Policies targeting the sale of tobacco and youth smoking behaviour

Nuyts, P.A.W.

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CHAPTER 1

General introduction
“Tobacco is the only legal drug that kills many of its users when used exactly as intended by manufacturers.”¹, p.¹ Smoking is associated with a plethora of non-communicable diseases. According to the World Health Organization (WHO), approximately seven million people die each year from tobacco smoking.² Six million die from direct use of tobacco and 890,000 from the exposure to secondhand smoke.²

SMOKING AMONG YOUNG PEOPLE

Worldwide, an estimated 14.3% of young people between 15 and 24 years old smoke, and 7% of 13 to 15 year old adolescents smoke. The highest prevalence rate among 13-15 year olds was found in the Americas with 9.9% followed by Europe with a prevalence of 8.9%.³ Trends data from the ESPAD (European School Survey Project On Alcohol and Other Drugs) survey conducted among 35 European countries between 1995 and 2015 found a stable trend in lifetime, current and daily smoking until 2003, after which prevalence rates decreased.⁴ The 2015 data found that still 46% of adolescents aged 15 to 16 reported lifetime cigarette use and 21% reported smoking in the past 30 days.⁴ In addition, 60% of participants in 2015 said it would be easy to obtain cigarettes if they wanted.⁴

Young people are a primary target group for smoking prevention as they are a susceptible group to start smoking. Most people start smoking before the age of 18 years old.⁵ Those who start smoking during adolescence are more likely to continue smoking than those who start as adults.⁶

Flay et al. (1992) identified five different stages in the development of nicotine addiction in youth: preparatory, initial trying, experimentation, regular use, and nicotine addiction.⁷ Adolescents first establish certain beliefs around smoking (preparatory), some may then try two or three times (initial trying), this initial trying can then extend to experimentation, which may take several years and is often context-driven (e.g. at parties). Experimentation can then turn into regular smoking (i.e. on a regular basis).

The idea that heavy and long-term smoking is a prerequisite for nicotine addiction was proven wrong by previous studies finding that adolescents already experience withdrawal symptoms before beginning daily smoking.⁸⁻¹² Adolescents can already develop withdrawal symptoms between subsequent cigarettes, such as cravings, anxiety and restlessness.⁷,⁸ This suggests that even adolescents experimenting with cigarettes can develop nicotine addiction.⁸ It is therefore imperative to prevent adolescents from starting to smoke.
SUSCEPTIBILITY TO SMOKING

Adolescence is a period that is often characterized by increased risk-taking and sensation-seeking behaviour. Several perspectives on adolescent development and the associated behaviours exist: 1) the biological perspective, 2) the psychosocial perspective, and 3) the societal perspective.

The biological perspective attempts to explain the presence of risk-taking behaviour during adolescence, such as smoking, by looking at brain development between childhood and adolescence. Two primary theories have come forth 1) the development of the prefrontal cortex and 2) changes in the dopaminergic system of the brain.\textsuperscript{13} The prefrontal cortex is responsible for “planning, controlling impulses, and weighing the consequences of decisions before acting.”\textsuperscript{14, p.159} During adolescence it has not fully developed and continues to develop until mid-20s. This could explain why adolescents may lack planning ability and impulse controls and may therefore be more likely to start experimenting with smoking. The second theory focuses on the dopaminergic system (i.e. the reward system in the brain) and its role in risk-seeking behaviour. During adolescence, changes in the dopaminergic system take place which are said to be associated with puberty. These changes can lead to either a “reward deficiency” (reduction in dopamine) or an increase in the sensitivity of the dopaminergic system leading to a “higher level of reward.” In both cases, it can lead to increased reward-seeking behaviour such as smoking.\textsuperscript{13} Nicotine in cigarettes binds to nicotine receptors in the brain, releasing dopamine and thereby triggering a feeling of reward.\textsuperscript{15} These receptors however become desensitized, requiring a higher dose of nicotine to activate the receptors a second time, to meet the same level of reward, resulting in nicotine addiction over time.\textsuperscript{15}

The psychosocial perspective emphasizes that adolescents’ self-identity is still developing. Adolescents are increasingly trying to find an identity, it is “a time of self-exploration.”\textsuperscript{16} Within this perspective there is also a strong focus on the influence of family and peers on risk-taking behaviour, in this case smoking. During adolescence, the parent-adolescent relationship often becomes more complex and distant, and the role of peers becomes increasingly important.\textsuperscript{6, 16, 17} Research shows that peer influence is strong during adolescence, making them more susceptible to start smoking if exposed to smoking peers.\textsuperscript{6} Family and peers also play an important role in access to cigarettes. Smoking family and peers can facilitate an adolescents access to cigarettes.\textsuperscript{18}

The societal perspective focuses on the influence of societal norms, the physical environment (e.g. school, community and tobacco retail environment), the policies in place, and enforcement of the policies, on risk-taking behaviour. These components should not be seen as separate entities but can influence one another.
Individuals exposed to a society with anti-smoking norms are less likely to start smoking than those residing in a society with pro-smoking norms. Norms are largely determined by what other people do and think. The school, community, and retail environment as well as the comprehensiveness of tobacco control policies targeting these environments can influence an individual’s thinking and behaviour, and can therefore influence societal norms. For example, adolescents exposed to school, community or retail environments where smoking is prominent and visible, and where no strict policies are in place, may perceive smoking as acceptable behaviour resulting in a positive smoking norm. The positive smoking norm can increase an adolescents susceptibility to start smoking and can contribute to a higher perceived accessibility to cigarettes. The physical environment (i.e. school, community, and retail) can also facilitate an individual’s access to cigarettes. For example, weak tobacco control policies within these environments specifically the retail environment can allow adolescents to access cigarettes and start smoking.

In order to prevent young people from starting to smoke, tobacco control policies can target the different elements mentioned above, specifically societal factors, that influence a young person’s risk of initiating smoking.

**DEVELOPMENTS OF TOBACCO CONTROL POLICIES IN EUROPE**

In the 1970s Scandinavian countries were the first to adopt tobacco control policies, it was not until 1984 that initiatives were taken at the European level, when it became a responsibility of the European Commission (EC). Between 1984 and the 1990s tobacco control gained priority. A Programme Against Cancer in which smoking was a high priority and legally-binding directives was adopted by the EC. In the 1990s, tobacco control in Europe became more concrete and several Directives were put in place such as the tobacco advertising and tobacco productive Directives, which stipulated laws regulating tobacco advertising and product content throughout the EU.

Next to the role of the EC in tobacco control, the WHO became an important player in 2005, when the Framework Convention on Tobacco Control (FCTC) was signed by the European Union and countries. This legally-binding treaty aimed to provide guidelines for global tobacco control and included measures to reduce the supply and demand of tobacco and to protect people from second-hand smoke. To date, 181 countries, including all countries in Europe, have signed and ratified the FCTC.

However, while policies are proposed at the European- and global-level, most of them are adopted and implemented at the national level. This has resulted in large variations in the implementation of tobacco control policies between countries.
in Europe. In countries like the UK, Ireland and Finland there have been strong developments in tobacco control since the 1970s. In the dominant political discourse, these countries regard tobacco smoking as a public health problem and not as an individual choice. In contrast, in countries such as Austria, Germany and Italy the adoption of tobacco control policies has been much lower and developments in this area have stagnated. In Germany and Italy, there is still a strong influence of the tobacco industry, making it less likely for new policies to be adopted. The extent to which tobacco control policies are adopted in Europe is measured with the Tobacco Control Scale (TCS), a scoring system on a point-scale from 0 to 100, with a higher score corresponding with the most comprehensive tobacco control. This score is based on an evaluation of the following policies: price of cigarettes, smoke-free places, campaigns, advertising and promotion bans, health warnings, and cessation support. The TCS score of 2016 found that 19 countries are still failing to meet 50% of the total possible score. Figure 1 provides an overview of the scores for 2013 and 2016. Between 2013 and 2016 more countries have adopted comprehensive tobacco control policies. In both years the United Kingdom, Ireland, and Iceland are at the top with the most comprehensive tobacco control (over 60/100 points) and Austria, Germany, and Luxembourg at the bottom with the least comprehensive (under 38/100 points).

![Figure 1. TCS scores in 2013 and 2016. In 2013, the Russian Federation was not included.](image)

**POLICIES FOCUSED ON YOUTH SMOKING**

Over the past 5 years, five European countries (Scotland, Ireland, Finland, the Netherlands, and France) have embraced a smoke-free generation movement, and several countries have initiated plans for such a movement including England, Sweden and Belgium. The aim of this movement is to give every child born after a certain year (e.g. 2017) the chance to grow up smoke-free and
thereby contribute to the denormalisation of smoking. These countries have also set national targets to reduce the smoking prevalence to under 5% in the total population within a certain time-frame (i.e. by 2040 in the Netherlands).

As part of this movement, more restrictive tobacco control policies are needed in order to reach the goals set out by these countries. Each country has developed a roadmap in which the types of tobacco control policies to be implemented are laid out. In Ireland for example, hoping to reach a smoke-free generation by 2025, the following policies will be implemented including plain packaging, restricting sales and displays of tobacco products, smoking bans in cars, etc. Similarly, in the Netherlands, with a goal of a smoke-free generation by 2035, policies such as smoke-free schools, sport clubs, and playgrounds as well as an increase in the price of cigarettes and measures targeting the sale of tobacco will be implemented.

This thesis will focus on policies targeting the sale of tobacco, as this is an area that has not received much attention, but that is gaining attention among policy makers especially in light of the smoke-free generation movement. The retail environment - which we define as any place where tobacco products are sold (e.g. supermarkets, newsagents, gas stations, etc.) - plays an important role as it can influence young people in various ways by influencing accessibility to cigarettes and exposure to tobacco products. Policies within this environment can be oriented towards limiting access, visibility, and availability of cigarettes. Such policies cover age-of-sale laws and point-of-sale measures.

POLICIES TARGETING THE SALE OF TOBACCO

Age-of-sale laws

A ban on sales to minors (i.e. age-of-sale laws), limits access to commercially-sold cigarettes to minors. This is the only measure recommended by the EC and proposed by the FCTC that specifically targets young people. In the EU, 26 countries have a minimum purchase age of 18 years old, and two countries (Belgium and Austria) have a sales age of 16. Such laws were implemented to prevent adolescents below a certain age from accessing commercial sources of cigarettes and thereby preventing and reducing smoking among minors. In Europe, the first age-of-sale laws were implemented in the 1970s in Scandinavia. Since then, all European countries have adopted an age-of-sale law although increases to the age of 18 did not take place until the early 2000s.

Evidence on the effectiveness of age-of-sale laws on youth smoking behaviour is varying. Findings have shown that an increase in the minimum age-of-sale can lead to reduction in tobacco use, reduced experimentation, and a decrease in
tobacco bought from commercial sources. However, some studies have not found such reductions in smoking prevalence. The effectiveness of the policy is often brought into question due to this disparity in findings, and critics argue that we should “abandon youth access tobacco programmes.”

However, there is a need for a more thorough analysis of what exactly the effect of age-of-sale laws is on young people. We do not yet understand why there are disparities in the current findings. Effectiveness may be influenced by different circumstances such as the currently researched groups, settings, etc. In order to get a better understanding we need to know more about the underlying mechanisms and how different circumstances can influence them. More studies are needed to measure these mechanisms, including qualitative as well as quantitative studies, to provide more insight in the effectiveness of age-of-sale laws.

Point-of-sale measures

Next to access, exposure to tobacco products at the points of sale also remains prominent. Factors that influence exposure are visibility of tobacco products (e.g. advertising and display) and tobacco retailer density and proximity (i.e. availability of cigarettes). Print and broadcasting tobacco advertising, such as on television, radio, newspapers, and outdoor advertising on billboards have been largely banned in Europe. However, visibility of products inside and directly outside tobacco retailers is still present.

Visibility of tobacco products at the point-of-sale (PoS) is one of the last remaining marketing elements the tobacco industry can influence by determining the placement of products and ensuring brand visibility. Exposure to tobacco products among young people can lead to increased susceptibility to smoking and increased smoking uptake. Increased brand recognition and exposure to tobacco marketing can also create the idea that tobacco products are normal and that smoking is an acceptable behaviour.

It is therefore important to monitor the visibility of tobacco products, and variations among retailers, is needed. This information is however limited. Only one Scottish study has evaluated the visibility of tobacco products, finding that visibility was high inside retailers and that more than half of the retailers had products visible from outside the store. Such data has not been collected in other European countries, yet could be important in providing insight into the level of exposure to tobacco products, thereby highlighting where measures may need to be taken to limit this visibility.

Point-of-sale displays bans can remove the visibility of tobacco products at the points of sale by requiring retailers to place tobacco products outside the view
of the customer. Such bans are increasingly being introduced in Europe, aiming to remove the display of tobacco products at the point-of-sale. Article 13 of the WHO FCTC advocates for the removal of all tobacco product advertisements, promotion and sponsorship and thereby encourages member states to adopt measures such as PoS display bans.\textsuperscript{23} Evidence on the effectiveness of PoS display bans on smoking behaviour among adolescents is limited and varying. Two studies conducted in Ireland\textsuperscript{53} and England\textsuperscript{54} found no significant effect on adolescent smoking prevalence, whereas studies performed in New Zealand\textsuperscript{55} and Australia\textsuperscript{56} did find a significant association. Gaining more insight into the effectiveness of point-of-sale display bans could provide more incentive for other European countries to adopt such measures and thereby limit the visibility of tobacco products and consequently smoking behaviour among young people.

The visibility of tobacco products also depends on the number of tobacco outlets within a certain area. A high tobacco outlet density and proximity can increase an adolescents smoking behaviour by increasing access to cigarettes and exposure to the visibility of tobacco products.\textsuperscript{57-61} It can also contribute to the normalisation of smoking due to higher exposure to tobacco products.\textsuperscript{62} This may enable the initiation of smoking or transition from experimentation to regular smoking. Evidence on the association between tobacco outlet density and proximity on youth smoking behaviour is however varying. Two reviews have assessed this association, and found an association between outlet density and proximity and smoking behaviour.\textsuperscript{62, 63} However, both reviews point out important limitations such as the inconsistencies in the measurements of density and smoking outcomes, and variations in settings and populations. The question whether there is an association between tobacco outlet density and proximity and youth smoking behaviour therefore remains. Answering this question is important as reducing the density and proximity between outlets or to schools have been proposed as ways to prevent smoking, but it is unclear whether this may be expected.

**AIMS OF THE THESIS**

The overall aim of this thesis is to examine policies targeting the sale of tobacco and the influence on youth smoking behaviour.

Two specific objectives:

1. To understand the relationship between age-of-sale laws and youth smoking behaviour.

2. To examine the relationship between point-of-sale related tobacco measures and youth smoking behaviour.
OUTLINE OF THE THESIS

Part I Age-of-sale laws

Part I consists of four chapters aimed to understand the relationship between age-of-sale laws and youth smoking behaviour.

Chapters 2 and 3 examine the effect of age-of-sale laws on smoking behaviour from the perspective of youth. Chapter 2, a realist review, examines how a ban on tobacco sales to minors can be effective in changing smoking behaviour among youth, by identifying the various mechanisms and contra-mechanisms that play a role in this relationship. Chapter 3 expands on the mechanisms identified in Chapter 2 by exploring adolescents' access to cigarettes across seven European countries, and highlights differences between policy contexts. Chapter 4 examines the age of smoking initiation across several birth cohorts in the Netherlands over a period when youth-oriented tobacco control policies, including an age-of-sale law, were implemented. Chapter 5 investigates how an increase in the age-of-sale from 16 to 18 in the Netherlands impacted the perceived accessibility to cigarettes among never-smoking adolescents, compared to never-smoking adolescents in Belgium where the age-of-sale remained 16.

Part II Point-of-sale measures

Part II consists of three chapters aimed to examine the relationship between point-of-sale related tobacco measures and youth smoking behaviour.

Chapter 6 examines the visibility of tobacco products and advertising at the points of sale in Amsterdam by systematically auditing tobacco retailers in several neighbourhoods. Chapter 7 studies the impact of the removal of point-of-sale tobacco displays on smoking behaviour among adolescents in Europe. Chapter 8 systematically reviews the literature on the association between tobacco outlet density and smoking among young people.

Part III General discussion

The general discussion of this thesis provides an overview of the main findings followed by a discussion on the policy implications for age-of-sale laws and point-of-sale measures. Within each of these topics, we zoom in on one relevant future policy measure, namely a tobacco age-of-sale of 21 and a tobacco retailer licensing system, and discuss the potential of the adoption of these policies within the European context. Finally, suggestions for future research are made.
DATA SOURCES AND METHODOLOGY

Table 1 provides an overview of the data sources and methods used per chapter. This thesis includes both quantitative and qualitative research as well as two different kinds of reviews, namely a realist review and a systematic methodological review.

Table 1. Overview of chapters and respective study characteristics.

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Realist methodology

The studies in Chapter 2, 3 and 5 were conducted as part of the SILNE-R project. This project aimed to evaluate how effectiveness of current tobacco control policies on youth smoking behaviour can be improved, by using realist methodology. A realist evaluation method, as proposed by Ray Pawson in his book ‘Evidence-based policy: a realist perspective’, allows us to look at how, why, for whom and under which circumstances an intervention could work, by identifying the underlying mechanisms. It goes beyond whether an intervention works but aims to understand why it works and within which contexts, it therefore differs from a traditional analysis that only examines effectiveness. In Chapter 2 and 3 we apply this methodology to examine how minors respond to a ban on sales to minors by looking at the underlying mechanisms and identifying the contextual factors that could influence these mechanisms. A realist evaluation can provide greater insight into the inner-workings of tobacco control policies...
and can ultimately lead to more tailored and more effective policies that take into account the greater context.

**Quasi-experimental studies**

The evaluation of tobacco control policies is essential in providing evidence to policy makers. Chapters 5 and 7 use a quasi-experimental design, using repeated cross-sectional data, to evaluate the effect of an age-of-sale law and point-of-sale display ban. Natural experiments can be utilised to evaluate the effectiveness of policies, as Randomised Controlled Trials (RCTS) are not feasible because national policies cannot be randomly implemented at the same time in some countries but not in others. Quasi-experimental studies compare changes over time before and after the implementation of a policy in an intervention group and compares these changes with a control group. Specifically the implementation of the policy occurred in countries included in the intervention group but not in the control group. Quasi-experimental studies assume that, when confounding is taken into account, any changes in smoking-related outcomes in the intervention group that are larger than those observed in the control group are attributable to the change in policy that occurred in the intervention group. Even though these are observational studies that measure associations, causal inferences are more convincing than in before-after studies that are only conducted in intervention groups or cross-national studies that only compare countries without measuring changes over time.
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