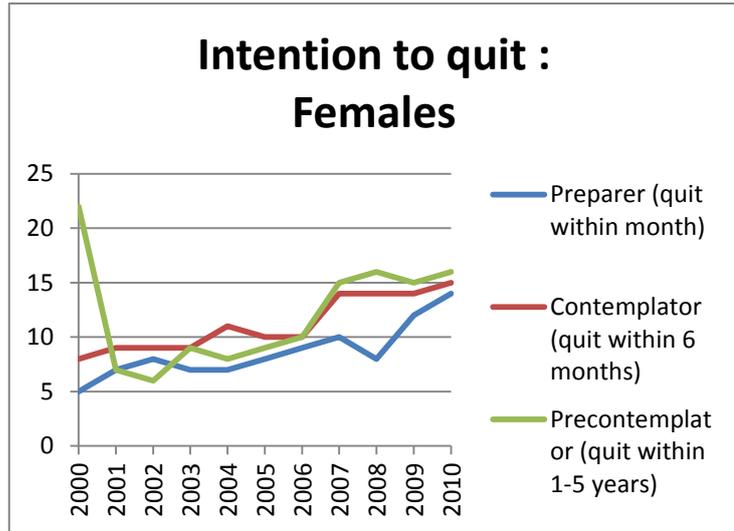


Figure 4.3b

We can see from figure 4.3a and 4.3b that especially the percentages of males and females that pre-contemplate in the year 2000 are high. If we look to the implementation of policies in that year, we see that only a mass-media campaign can be of influence on that percentage. Westerik et al. (2009) concluded that mass-media campaigns did not result in high percentages of long-term abstinence. However, when we compare this to figure 1.1 this seems strange because in 2000 the total smoking prevalence of males (37% to 33%) and females (29% to 27%) decreased significantly. When we delete the year 2000 out of the analysis for the pre-contemplating males and females there is a significant linear relationship between year and percentage of males and females that are pre-contemplating.

When we look at figure 4.3a and 4.3b we can determine that there is an increasing trend in the intention to quit for both males and females. Especially after 2008 there is an increasing trend of males and females that have the intention to quit. This correlates with the increasing policies and interventions that have been implemented in that year so both males and females are sensible for smoking policies and interventions and this increases the intention to quit smoking.

When we look at differences between males and females we see that when more smoking cessation interventions have been implemented, the intentions for females are slightly higher than for males.

4.4.4 Link intention to quit with smoking prevalence: Sex

In order to see how the different intentions link with the smoking prevalence for different sexes, figure 4.4 is given.

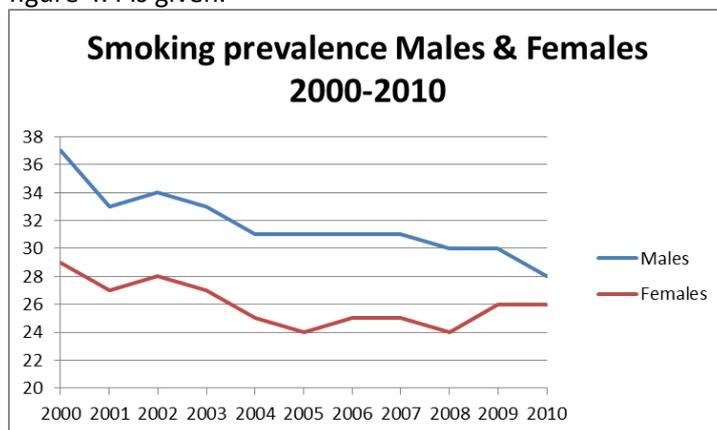


Figure 4.4 Smoking prevalence Males & Females (Stivoro, 2011)

We see that in general the smoking prevalence is decreasing for both males and females. Especially from 2000 until 2004 the lines of males and females are parallel but still the smoking prevalence of males is around 6-8% higher than for females. Especially after 2008 we see that the smoking prevalence of males is decreasing but strangely enough the smoking prevalence of females is increasing. In 2010 the gap between the smoking prevalence for males and females is only 2%. This looks strange because we have assumed in the hypothesis that increasing policies and interventions regarding to smoking may result in higher intentions to quit smoking and lower smoking prevalence. For females this is not the case.

4.5 Intention to quit in age-categories

In the next part we will discuss the regression analysis outcomes for the variables age-category (with age-categories 15-19 years, 20-34 years, 35-49 years, 50-64 years and 65+). This is then divided for people that have the intention preparing (quit within one month) contemplator (quit within half a year) and pre-contemplator (quit within 0.5-5 years) to quit smoking. The outcome of the regression analysis is shown in table 4.3.

| | intention preparer | | | | contemplator | | | | precontemplator | | | |
|---------|--------------------|-------|-------|-------|--------------|-------|-------|-------|-----------------|-------|-------|-------|
| | constant | B | sig | R | constant | B | sig | R | constant | B | sig | R |
| 15-19 | 5,364 | 0,764 | 0,067 | 0,570 | 4,682 | 0,900 | 0,213 | 0,408 | 5,273 | 0,909 | 0,120 | 0,497 |
| 20-34 | 5,591 | 0,827 | 0,000 | 0,885 | 8,227 | 0,845 | 0,000 | 0,911 | 11,818 | 0,145 | 0,770 | 0,100 |
| 35-49 | 3,409 | 0,773 | 0,000 | 0,954 | 8,000 | 0,600 | 0,000 | 0,873 | 10,545 | 0,291 | 0,506 | 0,225 |
| 50-64 | 4,136 | 0,555 | 0,002 | 0,832 | 5,091 | 0,727 | 0,001 | 0,863 | 6,682 | 0,664 | 0,113 | 0,505 |
| 65+ | 4,318 | 0,791 | 0,001 | 0,864 | 2,909 | 0,964 | 0,000 | 0,930 | 1,773 | 1,009 | 0,013 | 0,717 |
| N=56537 | | | | | | | | | | | | |

Table 4.3

4.5.1 Intention to quit in age-categories: preparing

We will first focus on the variable age-category with the intention preparing to quit. We see that only the 15-19 age-category gives non-significant results (at the 0.05 significance level). This means that for the 15-19 age-category, there is no linear relationship between the variable year and the percentage of preparers in that particular age-category.

In that case it is interesting how the percentages are divided for the 15-19 age-category. In figure 4.5 the percentages for the 15-19 age-category are showed with the different intentions to quit smoking.

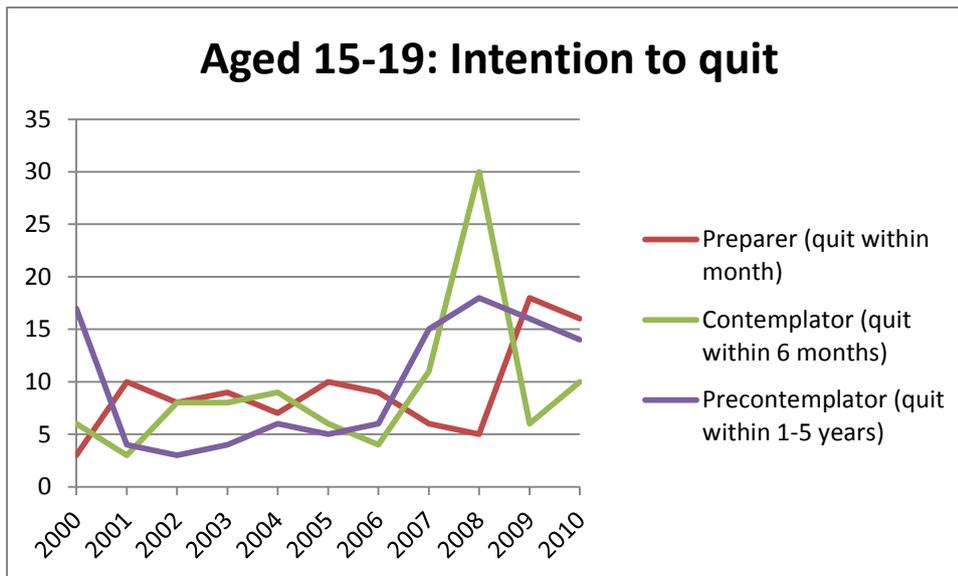


Figure 4.5 Intention to quit smoking in percentages for the 15-19 age-category.

The red line in figure 4.5 shows the percentages of preparers in the 15-19 age-category. We see that especially in 2009 and 2010 the percentages are relatively high in comparison to previous years. If we want to look if there is a significant difference between preparers of the 15-19 age-category before and after 2008 we will analyze this by doing a paired sample T-test. The results for the group until 2008 (8.55) are significantly lower than the results for the groups in 2009 and 2010 (17.0). When taking into account two standard deviations of the groups before intervention (2.70) and after intervention in 2008 (1.41) we still see a significant difference between the 2 means. This means that there is a correlation between the implementation of policies and intervention and the percentages of people in the 15-19 age-category that is preparing to quit smoking. In other words, the implementation of different policies and interventions in 2008 show significant increasing percentages of preparers in the 15-19 age-category.

4.5.2 Intention to quit in age-categories: Contemplating

When we look again to table 4.3, we see that for the 15-19 age-category who are contemplating, there is no significant linear relationship. The reason for this non-significant linear relationship can be found in figure 4.5. When we look at the green line we see that there is one outlier in the percentage of contemplators in the 15-19 age-category: the year 2008.

In figure 4.3, we can see that for the preparers, all other age-categories except of the 15-19 age-category have significant linear relationship between the variables year and percentage. We can see from the different Beta- coefficients that there is a positive relationship, so with increasing years (and increasing policies and interventions) the percentages of persons that are preparing to quit smoking also increases.

The same conclusion can be drawn for the percentages of contemplators. For all other age-categories, except of the 15-19 age-category, there exists a linear relationship between the variables year and percentage. Again, increasing years, with extra policies and interventions leads to increasing percentages of contemplators.

However, as we can see from figure 4.3 by looking at the pre-contemplators, the only age-category that has a significant linear relationship is the 65+ age-category. So, when years increase, also the percentages of pre-contemplators in the 65+ age-category are increasing.

4.5.3 Link intention to quit with smoking prevalence: age-categories

When we look at differences between age-categories in the smoking prevalence a distinction between males and females can be made. The smoking prevalence in age-categories of males and females are showed in figure 4.6a and 4.6b.

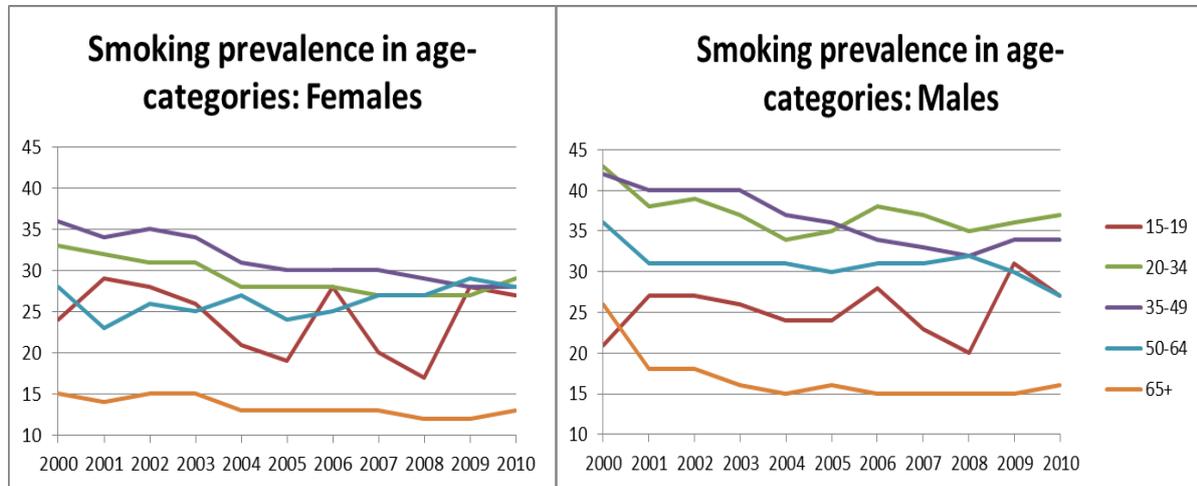


Figure 4.6a

Figure 4.6b

When we look at figure 4.6a we see the smoking prevalence of females in age-categories. We see that most of female age groups show a more or less parallel trend however only the 15-19 age-category shows big disturbances. We see that the smoking prevalence of females in age-category 15-19 peaks in 2006, 2009 and 2010. When we compare this to the different policies and interventions there is no straightforward explanation. In 2004 different policies and interventions have been implemented and we see that in the subsequent year 2005, the smoking prevalence is indeed decreasing. However in July 2008, more different policies and interventions regarding smoking have been implemented, which should, most logically lead to a decreasing smoking prevalence as well. The opposite is the issue and we can conclude that for the 15-19 age-category the different smoking policies and interventions have not resulted in a decreasing smoking prevalence for females in the 15-19 age-category.

In figure 4.6b the smoking prevalence for the males in age-categories is showed. The main characteristics are that for all age-categories, except of the 15-19 age-category the smoking prevalence for males is decreasing from 2000 until 2010. Again the 15-19 age-category shows opposite facts than the expectations. We would expect the smoking prevalence to go down when more policies and interventions would be implemented however the opposite is the case. Especially in 2009, half to one and a half year after the big implementations of policies and interventions regarding smoking in July 2008, the smoking prevalence peaks at 31% in 2009 after which it slightly decreases to 27%. Also here we can conclude that the different smoking policies and interventions have not resulted in a drop for males in the 15-19 age-category.

4.6 Intention to quit in Socio-economic Status

In this part the intention to quit smoking for different socio-economic status will be discussed. As already stated in 3.3, in 2006 another way of measuring has been introduced. Whereas before 2006 a combination of job and education was responsible for socio-economic status, after 2006 only education was the variable which declared socio-economic status. We will first start with the different socio-economic status groups who have a preparing intention to quit smoking.

4.6.1 Intention to quit in Socio-economic Status: Preparers

In this part regression analysis will be discussed about different socio-economic status groups divided in high, middle and low classes. One note has to be made when we consider the used data. Because of differences in the data, cases are merged or deleted. After 2006 another way of measuring has been introduced. This is described in 3.4.

We will first start by looking at smoking patterns for high socio-economic status groups. We will discuss regression analysis that is depicted in table 4.4.

| | intention preparer | | | | contemplator | | | | precontemplator | | | |
|---------|--------------------|-------|-------|-------|--------------|-------|-------|-------|-----------------|-------|-------|-------|
| | constant | B | sig | R | constant | B | sig | R | constant | B | sig | R |
| high | 5,727 | 0,655 | 0,018 | 0,693 | 9,773 | 0,427 | 0,039 | 0,628 | 9,409 | 0,336 | 0,451 | 0,254 |
| middle | 5,067 | 0,744 | 0,000 | 0,865 | 7,853 | 0,757 | 0,000 | 0,857 | 10,353 | 0,257 | 0,508 | 0,162 |
| low | 3,310 | 0,860 | 0,000 | 0,875 | 5,138 | 0,843 | 0,007 | 0,728 | 8,724 | 0,387 | 0,265 | 0,350 |
| N=55930 | | | | | | | | | | | | |

Table 4.4

When we look at the data from the high socio-economic status groups who are preparing to quit smoking we see the following outcomes. We can see from table 4.4 that there exists a significant linear relationship between the variable year and percentage of the high socio-economic status group who prepare to quit smoking. The constant of 5.727 and the Beta-coefficient of 0.655 show us that with every increase of 1 year the percentage of high socio-economic status persons who prepare to quit smoking, increases by 0.655 as well.

The same regression tests have been calculated for the middle and low socio economic status groups and can be found in table 4.4. We can see that the constant for the middle and low socio-economic status groups that are preparing to quit smoking is considerably lower in comparison to the highest socio-economic status group (5.067 and 3.310 respectively). However if we take a look at the Beta-coefficient we see that these parameters are substantially higher in comparison to the highest socio-economic status group (0.740 and 0.860). This shows that between 2000 and 2010 the middle socio-economic status group and especially the lowest socio-economic status group react more on the different implement policies and interventions that have been implemented in that time-period, in terms of percentages that prepare to quit smoking.

4.6.2 Intention to quit in socio-economic Status: Contemplators

In this part the regression analysis will be discussed about different socio economic status groups divided into high, middle and low for people that are contemplating to quit smoking between 2000 and 2010. The results are showed in table 4.4.

We can see from table 4.4 that all 3 groups have significant outcomes when looking at the linear relationship between the variable. This means that for all 3 groups there exists a linear relationship between the variable year and percentage of people that are contemplating to quit smoking.

When we look however to the differences in constant and beta-coefficient we can identify some differences. The constant of the highest socio-economic status group (9.773) is considerably higher than the constant of the middle (7.853) and low (5.138) socio-economic status group for people that are contemplating to quit smoking. However if we look to the Beta-coefficient we see that exactly the opposite can be identified. For high socio-economic status groups the beta-coefficient is 0.427 compared to 0.757 for middle socio economic status groups and 0.843 for low socio-economic status groups. This shows that between 2000 and 2010, increasing years result in increasing percentages of people that are contemplating to quit smoking, however low-socio economic status groups react higher on increasing years with increasing policies and interventions regarding smoking.

4.6.3 Intention to quit in socio-economic Status: Pre-Contemplating

The last part of the analysis is about the effect of different years on the percentages of people that are pre-contemplating divided into the three socio-economic status groups.

When we take a look at table 4.4 we see that for all three socio-economic status groups there is no linear relationship between the variable year and the percentage of pre-contemplators at the 0.05 significance level.

4.6.4 Link intention to quit with smoking prevalence: Socio-economic Status

In this part we will discuss the smoking prevalence between 2000 and 2010 for different socio-economic statusgroups. The total smoking prevalence for the different socio-economic statusgroups is showed in figure 4.7.

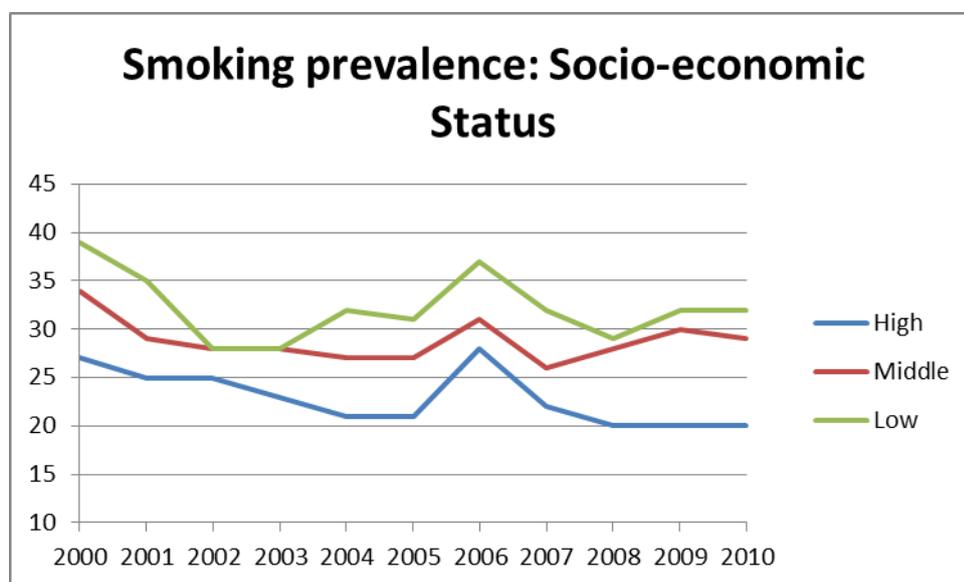


Figure 4.7 Smoking prevalence for socio-economic status (Stivoro, 2011).

When we look to the main characteristics of figure 4.7 we see that there is a difference in the smoking prevalence between socio-economic status groups. We see that in general the low socio-economic status groups have the highest smoking prevalence and the high socio-economic status group the lowest smoking prevalence. One important rise in the smoking prevalence in 2006, for all groups, can be found in the fact that no big policies and interventions have been implemented in that year. However when we look after the implementation of 2008, when different policies and interventions were implemented, we would expect a drop in smoking prevalence. The opposite can be detected for the middle and low socio-economic status groups: In 2009 the smoking prevalence among middle socio-economic status groups rises after which it slightly decreases in 2010. For the lowest socio-economic status group the smoking prevalence also rises from 2008 to 2009 and remains stable in the subsequent year 2010.

5 Conclusions and discussion

5.1 Conclusions

The objective of this thesis is to determine the influence of policies and interventions towards smoking on the intention to quit smoking for different sex, age categories and socio-economic groups between 2000 and 2010 in the Netherlands.

When we look at differences between males and females we see that for both groups the intention to quit smoking increases when more smoking policies and interventions are implemented. Especially after 2008 the intention to quit smoking is significantly higher for both males and females, which means that smoking policies and interventions have a positive effect on the intention to quit smoking for males and females. Also differences between males and females can be detected. We see that when more smoking cessation interventions have been implemented the intentions for females are slightly higher than the intentions for males.

The influence of policies and interventions on different age-categories shows that for all age-categories, except the 15-19 age-category, there is a positive linear relationship between year and the percentage of preparers and contemplators in these particular age-categories. This means that the percentage of preparers and contemplators is increasing when more smoking policies and interventions are implemented for the age-categories 20-34, 35-49, 50-64 and 65+.

When we look at the 15-19 age-category we see that outliers distort the linear relationship. Especially after 2008 the percentages of preparers and contemplators are significantly higher than before the year 2008. In the year 2008 different smoking policies and interventions have been implemented which have shown to have a significant effect on the intention to quit smoking for people in the 15-19 age-category.

Looking at different socio-economic status groups, we see that for preparers and contemplators in high, middle and low socio-economic status groups there exists a positive linear relationship between the variable year and the percentages of preparers and contemplators. This means that when more policies and interventions are implemented in subsequent years, higher percentages of people in high, middle and low socio-economic status groups have the intention to quit smoking. However, the intention to quit smoking increases more for the middle and low socio-economic status-groups in comparison to the highest socio-economic group.

The next step in our analysis is to look from intention to quit smoking to the smoking prevalence for the whole of the Netherlands divided in previously announced subgroups. The smoking prevalence for males and females between 2000 and 2010 decreased however the difference between males (28%) and females (26%) became smaller.

The smoking prevalence divided in age-categories for males and females show that all age-categories, except of the 15-19 age-category, are characterized by a decreasing smoking prevalence between 2000 and 2010. The smoking prevalence for the 15-19 age-category however increased between 2000 and 2010.

The smoking prevalence divided in high, middle and low socio-economic status-groups show that between 2000 and 2010 smoking prevalence is decreasing. However if we look to the differences between the groups we see that the gap in smoking prevalence between high-middle and high-low socio-economic status groups have been widening. This means that the implemented policies and interventions have been more effective for the high socio-economic group in comparison to the middle and low socio-economic status groups

We can conclude that for many different subgroups smoking cessation interventions have led to increasing intentions to quit and decreasing smoking prevalence between 2000 and 2010 in the Netherlands. Special attention and interventions are needed for the groups with increasing smoking prevalence such as females, the 15-19 age-category and low socio-economic status groups.

5.2 Discussion

Based on our hypothesis we can assume that smoking cessation interventions have had a diminishing effect for the smoking prevalence in the Netherlands between 2000 and 2010. When we link the total smoking prevalence with the intentions to quit we can also assume that when more smoking cessation interventions have been implemented the intentions to quit smoking are rising and the smoking prevalence is decreasing.

Influence of smoking cessation interventions for the different subgroups show that for males and females, smoking cessation interventions have an increasing effect on the intention to quit smoking for males and females. However we do not see that these intentions are higher for males than for females as our hypothesis states. We can conclude that smoking cessation interventions have an increasing effect on the intention to quit for males and females, although more for females than for males. When we look at the subgroup of age-categories we have hypothesized that smoking cessation interventions have an equal distributed increasing effect on the intention to quit smoking for different age-categories. We can reject this hypothesis because we have seen that rising intentions to quit have not led to decreasing smoking prevalence for the 15-19 age-category. For the other age-categories rising intentions have led to decreasing smoking prevalence.

The last hypothesis states that smoking cessation interventions have an increasing effect on the intention to quit smoking, but a higher effect on high socio-economic status groups in comparison to middle and low socio-economic status groups. This hypothesis can be assumed

5.3 Recommendations

The main objective of this study is to determine the influence of smoking policies and interventions on different subgroups. Broad conclusions are listed above but further research is needed especially to the influence of particular policies and interventions. This research looks at the influence of policies and interventions on the intention to quit smoking and on the smoking prevalence. Because at certain moments in time more policies and interventions are implemented at the same time, it is hard to determine which particular policies and interventions have led to the changing intention to quit smoking or the smoking prevalence. This means that more research is needed to show which particular policies and interventions have led to changes in intention to quit, or the smoking prevalence.

Especially looking at the 15-19 age-category we have determined that their smoking prevalence increased. More research is needed in order to determine which particular policies and interventions can be helpful in diminishing the smoking prevalence for this particular age-category.

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