

**AN ETHICAL FRAMEWORK FOR TOBACCO CONTROL  
POLICY**

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## Declaration

I hereby declare that this thesis is my original work and it has been written by me in its entirety. I have duly acknowledged all the sources of information which have been used in the thesis.

This thesis has also not been submitted for any degree in any university previously.

Yvette van der Eijk

January 15<sup>th</sup> 2015

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## Summary

This thesis considers an ethical framework for tobacco control policy. This is achieved by building on existing theories of public health ethics. It includes a critique of the social processes that influence addiction neurobiology, the complex factors that can affect autonomy in addiction, and further issues presented by vested interests such as the tobacco industry. The central argument is that tobacco control policies should protect the public's health, and maximize individual freedom by providing the conditions that promote or protect autonomy. Addiction is autonomy-undermining, so having an option to use tobacco—an addictive and autonomy-undermining product for most users—does not enhance freedom. An ethical tobacco control policy therefore is an interventionist approach, in which policymakers acknowledge the complex social factors that underlie addiction susceptibility and that these contribute to the formation and sustaining of addictions.

These ideas are incorporated into an ethical framework for tobacco control policy, which is conveyed through relational autonomy and a set of ethical considerations. These reflect the importance of universal measures that discourage smoking, protect others from second-hand smoke, and protect people below age 25 from tobacco. They also emphasize the importance of restricting and exposing tobacco industry activity, and being transparent about the ethical basis and rationale of tobacco control measures. The ethical framework also focuses on relational autonomy: providing autonomy-promoting social conditions and involving the community, family, and other important relationships in the prevention and treatment of tobacco addictions. This should be done in a way that provides extra support to socially disadvantaged groups who suffer disproportionately from tobacco-related harm; therefore social justice is another important aspect of the ethical framework.

This framework is then used to provide ethical analyses of four recent approaches to tobacco control: tobacco denormalization, the tobacco-free generation proposal, tobacco harm reduction, and medicalized approaches including nicotine vaccines and genetic tests for nicotine addiction.<sup>1</sup>

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<sup>1</sup>Although not the primary focus of the thesis, these analyses are intended to show how the ethical framework may be applied and to highlight the kinds of concerns it raises in the context of more recently developed tobacco control interventions.



# Chapter 1

## Introduction

### 1.1 Overview

This thesis is focused on the ethical aspects of tobacco control policies. It concerns questions regarding what tobacco control policies *should* do: reasons why tobacco should be regulated, how it should be regulated, and the relevant factors that should influence tobacco control policies.<sup>1</sup>

#### Ongoing issues in tobacco control policy

Tobacco use is an important cause of addiction,<sup>2</sup> death, and chronic disease. Cigarette smoking, which represents the main form of tobacco use, affects virtually every organ and system in the body.[1] Cigarette smoke contains over 250 harmful chemicals, of which approximately 50 are known carcinogens.[2] Consequently, smoking is the primary cause of lung cancer, as well as other cancers and chronic diseases such as cardiovascular diseases, chronic bronchitis, emphysema, and asthma.[1] Approximately half of all smokers die prematurely from a tobacco-related disease,[3] and, on average, smokers lose 20 years of productive life.[4] Smoking also directly harms the health of others through the effects of second-hand smoke (SHS).<sup>3</sup> This can result in deaths from chronic diseases such as ischaemic heart disease, asthma, and lung cancer.[5]

Over the last few decades, tobacco control policies have evolved in order to minimize these harms. Many of these policies are based on an international regulatory framework set out in the World Health Organization's 2005 Framework Convention on Tobacco Control (WHO FCTC) treaty.[6] The ethical

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<sup>1</sup>In other words, this thesis is a normative one focused on ethical aspects, and limited in that it does not consider at length economic or practical factors. This point is further clarified below—under ‘methodology and scope’.

<sup>2</sup>The term ‘addiction’ remains widely disputed. Nevertheless, it is a clinically recognized disorder associated with distinct behavioral features that indicate an impaired ability to avoid the addictive activity—see page 4.

<sup>3</sup>The sidestream smoke released from a cigarette, as well as smoke exhaled by the smoker.

foundation of this treaty is grounded in the principles of human rights, particularly protection of the right to health; this is achieved by discouraging smoking while permitting adults the option to smoke. Accordingly, measures under the WHO FCTC aim to protect children from smoking initiation and to discourage smoking among adults, by restricting tobacco sales to people over a certain age (18 years in most countries), raising the price of tobacco through taxation, and warning people about the detrimental health effects of smoking. Cessation services are also provided to smokers who wish to quit. Restrictions are imposed on the tobacco industry (TI) by banning all forms of tobacco advertising, promotions, and sponsorships (TAPS), and smokefree laws are implemented in public areas in order to protect others from the harms of SHS exposure.

Nevertheless, tobacco use remains a serious public health issue. Although tobacco control interventions have significantly reduced global smoking prevalence,<sup>4</sup> overall tobacco consumption has actually increased due to population growth,[7] and 22% of the current global population aged over 15—over 1 billion people—smokes tobacco on a daily basis. Smoking kills approximately 6 million people per year, of whom over 600,000 are non-smokers exposed to SHS. At current trends it is thus estimated that, in the 21<sup>st</sup> century, 1 billion people will die as a result of smoking.[3] Smoking also continues to have serious impacts on societies, healthcare systems, economies, and the environment.[8]

These issues persist for various reasons. Tobacco control policies vary in their implementation level,[9] with implementation being more of a challenge in countries with limited financial resources or where governance is weak. These are both strongly linked to TI activity, since the TI is heavily involved in lobbying politics, filing lawsuits against states that implement restrictions on tobacco, and propagating pro-tobacco arguments. The latter is often conveyed through debates in which smoking is depicted as an exercise of freedom (the ‘free choice’ to smoke), liberty rights (a ‘right to smoke’), or a beneficial activity that provides pleasure, stress relief, or has some other positive social connotation. Tobacco regulations are then construed as paternalistic, unreasonable restrictions on personal freedom and enjoyment.[10] Therefore the TI retains a vast amount of economic and political power, and remains a powerful adversary to tobacco control efforts.

Furthermore, even a thorough implementation of policies based on the WHO FCTC seems to be unable to reduce smoking prevalence below a certain threshold, which is estimated at 13–15%.[11] This limitation may be in part because certain groups of people are less responsive to current regulatory frameworks. This idea, termed the ‘hardening hypothesis’, is supported by the fact that, in countries where smoking prevalence has reduced, smoking is increasingly concentrated among certain groups of

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<sup>4</sup>Between 1980 and 2012, smoking prevalence has reduced from 41% to 31% (among men), and from 11% to 6% (among women). See [7].

people:[12] people with a comorbid mental illness, certain racial minorities, people marginalized from the social mainstream, and people in low socioeconomic strata.[7] This trend may exist because specific needs of these groups are not addressed in current regulatory frameworks, because these groups suffer disproportionately from more severe tobacco addictions which in turn makes it more difficult for them to give up smoking—or both.

### **Issues related to more recent strategies**

It is argued, then, that a more radical strategy should be implemented in conjunction with current regulations in order to further push down smoking prevalence.[13] Tobacco ‘endgame’ strategies aim to near-eliminate smoking by reducing smoking prevalence to near-zero (such as 5%). One approach is to denormalize tobacco: implement measures that imply that smoking is not—and should not be—a normal activity in society. These discourage smoking initiation among children and encourage adult smokers to quit.[14] However, there are concerns that it results in the stigmatization and social marginalization of smokers.[15] Another endgame approach is to focus preventive efforts on smoking initiation among younger generations, by denying tobacco sales to people born after a certain date. This approach, termed the ‘tobacco-free generation’ (TFG) proposal, protects youth from smoking initiation while not affecting current smokers.[16] However, the proposal may be considered an unreasonable restriction on the personal freedom of adults born after the cut-off date. This approach therefore raises questions on the limits of tobacco restrictions, how initiation should be prevented among children, and whether initiation should be prevented through a less restrictive means.

Policies could also employ a harm reductive approach, in which the goal is to reduce the health, social, and economic impacts of drug use without necessarily reducing drug use itself. Tobacco harm reduction, then, consists of efforts to find an alternative product to cigarettes that is below an acceptable harm threshold. Recent developments have focused on electronic nicotine delivery systems (ENDS),[17] although there are also debates on the use of smokeless tobacco (SLT) as an alternative to cigarettes.[18, 19] However, there are concerns regarding the safety of these products, their appropriate use, and ways in which the TI may attempt to market ENDS or SLT in a way that could undermine otherwise effective tobacco control measures. The TI, for example, may market ENDS and SLT to youth in a way that encourages them to switch to cigarettes in later life, or that encourages dual use among smokers rather than a complete switch to ENDS or SLT.[17, 19]

Two medical interventions—still undergoing development—may be used in the treatment or pre-

vention of tobacco addictions: nicotine<sup>5</sup> vaccines, and genetic tests for nicotine addiction susceptibility. The aim of the nicotine vaccine is to block the rewarding effects of nicotine in the brain.[20] It may be used as a cessation therapy for smokers (as a type of self-binding strategy), or as a preventive method in people who have initiated smoking or are likely to initiate smoking, but have not yet developed nicotine addiction. The aim of the genetic test is to predict one’s susceptibility to developing nicotine addiction, such that ‘high-risk’ people can be targeted for interventions such as the nicotine vaccine. However, these interventions both rely on the idea that smoking is a medical disease, and may ignore other important psychosocial factors. Furthermore, they may be misused by vested interests such as the TI, and there are also concerns over whether they may result in undesirable behaviors,<sup>6</sup> or whether they may be used coercively.[21]

### **‘Addiction’: Conceptual uncertainties**

Tobacco contains nicotine, a psychoactive drug<sup>7</sup> that has the potential to establish addictive<sup>8</sup> patterns of use; so an important reason why tobacco, despite its deadliness, remains widely consumed is its addictiveness. Although what exactly ‘addiction’ is remains widely disputed, it is a clinically recognized disorder with distinct behavioral, psychological, and physical features, many which reflect an impaired ability to resist the addictive activity.<sup>9</sup> Thus it is thought that addiction is a disorder that, to some extent, undermines one’s autonomy in this context.<sup>10</sup>[23] This thesis, too, argues that addiction is autonomy-undermining but not necessarily autonomy-negating, and that this has important implications on how policies should respond.

The question of “*what is autonomy in addiction?*” is particularly relevant in the context of tobacco: a significant proportion of smokers make attempts to quit (40–50% in any given year),[24] yet very few unaided cessation attempts are successful (just 3–7%).[25] Further, most smoking initiations occur during adolescence,[26] before the capacity to make autonomous decisions has fully developed. Put

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<sup>5</sup>Nicotine is the constituent in tobacco that gives it addictive potential—more explanation on ‘addiction’ below. For the purpose of this thesis, ‘nicotine addiction’ and ‘tobacco addiction’ are used interchangeably.

<sup>6</sup>For example, increased smoking among adolescents on the basis that they are at ‘low risk’ of developing an addiction.

<sup>7</sup>‘Psychoactive drug’ refers to a drug that crosses the blood–brain barrier and elicits changes within the central nervous system.

<sup>8</sup>‘Addictive drug use’ refers to a type of drug use in which the individual has developed an addictive relationship towards his/her use of a drug. This addictive relationship is characterized by various neurological patterns, behaviors, and psychological features (such as craving) that are further described and discussed throughout this thesis—particularly in chapters 2 and 3.

<sup>9</sup>For example, in the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM–5), tobacco addiction is classified as “tobacco use disorder” and characterized by behavioral criteria that reflect cognitive dissonance regarding tobacco use (e.g. repeated and unsuccessful efforts to quit or cut down), craving, and physical symptoms such as tolerance and withdrawal—see [22].

<sup>10</sup>There are various definitions of ‘autonomy’, and this concept is clarified in chapter 2. For now, ‘autonomy’ in the context of addiction refers to the ability to resist the addictive activity (i.e. tobacco use).

together, this raises various questions: whether the decision to initiate smoking is freely made, the extent to which—once tobacco addiction has developed—it is possible to resist using tobacco, and what the relevant implications for tobacco control policies are.

There are various explanations of addiction and the nature of decision-making and autonomy in addiction. These explanations, in turn, affects ideas on how addictive drugs should be regulated, how autonomy in addiction should be maximized, and the relevant roles of the state,<sup>11</sup> the community,<sup>12</sup> and addicted individuals. ‘Brain disease’ theories of addiction have become particularly influential in recent years, in response to neurobiological evidence showing the impacts of drug use on various neurological circuits and structures.[27] They suggest that prolonged drug use triggers neurobiological changes that undermine one’s ability to resist drug use.[28, 29] Policies that follow, then, should restrict tobacco availability as much as possible and provide medical treatments, such as nicotine vaccines, for addiction. Since the medicalized approach of brain disease theories often presumes that vulnerability is largely conferred by genetic factors, they may also endorse genetic tests as a suitable prevention strategy.[21]

Some interpretations of brain disease theories have gone further to argue that, since people with addiction lack self-control, they are unable to make autonomous decisions regarding their drug use,[23] or should be forced into medical therapies in order to restore ‘lost’ autonomy.[30] So brain disease theories of addiction may endorse a heavily medicalized or geneticized approach, and, in some cases, coercive therapy. However, this presents ethical implications if addiction does not negate autonomy, or if a medicalized or geneticized approach turns out to be inappropriate given the psychosocial nature and etiology of the disorder.

Otherwise, it has been argued that addictive behaviors are freely chosen. This has led into two main interpretations. If the addictive behavior is considered socially unacceptable, ‘addiction’ tends to be depicted as an immoral lifestyle decision that people should be deterred from. The result is an approach in which addicted individuals are often stigmatized, socially marginalized, and—in many cases—punished for using drugs. This approach is termed the ‘moral choice’ theory of addiction. It has been widely criticized for its stigmatizing treatment of drug users, especially in the context of illicit drug use (e.g. marijuana, cocaine, heroin).[31] In contrast, if the addictive behavior is considered socially acceptable, then it tends to be portrayed as a freely chosen behavior similar to other behaviors. Policies, then, should permit it, and impose restrictions only for the purpose of protecting others from

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<sup>11</sup>For the purpose of this thesis, ‘the state’ refers to an organized political community—for example a nation or province—accounted for by a government.

<sup>12</sup>For the purpose of this thesis, ‘the community’ refers to a group of people who live in the same area, or who share a similar characteristic. It is used more or less interchangeably with ‘society’.

harm. This approach has been termed the ‘liberal theory of addiction’, and would lean towards a *laissez-faire* approach.[32] However, this is potentially problematic if addictive behaviors are not freely chosen, or if they present a significant public health threat that warrants intervention.

It has also been argued that addiction is a disorder that is triggered by psychosocial influences, and that the ability to exercise self-control over addictive behaviors depends, to some extent, on the social environment. This has led to a more specific theory that addiction is a form of self-medication against painful or stressful circumstances: the ‘self-medication hypothesis’ of addiction.[33] Similarly, it has also been argued that addiction is a coping strategy against social dislocation: the loss of social, cultural, and individual identity or belonging that occurs as a result of social change. Policies based on such perceptions, then, should focus preventive and treatment efforts onto the social environment, and approach people with addiction—as victims of their circumstances—from a more sympathetic angle.[34]

Tobacco addiction is often described under a liberal theory of addiction. As mentioned above, smoking tends to be depicted—particularly by the TI—as a freely chosen, pleasurable activity that should be permitted and socially accepted. It is sometimes also described as a form of self-medication against a mental illness or difficult social circumstances. Perceptions, however, have started to shift in more recent years. Knowledge on the harms of smoking, particularly to others (especially through SHS exposure) has led smoking to be portrayed as a socially unacceptable behavior, which supports a moral choice theory of tobacco addiction, a moralized approach to tobacco control policy, and measures such as tobacco denormalization. There is also increased support for a brain disease theory of nicotine addiction, in response to neuroscientific evidence that shows the impacts of nicotine on the brain. This may, in turn, lead to increased support for medicalized interventions such as nicotine vaccines and a geneticized preventive approach.

It is premised in this thesis that it is still unclear what an ‘addiction’ entity is, what makes some people more vulnerable to addiction, and which theory—of the four described<sup>13</sup>—is the most fitting description of tobacco addiction. It also remains unclear how autonomy is manifested or curtailed in addiction, or how tobacco control policies should aim to preserve autonomy in prevention and treatment efforts. These considerations are important, as they can help to address some of the ongoing issues related to tobacco addiction, such as tobacco-related health inequalities or the poor success rates in smoking cessation.

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<sup>13</sup>Moral choice theory, liberal theory, brain disease theory, and the self-medication hypothesis.

## **Factors that policies should address**

Further implicating these questions is the social environment, which has important influences on patterns of tobacco addiction and tobacco use. Addictions are triggered in times of social hardship, such as war, colonization, and social transformation.[34] Epidemiological trends, similarly, show an elevated smoking prevalence among people from socially disadvantaged backgrounds, people with mental illnesses, and racial minorities.<sup>14</sup>[35] Such groups also have higher rates of illicit drug use[36] and alcoholism.[37] What are the reasons behind these trends, and what are the environmental factors that tobacco control policies should focus on? It is possible that some people are genetically more predisposed to problematic patterns of drug use and addiction; yet social processes also play an important role. To be considered, then, is how social processes contribute to vulnerability, and how policies should respond. One influence in particular that should be considered is the TI, which has shaped the social environment, perceptions on tobacco use, perceptions on addiction, and scientific research in ways that have led to increases in smoking prevalence and the normalization of smoking as a socially acceptable behavior.[38, 39]

## **The ethical foundation of tobacco control policies**

How tobacco control policies are ethically and conceptually grounded can have important implications. It in part determines the types of intervention advocated for, and it also affects how these interventions are accepted by policymakers and the public.[40] In other words, in order to determine how tobacco control policies should deal with the issues raised above, they need to be based on a solid ethical and conceptual foundation that presents a clear picture of what addiction is, as well as why, how, and to what extent tobacco should be regulated.

Current regulations are based on discouraging rather than prohibiting tobacco use in adults. Priority is on protecting the public's health while maintaining a certain degree of freedom to use tobacco.[41] It is therefore important to consider the notions of 'health' and 'freedom': their precise meaning in the context of tobacco use and addiction, how they interrelate, and how they may be preserved within an ethical framework. Liberal theories, such as Mill's liberalism,[42] are often drawn on in pro-tobacco arguments in order to advocate for a 'free choice' to smoke, but tobacco use—due to its addictiveness—may not be considered compatible with the notion of 'freedom' if addiction is a disorder that, to some degree, is freedom-undermining. If this is the case, preserving freedom in this context may require an

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<sup>14</sup>'Racial minority' in this thesis is used as a non-pejorative term to refer to a racial group that, relative to the social mainstream, comprises a smaller population. In a Western country such as the USA, typical examples include African Americans and Native Americans.

interventionist approach rather than one that is rather less intrusive. It is also important to consider how these ideas relate to human rights, since regulations—as mentioned above—tend to be based on human rights principles.

Although there is no specific ethical framework for tobacco control policy, a number of ethical frameworks and theories have been developed for public health issues more generally. These frameworks, broadly speaking, aim to strike a balance between protecting the public’s health and preserving the freedom of individuals. Some theories also emphasize the importance of reducing health inequalities by providing better opportunities for health to people most affected by social disadvantage.[43] Other theories go further to argue that social justice is a necessary requirement for public health,[44] or that good health depends in part on the community and the social structures that support good health.[45] It is unclear, though, how the concepts of ‘public health’, ‘freedom’, and ‘social justice’ fit into the context of tobacco control, how ‘freedom’ should be preserved in the context of addiction (when the nature of autonomy in addiction remains undetermined), and what the relevant roles of individuals, the community, and the state are.

## **Research problems**

To summarize, there are a number of research problems as far as the ethical aspects of tobacco control policies are concerned:

- It is unclear how tobacco control policies should address ongoing issues in tobacco control, most notably the limitations of current regulatory frameworks and the increasing gap in tobacco-related health inequalities.
- It is often claimed that smoking is beneficial, yet it is unclear what these benefits are, and whether they should offset some restrictions on tobacco.
- It is unclear how tobacco control policies should address potential ethical issues presented by more recent policy approaches, such as tobacco denormalization, the TFG proposal, tobacco harm reduction, nicotine vaccines, and genetic tests for nicotine addiction.
- Smoking is, in many cases, addictive; yet it remains unclear what addiction is, how it affects autonomy, and how the health and freedom of individuals should be maximized in addiction.
- It is unclear why some people are more vulnerable to (tobacco) addiction than others, and how tobacco control policies should respond.



- It is unclear which social factors should be addressed by tobacco control policies, how they should be addressed, and how tobacco control policies should deal with ethical implications that result from TI activity.
- There is as yet no ethical and conceptual foundation to underpin tobacco control policies that has been made sufficiently sensitive to these considerations.

## 1.2 Research question

Accordingly, the research question of this thesis is as follows:

What are the elements of an ethical framework for tobacco control policy?

This relates to a series of sub-questions that are systematically addressed throughout different parts of the thesis.

1. What are the relevant features of tobacco use and addiction that should guide tobacco control policies, in terms of public health impacts (chapter 2) and neurobiological impacts (chapter 3)?
2. How does tobacco addiction affect autonomy (chapter 3), and how should tobacco control policies aim to maximize health and freedom (chapter 5)?
3. How should tobacco control policies account for the vulnerabilities of certain groups of people to addiction (chapters 3 and 4)?
4. What comprises a conceptual account of addiction that can inform an ethical framework for tobacco control policy (chapters 4 and 5)?
5. How should tobacco control policies address ethical issues that arise as a result of tobacco industry activity (chapter 4)?
6. How should tobacco control policies address ethical implications associated with more recent strategies including tobacco denormalization, the TFG proposal, tobacco harm reduction, nicotine vaccines, and genetic tests for nicotine addiction (chapter 6)?

## 1.3 Aims

The central aim of this thesis is to develop an ethical framework for tobacco control policy (chapter 5). In doing so, this thesis also has the following sub-aims:

1. To discuss the relevant features of tobacco use and addiction that should guide tobacco control policies, in terms of public health impacts (chapter 2) and neurobiological impacts (chapter 3);
2. To determine how tobacco addiction affects autonomy (chapter 3), and how tobacco control policies should aim to maximize health and freedom (chapter 5);
3. To elucidate how tobacco control policies should account for the vulnerabilities of certain groups of people to addiction (chapters 3 and 4);
4. To develop a conceptual account of addiction that can inform an ethical framework for tobacco control policy (chapters 4 and 5);
5. To discuss how tobacco control policies should address ethical issues that arise as a result of tobacco industry activity (chapter 4);
6. To discuss how tobacco control policies should address potential ethical implications associated with more recent strategies including tobacco denormalization, the TFG proposal, tobacco harm reduction, nicotine vaccines, and genetic tests for nicotine addiction (chapter 6).

## **1.4 Thesis statement**

The central argument of this thesis is that tobacco control policies should maximize freedom by providing the conditions that promote or protect autonomy; this, in turn, requires policymakers to acknowledge complex social factors that underlie addiction susceptibility, and that these contribute to the formation and sustaining of addictions.

## **1.5 Methodology and scope**

This thesis develops an ethical framework for tobacco control policy. This is done by building on existing theories in public health ethics, and nuancing these with a critique of the social processes that influence addiction neurobiology, the complex factors that can affect autonomy in addiction, and the role of the TI. The analytical approach used in this thesis is grounded in conceptual ideas from public health ethics, in particular theories that try to balance health and freedom within a broader social context. Ideas are then nuanced and broadened with relevant evidence from various research perspectives, drawing on my own primary reviews of the literature in neurobiology, genetics, epigenetics, public health, and sociohistorical studies. The premises of this thesis are incorporated into an

ethical framework for tobacco control policy, which is conveyed through a set of ethical considerations. This framework is then used to provide an ethical analysis of four recent strategies in tobacco control: tobacco denormalization, the tobacco-free generation proposal, tobacco harm reduction, nicotine vaccines, and genetic tests for nicotine addiction.

In other words, the ideas in this thesis are centered around a normative investigation that links together empirical research from different perspectives, develops this into an ethical framework for tobacco control policy, and applies this ethical framework into a series of ethical analyses. The reason for this approach is that large bodies of evidence have already explored the nature of addiction, factors that contribute to addiction susceptibility, the factors that have contributed to the current state of affairs in tobacco control policies, and the ethical implications of all of these. However, much of this information remains disconnected, and has not been tied into a nuanced and integrated analysis that can be used to guide tobacco control policies.

This thesis is focused on informing tobacco control policies in regards to their ethical aspects, with deeper but potentially distracting questions left out. For instance, a comprehensive analysis of legal, economic, and political considerations would require a deeper investigation into legal, economic, and political factors, which can vary considerably between different places. A deeper philosophical enquiry may involve the integration of moral, political, and jurisprudence theories. Focus is therefore maintained on ethical theory *insofar as it is useful for policy*, and on practical considerations most crucial to the development of the ethical framework. Issues related to local and cultural context are also beyond scope, so this thesis does not advocate for one particular policy or a set of policies adapted for specific cultural, or political contexts; focus is maintained on the development of an ethical framework for tobacco control policies more generally. Focus is on international policies and frameworks where appropriate (e.g. the WHO FCTC and international human rights treaties). The focus is kept on issues and debates that have arisen more recently, so most of the discussions and analyses will be done in reference to developed countries where tobacco control policies are more advanced, and specific tobacco control strategies that have become the subject of debates more recently, e.g. the TFG proposal.

## 1.6 Original contribution

The original contribution of this thesis is the development of an ethical framework for tobacco control policy, that is ethically grounded, supportive of human rights principles, and sufficiently nuanced

for the context of tobacco control. Other original contributions include: ethical analyses on recent developments in tobacco control (tobacco denormalization, the TFG proposal, tobacco harm reduction, nicotine vaccines, and genetic tests for nicotine addiction) in reference to the ethical framework developed in this thesis, and original discussions on the relevant features of addiction that should be used to guide policies for tobacco addiction and others addictions more generally. The latter brings together various research perspectives—genetic, epigenetic, neurodevelopmental, neurobiological, and sociohistorical—into an integrated account of addiction that can inform the fields of addiction research and policy.

## **1.7 Target audience**

The target audience of this thesis is academics, researchers, policymakers, and others involved in tobacco control, particularly new approaches to tobacco control (tobacco denormalization, the TFG proposal, tobacco harm reduction, nicotine vaccines, and genetic tests). Ideas are also instructive for those involved in public health or public health ethics more generally, particularly public health issues related to other addictions.

## **1.8 Structure of the main text**

### **Chapter 2: The basis of tobacco control policies**

This chapter provides an overview of the public health impacts of tobacco use, and how these compare to the health impacts of other psychoactive drugs. It also provides an overview of current tobacco control policies, their limitations, ways in which these limitations are being addressed with more recent tobacco control strategies, and potential ethical issues presented by these strategies. This chapter also introduces ethical frameworks that may be used in addressing these issues. Focus is on ethical approaches that aim to preserve health and/or freedom: Mill's liberal theory, public health ethics frameworks, and human rights. These highlight some important considerations to be carried into the ethical framework of this thesis: the importance of distinguishing between positive and negative freedom; of characterizing autonomy in addiction; and of exploring the interconnection between social justice and public health in addiction. Together, these discussions provide a basis for tobacco control policies in terms of the public health impacts that justify restrictions on tobacco, ongoing issues that tobacco control policies should focus on, and ethical theories that may be adapted into the context of tobacco control.

### **Chapter 3: Neurobiological features of addiction**

This chapter elucidates the neurobiological events that underlie addiction, as well as genetic, epigenetic, and neurodevelopmental processes that confer susceptibility to addiction. These are considered in terms of how interrelated social factors, such as stress, early attachment experience, and the social environment, contribute to the neurobiological features often observed in addictions. This chapter therefore provides neurobiological evidence for the ethical framework, particularly its focus on social aspects and on questions regarding the nature of autonomy in addiction. This chapter also clarifies whether addictive smoking is beneficial from a neurobiological perspective; some of the factors that influence autonomy in addiction; the role of the social environment in addictive decision-making; and reasons why certain groups of people—namely, young children, adolescents, and socially disadvantaged groups—are more predisposed to developing addictions.

### **Chapter 4: Social context and the tobacco industry**

This chapter considers the social contexts that contribute to addiction and tobacco use, with particular focus on the TI. This chapter discusses how the TI has propagated tobacco-related public health issues by influencing and taking advantage of social contexts and vulnerable groups of people, including children and the socially disadvantaged. This chapter also notes how perceptions of addiction have shifted in response to social contexts, and how this, in turn, can influence tobacco control policies. Broadly speaking, this chapter highlights the importance of social factors in (tobacco) addiction, and so raises important questions regarding the role of the social environment, and the responsibility of the state in minimizing issues of social injustice by providing better support systems to groups more affected by addiction.

### **Chapter 5: An ethical framework for tobacco control policy**

This chapter brings together information presented throughout previous chapters to provide a conceptual and ethical grounding for tobacco control policies. Different theories of addiction (moral choice theories, liberal theories, brain disease theories, and the self-medication hypothesis) are discussed in light of the findings presented in preceding chapters, in order to determine the relevant features of addiction that should provide the conceptual basis for an ethical framework. An ethical framework for tobacco control policy is then developed, which builds on ethical concepts and theories introduced in chapter 2, and discussions from chapters 3 and 4. The ethical framework is conveyed through a set of ethical considerations, and the human rights supported by these considerations.

## **Chapter 6: Application of the ethical framework**

This chapter applies the ethical framework developed in chapter 5 into four new approaches to tobacco control. These include: (1) tobacco denormalization; (2) the TFG proposal; (3) tobacco harm reductive strategies (SLT and ENDS); and (4) medicalized interventions including nicotine vaccines and genetic tests for nicotine addiction susceptibility.

## **Chapter 7: Conclusion**

This chapter summarizes the research and arguments of this thesis, explains their significance and relevance to the field of tobacco control, discusses the limitations of this research, and provides indications for future research building on the work in this thesis.

## Chapter 2

# The basis of tobacco control policies

Tobacco is a psychoactive drug<sup>1</sup> that, like many other drugs of abuse,<sup>2</sup> is harmful and addictive.<sup>3</sup> However, tobacco use<sup>4</sup> is also widespread and often considered to be pleasurable or beneficial in some way. As a result, debates on the use and regulation of tobacco are ongoing.

### Debates on tobacco regulation

Debates in the sphere of tobacco control policy are, generally speaking, orientated towards supporting either public health or individual freedom. A major stakeholder in these debates is the tobacco industry (TI), and individuals or institutions receiving funds from the TI. The TI advocates for the liberalization of tobacco trade and minimal restrictions on its use in order to protect consumer freedom.<sup>5</sup> The public health community, which advocates for regulations on tobacco in order to protect public health,<sup>6</sup> is the TI's strongest counterforce.

The interests of the TI (to profit from selling tobacco) and public health (to provide better conditions for health) are generally considered to be fundamentally incompatible, due to the serious public health threats presented by tobacco consumption. The World Health Organization (WHO), for example, states that: “there is a fundamental and irreconcilable conflict between the tobacco industry’s

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<sup>1</sup>‘Psychoactive drug’ refers to a drug that crosses the blood–brain barrier and elicits changes within the central nervous system.

<sup>2</sup>‘Drug of abuse’ refers to a psychoactive drug commonly associated with social or public health problems. This could be due to addictive use, or due to non-addictive, but socially problematic use e.g. alcohol binge drinking. This manner of drug use will be referred to as ‘problematic drug use’ or ‘drug abuse’.

<sup>3</sup>The terms ‘addictive’ and ‘addiction’ are widely disputed. Nevertheless, addiction is associated with distinct clinical and behavioral features (described in section 2.1.1) and neurobiological changes that can affect behavior (described in section 3.1). Tobacco use can strongly contribute to these changes, and so tobacco as a drug is considered ‘addictive’. Also see appendix B for definitions.

<sup>4</sup>Cigarette smoking represents the most prevalent form of tobacco use and is the most problematic (in terms of public health burden), and so ‘cigarette smoking’, ‘smoking’, and ‘tobacco use’ are used interchangeably unless stated otherwise.

<sup>5</sup>Throughout this thesis, the arguments of this group will be referred to as ‘pro-tobacco’ or ‘anti-regulation’.

<sup>6</sup>Throughout this thesis, the arguments of this group will be referred to as ‘anti-tobacco’, ‘pro-health’, or ‘pro-regulation’.

interests and public health policy interests” (pg.2, [6]). Similarly, the USA’s National Institute on Drug Abuse (NIDA) argues that: “the interests of the tobacco industry are fundamentally incompatible with [NIDA’s] scientific goals and public health mission”.<sup>[46]</sup> Consequently, ongoing attempts of the TI to resist tobacco regulations have led the TI to be depicted as a morally corrupt entity responsible for millions of tobacco-related deaths, morbidities, and addictions.<sup>[10]</sup> The TI, meanwhile, retaliates by framing tobacco control policies as paternalistic, extremist, and authoritarian restrictions on a freely chosen, pleasurable activity.<sup>[47, 48]</sup> These arguments are, in turn, used to support or oppose restrictions on tobacco.

### Questions raised by these debates

Debates on tobacco regulation raise a number of questions. Pro-regulatory arguments are generally based on the premise that tobacco use is a threat to the public’s health: how and to what extent is tobacco use detrimental to public health? What types of restrictions does this justify, and what level of intervention should be implemented? Pro-tobacco arguments tend to be based on the idea that smoking is a pleasurable, relaxing, or freely chosen activity. However, tobacco is also addictive;<sup>7</sup> so to what extent is addictive smoking *freely* chosen, and what are the *benefits* of smoking, such as pleasure or stress relief? Tobacco control policies that have evolved from these debates, as well as those that may be implemented in the near future, should also be reviewed in light of these considerations. Are they too restrictive, or insufficient in addressing the issues? What ethical basis do these policies have, and what sort of ethical framework should be used to underpin them?

These questions point to the primary goal of this thesis: to develop an ethical framework for tobacco control policy. Proper ethical framing is crucial, for two main reasons. First, a policy that is guided by a robust ethical framework is more likely to contribute to positive expectations. Second, such a policy advocates highly esteemed values, such as ‘health’ and ‘freedom’, so is more likely to gain public, political, and economic support. Such policies can also trigger social movements, in which the ethical framing of the policy plays an important role. This has undoubtedly already happened to an extent in the sphere of tobacco control, for both sides: pro-tobacco social movements that emphasize the importance of freedom, and pro-regulatory social movements that emphasize the importance of public health.<sup>[49]</sup>

There is still no robust, context-sensitive ethical framework upon which tobacco control policies can be based. An early ethical analysis on tobacco was provided by Goodin,<sup>[50]</sup> who ultimately argued

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<sup>7</sup>‘Addiction’ as a disorder is described further in section 2.1.1, under the subheading “tobacco addiction”.



for more comprehensive restrictions on tobacco.[51] This analysis now seems somewhat outdated; since then there have been significant changes in the field, such as the implementation of comprehensive tobacco control policies (discussed in section 2.2.1) or the development of e-cigarettes and endgame policies (discussed in section 2.2.3). Otherwise, it has been suggested that a set of ethical principles, similar to the ‘Georgetown Mantra’ often used to instill ethics in clinical medicine education,<sup>8</sup> should be used.[40] However, these principles were initially designed for clinical contexts; they are less applicable to public health issues such as tobacco control and addiction. A number of ethical principles and frameworks have been developed for population–level issues within the field of public health ethics. While none of these are sufficiently sensitive to the context of tobacco control policy, their ideas may be further developed and adapted into the sphere of tobacco control.

Before looking at ethical theories, then, it is necessary to understand the ‘tobacco problem’ and the context of the tobacco problem. What are the public health impacts that result from tobacco use, how are current policies attempting to minimize these impacts, and what are the issues that an ethical framework should pay attention to?

## **Aim of this chapter**

The aim of this chapter is to provide an overview of the public health impacts of tobacco use, ongoing issues faced in tobacco control, and ethical theories that may be used in addressing these issues. Section 2.1 discusses the public health impacts of tobacco, and its harm profile in comparison to that of other addictive drugs such as alcohol, cocaine, and heroin. These discussions help to determine the extent to which tobacco should be regulated in order to protect the health of self and others, and the types of restrictions that are justified. Section 2.2 provides an overview of the current regulatory framework for tobacco, its limitations, recent policy developments that aim to address these limitations, and ethical concerns raised by these. Section 2.3 discusses ethical concepts, theories, and frameworks that may be used to underpin tobacco control policies. Together this provides a basis for tobacco control policies, which is nuanced and made more context–sensitive using evidence in chapters 3 and 4, and eventually developed into an ethical framework for tobacco control policy in chapter 5.

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<sup>8</sup>These ethical principles include non–maleficence (“to do no harm”), beneficence (“to do good”), justice (“to act with fairness”), and respect for autonomy (“to be free from controlling influences”)—see [52]. It was suggested that these principles could be used to guide tobacco control policies, alongside two additional principles: truthfulness (to disclose the truth and employ only evidence–based arguments) and transparency (“to fully disclose and have fair dealings with all collaborative partners”)—see [40].

## 2.1 The public health impacts of tobacco use

### 2.1.1 Tobacco: The current public health situation

#### Mortality and morbidity

Tobacco use is arguably one of the most important global public health issues that exists. Currently there are over one billion daily smokers worldwide, half of whom will die prematurely from smoking. In the 20<sup>th</sup> century, smoking killed 100 million people; in the 21<sup>st</sup> century, it will kill 1 billion if current trends continue. Thus, smoking currently kills approximately 6 million people worldwide annually, which is more than HIV/AIDS, malaria and tuberculosis *combined*.<sup>9</sup> This figure is expected to rise to 8 million annually by 2030.[3] In other words, tobacco is the single largest cause of easily avoidable death, and responsible for approximately 1 in 10 of all adult deaths worldwide.

Since the life expectancy for an average smoker is reduced by 14 years,[53] and most tobacco-caused diseases are chronic, smoking also significantly affects the length and quality of life. Annually, it is responsible for 6.9% of the total years of life lost, and 5.5% (57 million) of the world's total disability-adjusted life years (DALY).<sup>10</sup>[54] In other words, on average smokers lose—as a direct consequence of smoking—approximately two decades of productive life.[4] Smoking negatively affects virtually every organ and system in the body. It compromises fitness, reduces fertility, and is responsible for roughly 30% of cardiovascular diseases such as stroke, heart attack, aneurysm, hypertension, and vascular disease. It also causes fatal respiratory diseases such as chronic bronchitis, emphysema, and asthma, and is responsible for roughly a third of all cancers. These include 90% of all lung cancers (the deadliest cancer in terms of the amount of people killed), colorectal cancer (the 2<sup>nd</sup> deadliest), and other common cancers, such as cancer of the breast, prostate, cervix, and liver. Smoking is also associated with a wide range of other fatal or debilitating conditions, such as diabetes, rheumatoid arthritis, and cataracts.[1]

Put together, the serious health risks presented by smoking have led to a general consensus that there is no level at which smoking can be considered 'safe'. Consequently, the general advice 'consume in moderation', which may apply to other unhealthy substances such as sugar or alcohol, does not apply to tobacco. For policies, this means that interventions that aim to minimize smoking prevalence

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<sup>9</sup>Smoking presents a significant public health threat in virtually every country in the world. Previously, smoking was concentrated mostly in developed countries. Nowadays, smoking rates have stabilized in most developed countries, and smoking prevalence is starting to increase in developing countries (particularly in Asia) as a result of increased marketing activities by the TI, weak economic and political infrastructures, and a reduction in smoking prevalence in developed countries. So it remains very much a global issue—see [7].

<sup>10</sup>DALY is a measure of overall disease burden, expressed as the number of years in which the quality or length of life is significantly reduced by the effects of ill health, disability, or early death.

as much as possible are strongly justified—at least from a public health perspective.<sup>11</sup>

### **The effects of second-hand smoke**

Exposure to second-hand smoke (SHS) is another major health concern. SHS is similar in composition to inhaled smoke, and so contains at least 250 harmful chemicals, of which over 50 are known carcinogens.[2] Non-smokers exposed to typical levels of SHS on a daily basis, at home or at work, have a 25–30% increased risk of heart disease, and 20–30% increased risk of lung cancer.[53] There is no safe level of SHS exposure, so a zero-risk threshold is also applicable when considering a suitable level of SHS exposure. This applies particularly to children, who are especially sensitive to the effects of SHS: SHS exposure puts them at a heightened risk of developing middle ear infections, asthma, Sudden Infant Death Syndrome (SIDS), acute respiratory illness (risk is increased by 50–100%), behavioral disorders, and smoking in future.[5]

Smoking during pregnancy can also have serious consequences on a child's development, with effects such as miscarriage, stillbirth, premature birth, low birth weight, and congenital abnormalities such as cleft lip.[55] Heavy smoking during pregnancy can result in the baby being born with nicotine dependence,[56] and predispositions to other behavioral and neural conditions such as substance abuse.[57] Furthermore, paternal smoking affects sperm quality, which in turn may increase the child's risk of suffering from postnatal health problems such as SIDS, genetic diseases, physical malformations, and childhood cancer.[58]

Despite these risks, SHS exposure remains common. An estimated 35% of all non-smoking adults are exposed to SHS in everyday life, and 40% of all children worldwide (700 million) are exposed to SHS at home.[5] Even in countries such as the USA, where smoking prevalence is relatively low (18%) and smokefree laws are comprehensive and well-enforced, most (54%) children aged 3–18 years are regularly exposed to SHS, mostly in the home.[1] Consequently, the worldwide public health burden of SHS exposure is high: of all tobacco-caused deaths, non-smokers killed by the effects of SHS represent approximately 15% (currently over 600,000 people per year).[3] Therefore current policies do not sufficiently protect people from SHS, particularly children, because there are very few policies that address SHS exposure in the home. They also reflect injustice, since most non-smokers killed by SHS exposure are women (64%) and children (31%). These deaths are typically from chronic diseases that affect the quality and length of life: lower respiratory infections or asthma (in children), and ischaemic heart disease, asthma, or lung cancer (in adults). The total disease burden from

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<sup>11</sup>They may not be justified, however, within liberal frameworks that hold 'freedom'—even at the expense of health—as the pre-eminent value. Further discussion on this point is made in section 2.3.

these deaths corresponds to approximately 10.9 million DALY, which is 19% of the total DALY as a consequence of active smoking.[2]

Since there is no safe exposure level to SHS, policies should aim to minimize exposure as much as possible.<sup>12</sup> This applies in particular to places where children are often present, due to their increased sensitivity to the effects of SHS. In other words, the implementation of smokefree laws and other measures that protect others from SHS exposure are essential. Measures should also be taken to reduce smoking in pregnancy, as to protect the development of young children.<sup>13</sup>

## **Tobacco addiction**

Smoking causes addictive states. Although ‘addiction’ remains a highly contested term,<sup>14</sup> it is a neurobiopsychosocial disorder, with clear neurobiological,<sup>15</sup> behavioral, and psychological manifests. In general, addictions—including tobacco addictions—are clinically diagnosed using behavioral criteria. In the 5<sup>th</sup> Diagnostic and Statistical Manual of Mental Disorders (DSM-5),<sup>16</sup> for example, diagnostic criteria for ‘tobacco use disorder’ tend to reflect behavioral dissonance regarding the use of tobacco: consuming more than intended, persistent (and often unsuccessful) efforts to quit or cut down, continued use despite persistent or recurring problems that result from use, or difficulty in abstaining despite knowledge of the potential risks. Other criteria include craving,<sup>17</sup> physical tolerance,<sup>18</sup> and physical withdrawal.<sup>19</sup>[22] In other words, (tobacco) addiction is defined by clear behavioral and psychological features, some which may affect the ability of the individual to avoid or cease using a drug—in this case tobacco.

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<sup>12</sup>This does, however, come at the expense of the freedom of smokers to smoke in places where others are present. Ethical frameworks that address this trade-off are discussed in section 2.3.

<sup>13</sup>While ‘children’ in this context may refer to unborn babies, the aim here is not to enter into debates on foetal rights or the moral status of unborn babies. The point is that parental smoking before a child is born can result in the child suffering health complications after birth and throughout the life course.

<sup>14</sup>There is still no consensus on what addiction is. It has been argued, for example, that ‘addiction’ is a freely chosen, appetitive behavior similar to other behaviors. However, this thesis disputes this idea due to the neurobiological, behavioral, and clinical features that distinguish addictive behaviors from other behaviors. These are generally related to an impaired ability to avoid the addictive pursuit. These issues are discussed further in section 5.1.

<sup>15</sup>Neurobiological processes involved in addiction can, in turn, affect psychological and behavioral functions. They are described at length in chapter 3.

<sup>16</sup>DSM-5 is currently one of the most important tools for the diagnosis of mental disorders.

<sup>17</sup>A psychological criterion. According to DSM-5, craving is: “an intense desire or urge for the drug that may occur anytime, but is more likely in a relevant environment where the drug was obtained or used” (pg.483, [22]). The neurobiological processes that underlie craving, as well as its significance for tobacco control policies, are discussed in section 3.1.

<sup>18</sup>DSM-5 defines physical tolerance as: “requiring a markedly increased dose of the substance to achieve the desired effect or a markedly reduced effect when the usual dose is consumed” (pg.483, [22]). In the context of smoking, this may be reflected by a higher number of cigarettes consumed per day (CPD), or a reduction in the usual effects or benefits gained from smoking a cigarette.

<sup>19</sup>DSM-5 defines physical withdrawal as: “a syndrome that occurs when blood or tissue concentrations of a substance decline in an individual who had maintained prolonged heavy use of the substance” (pg.483, [22]). In the context of smoking, this is usually reflected by temporary withdrawal symptoms such as headache, nausea, anxiety and irritability when tobacco consumption is not sustained.

The addictiveness of tobacco is mostly owed to the neurological actions of nicotine. Nicotine impacts neurological circuits in a similar way to other addictive drugs, such as heroin, cocaine, and methamphetamine.<sup>20</sup> Nicotine delivery through a cigarette is extremely rapid; inhalation allows nicotine to be absorbed into the brain within seconds. This, in turn, increases its addictive potential. Many cigarettes are also designed to increase the potency of nicotine, through the addition of bronchodilators such as cocoa and licorice, or freebasing<sup>21</sup> agents such as ammonia.[39] This further increases their addictive potential and can make it very difficult for people, particularly those who initiated at a young age,<sup>22</sup> to quit. Consequently, tobacco has a high conversion to dependency<sup>23</sup> rate. For example, a comparative study found that, of those who ever try smoking, an estimated 32% will develop an addictive pattern of use later in life;<sup>24</sup> this is significantly higher than for heroin (23%), cocaine (17%), and alcohol (15%).[60]

The dissonance commonly observed among adult smokers suggests that the majority of smokers are addicted to tobacco by the time they reach adulthood. An estimated 90% of adult daily smokers<sup>25</sup> regret having ever started smoking.[61] Regret is an indicator of cognitive dissonance, which closely matches criteria related to behavioral dissonance that are used to diagnose addictions in sources such as DSM-5.[22] Furthermore, smoking cessation produces significant health benefits even within a short time of quitting,[5] and so in any given year roughly 40–50% of smokers try to quit.[24] Yet, most of these quit attempts are unsuccessful despite the smokers’ desire to abstain, which corresponds to behavioral criteria for addiction (see above). Unaided, the success rate is just 3–7%; with the use of aids,<sup>26</sup> this increases to a modest 25%.[25] Although it is difficult from the above to derive the exact proportion of smokers who have developed addiction, a conservative estimate is that the majority of adult smokers—50% or more—are, to some degree, addicted to tobacco.<sup>27</sup> This is an important

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<sup>20</sup>Primarily in mesolimbic dopamine pathways that affect reward-seeking behavior, the ability to control behavior, cravings, and other processes. Further discussion is provided in section 3.1.

<sup>21</sup>‘Freebasing’ is a chemical process that detaches a drug from its salt base, allowing for a faster absorption into the brain. The technique is also used to increase the ‘high’ of other drugs, such as cocaine, which is freebased into ‘crack’ cocaine and smoked in a similar way to tobacco.

<sup>22</sup>This point is important because, at a younger age, people are more vulnerable to developing addiction—see the discussion below, under the subheading “smoking initiation”.

<sup>23</sup>In this thesis, the terms ‘addiction’ and ‘dependence’ are used interchangeably.

<sup>24</sup>This figure is variable, and depends on many other complex factors such as age of initiation or how many times smoking is repeated after the first try. Addiction is more likely to develop if age of initiation is younger, and smoking occurs over a prolonged period. For example, the conversion to dependency rate for children below age 15 is estimated to be over 50%; higher if smoking is repeated over a prolonged period.[59]

<sup>25</sup>Based on a survey of over 8,000 smokers across Canada, the USA, the UK, and Australia.

<sup>26</sup>Various approved cessation aids are available, such as nicotine replacement therapy (NRT), medicines such as varenicline and bupropion, or psychological aids such as cognitive and behavioral therapy.

<sup>27</sup>Part of the reason why it is difficult to derive the global proportion of addicted (as opposed to non-addicted) smokers is because many smokers don’t seek medical help, and because ‘smoking’ status is defined variably. It may be inferred that a daily smoker is addicted to some degree, so often ‘smoker’ is defined as one who ‘smokes on a daily basis’, but sometimes also ‘smokes daily or occasionally’ or ‘smokes on a weekly/monthly basis’. It was mentioned above that over one billion people currently smoke tobacco on a daily basis; hence it may be inferred that currently over one billion

point for tobacco control policies, because addiction can significantly undermine an individual’s ability to avoid using tobacco.<sup>28</sup> Measures should then aim to minimize the development and sustaining of addictions.<sup>29</sup> Furthermore, the low success rates in cessation reflect a need for better access to cessation services, as well as more effective approaches to treating tobacco addictions and preventing relapse.

## Smoking initiation

Adolescence is the time when most initiations occur: most before age 18,[26] and virtually all by age 25, by which time most addictions have developed.[63] Thus, tobacco addictions generally develop during a time when the neurological capacity to preconceive long-term risks is not yet fully developed, and the brain is more sensitive to developing addictions than it is in later adulthood.<sup>30</sup> Adolescents typically underestimate the addictive potential of nicotine: an estimated 92% predict that they will quit within a year, although in reality only about a third will succeed during that time frame.[64] This fact is well understood by the TI, who have intensively promoted cigarettes to youth since the early 1900’s.<sup>31</sup> The implication is that adolescents are a group that require special protection, both from initiation and from targeting by the TI. Tobacco control policies should therefore be sensitive to the contexts of initiation, and the reasons why—and ways in which—adolescents are neurobiologically more predisposed to developing addictions than adults.

## Vulnerable populations

Adult groups among whom smoking tends to be concentrated include men,<sup>32</sup> people from low socioeconomic strata, racial minorities such as African Americans and Natives, and people with a comorbid mental illness. Smoking rates among people with schizophrenia, for example, are estimated at over 80%; with depression 50–60%; and with alcoholism or other substance abuse problems roughly 60%.[65]

Moreover, in areas where tobacco control policies have reduced overall smoking prevalence, smoking

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people are, to some extent, addicted to tobacco. It is reasonable to conclude that this comprises the majority of all tobacco users—i.e. all people who smoke on a regular or occasional basis.

<sup>28</sup>A thorough analysis of the effects of addiction on autonomy and decision-making is done in chapters 3 and 4.

<sup>29</sup>I have also discussed this point in a relevant paper. The argument was that there is a difference between ‘recreational use’ and ‘maintenance use’ (see appendix B for definitions); the latter is associated with addiction, whereas the former is not. This was argued to be an important consideration for tobacco control policies, because of the large proportion of addicted smokers. See [62].

<sup>30</sup>The neurodevelopmental processes that owe adolescents their heightened susceptibility to addiction are explained further in section 3.2.4.

<sup>31</sup>This has played an important role in triggering smoking initiations and sustained tobacco addictions among youth, and is an important consideration for tobacco control policies—further discussion in section 4.3.

<sup>32</sup>In many developing countries, particularly in Asia, smoking among men is far more prevalent than among women, but the women are fast becoming targets for tobacco promotions in the name of ‘gender equality’. However, the discussions in this thesis are focused on places where tobacco control policies are more developed. In such places gender disparity is usually smaller, and smoking prevalence among men is only slightly higher than among females.

has not decreased significantly among those with comorbid mental illness.[35] This could reflect the fact that they are more strongly addicted to cigarettes, that tobacco control policies have not been sufficiently tailored to meet their specific needs, or both. Consequently, health inequalities—and the reasons behind these—continue to be improperly addressed by tobacco control policies. It is important, then, to consider the underlying mechanisms that render these groups more vulnerable to tobacco use and addiction than others, and ways in which tobacco control policies should address these. Later—using evidence from chapters 3 and 4—it is argued that it is important for tobacco control policies to pay attention to factors that contribute to social injustice.

### **Socioeconomic costs**

Besides having serious and direct consequences on the health of self and others, smoking also carries a substantial socioeconomic burden, both in terms of direct healthcare costs and indirect costs such as losses in labour productivity, fire damage, and environmental harms from littering and tobacco farming. Direct tobacco-related healthcare costs are, for many countries, enormous. In the USA, for example, they are estimated at \$96 billion annually.[8] Excise taxes do in part compensate for this loss, though far from sufficiently. It was estimated that, for an American smoker, the monetary value of direct health damage from a single pack of cigarettes is \$35, while excise taxes in the USA stand well below \$10 per pack.[66] It was also argued, mainly by the TI, that smoking actually boosts the economy, because many smokers die before they are eligible to claim their pension funds.[67] However, TI-independent sources, using more comprehensive calculations, have argued that this is offset by reduced labour productivity and taxable income, as well as increased disability benefits.[68] Further indirect costs—such as environmental and fire damage—vary between places,<sup>33</sup> but actually represent the bulk of total economic cost in some nations.[8]

The harms that result from tobacco use are on multiple levels, significant, and ubiquitous, and so tobacco affects even those who do not smoke or who are never exposed to SHS due to its wider impacts on the economy, society, and environment. Thus, tobacco provides a good example of how the welfare of the community and of individuals are interconnected. This provides a justification for the allocation of resources towards tobacco control programmes, even if these resources are to be taken from those who are not directly affected by tobacco (further discussion in section 2.3).

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<sup>33</sup>For example, countries that, due to a dry, hot climate, are more affected by bush fires caused by cigarette butt waste, or where tobacco farming represents a larger agricultural area.

## 2.1.2 Tobacco compared to other addictive drugs

Restrictions on tobacco are generally justified, due to the widespread harms that result from its use. However, regulations on tobacco are often quite permissive, especially in relation to those for other psychoactive drugs such as cocaine and marijuana; these drugs are generally under a scheduling system,<sup>34</sup> whereas tobacco is not. One question, then, is whether tobacco control policies correctly reflect these harms in comparison to policies that exist for other addictive drugs.

### Harm profile

How do tobacco-related harms compare to the harms associated with other potentially addictive drugs? A 2007 study used a panel of experts to rank various drugs<sup>35</sup> according to their harm profile, in three categories:[69] (1) physical harm to self (acute, chronic, and complications associated with intravenous use); (2) addictiveness; and (3) harm to others (either direct<sup>36</sup> or indirect<sup>37</sup>). Tobacco ranked highly in a number of categories. For chronic physical harm it ranked first; for social costs related to healthcare it ranked second (after heroin); and for addictiveness it ranked third (after heroin and cocaine). Tobacco ranked lower in other categories, because tobacco intoxication does not usually result in impaired judgement, aggression, hallucinations, or other such symptoms. It is also not injected, and so does not contribute to intravenous-related health complications. However, it is interesting to note that tobacco use, which is often associated with the notion of ‘free choice’ in pro-tobacco arguments, is considered addictive even in comparison to various illegal drugs. It also ranks highly in terms of social costs, which attests further to the argument that tobacco-related harms, at some level, affect everyone in society (see section 2.1.1). Tobacco-related harms in terms of chronic disease, death, and addiction were deemed sufficient to classify tobacco under schedule B;<sup>38</sup> a stark contrast to its current legal status.[69]

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<sup>34</sup>The sale of scheduled drugs is not legally permitted, and sanctioned with penalties such as fines or imprisonment. Unscheduled drugs such as tobacco and alcohol, in contrast, can be legally sold within defined limits (for example, to adults over a certain age).

<sup>35</sup>20 psychoactive drugs, both licit and illicit, including: tobacco, alcohol, heroin, cocaine, amphetamine, street methadone, barbiturates, ketamine, benzodiazepines, buprenorphine, Ecstasy, LSD, 4-MTA, cannabis, anabolic steroids, methylphenidate, solvents, khat, alkyl nitrites, and GHB.

<sup>36</sup>For example, through intoxication-induced violence or exposure to SHS.

<sup>37</sup>For example, socioeconomic costs incurred by hospitalization.

<sup>38</sup>In line with the British drug scheduling system. Illicit, psychoactive drugs are either under schedule A (the most controlled substances, e.g. heroin, cocaine), schedule B (next level down, e.g. barbiturates, amphetamine), or schedule C (lowest level, e.g. benzodiazepines).



## Patterns of use

The overall use of scheduled drugs such as cocaine, heroin, and cannabis, due to their illegal status in most jurisdictions, is less prevalent than tobacco, and among the world's adult<sup>39</sup> population remains stable at approximately 5% (167–315 million people). Among these, an estimated 11% (16–39 million people) are addicted,<sup>40</sup> mainly to forms of cocaine and/or opioid drugs.[36] This is a strong contrast to tobacco use, which appears to be addictive for the majority of adult smokers.<sup>41</sup> As with tobacco, most initiations of the use of illicit drugs are before age 18, and most addictions develop before age 25.[70] Illegal drug use, as with tobacco use, is also typically concentrated among people from low socioeconomic strata (e.g. the poor, the unemployed), racial minorities (e.g. African Americans, Natives), and those suffering from comorbid mental disorders.[36]

Patterns of alcohol use are similar: global consumption remains stable, and most alcohol users initiate before age 25.[37] However, the proportion of *addicted* users is, like illegal drugs, considerably lower for alcohol than for tobacco; an estimated 2–9% of adult alcohol users are clinically dependent,[71] whereas for tobacco this figure is over 50% (see section 2.1.1). Since both drugs are legally available in most countries,<sup>42</sup> this disparity most likely reflects variations in the addictiveness of nicotine versus alcohol, the mode of administration (inhalation versus oral),<sup>43</sup> and social perceptions regarding the appropriate uses of tobacco and alcohol. Although alcohol use is prevalent among minority groups as well as the mainstream, the *pattern* of alcohol use varies; addictive use is generally concentrated among the most socioeconomically deprived, and racial minority groups.[37]

## Public health burden

The use of illicit drugs creates a considerable public health burden. Drugs such as heroin are often injected with dirty needles, which leads to collapsed veins, infections of the heart lining and valves, abscesses, and infection with HIV, hepatitis B, and hepatitis C. A significant proportion of injecting drug users live with HIV (11.5%) and hepatitis C (51%), and an estimated 100,000–250,000 deaths per year occur directly through drug use, which represents 0.5–1.5% of all adult deaths.[36] The most common cause of such deaths is overdose.[72] Although these figures are notably lower than for tobacco, they do not take into account indirect drug-related deaths, such as accidents caused by

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<sup>39</sup>In this case, defined as 15–64 years of age.

<sup>40</sup>By clinical definition; see section 2.1.1.

<sup>41</sup>This is likely to be in part due to tobacco's legal status.

<sup>42</sup>All countries except: Bhutan (tobacco); Afghanistan, Brunei Darussalam, Iran, Maldives, Mauritania, Pakistan, Saudi Arabia, Somalia and Sudan (alcohol).

<sup>43</sup>Inhalation allows a far quicker absorption of a drug than oral administration, and is therefore likelier to result in addiction.

drug intoxication or drug-related criminal activity. These costs, though difficult to estimate, likely far outweigh the direct burdens mentioned above.[31]

Meanwhile, alcohol, which like tobacco remains a legal<sup>44</sup> substance, is the world's third largest risk factor contributing to the most DALY. Tobacco ranks sixth, and illicit drugs 18<sup>th</sup>. As with tobacco, alcohol is implicated in a wide range of diseases; however, another reason it ranks so highly is because of alcohol-induced intoxications that lead to violence, accidents, lost work productivity, child abuse, and child neglect. Harmful alcohol use, then, is responsible for roughly 4.5% of the global burden of disease and injury, and 4% of all deaths worldwide (2.5 million deaths annually).[37] This is approximately 40% in relation to the death burden caused by tobacco. While tobacco does not significantly intoxicate its users, it still far outshines all illicit drugs and alcohol in terms of the public health burden caused by its correlation with many chronic diseases. It is estimated to cause up to 40% of all addictive substance-related hospitalizations, and 60% of all addictive substance-related deaths.[69]

### **Policy implications**

The above analysis demonstrates at least three important points. First, tobacco use is extremely harmful—even in comparison to the use of illicit drugs—in terms of chronic health and mortality burdens. Yet it remains legally available, which means that it is *sui generis* as a legal substance associated with such significant health threats: it is the only legally available substance that, when used correctly, kills half of its users.[39] Second, addictions to all substances compared—tobacco, alcohol, and illegal drugs—tend to be clustered among people from socially disadvantaged groups, and initiating the use of these substances occurs mostly among youth. There are important neurobiological and social reasons for these vulnerabilities, that are discussed in greater detail throughout chapters 3 and 4. This, in turn, highlights the role of various social processes and factors in triggering and sustaining (tobacco) addictions, and the importance of paying attention to issues related to social injustice (further discussion in section 2.3).

Third, tobacco is addictive to a far higher proportion of users than other drugs: the *majority* of tobacco users are addicted to tobacco, whereas the proportion of users addicted to alcohol or illicit drugs lies closer to 10%. This is likely to be due to multiple reasons. Pharmacological reasons may include the psychoactive properties of nicotine, its rapid mode of administration (inhalation), or features in the design of cigarettes that increase their addictive potential (for example, the addition of

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<sup>44</sup>'Legal' in this context refers to free sale of the product within defined limits, for example to people over a certain age.

bronchodilators and freebasing agents). Other reasons may relate to the social connotations of smoking (discussed in chapter 4), or the current legal status of smoking. Yet, it is clear from these discussions that tobacco is sufficiently harmful to warrant restrictions. It is necessary, then, to consider the types of restrictions that are currently implemented on tobacco, their limitations, and ways in which these limitations are being addressed in more recent developments.

## 2.2 Tobacco control policies

The most important regulatory framework for tobacco control at current is the WHO Framework Convention for Tobacco Control (WHO FCTC) treaty, which entered into force in 2005.[6] The WHO FCTC was developed in response to mounting evidence attesting to the harms of tobacco, successful litigations against the TI,<sup>45</sup> and major anti-tobacco movements that started throughout the 1990's. Currently, 177 countries are a Party to the WHO FCTC, and so it has set a precedent for tobacco control policies in most countries in the world.[73]

The WHO FCTC, broadly speaking, calls for a global approach to gaining control over tobacco, its public health impacts, and the TI. It is based on overarching human rights principles set out in United Nations (UN) treaties. The right most emphasized in the WHO FCTC is the right to "... enjoyment of the highest attainable standard of physical and mental health" (pg.2, [6]), and "... without distinction of race, religion, political belief, economic or social condition" (pg.3, [6]). Focus is also on children's rights, in particular to "recognize the right of the child to the enjoyment of the highest attainable standard of health" (pg.3, [6]).

### 2.2.1 Measures under the WHO FCTC

Measures endorsed by the WHO FCTC treaty are evidence-based,<sup>46</sup> and target tobacco demand as well as supply in order to *discourage* tobacco use. Therefore the overall approach is to strike a balance between freedom and health: preserving the option to smoke, yet within a limit at which the health of self and others is, to some extent, protected.<sup>47</sup> Accordingly, tobacco supply is reduced by controlling

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<sup>45</sup>Arguably the most important litigation against the TI was in 1998, by 46 US states against four major tobacco companies (Philip Morris, R.J. Reynolds, Brown & Williamson, and Lorillard). It led to a Master Settlement Agreement, which forced the companies to compensate the states \$206 billion towards Medicaid costs, stop advertising to youth, disband TI-funded research organizations, and release 40 million previously confidential industry documents onto the Internet. See [65] and the discussions in chapter 4.

<sup>46</sup>As in, at the time the WHO FCTC was drafted, there was a strong evidence base attesting to the harms of tobacco, the urgent need to concert a globalized approach to tobacco control policy, and the possible reductions in smoking prevalence if the measures would be implemented. Since it went into force, the evidence base for the latter has strengthened.

<sup>47</sup>This approach is based on libertarian paternalism, an ethical concept in which healthy choices are encouraged, while unhealthy options (e.g. smoking) are still permitted, but discouraged. This approach is discussed further in section

illicit tobacco trade and sales to youth, for example by raising the minimum age of sale to 18. Tobacco demand is reduced via measures described below.

### **Smokefree laws**

It has been correspondingly argued that smokefree laws are necessary because SHS exposure is responsible for a significant number of mortalities and health issues among non-smokers, particularly children. SHS is still harmful when it travels from one room to another, or when it is filtered through a ventilation system, so smokefree laws should be comprehensive and well-enforced if they are to offer proper protection.[5] Comprehensive smokefree laws are effective: experiences in a number of countries demonstrate that they are popular among the public, beneficial to the hospitality industry, and significantly improve health.[74] For example, in California, smokefree laws in bars resulted in sharp reductions in respiratory symptoms among workers within just two months of their implementation.[75]

Besides protecting others, comprehensive smokefree laws also encourage cessation among current smokers. In Ireland, for example, they encouraged 46% of smokers to consider cessation. Among those who had quit, 80% reported that smokefree legislations were a primary motivating factor, and 88% reported that they prevented relapse.[76] Comprehensive smokefree laws also help to raise awareness on the harms of SHS, which encourages smokers to make their own homes smokefree, thereby protecting their own family members from exposure to SHS.[77] They also contribute to the denormalization<sup>48</sup> of smoking, especially if implemented in indoor and outdoor recreational settings (for example bars, restaurants, parks, concert venues). This effect tends to discourage smoking initiation among youth and encourage cessation among smokers; however, it may also stigmatize or marginalize smokers, as a segregation between smokers and non-smokers is then created. It has also been argued that this leads some smokers to smoke more in their own homes, which, in turn, exposes others in the home to higher levels of SHS.<sup>49</sup>[78]

### **Cessation services**

The WHO FCTC recommends the provision of approved cessation services such as a national quit line, medicines such as NRT, bupropion, or varenicline, and cognitive behavioral therapy.[79] As mentioned in section 2.1.1, it is necessary to provide such services because, without them, the success rate for cessation is just 2–7%. With use of these aids, the rate of cessation success is higher but still just

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2.3—also see [41].

<sup>48</sup>‘Denormalization’ in this context refers to any measure that indicates that smoking is not, or should not be, considered a normal activity in society.

<sup>49</sup>Ethical issues associated with tobacco-denormalizing smokefree laws are discussed in section 6.1.

25%. More effective approaches to cessation should therefore be sought along with current measures. This need is reflected in more recent developments on tobacco harm reductive strategies and nicotine vaccines (see section 2.2.3).

Among smokers, the primary motivators for cessation appear to be personal health (for 71% of smokers), followed by pressure from family, friends, or a partner (52%), the price of tobacco (47%), and the effects of SHS on non-smokers (35%).<sup>[80]</sup> Thus, raising awareness on the negative impacts of smoking on personal health and the health of non-smokers, and raising tobacco prices, are likely to increase smokers' motivations to quit. Otherwise, as mentioned above, cessation can be encouraged by denormalizing tobacco though this may stigmatize smokers. Support from loved ones may also increase cessation success. There is evidence that smoking cessation typically occurs in social clusters (e.g. spouses or friends quitting together),<sup>[81]</sup> so it is also important to harness social support from close friends, family, or a partner. The significance of this idea is an important clue to the ethical framework developed in this thesis, and is discussed further in chapter 3.

### **Providing warning**

The WHO FCTC recommends the use of media campaigns and warning labels on tobacco packaging to provide information to the public on the negative health impacts of smoking. Advertising done through a diverse range of media can reach people of a lower socioeconomic status, who seem to be less responsive to anti-tobacco TV adverts.<sup>[82]</sup> Large, pictorial, and rotated health warnings on tobacco packaging are also effective, and tend to encourage positive trends such as public acceptance of other tobacco control measures, and fewer initiations among children.<sup>[83]</sup> These measures can also be used to shape public opinions and behaviors regarding tobacco, to denormalize and discourage smoking. This generally requires adverts with a stronger message (for example, that smoking is socially undesirable), and sustained exposure over a prolonged period.<sup>[84]</sup> Youth are particularly responsive to such campaigns.<sup>[85]</sup> However, as with some smokefree laws, the denormalizing effect of these measures may stigmatize or marginalize some smokers.

### **Restrictions on tobacco advertising, promotions, and sponsorships**

Tobacco advertising, promotions, and sponsorship (TAPS) have been used by the TI to promote smoking in ways that have contributed—in very important ways—to the current public health situation.<sup>50</sup> Therefore banning TAPS should be an essential part of tobacco control strategies. Bans

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<sup>50</sup>This is discussed at length in chapter 4.

on TAPS should be comprehensive, since the TI tends to promote tobacco products through indirect means when direct means<sup>51</sup> are banned. Popular indirect means utilized by the TI include: ‘brand stretching’, in which a cigarette brand is promoted by a non-tobacco product of the same name;<sup>52</sup> free distribution of products; promotional discounts; product placements in movies and entertainment; TI-funded ‘anti-smoking campaigns’;<sup>53</sup> philanthropy; and sponsored events.[9] The tobacco packaging itself is another form of advertising, since the cigarette brand is used by the TI to forge smoker identities, particularly in youth.[86] Thus, large pictorial warning labels, fewer branding elements, and ultimately plain packaging<sup>54</sup> can help youth to perceive smoking less favourably, and increase the likelihood that smokers will quit or cut down.[87]

## Taxation

The WHO FCTC recommends that excise taxes on tobacco should comprise at least 75% of the retail value. Tobacco, due to its addictiveness, has a relatively low price elasticity.<sup>55</sup> Nevertheless, consumers will still respond to price increases. In developed countries, youth and people on a low income are generally more responsive to price increases.[79] Taxation is considered to be the most effective intervention in reducing tobacco consumption, encouraging cessation, and discouraging smoking initiation among youth. Although taxation is contested on the grounds that it is ineffective or results in illicit tobacco trade, this is not necessarily the case provided that governance is good.<sup>56</sup> Tobacco tax is also a source of government revenue, which can be funded back into tobacco control programmes. Therefore, taxation—along with strong compliance mechanisms—remains a highly endorsed measure by the WHO FCTC.

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<sup>51</sup>Direct means of advertising include TV, cinemas, radio, print media, outdoor displays, point of sale displays, and Internet.

<sup>52</sup>For example, R.J. Reynolds, the producer of Camel cigarettes, had a ‘Camel’ clothes line which was marketed under the same logo and style.

<sup>53</sup>These campaigns are actually designed to increase smoking initiation among youth and are therefore a form of tobacco promotion. See section 4.3.

<sup>54</sup>‘Plain packaging’ is a mandate on cigarette packs that requires all cigarettes to be sold in a standardized package, with no branding elements, a standard font which states the brand, and large pictorial warnings on all sides of the package. It was pioneered in Australia in 2012, with other countries (e.g. Ireland and New Zealand) now following suit.

<sup>55</sup>Price elasticity is a measure of the extent to which demand for a product changes, proportional to and following a price change. A price elasticity above 1 is considered high. A price elasticity of around 0.4 indicates that, as prices increase by 10%, demand will go down by 4%. The price elasticity for tobacco varies per country, but on average is estimated at 0.4.

<sup>56</sup>In Norway, for example, taxation is high (73% of the retail value) but illicit tobacco trade is uncommon, since rules are well-enforced. Conversely, illicit tobacco trade is high in countries such as Armenia, where taxes are low (25% of the retail value) but compliance to licit trade is weak. See [39].

## 2.2.2 Impact of measures under the WHO FCTC

### Progress

Since the entry of the WHO FCTC in 2005, international progress in tobacco control has escalated significantly. Over a third of the world's population is now covered by at least one efficient tobacco control measure (such as taxation or smokefree laws),<sup>[9]</sup> and smoking rates have dropped sharply, especially in developed countries. Consequently, it is estimated that, as a result of policies based on the WHO FCTC, 7.4 million lives were saved between 2007 and 2010. Most of these are attributable to measures based on taxation (3.5 million lives) and smokefree laws (2.5 million lives).<sup>[88]</sup> Furthermore, smoking prevalence has declined globally between 1980 and 2012 from 41.2% to 31.1% (among men), and from 10.6% to 6.2% (among women). This is arguably one of the greatest public health success stories over the last 40 years.<sup>[7]</sup> Accompanying this has been a normative shift—particularly in countries where implementation of tobacco control measures has been quite thorough<sup>57</sup>—towards more denormalized perceptions of smoking and a higher acceptance of tobacco regulations.

However, due to substantial population growth over the last 40 years, the number of cigarettes consumed worldwide has increased by 26%; the net result is that the global tobacco market has actually grown.<sup>[7]</sup> In other words: progress in tobacco control has been remarkable, but insufficient. Consequently, the serious public health issues described in section 2.1.1 are ongoing, and warrant further implementation of measures under the WHO FCTC, as well as other measures that tackle issues otherwise not addressed by the WHO FCTC.

### Limits of implementation

As discussed in section 2.2.1, the implementation of tobacco control measures must be comprehensive for them to be fully effective.<sup>58</sup> However, the implementation of most measures is poor or incomplete in most places.<sup>[9]</sup> This is due to various reasons: the TI is involved in political lobbying, expensive lawsuits against states wishing to regulate tobacco, and spreading pro-tobacco arguments that smoking is an exercise of freedom, individual rights, beneficial, or has some other positive social connotation.

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<sup>57</sup>In general, this refers to developed nations where there are good infrastructures and economic resources to fully implement these policies, and where political will has been strong. Good examples include Australia, Canada, and Finland.

<sup>58</sup>'Fully effective' is defined separately according to the type of strategy. For smokefree environments, all public places should be completely smokefree, or at least 90% of the population covered by complete subnational smokefree legislations. For cessation therapy, a national quit line, NRT, plus an additional cessation service should be covered. For warning, large pictorial warning labels must be rotated on all tobacco packaging, and national media campaigns should be conducted continuously and regularly on different media including TV and/or radio. Bans on TAPS should be on all direct and indirect forms of tobacco promotions. Taxation should comprise at least 75% of the retail value. See [9].

This can significantly reduce the political will to implement effective tobacco control policies, and can compromise the overall acceptance of regulations on tobacco. These issues are, as one may expect, most apparent in places where political lobbying by the TI is strongest, or where the financial resources to fight TI-led lawsuits are limited.

Accordingly, there are considerable regional variations in the strength of tobacco control measures. This in turn affects smoking prevalence, because implementation levels are, generally speaking, inversely proportional to smoking prevalence.<sup>59</sup> Furthermore, developed countries that have based their tobacco control policies on the WHO FCTC tend to share a common trend: a smoking prevalence that has dropped in recent years, followed by a plateau. This plateau tends to occur after the implementation of tobacco control policies has ‘stalled’. In countries where policies stalled at a low level of implementation, smoking prevalence remains relatively high (over 30%); in countries where policies have been thoroughly implemented, but remain unchanged after that, smoking prevalence remains at roughly 15–20%.<sup>[9]</sup> Thus, in regions such as the EU, where most tobacco control policies have now stabilized and implementation levels are mixed, smoking prevalence has not significantly changed between 2009 and 2012 and remains stable at approximately 28%.<sup>[89]</sup>

This has two important implications. First, ongoing work in fully implementing measures under the WHO FCTC is necessary to achieve a continued reduction in smoking prevalence. Second, when full implementation of these measures is achieved, smoking prevalence is unlikely to reduce much further below 10–15%.<sup>60</sup> This means that additional strategies are necessary, as a 15% smoking prevalence is still significant and would result in over 7% of the world’s population losing, on average, 20 years of productive life; not counting those affected by SHS exposure and the social, economic, and environmental costs. Moreover, there is evidence that these impacts would have a disproportionate effect on socially disadvantaged groups, thus contributing to health inequalities.

### **Tobacco-related health inequalities**

In developed countries where measures under the WHO FCTC have been implemented, adult smoking is increasingly concentrated among the poor, the socially marginalized, certain racial minorities, and people suffering from co-morbid mental illnesses, particularly schizophrenia.<sup>[7]</sup> These people tend to be less responsive to tobacco control policies, which has led to a ‘hardening hypothesis’: the argument that, when smoking prevalence drops, the smokers that remain are on average more reluctant to

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<sup>59</sup>Thorough policies are usually accompanied by a sharp drop in smoking rates, and/or a low smoking prevalence.

<sup>60</sup>It has been estimated, for example, that measures based on the WHO FCTC, if implemented fully, would bring the world prevalence of smoking down to 15.4% in 2020, and 13.2% in 2030. See [11].



quit.[12] This may explain in part why measures based on the WHO FCTC appear unable to reduce smoking prevalence below a certain threshold. The reasons behind this trend are explained from a neurobiological perspective in section 3.2, and from a social perspective in chapter 4. In both cases, the effects of social hardship, marginalization, and stress are demonstrated as having a significant impact on later patterns of addiction. These in turn relate to issues of social injustice; to tackle these should be an important aspect of tobacco control policies.

### 2.2.3 Further developments in tobacco control

It has been argued that, due to the limitations of the tobacco control measures described above, it is necessary to pursue more innovative strategies that go beyond measures embraced by the WHO FCTC.[13] Such strategies should not neglect evidence-based measures based on the WHO FCTC;[90] however, they could be implemented in addition to these measures to maximize their impact or to fill ‘gaps’—such as tobacco-related health inequalities—currently not addressed by the WHO FCTC. However, these innovative strategies in themselves also raise a number of ethical concerns.

#### **Tobacco-denormalizing ‘endgames’**

Tobacco endgames are strategies<sup>61</sup> that aim to more or less eliminate<sup>62</sup> tobacco consumption. Their rationale is that the current public health situation remains unacceptable, and discouragement measures based on the WHO FCTC—though effective—are insufficient, so more innovative strategies with a stronger goal—elimination—are necessary.[94] Places considered well-placed for a tobacco endgame are those with strong political leadership, a good public acceptance of tobacco regulations, and a low (15% or below) or rapidly decreasing smoking prevalence.<sup>63</sup> Some of these places officially strive to be tobacco-free by a certain year: Ireland and New Zealand by 2025,[96, 97] Scotland by 2034,[98] and Finland by 2040.[99] A tobacco-free goal by 2035 has also been proposed for Canada.[100]

Their strategies all build from measures based on the WHO FCTC, and are strongly focused on creating a social movement that denormalizes tobacco and discourages smoking initiations among youth. The Irish strategy, for example, states that:

“Making smoking less attractive to children and young people and increasing its social

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<sup>61</sup>Strategies vary. Some proposed strategies—not considered further in this thesis—include regulating the supply or content of tobacco: for example by imposing a ‘sinking lid’ on tobacco import quotas,[91] regulating the TI,[92] or replacing for-profit TI with a regulated market that encourages the use of less harmful nicotine products.[93] These strategies are not considered further because of their practical difficulties in gaining co-operation from the TI.

<sup>62</sup>‘Eliminate’ is defined variably. Some define it as a smoking prevalence of near-zero, others as below 5%. For the purpose of this thesis, ‘eliminate’ in the tobacco endgame context refers to a smoking prevalence below 5%.

<sup>63</sup>For example, places such as Uruguay, Australia,[90] and California.[95]

unacceptability are key elements in the denormalization of tobacco. Denormalization of tobacco at every level of society is one of the key strategies for protecting children.” (pg.41–42, [96])

The Scottish and New Zealand strategies, similarly, emphasize the importance of a social movement that creates an environment in which children, particularly those from socioeconomically deprived areas, do not *want* to smoke.[98, 101] The essence of New Zealand’s strategy, for example, is:

“... about creating a national identity that protects our children by being proud to be tobacco free. This will be achieved through a social movement against tobacco in New Zealand.” [101]

More specific measures include encouraging parents to create smokefree homes, protecting children from the marketing practices of the TI, restricting the sales and display of tobacco (to prevent youth from buying tobacco), implementing plain packaging, and creating smokefree outdoor areas, particularly where children are often present (e.g. playgrounds, schools, parks).[96, 97, 98, 99] However, there are concerns that the tobacco–denormalizing effect of these strategies will stigmatize smokers. This could, in turn, widen the health inequality gap because socially disadvantaged groups tend to be more affected by stigma. This approach therefore raises questions regarding the extent to—and ways in—which it is ethical to denormalize tobacco for the purpose of discouraging smoking, and special considerations that should be made for socially disadvantaged groups.<sup>64</sup>

### **Prohibitive approaches**

Other tobacco endgame advocates have proposed that tobacco sales should be prohibited.[102] One country—Bhutan—has done this since 2004, although compliance has been uncertain and their policy was criticized for being too draconian.[103] An arguably more lenient approach, under consideration in Singapore,[16] Tasmania,[104] and the UK,[105] is the tobacco–free generation (TFG) proposal. It would work by denying tobacco sales to citizens born after a certain date, such as 1<sup>st</sup> January 2000, by making an amendment to the current minimum age of sales law. In most countries, including Singapore, Australia, and the UK, the minimum age for tobacco sale is 18 years; the TFG proposal would amend this law such that tobacco sales are prohibited to all individuals aged under 18 years *and* all citizens born on or after 1<sup>st</sup> January 2000.[16] This would effectively phase out tobacco sales to an entire cohort of citizens, without affecting tourism or foreign employment, imposing further restrictions

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<sup>64</sup>An ethical discussion of these points is made in section 6.1.

on current smokers, or criminalizing people who initiate smoking regardless of the amended law. The TFG proposal would also, over time, increase the generation gap between smokers and non-smokers, which would create a ‘norm cascade’ that denormalizes smoking as an outdated phenomenon.[106]

The rationale of the TFG proposal is that it prevents smoking initiation among younger generations, which makes it especially relevant in places where smoking initiation is a major concern. In Singapore, for example, smoking among the youngest adult cohort (aged 18–29 years) has increased from 12.3% in 2004 to 16.3% in 2010.[107, 108] Accordingly, proponents of the TFG proposal argue that younger generations should be a primary focus of tobacco endgame strategies.[106] However, the TFG proposal raises questions regarding the limits of prohibition in the context of tobacco. Pro-tobacco arguments often claim that smoking is a freely chosen activity that is—albeit harmful—pleasurable or beneficial in some way. Is it ethical, then, to deny the option to initiate smoking to an entire cohort of citizens, even in adulthood? The TFG proposal also does not necessarily help current smokers in overcoming their addictions, or protect others from SHS exposure; yet these two issues are—as discussed in section 2.2.1—significant. It is therefore necessary to assess whether—and the circumstances under which—it is ethical to deny an individual the option to initiate smoking, and how other tobacco-related issues should be addressed alongside the implementation of the TFG proposal.<sup>65</sup>

## **Tobacco harm reduction**

Harm reduction is an approach that aims to reduce the adverse health, social, and economic consequences of drug use without necessarily reducing drug consumption.<sup>66</sup> From a public health perspective, harm reduction is considered ethical because it tends to minimize the negative health impacts of drug use without increasing drug use itself, and can bring addicted individuals closer to treatment services which increases their chances of recovery.<sup>67</sup> This has led to ideas that a similar approach could work for tobacco. Tobacco harm reduction, then, involves finding an alternative product to cigarettes—the most harmful and prevalent form of tobacco use—that addicted smokers can switch to or use to wean off nicotine altogether.<sup>68</sup> A variety of alternatives to cigarettes exist, but most are

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<sup>65</sup>Ethical analysis of these points is made in section 6.2.

<sup>66</sup>A harm reductive approach has been adopted for various illicit drugs. Methadone, for example, is often prescribed to wean people off heroin addictions, while clean needles are provided to injecting drug users to prevent infections and the spread of diseases such as HIV.

<sup>67</sup>A comprehensive analysis on the benefits of harm reductive strategies for illicit drugs, particularly in comparison to more punitive approaches that still prevail in many jurisdictions, was made recently in [31]. For further discussion on the ethical implications of punitive approaches to preventing and treating addictions, see section 4.2.

<sup>68</sup>Harm reduction principles may also be adapted into an endgame strategy. For example, it was proposed that nicotine could be eliminated from tobacco to prevent the development of addictions in youth.[109] The TI could be forced to commit to the phasing out of cigarettes, while weaning options, such as SLT and ENDS, are introduced onto the market.[110] Alternatively, I have argued elsewhere that cigarettes could be phased out in a similar fashion to the TFG proposal, while permitting the use of alternative, less harmful products as part of an integrated endgame strategy—see

not considered sufficiently safe to be part of a tobacco harm reduction strategy. Pipes, cigars, bidis, kretek, shisha, and other such forms still cause addiction and cancers, and are harmful to non-smokers through the effects of SHS; these harms are not at a threshold that is much lower in comparison to cigarettes.[112] However, there are two potential products that have received considerable attention in debates on tobacco harm reduction: smokeless tobacco (SLT), and electronic nicotine delivery systems (ENDS).

SLT is an oral tobacco product that does not enter the lungs. It can result in addiction, cancers, oral diseases, and heart disease.[112] However, forms of SLT with a low nitrosamine (carcinogen) content (LN-SLT) are less harmful than cigarettes; the estimated risk of mortality and disease from LN-SLT, relative to cigarettes, is just 5–9%.[113] LN-SLT is also not associated with fatal respiratory diseases such as emphysema and lung cancer, and does not directly affect the health of non-users.<sup>69</sup> In Sweden, LN-SLT is a popular cigarette alternative (for an estimated 12% of Swedes),[114] and has led to a steep decline in smoking prevalence and associated tobacco-related diseases.[115] Consequently, smoking prevalence in Sweden is just 16%, which is notably lower than the EU average of 28%.[80] However, the use of SLT remains banned in many places, and in others is considered problematic. In South Africa, for example, SLT is affordable and designed to deliver high levels of nicotine, which encourages addiction in adolescence and cigarette smoking later in life.[116] In India, the use of SLT often results in later cigarette smoking and chronic disease; most people in India are unaware of these harmful effects.[117]

ENDS are devices that deliver nicotine to the lungs through a vapour in a similar fashion to cigarettes. They do not contain tars or other pyrolysis products found in tobacco, so are ostensibly less harmful than cigarettes. However, because of regulatory loopholes,<sup>70</sup> there are few restrictions on their marketing, use, and design. The market for ENDS is booming: in 2014 an estimated 466 brands were sold, in a market that is now worth roughly \$3 billion.[17] ENDS vary widely in their ingredients,[118] and the safety of their design.[119] In general, they contain lower levels of harmful chemicals than cigarettes, although some varieties have been found to contain toxicants such as formaldehyde and acrolein at a similar level as is found in cigarettes.[17] The long-term health consequences of the repeated use of ENDS is not yet clear, and it is also not known whether the vapour released by ENDS is harmful to non-smokers;[120] hence the risk of using ENDS relative to cigarettes is unknown.[121] It

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[111]. However, for the purpose of this thesis, focus is maintained on a conventional harm reduction approach, which simply entails permitting the use of an alternative product.

<sup>69</sup>Except *in utero* or during breastfeeding, and so LN-SLT is not considered safe to use for pregnant or lactating women.

<sup>70</sup>ENDS have escaped regulation in most countries, because they are relatively new to the market, and are not classified as a medicinal product or a tobacco product.

is known, however, that ENDS can be highly addictive, and can cause nicotine-related complications<sup>71</sup> in those using ENDS as well as others who breathe in the exhaled vapour.[122]

As a result, opinions remain divided on whether either product should be permitted onto the market. There are in principle objections to substances that, though safer than cigarettes, are still addictive and potentially harmful to self and others. There are also concerns over how the TI will use LN-SLT or ENDS to undermine current tobacco control policies. A switch from cigarettes to LN-SLT or ENDS should be complete, because the health benefits of reducing cigarette consumption are far less than those obtained from complete cessation.[17] However, LN-SLT and ENDS could be designed and marketed to encourage dual use with cigarettes rather than a complete cessation from cigarette smoking.[17, 19] There are also concerns that a loose regulation of ENDS will renormalize smoking, act as a gateway<sup>72</sup> for youth into cigarette smoking, or lead to heavier cigarette smoking among dual users, due to the high and unregulated nicotine content in ENDS.[123]

This raises various ethical questions. Are the harms presented by SLT and ENDS sufficiently low to justify their use within a harm reductive strategy? How might the implementation of a harm reductive approach backfire (i.e. undermine current tobacco control measures), and how should this be avoided? The potential for LN-SLT and ENDS to be used as cessation or weaning aids also raises questions regarding the treatment of tobacco addictions. If smokers can successfully quit with approved cessation aids, is it necessary to wean them onto potentially harmful products? Are there certain groups of people with more severe addictions who might not be able to quit smoking cigarettes without use of these alternative products? These questions require a more detailed look at the commercial environment (i.e. the marketing strategies of the TI), and the factors that can enhance—or undermine—one’s ability to successfully quit smoking.<sup>73</sup>

## Medicalized strategies

Recent advances in genetic and neuroscientific research have stimulated interest in developing medicalized strategies, in order to provide more effective approaches to preventing and treating nicotine addiction. Two medical interventions, currently in development, have caught recent attention: nicotine vaccines, and genetic tests for nicotine addiction.

The aim of the nicotine vaccine is to provide a lasting, active immunization against nicotine by

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<sup>71</sup>Nicotine constricts the blood vessels which can result in cardiovascular-related complications. It is also a tumour promoter, which means that it is not carcinogenic in itself, but can contribute to the cellular processes that eventually lead to cancer—see [17].

<sup>72</sup>The ‘gateway’ effect refers to the idea that the use of one substance among youth will wean them onto other substances.

<sup>73</sup>This is done in chapters 3 and 4. An ethical analysis of tobacco harm reduction is done in section 6.3.

stimulating the production of antibodies that sequester nicotine molecules in the bloodstream. So although the vaccine cannot prevent the act of smoking, it blocks the addictive, rewarding effects of nicotine in the brain, which in turn prevents addictions from developing in vaccinated individuals who initiate smoking.[20] The vaccine can also be used as a self-binding tool for addicted ex-smokers,[124] as the absence of nicotine reward may help to prevent relapse.[20] Nicotine vaccines are, so far, generally safe and well-tolerated in Phase II and Phase III clinical trials, although their efficacy remains low.[125, 126] The aim of genetic tests for nicotine addiction is to predict an individual's susceptibility to developing nicotine addiction. 'High-risk' individuals could then be targeted more in tobacco control policies, or for patient-specific interventions such as the nicotine vaccine.[21]

Both nicotine vaccines and genetics tests remain technologically flawed, and are not yet part of a formalized tobacco control strategy. However, concerns have been raised over their potential efficacy, application, and ethical implications.[127] Their application in preventing nicotine addiction in adolescents is considered to be particularly ethically contentious, due to their potential for coercive use.[128] The role of vested interests, such as the TI, in these interventions is also concerning. Japan Tobacco, for example, provided substantial funds to three biotechnology companies involved in genetic and vaccine work: Genesys and Corixa for a lung cancer vaccine, and British Biotech for research on genetically engineered proteins that may prevent heart diseases.[129] It is necessary, then, to explore ways in which vested interests may use these interventions and relevant research in ethically problematic ways.<sup>74</sup> There are also concerns that nicotine vaccines and genetic tests are too medicalized, and thereby ignore important psychosocial aspects of smoking. This requires an analysis of the extent to which addiction susceptibility is genetic, and whether addictions should be prevented and treated via medicalized—as opposed to psychosocial—approaches.<sup>75</sup>

## 2.3 Ethical grounding for tobacco control policies

The above descriptions have highlighted important points about the goals that tobacco control policies might have, the types of interventions that are justified, and ongoing and potential issues that policies should focus on.

The public health impacts of tobacco use are *serious* even in comparison to those that result from alcohol or illicit drug use; *widespread* in the sense that they affect self, others, societies, economies, and the environment; and *ongoing* despite current regulatory efforts. From a public health perspective,

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<sup>74</sup>The marketing and research tactics of the TI are discussed in chapter 4, and an ethical analysis of these two interventions is done in section 6.4.

<sup>75</sup>A discussion of the role of genetic factors in conferring susceptibility to tobacco addiction is done in section 3.2.1.

then, a policy that restricts the option to smoke is considered ethical. However, this comes at the expense of the freedom to smoke and may result in other ethical issues (discussed in section 2.2.3). To what extent, on what grounds, and in which ways is it ethical to restrict the choice to smoke for the protection of public health, and what sort of ethical theory or framework can be used to determine this? Smoking affects the health of others exposed to SHS; this argument has been used to justify smokefree laws in order to minimize SHS exposure. Minimum age of sale laws, denormalization, bans on TAPS and other measures are intended to protect children from smoking initiation. Adults are permitted to use tobacco, yet discouraged from this on the grounds that it is a serious detriment to their health. On what grounds are restrictions on tobacco ethically justified for the protection of others, children, and self? Further, a growing gap in tobacco-related health inequalities highlights the need for an ethical framework that pays attention to the effects of social injustice. It is also uncertain—from the above discussions—what addiction is, what the precise meaning of ‘freedom’ is in addiction, and therefore how freedom should be preserved or maximized in this context.

These questions all point to uncertainties regarding the meaning of ‘freedom’ and ‘health’ in the context of tobacco control policy, and uncertainties on how to preserve them. Yet, the notions of ‘health’ and ‘freedom’ are important in tobacco debates; as discussed above, they have been used to support pro-tobacco (freedom) and pro-regulatory (health) arguments, and to support or oppose restrictions on tobacco. These concepts and their application in debates can have important influences on tobacco control policies: the type of policy that is implemented, and its acceptance by policymakers and the public. Thus it is important to look at ethical theories and frameworks that aim to support ‘freedom’ and/or ‘health’, particularly those which have been most influential in tobacco debates or similar public health contexts. Liberalism is a philosophy often used in pro-tobacco arguments; it holds *freedom*—also referred to as ‘liberty’—as its most important value. Meanwhile, public health ethics theories have tried to balance or reconcile freedom with *public health*. Human rights—particularly the right to health—have also been used to support tobacco control measures under the WHO FCTC treaty, and so it is important to assess their potential application in this context. This section, then, provides a background of relevant ethical concepts, theories, and frameworks that are further nuanced and developed into an ethical framework for tobacco control policy in chapter 5.

This section starts off by clarifying the key concepts used in tobacco debates (section 2.3.1). ‘Health’ is such a concept: what is ‘health’, what is ‘public health’, and why is it necessary to protect it? Pro-tobacco arguments tend to emphasize smoking as a pursuit of pleasure. What is ‘pleasure’, and how does it relate to other concepts such as ‘freedom’ and ‘health’? ‘Freedom’ has also dominated

debates, particularly from the pro-tobacco side: what is ‘freedom’ in the context of smoking, and how does it relate to other important concepts such as ‘autonomy’? Discussion then proceeds onto theories and frameworks based on liberalism (section 2.3.2), public health ethics (section 2.3.3), and human rights (section 2.3.4).

### 2.3.1 Concepts in tobacco debates

#### Health

‘Health’ has been defined by the WHO in their constitution as: “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”[130] Thus, health is considered in a negative and positive sense: the *absence* of disease or infirmity (negative), as well as the *presence* of complete physical, mental and social wellbeing (positive). Health in the negative sense (disease or infirmity) is usually measured scientifically, by biomedical determinants such as the presence of an infection. Health in the positive sense, on the other hand, may be thought of as a normative construct, measured in terms of a comparison to what is generally considered a healthy ideal that individuals should aspire to. Negative and positive health are closely interrelated, since one provides conditions for the other.[131]

The WHO’s definition of health, particularly its positive aspect, has been disputed on the basis that it sets too high a threshold.[132] It is also very broad, since ‘health’ could be considered as a single aspect of wellbeing which may include other aspects such as attachment or personal security.[44] Nevertheless, this thesis follows the WHO’s definition, due to the important interconnections between physical, mental, and social health in the context of addiction.<sup>76</sup> The high threshold of ‘health’ as defined by the WHO can be interpreted as an aspiration in which health is considered synonymous with wellbeing. It is in this way that ‘health’ is referred to throughout this thesis.<sup>77</sup>

#### Collective health

Due to the globalized nature of tobacco use and its direct health impacts on others, ‘health’ should also be considered collectively. ‘Population health’, then, is the health of a population, while ‘population’ or ‘the public’ refers to a collection of individuals who, to some extent, all have ‘public’ lives that involve relationships and interactions with others.[133] ‘Public interests’ are interests that provide a

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<sup>76</sup>Chapter 3 argues that neurobiological processes both affect and are affected by thought processes; these, in turn, influence and are influenced by ‘social health’, such as the quality of social relationships. Chapter 4 argues that the structures within a society also influence these. Thus, ‘health’ in the context of addiction encompasses one’s physical and mental integrity, the quality of social relationships, and the structures of the society itself.

<sup>77</sup>For the purpose of this thesis, the terms ‘health’ and ‘wellbeing’ are used interchangeably.



benefit to the collective or the public rather than an aggregate benefit to individuals.[134] Provision of a good or service in promoting a public interest, that would be unattainable by individual action, is a ‘public good’.[133] Thus ‘public health’ is a public good, as it consists of the efforts made to make a social setting more conducive to health, with the ultimate goal of preventing disease, improving longevity, and promoting health.<sup>78</sup> This is achieved through organized efforts of society, with a focus on prevention rather than on cure, and on the population rather than on individuals.[43] Tobacco control, as a branch of public health, is also a public good and consists of the organized efforts of society to create infrastructures and conditions for a healthier lifestyle free from tobacco-related diseases and mortalities.

The communitarian<sup>79</sup> focus of public health implies that it may lose sight of the wellbeing of individuals. However, the wellbeing of the community and of the individual are strongly interlinked. To some extent, an individual’s wellbeing depends on the wellbeing of the community.<sup>80</sup> Healthy individuals, as an aggregate notion, in turn contribute to the wellbeing of the community. Further, some interactions between an individual and others involve what have become commonly called ‘social contracts’. These are broadly and essentially co-operations between the state and the individuals, or between individuals as coextensive agents within communities. These social contracts may protect individuals from harm,<sup>81</sup> provide goods that maximize their wellbeing,<sup>82</sup> or impose a reciprocal duty on others.<sup>83</sup>[124]

## Social justice

Health is unfortunately not spread equally; as mentioned in section 2.1.1, the negative health impacts of tobacco use are generally concentrated among socially disadvantaged groups. This idea is widely recognized in public health more generally: social determinants of health—such as employment status, income, education, and social support networks[137]—can significantly influence the health of individuals, and are important sources of health inequalities. Social justice has also been recognized as a

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<sup>78</sup>Not all define public health in this way, but this thesis follows this particular definition, which can be attributed to the Nuffield Council on Bioethics.[43]

<sup>79</sup>‘Communitarianism’ is a theory that emphasizes the social constitution of human lives, and the importance of the community and solidarity—see [135].

<sup>80</sup>This is particularly true in the context of addiction, because the social environment can have important impacts that, in turn, can predispose an individual to addiction. More discussion in chapters 3 and 4.

<sup>81</sup>There are lots of types of social contracts that are beyond the scope of this discussion—see [124]. In the context of tobacco control, a social contract that protects others from harm is exemplified by smokefree laws. They are imposed by the state onto smokers, to not smoke in certain places in order to protect the health of others.

<sup>82</sup>One such good may be public health, which—as discussed above—is a public good.

<sup>83</sup>‘Reciprocity’ is a type of transaction in which one party provides a benefit or avoids harm to another; this favour is returned by the other party—see [124]. In the context of tobacco, for example, a reciprocal transaction is established between smokers and the state if excise tax from tobacco is used to subsidize cessation services for smokers.

necessary requirement of public health.[44] In the context of tobacco, this thesis, similarly, argues that there are important interconnections between public health and social justice. Accordingly, tobacco control policies should recognize these interconnections, and find ways to tackle the relevant factors—social determinants—that put some groups of people at a higher risk of developing tobacco-related diseases than others. Minimizing social injustice as a necessary component of reducing tobacco-related health inequalities is in turn important for ensuring the welfare of the community.<sup>84</sup>

## Agency

‘Health’ is related to other concepts, such as freedom, autonomy, and therefore agency. Agency, in capturing these elements, may be described as follows:<sup>85</sup>

“An agent is one who acts. In order to act, one must initiate one’s action. And one cannot initiate one’s action without exercising one’s power to do so. Since nothing and no one has the power to act except the agent herself, she alone is entitled to exercise this power, if she is entitled to act.”[138]

In other words, to have agency is to have an authority over oneself that is grounded in the *mental capacity* for free action<sup>86</sup> (autonomy—discussed next) as well as the *external conditions* that permit this action (freedom—also discussed below).

## Autonomy

In general, autonomous actions are considered to be those which are conceived on the basis of on one’s *own* motives, reasons, and values.[139] Yet for most individuals, decisions are not generally free from the influence of others or emotions: they are subject to social and cultural contexts, desires, relationships, and values.[140] This does not necessarily imply that most individuals are not autonomous; it is rather a reflection on the importance of context and relationships in human decision-making and autonomy. This is particularly true in addiction.<sup>87</sup> Hence autonomy, for the purpose of this thesis, is referred to in a relational sense. ‘Relational’ can take on various meanings: it may be used to imply

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<sup>84</sup>For example, if taxpayers’ money is allocated to smoking cessation programmes for socially disadvantaged people, the taxpayers who do not directly benefit from these programmes will still benefit in a wider sense, but only if the cessation programmes help to minimize health inequalities and promote the overall productivity and flourishing of the society.

<sup>85</sup>Although there are numerous other ways to define ‘agency’, this is a working definition that draws out key elements necessary for the analysis in this thesis.

<sup>86</sup>‘Free action’ may also refer to ‘purposive action’: action that is in accord with one’s own motives, reasons, and values.

<sup>87</sup>This is explained further in chapter 3, which discusses important ways in which the social environment and relationships can influence addictive decision-making and autonomy.

that autonomy does not require self-sufficiency, that agents are socially and relationally embedded, or that relational processes—such as social relationships—are necessary for autonomy.[141] In this thesis, ‘relational autonomy’ refers more broadly to the idea that social processes, such as social relationships, are important in human decision-making and *can affect an individual’s autonomy*.

In this view, social conditions can suppress or promote autonomy. Autonomy-promoting conditions are those that allow individuals to realize and form their own preferences and values, and pursue or maintain wellbeing in their own way. Autonomy-suppressing conditions, meanwhile, limit these. Oppressive conditions can also lead to the formation of preferences that are actually adaptations to difficult or unjust circumstances, but internalized as one’s own. This process, termed ‘adaptive preference formation’, is considered non-autonomous because it does not necessarily contribute to self-realization, wellbeing, or the formation of authentic values and preferences.[142] It is later argued—in chapter 3—that adaptive preference formation is an important characteristic of many addictions, since addictions are largely coping mechanisms against stressful or oppressive circumstances, and do not necessarily reflect what the individual truly wants or would have wanted otherwise. In this view, autonomy in addiction is incomplete and hinges, to an extent, on the social and relational environment.

The idea of authentic preferences and ‘what the individual truly wants or would have wanted otherwise’ is usefully illustrated by Frankfurt’s first- and second-order desires. According to Frankfurt, desires are hierarchical: first-order desires reflect what one wants (‘I want to X’); second-order desires involve some higher reflection on whether ‘X’ is really desired (‘I *want to* want to X’). Where there is conflict between first-order desires, action is only considered autonomous if it is in accord with the second-order desire.[143] Put into the context of addiction, a smoker may have two first-order desires: to quit and to smoke. These conflict, and so the individual may reflect on this further to generate the following second-order desire: ‘I *want to* want to quit smoking’; which conflicts with the first-order desire to smoke. If the individual then quits smoking, it is in accord with the second-order desire and therefore autonomous; but if the individual smokes, it is in accord with the first-order desire—not the second-order desire—and not autonomous. This point is important in addiction, because—as mentioned in section 2.1.1—addictive behaviors are often associated with signs of cognitive dissonance.

### **Negative and positive freedom**

Freedom,<sup>88</sup> which refers to the external conditions that permit free action, is another concept that—along with ‘health’—has been emphasized in tobacco debates. Pro-tobacco arguments often highlight

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<sup>88</sup>‘Freedom’ and ‘liberty’ are used interchangeably in this thesis.

the importance of freedom obtained from minimal state interference: the ‘freedom to smoke’. However, advocates of tobacco regulations have also used the notion of liberty to argue for smokefree laws.[10] A high importance is often attached to freedom;<sup>89</sup> it is noteworthy that smoking restrictions were not implemented and widely embraced by the public until the harms of SHS exposure became known, and this became emphasized as a ‘freedom’ or ‘right’ to be free from SHS-induced harm.[10, 47]

In the context of intervention, freedom may be construed in two ways:[145] in its negative sense (external conditions that *minimize state interference*), and in its positive sense (freedom created by *state interference that intends to promote autonomy*).[146] Therefore it is necessary to think of freedom not just in a negative sense, but also in its positive sense.<sup>90</sup> In this view, the capacity for free action hinges in part on conditions and infrastructures created by the state, and ‘harm’ is the failure to protect autonomy or to provide conditions that promote autonomy, including the failure to eliminate options that ultimately restrict autonomy. Thus, state interventions extending into individual choices are ethically justified, *provided that* their aim is to protect or promote autonomy.[147] This concurs with the idea that autonomy is relational and is affected by social conditions,[141] and contrasts to the view that freedom arises solely from having options, and that the solution to maximizing freedom lies in minimal state intervention.[144]

### **Health or freedom: Which takes priority?**

The importance of health and freedom is reflected in ethical debates on tobacco, so this thesis considers both of equal significance. This raises important questions on how these two values interrelate and how they should be protected in an ethical framework for tobacco control policy. When freedom is construed in a negative sense, it tends to clash with ‘health’; but if construed in a positive sense, health and freedom interrelate in important ways, especially in the context of some health issues—such as addiction—that can undermine an individual’s autonomy. Recognized as such, some interventions that maximize health could also maximize freedom, thus resolving the tensions in debates that camp health and freedom against one another as clashing values.<sup>91</sup>

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<sup>89</sup>Harris, for example, considers freedom to be an essential human quality that prevails over perfection: “Autonomy surely requires not only the possibility of falling but the freedom to choose to fall, and that same autonomy gives us self-sufficiency” (pg.103, [144]).

<sup>90</sup>In this thesis, ‘freedom’ is referred to in both its negative and positive sense.

<sup>91</sup>Later, this thesis argues that one of the main reasons why there is a perceived tension between freedom and health, at least in the context of tobacco debates, is because these debates have overly narrowed the concept of ‘freedom’ into its negative sense. However, if the concept of ‘freedom’ is broadened into its positive and negative sense, and the autonomy-undermining effects of addiction are recognized, tobacco control interventions that promote health are not necessarily incompatible with freedom—provided that they help to treat or prevent addictions.

## **Pleasure**

A final concept that is oft-emphasized in pro-tobacco debates is that of 'pleasure'. In this thesis, 'pleasure' refers to a transient state that is usually referred to as a 'high' in the context of psychoactive drug use. Later, it is argued that addictive behaviors can be compatible with the notion of pleasure but not with the notions of positive freedom or autonomy, and in this sense, having the option to smoke, particularly in cases of addiction, does not enhance 'freedom'. However, freedom and pleasure—as they are defined here—are often conflated in pro-tobacco arguments, because having an option to enjoy the pleasurable effects of smoking tends to be construed as an exercise of freedom. Thus it is important to characterize 'pleasure', both in terms of its neurological manifestations, and how it relates to freedom in addiction. It is time, then, to look at liberty-preserving theories in more detail.

### **2.3.2 An overview of Mill's liberal theory**

The liberal philosophy of Mill holds freedom as the pre-eminent factor from which human individuality, diversity, and communities can flourish. Many arguments in tobacco debates—particularly from the pro-tobacco side—follow highly individualistic, liberal ideas derivative of his 'harm principle':

“That the only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others. His own good, either physical or moral, is not a sufficient warrant.” (pg.13, [42])

In pro-tobacco arguments, the harm principle is used to resist smoking restrictions. In pro-regulatory arguments, it is engaged as a justification for smokefree laws that protect the health of others. However, there are some nuances in Mill's liberal philosophy that tend to be overlooked in tobacco debates—discussed next.

#### **The scope of 'harm to others'**

What counts as 'harm to others' in the harm principle is unclear in tobacco debates. In most anti-regulatory arguments, 'harm' has taken a narrow scope, referring only to unavoidable, direct, and physical harm to others, particularly harm elicited through SHS exposure. Tobacco companies such as Philip Morris, for example, are opposed to tobacco restrictions, although they accept some smokefree laws aimed at protecting others from SHS. On their website, Philip Morris argues that smokefree laws are acceptable only in public areas where non-smokers *must* go, such as hospitals and public transport services, but smokefree laws in recreational areas, such as restaurants and bars, are unethical on the

grounds that non-smokers can opt not to visit these places.[148] However, in many pro-regulatory arguments, the scope of ‘harm’ has been widened to include indirect harm,<sup>92</sup> harm through inaction,<sup>93</sup> and non-physical harm.<sup>94</sup> These would essentially support further restrictions on tobacco use.[149]

The harm principle can therefore be used to support arguments on both sides, depending on how ‘harm’ is interpreted.[150] It does not, however, include harm from which: “the inconvenience is one which society can afford to bear, for the sake of the greater good of human freedom.”(pg.63, [151]) This refers to actions that may disagree with others’ moral values,<sup>95</sup> but that otherwise do not present any threats to others. This thesis will refer to these harms as ‘moral harm’, and will not count them in any assessments of tobacco-related harm.<sup>96</sup> However, non-moral harms are taken into account, including those that are avoidable, indirect, caused through inaction, and non-physical. From the discussion in section 2.1, it is clear that smoking is causal of a multitude of severe harms, and that further restrictions on tobacco use are ethically justified even within Mill’s liberal framework.<sup>97</sup>

### Justifying paternalistic actions

Paternalistic<sup>98</sup> actions are generally considered unethical within liberal frameworks. Such interferences could, for example, result in an authoritarian rule in which human actions are controlled by the ideologies of the state. However, there are forms of paternalism that may be considered more acceptable. Mill considered paternalistic actions in the best interests of children as ethical, since children are not yet capable of forming their own sound judgements. He also considered soft paternalism<sup>99</sup> to be more acceptable.[153] In the context of tobacco control policy, this presents uncertainties over the extent to which certain groups of people should be protected from their own actions: young people who may not have yet reached the maturity of their faculties, and addicted smokers whose smoking may not be fully voluntary.

If addicted individuals are considered *completely incapable* of exercising voluntary control over their

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<sup>92</sup>For example, the economic impacts of smoking on society.

<sup>93</sup>For example, failure to implement policies that would prevent smoking initiation among children or that would protect ex-smokers from relapse.

<sup>94</sup>For example, the emotional impacts of a tobacco-related death on family members.

<sup>95</sup>Actions that may be considered morally repugnant by some but that are otherwise harmless, for example adopting a purple mohican hairstyle.

<sup>96</sup>This is primarily because considering this type of harm has influenced the policies of some psychoactive drugs in very counterproductive and unethical ways—see section 4.2.

<sup>97</sup>For example, the harm principle—when broadened to include avoidable harm—would also justify smokefree laws in places where non-smokers may choose to go, such as bars and restaurants.

<sup>98</sup>In this thesis, ‘paternalism’ follows Dworkin’s definition: interference with another person, against his/her will, on the perceived basis that this interference will bring a benefit to that person or protect him/her from harm. See [152].

<sup>99</sup>‘Soft paternalism’, as defined here, applies to instances in which an individual’s action is not voluntary or knowledgeable, or a temporary intervention is necessary to assess whether the agent is able to act voluntarily; for example in cases of mental impairment. ‘Hard paternalism’ refers to instances in which the individual’s action is voluntary and knowledgeable.

addiction, coerced therapy may be considered justified on the basis of soft paternalism.<sup>100</sup> However, it is also possible that autonomy is, as a result of the addiction, *not completely negated but undermined to some degree*; this means that the autonomy of the individual lies above a threshold at which coercive therapy is justified, yet below a threshold at which no intervention is necessary. In such cases, special considerations may be made within an ethical framework that aims to promote the autonomy of addicted individuals. Thus, it is necessary to assess the nature of autonomy in addiction, in order to determine whether addiction is a condition that—by definition—undermines autonomy, and if so to what *degree*, and on which *basis*.<sup>101</sup>

### **Mill's conception of freedom**

As argued in section 2.3.1, freedom should be considered in both its negative and positive sense; yet Mill's liberalism presumes that the necessary conditions for freedom are pre-existent and do not need to be created by the state. Freedom, then, is maximized by minimal state interference and referred to in its negative sense.[146] However, if addictive smoking is autonomy-undermining, then a necessary condition for freedom—autonomy—does not yet pre-exist and should be created by the state. Therefore a limitation of Mill's liberal theory, as applied in tobacco debates, is that its conception of 'freedom' is interpreted too narrowly. Furthermore, if the freedom of addicted individuals is undermined in part due to autonomy-undermining social circumstances or the effects of the drug, then maximizing the liberty of individuals may in fact *require* state interventions that tackle these conditions.

### **The role of communities**

Communities are also important in maximizing the liberty of individuals. As argued in section 2.3.1, the wellbeing of individuals and the wellbeing of the community are interlinked. Mill also recognized this to some extent in his utilitarian theory, because he acknowledged that utility is maximized through liberty in a broader sense.[151] In other words, allowing individuals to act freely promotes human individuality, diversity, and flourishing, which in turn promotes the flourishing of the community. However, Mill's liberalism is generally interpreted as a very individualistic theory in which communal welfare must yield to individual freedom. It is also criticized for focusing insufficiently on inequalities

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<sup>100</sup>Caplan, for example, has argued that: "An addict cannot be a fully free, autonomous agent precisely because they are caught up in the behavioral compulsion that is addiction . . . [so] it may be possible to justify compulsory treatment involving medication or other forms of therapy" (pg.1919, [30]). In other words, lost autonomy may be 'restored' by coerced therapy.

<sup>101</sup>This is done in reference to neurobiological evidence in chapter 3.

as a result of social injustice.[43] However, the above arguments show that Mill’s liberalism is not necessarily incompatible with promoting the welfare of a community or social justice, provided that ‘freedom’ is correctly interpreted in a broader (positive and negative) sense, and that opportunities for freedom are distributed in a way that helps the most socially disadvantaged groups.

## **Summary**

Mill’s liberal philosophy has formed an important foundation for many tobacco debates, particularly those that support minimal restrictions on tobacco. However, liberalism has often been interpreted very narrowly, and is deliberately narrowed to be incompatible with state interventions that promote public health. Nevertheless, a broader interpretation of ‘freedom’, ‘harm’, and the interconnection between the welfare of communities and of individuals may actually support public health goals in a way that is compatible with a liberal framework. It is necessary, then, to build on liberalism by using ethical theories or frameworks that recognize the importance of public health interventions and the opportunities they provide.

### **2.3.3 An overview of public health ethics**

Theorists in public health ethics have attempted to go beyond Mill’s liberal theory in order to develop ethical frameworks more applicable to the context of public health. As discussed in section 2.3.1, public health deals with populations, not individuals, and one of its primary goals is to create infrastructures and social conditions that enable members of a society to live more healthily. An ethical framework for public health should therefore account for populations rather than having too strong of an individualistic focus.[154]

### **Libertarian paternalism**

One approach is to strike a balance between public health and freedom by incorporating a concept termed ‘libertarian paternalism’. Libertarian paternalism has gained recent popularity as a level of intrusion at which people are encouraged to make healthier lifestyle decisions, yet still permitted access to unhealthy options. This is achieved by creating disincentives for unhealthy options, changing default policies (while still allowing other unhealthier options), or creating incentives for healthier options.<sup>102</sup>[41] In the context of tobacco, it works by making tobacco products less desirable through means such as taxation and warning labels. As discussed in section 2.2.1, regulatory frameworks for

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<sup>102</sup>These three strategies also form part of the Nuffield Council for Bioethics’ intervention ladder, in which interventions are graded according to their level of intrusion. The intervention ladder is discussed further below.



tobacco are already taking this approach. However, libertarian paternalism—while helpful—focuses insufficiently on health inequalities and the social conditions that underlie these, and is insensitive to the relational nature of autonomy in addiction. Thus, an ethical framework that goes beyond libertarian paternalism *and* Mill’s liberal theory, and that takes into account relational aspects of addiction, is necessary.

## Stewardship

Another concept in public health ethics that has been particularly influential is stewardship. The WHO, for example, states that “stewardship in health is the very essence of good government” (pg.117, [156]). Stewardship assumes that the necessary infrastructures and social conditions for freedom and human flourishing are not pre-existent, particularly for people affected disproportionately by health inequalities, so they should be provided by the state.[157] Governments are then viewed as having a responsibility to protect the health of their citizens and to minimize health inequalities. A particularly influential stewardship model for the public health sphere was presented by the Nuffield Council on Bioethics, on the grounds that Mill’s liberalism is too individualistic, fails to take into account the value of the community and public goods, and cannot sufficiently address health inequalities.[158] To accommodate these issues, the Nuffield Council’s ‘stewardship model’ was proposed as a revised form of liberalism.[43]

The basic premise of the stewardship model is that it requires states to pay attention to the needs of individuals as well as the collective,<sup>103</sup> thus minimizing health inequalities while balancing the requirements for liberty and health. Some interventions judged as paternalistic within Mill’s liberal framework are then considered a necessary component of stewardship.[159] However, it has been argued that stewardship, as an ‘extended liberalism’, does not differ significantly from Mill’s liberalism and is essentially a framing tool in which some paternalistic interventions can be made more acceptable.[154] Another criticism is that the stewardship model remains too conservative and context-insensitive.[160] For tobacco, for example, the stewardship model recommends the implementation of smokefree legislations in public spaces, cessation programmes, raising the minimum age of sale to 18 years, and corporate social responsibility (of the TI).[43] However, these measures do not differ significantly from those that would fall within the scope of other liberal frameworks.<sup>104</sup> They are also

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<sup>103</sup>The Nuffield Council, for example, states that: “the concept of ‘stewardship’ is intended to convey that liberal states have a duty to look after important needs of people individually and collectively. It emphasises the obligation of states to provide conditions that allow people to be healthy and, in particular, to take measures to reduce health inequalities. The stewardship-guided state recognises that a primary asset of a nation is its health: higher levels of health are associated with greater overall well-being and productivity” (pg.xvi-xvii, [43]).

<sup>104</sup>For example, it was argued in section 2.2.1 that tobacco control measures endorsed by the WHO FCTC aim to

insensitive to the effects and etiology of nicotine addictions<sup>105</sup> and the characteristic behaviors of the TI;<sup>106</sup> both which warrant interventions quite distinct from those outlined by the Nuffield Council.

Under the Nuffield Council's stewardship model, an appropriate balance between liberty and health is achieved using an 'intervention ladder' which grades interventions according to their level of intrusiveness. The most permissive interventions (such as inaction or providing information) are placed towards the bottom of the ladder, while more restrictive interventions (such as disincentives, choice restriction, and choice elimination) are placed progressively towards the top, reserved only for issues that cause the most harm. Every intervention, including inaction, requires justification.[43] Hence the ladder reflects the importance of preserving freedom while securing the requirements of public health. Where along the ladder tobacco should be placed, then, depends largely on the nature and severity of the harms it causes, the extent to which it is responsible for health inequalities, and the extent to which exposure to tobacco-related harm can be avoided by individual action.<sup>107</sup> However, the intervention ladder has been criticized on the basis of having too heavy a focus on preserving liberty, and not acknowledging the interconnections between freedom and health.[160] This thesis, too, argues that the interconnection between freedom and health should be recognized.

## **Ethical principles for public health**

It has been suggested that public health interventions should be based on a set of ethical principles that are sensitive to the collective nature of public health. These principles could include: (1) the harm principle; (2) employing the least restrictive or coercive means in order to maximize liberty; (3) reciprocity;<sup>108</sup> and (4) transparency.<sup>109</sup>[155] Other ethical principles, based on a relational conception of public health,<sup>110</sup> have been suggested. These principles are (1) relational autonomy;<sup>111</sup> (2) social

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discourage tobacco use; hence they are based on libertarian paternalism principles. Some interventions, such as smokefree laws or providing cessation therapy, also fall within the scope of Mill's liberalism.

<sup>105</sup>Described in chapter 3.

<sup>106</sup>Described in chapter 4.

<sup>107</sup>These points are discussed further in section 5.2.

<sup>108</sup>The reciprocity principle is defined and justified as follows: "Complying with public health requests may impose burdens on individuals. These may involve sacrifice of income or time and in general, these should be compensated. The reciprocity principle holds that society must be prepared to facilitate individuals and communities in their efforts to discharge their duties" (pg.102, [155]).

<sup>109</sup>The transparency principle refers to how decisions are made, which: "should be as clear and accountable as possible. As much as possible, the decision-making process should be free of political interference and coercion or the domination by specific interests" (pg.102, [155]).

<sup>110</sup>In other words, a conception of public health as involving social relationships. This puts a stronger emphasis on the relationships between individuals, social factors that may affect an individual's health (for example, social determinants of health), and relational autonomy.

<sup>111</sup>Relational autonomy was described in section 2.3.1.

justice;<sup>112</sup> and (3) relational solidarity.<sup>113</sup>[45] These three principles, it is argued, go further in emphasizing a commitment to minimizing health inequalities and promoting flourishing as a collective pursuit.[45] This thesis recognizes the importance of all of these principles, and will build on them in chapter 5 in the development of an ethical framework for tobacco control policy.

### 2.3.4 An overview of human rights

Human rights, due to their relevance in international law and relations, can be used to strengthen an argument, ethical framework, or policy that is protective of human rights. As one may expect, human rights have been used to support arguments in tobacco debates, on both sides. This section briefly introduces these arguments, the relevant human rights, and how human rights relate to some of the concepts and ethical theories described in preceding sections.

#### Underlying principles

In an international context, human rights exist in a number of treaties.<sup>114</sup> The main treaty is the United Nations (UN) Universal Declaration of Human Rights (UDHR).[161] Other international UN treaties include the International Covenant on Civil and Political Rights (ICCPR)[162] and the International Covenant on Economic, Social, and Cultural Rights (ICESCR),[163] as well as rights treaties designed to protect specific groups, such as the Convention on the Rights of the Child (CRC),[164] the Convention on the Elimination of Discrimination Against Women (CEDAW),<sup>115</sup>[165] the 1965 International Convention on the Elimination of all forms of Racial Discrimination (ICERD),[166] and the 2006 Convention on the Rights of Persons with Disabilities (CRPD).[167]

A common thread in all of these treaties is their moral foundation, which is summarized in UDHR:

“recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world” (preamble, UDHR).

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<sup>112</sup>This principle is described as follows: “social justice reflects our relational understanding of persons as socially constituted and situated . . . [and seeks] to correct rather than worsen systematic disadvantages in society” (pg.203, [45]).

<sup>113</sup>‘Solidarity’ refers to common interests, common purposes, the benefits of social cohesion, and co-operations whether altruistic, reciprocal, or based on some other type of social contract. ‘Relational solidarity’ refers to a solidarity that is committed to social justice, such that: “when we attend to relational solidarity, we need to be attentive to the increased and quite particular risks faced by members of some social groups as compared with others” (pg.204, [45]).

<sup>114</sup>Human rights treaties also exist at more regional levels, but since this thesis focuses on tobacco control in an international context, reference will be made primarily to the treaties listed here.

<sup>115</sup>The CEDAW treaty is considered relevant in the context of tobacco control, due to the rising prevalence of smoking among women in developing countries. However, this thesis focuses on ongoing issues in areas where tobacco control policies are more developed, and where smoking prevalence is more gender-equal. Hence CEDAW will not be considered further here.

In other words, the point of human rights is to protect the value and inherent dignity of human beings, which includes the protection of agency.<sup>116</sup> Accordingly, there are human rights that aim to protect the preconditions for agency: life, health, liberty, privacy, and self-determination—among many others. The concepts described in section 2.3.1 are also relevant to human rights. The concept of ‘health’ as defined by the WHO may—as mentioned in section 2.3.1—be interpreted as an aspiration, synonymous with wellbeing. In the constitution of the WHO, it is proclaimed that: “enjoyment of the *highest attainable standard* of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition ...”.<sup>[130]</sup> In other words, ‘health’ as an aspiration is also a right, and so the WHO’s definition of ‘health’ is very much grounded in human rights theory.

Although human rights are often seen as individualistic, they may also promote communitarian values such as social justice, communal welfare, and public goods (such as public health). For example, it has been argued that, due to the universality of human rights, they impose a reciprocal duty onto others.<sup>[136]</sup> A right to be free from “torture or to cruel, inhuman or degrading treatment or punishment” (UDHR article 5) requires that individual *A* refrains from such actions directed at individual *B*; however, individual *B* must also refrain from such action directed at individual *A*, because both individuals *A* and *B* possess this right. The protection of individual rights also protects human wellbeing, which in turn protects the wellbeing and flourishing of the community because the wellbeing of the community and of its individuals are interrelated—see the discussion in section 2.3.1.

### **Human rights applied in pro-tobacco arguments**

In pro-tobacco arguments, rights that are often engaged are the right to self-determination (ICESCR article 1, ICCPR article 1) and the right to liberty (UDHR article 3, ICCPR article 9). These rights are then translated into a ‘right to smoke’, or a liberty right of manufacturers to produce and sell tobacco. The right to privacy (UDHR article 12, ICCPR article 17) has also been used to defend smoking as a private activity, and equality rights (UDHR articles 2 and 7, ICCPR articles 2 and 26, ICESCR article 2) have been used to argue that tobacco restrictions are discriminative against smokers.<sup>[169, 170]</sup> Tobacco regulations, particularly laws mandating smokefree public areas, are then construed as violating these rights and as undermining the personal freedom and enjoyment of smokers. These arguments are then used to oppose restrictions on tobacco, encourage pro-tobacco

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<sup>116</sup>Some have gone further to argue that the moral foundation of human rights is to protect agency. A full discussion of the philosophical basis of human rights is beyond the scope of this thesis, so it is assumed that human rights should protect agency and the necessary preconditions for agency (which, as discussed in section 2.3.1, are freedom and wellbeing). For the reasoning behind these conclusions, see [168].

social movements, and gain political support for the liberalization of tobacco use.[171]

Based upon a conception of negative freedom, the rights to self-determination, liberty, and privacy all appear to support a minimal state, and would be presented—as they have been in pro-tobacco arguments—as contrasting with rights that support tobacco restrictions, such as the right to health. However, as argued in section 2.3.1, freedom and health are interrelated in important ways when ‘freedom’ is correctly construed in its positive sense; consequently, the right to liberty and the right to health may also interrelate and support one another.<sup>117</sup>

### **Human rights to support tobacco control**

As mentioned in section 2.2.1, the right to health (ICESCR article 12) forms the ethical basis of the WHO FCTC treaty.[6] It has also been used to support smoking restrictions to protect the health of others: groups such as the Canadian ‘Non-Smokers’ Rights Association’,[172] and the USA’s ‘Americans for Non-Smokers’ Rights’[173] have emphasized the right to be free from SHS as a health right.[171] Due to the relevance of human rights in international law and relations, it has also been argued that tobacco control should be grounded in human rights, in order to support governments in their tobacco control efforts. This could include, for example, using human rights arguments in tobacco control advocacy,[40] and to motivate policymakers and the public to become more involved in a pro-regulatory social movement.[171] It may also entail drafting stronger anti-tobacco laws based on human rights, using shadow reports to track a nation’s progress in tobacco control, or allowing aggrieved individuals to present human rights-based lawsuits against the TI.<sup>118</sup>[175]

In addition to the right to health, other rights of relevance to tobacco control include the rights to life (UDHR article 3, ICCPR article 6) and social conditions conducive to health (UDHR article 25). Children’s rights are also highly relevant to tobacco control policies. As discussed in section 2.3.2, even in liberal theories it is recognized that children are not yet fully capable of forming their own sound judgements, and therefore need others to act in their best interests. This idea is also evident in childrens’ rights, most of which are outlined in the CRC treaty. Most noteworthy for tobacco control are the child right to life and healthy development (CRC article 6) and the child right to a safe and clean environment (CRC article 24). Due to the special circumstances that may predispose children

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<sup>117</sup>Later, it is argued that addiction is autonomy-undermining, and so interventions that promote non-addiction can promote health and freedom; these measures are also compatible with liberty and health rights. These ideas will be developed further throughout chapter 5, once the nature of autonomy in addiction—and the factors that influence it—have been clarified.

<sup>118</sup>I have also argued elsewhere that the TFG proposal supports human rights principles, and that human rights may be drawn on in support of such a strategy—see [174].

to addictions in later life<sup>119</sup> and the marketing activities of the TI,<sup>120</sup> children's rights to be protected from violence (CRC article 19), drugs and drug trade (CRC article 33), and exploitation (CRC article 36) are also relevant.

Otherwise, equality rights (UDHR articles 2 and 7, ICCPR articles 2 and 26, ICESCR article 2) are also relevant to ethical debates on tobacco, since—as discussed in section 2.1.1—certain groups of people tend to suffer disproportionately from tobacco-related harm.<sup>[175]</sup> There are additional treaties designed to protect certain groups. Racial minorities are protected from discrimination under ICERD, and CRPD protects the rights of the severely mentally ill. In particular, those with severe mental illness have a right to health without discrimination on the basis of their mental illness (CRPD article 25), and a right to be protected from exploitation (CRPD article 16). For certain racial groups, such as indigenous peoples, the right to cultural participation and identity (UDHR article 27) is important. This right may appear to have no relevance to tobacco control; however, as will be explained in chapter 4, interventions that protect these rights may also protect individuals from developing addictions, since resistance to addiction hinges—to some extent—on a supportive social environment and sociocultural integration.

## 2.4 Summary

This chapter has provided an overview of the public health impacts that result from smoking, ongoing issues faced in tobacco control policy, and ethical theories and frameworks that may provide a basis for tobacco control policies.

Section 2.1 has shown that tobacco—even in comparison to alcohol and illicit drugs—is a serious threat to public health and that interventions to minimize smoking prevalence are justified. Interventions that tackle different aspects of the problem may be ethically justified on different grounds. For example, smokefree laws that protect others from SHS exposure are justified on the basis of the harm principle, while interventions that protect children from smoking initiation are considered ethical on the grounds that children are not yet fully capable of exercising sound judgement. Interventions that minimize tobacco-related health inequalities may be justified within an ethical framework that promotes social justice; however, *how* this issue should be addressed remains unclear. It is also important for policies to prevent and treat tobacco addictions, as this affects the majority of tobacco users and can significantly compromise their ability to quit. However, what addiction is—and what

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<sup>119</sup>These circumstances, and their potential effects on a child's development, are described in section 3.2.

<sup>120</sup>Many of these activities tend to be directed at children, which makes them more vulnerable to initiating smoking. See section 4.4.

special considerations this creates for policies—remains unclear. So ethical approaches discussed in section 2.3—liberalism, libertarian paternalism, the stewardship model, and ethical principles for public health—are instructive, but remain insensitive to some critical aspects of addiction.

The concept of ‘freedom’ was identified as playing an important role in tobacco control policies. Maximizing positive freedom requires that state interventions promote or protect autonomy; however, the nature of ‘autonomy’ in addiction remains unclear. If addiction does not affect autonomy, state interventions that prevent or treat addictions do not necessarily enhance positive freedom. However, if addiction is autonomy-undermining, state interventions should provide autonomy-promoting conditions in order to maximize positive freedom. If autonomy is undermined to the extent that addicted individuals are completely incapable of resisting drug use, a stronger intervention level—such as coercion—may be justified. Further, smoking may have beneficial effects—such as pleasure or stress relief—that influence the decision to smoke. It is necessary, then, to look at the nature of addictive decision-making: relevant neurobiological processes, and the factors that influence these processes. This information will, in turn, help to answer questions on how policies should proceed in maximizing the freedom of addicted smokers, and whether this would require a minimal or an interventionist state.

This chapter has also highlighted that two groups are especially vulnerable to tobacco addiction: adolescents and socially disadvantaged groups. What makes these people more susceptible, and how should policies respond? A deeper look at the mechanisms of susceptibility in adolescents and socially disadvantaged groups, and the relevant factors, can instruct policies on *which* interventions are required and *why*. In the case of adolescents—who are most vulnerable to initiation—it is important to consider the nature of smoking initiation, the influence of the TI, and age-related mechanisms of susceptibility. This helps to answer more specific questions such as: how should adolescents be protected from smoking initiation? Is the TFG proposal too restrictive, and how may adolescents be affected by interventions such as tobacco harm reduction and nicotine vaccines? In the case of socially disadvantaged groups, it is necessary to look at relevant social factors, and ways in which these factors interact with neurobiological processes that affect one’s susceptibility to addiction. This helps to answer specific questions such as: what makes socially disadvantaged groups more susceptible to tobacco addiction? Are genetic tests a promising predictive tool, or are social factors more relevant? What should policies do—and avoid—in order to minimize tobacco-related health inequalities?

It is time, then, to take a closer look at the neurobiological features of addiction, genetic and neurobiological mechanisms of susceptibility, and how these are interrelated to social and relational processes. Together, this can provide a conceptual basis for tobacco control policies in terms of ‘what

addiction is', and important clues on aspects that should be considered in an ethical framework for tobacco control policy.



## Chapter 3

# Neurobiological features of addiction

The aim of this chapter is to elucidate the neurobiological events that underlie addiction, as well as the genetic and neurobiological processes that confer a susceptibility to addiction. This will help to answer some of the question raised in chapter 2 regarding the nature of addiction. Chapter 2 has already argued that ‘addiction’ is a mental disorder associated with distinct behavioral, physical, and psychological features; still unclear, however, is whether addictive smoking is beneficial (for example, pleasurable or stress relieving), the extent to which it is autonomy–undermining, and what the factors that affect autonomy in addiction are. Also unclear is what makes some people more susceptible to addiction than others, and what the mechanisms behind this are.

These questions are considered in this chapter using neurobiological evidence. This evidence, which is typically used in support of ‘brain disease’ theories of addiction,<sup>1</sup> is then nuanced by considering interrelated social factors such as the effects of stress, early attachment experience, and the social environment on the developing brain. The relevant neurobiological literature is vast: thousands of papers and books have been written on the subject, and countless pieces of neuroscientific evidence, in humans as well as species with similar brains (such as non–human primates and rats) support this literature. Thus, key pieces of information are presented and developed into a more integrated neurobiological account of addiction that goes far beyond information typically presented in conceptual debates. In particular, focus is on how external factors (‘nurture’) influence an individual’s addictive neurobiology.

The structure of this chapter is as follows: section 3.1 reviews key findings from the neuroscientific literature to give an overall description of the neurological characteristics that typify the addictive

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<sup>1</sup>‘Brain disease’ theories of addiction argue that addiction is a chronic and relapsing brain disease, caused by prolonged drug use that results in neurobiological changes that make it difficult for the individual to avoid drug use. Brain disease theories are discussed and critiqued further in section 5.1.2.

state. Section 3.2 builds on this to discuss, from various biological perspectives (genetics, epigenetics, and developmental neurobiology) how different mechanisms of susceptibility can contribute to the development of these neurological characteristics, *before* initiation of drug use. The argument that will be presented throughout this chapter is that (tobacco) addiction is a complex disorder, with important neurobiological, psychological, relational, and social aspects; but with its roots ultimately embedded in social contexts. Addiction, then, arises not just as a result of drug use but also as a by-product of social injustice; autonomy in addiction is relational, and affected by autonomy-undermining social conditions. This calls for an ethical framework that emphasizes the importance of social justice, relational autonomy, and the promotion of positive freedom through state interventions that protect or promote the autonomy of addicted individuals. In other words, the neurobiological evidence presented throughout this chapter supports an interventionist approach, in which the prevention and treatment of addictions, particularly for the most vulnerable groups, is prioritized.

### 3.1 The brain in addiction

In general, the brains of drug-addicted people are characterized by a number of profound differences that distinguish them from the brains of non-addicted people. They are structurally different:<sup>2</sup> they contain less grey matter<sup>3</sup> in the cerebral cortex,[176] and less white matter,<sup>4</sup> which affects neurological maturation.[177] Prolonged drug use is also associated with neuroplastic changes that durably alter the structure and branching patterns of neurons.[178] These structural changes are often described—especially in brain disease theories of addiction—as a *consequence* of prolonged drug use; however, adverse life experiences, such as abuse, can have a similar impact.<sup>5</sup> Significant changes have also been observed in two important neurotransmitter systems: the endorphin-opioid system (EOS),[179] and the mesolimbic dopamine system.[180]

Prototypical drugs of abuse<sup>6</sup> increase extracellular levels of dopamine in the mesolimbic system, in both addicted and non-addicted individuals, through variable mechanisms. Nicotine, for example, binds to nicotinic acetylcholine receptors (NACHR) which triggers the direct release of dopamine

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<sup>2</sup>It is unclear whether these structural differences are a cause or consequence of prolonged drug use. These structural differences are also not observed in all addictions and may be present in some non-addicted individuals, so these observations refer to a general—rather than an exclusive—trend.

<sup>3</sup>Nerve cell bodies in the brain.

<sup>4</sup>The fibres that connect nerve cell bodies to one another in the brain. They are important in neurological development and communication between different nerve cells and regions.

<sup>5</sup>These effects are described at length in section 3.2.2. How long it takes for them to develop is uncertain. The extent of the neurological change is correlated with the severity of the addiction, and is of degrees, and so addiction is not a categorical (black or white) diagnosis.

<sup>6</sup>Addictive drugs that are typically associated with social or public health problems: for example heroin, cocaine, alcohol, and tobacco.

from cells;<sup>7</sup>[181] cocaine inhibits the reuptake of dopamine; methamphetamine elicits both actions. Opioid drugs such as heroin bind to opioid receptors to release endogenous opioids, which indirectly increases mesolimbic dopamine levels.[182] In all cases, the net result is that dopaminergic reward pathways originating in the ventral tegmental area (VTA) and substantia nigra (SN) in the midbrain are activated. Activation occurs primarily in the mesolimbic pathway (which projects to the nucleus accumbens (NAc)),<sup>8</sup> but also the mesostriatal pathway (projecting into the dorsal striatum),<sup>9</sup> and mesocortical pathway (projecting into the frontal cortex).[180]

These pathways are all interconnected, and involved with many other structures, in both cortical and subcortical regions, that mediate processes such as memory, reward, salience attribution, motivation, craving, inhibitory control, decision-making, emotional regulation, mood, and interoception.[183] They also interact with other essential transmitter systems such as the EOS, which is involved in nociception, hedonic reward, and emotional attachment,[179] and the stress response.[184] Put together, all of the behavioral and psychological features that typify the addictive state<sup>10</sup>—the motivation to procure drugs, the excessive value attributed to them, impulsive behavior, tolerance, cue- and stress-triggered craving, relapse, denial and other cognitive and emotional aspects—can be mapped out in various neurobiological circuits.

It becomes clear throughout this chapter that these abnormalities are in part, but not exclusively, a consequence of prolonged drug use. Environmental factors, such as stress, also have important neurobiological impacts. Recognition of this has important ethical implications for tobacco control, since certain social factors should then be addressed in tobacco control policies along with tobacco use itself. Below, these neurobiological impacts are described in terms of circuits involved in reward, behavioral inhibition, interoception, attachment, and stress.

### 3.1.1 Dopaminergic reward and memory pathways

As mentioned above, virtually all prototypical drugs of abuse, in addiction *and* non-addiction, increase activity in the mesolimbic dopamine pathways that produce sensations of reward, motivation and desire. Naturally reinforcing activities<sup>11</sup> elevate dopamine levels in a similar way, but the pharmacological effects of addictive drugs are usually more potent. While food, for example, can increase

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<sup>7</sup>In addition to the direct release of dopamine, nicotine triggers the release of adrenaline, which gives it stimulant properties. Chronic cigarette smoking also reduces the activity of neurotransmitters monoamine oxidase (MAO)-A and MAO-B. This results in a net increase in adrenaline and dopamine, which augments the effects of nicotine. See [181].

<sup>8</sup>'NAc' is also referred to as the 'ventral striatum'.

<sup>9</sup>'Dorsal striatum' is also referred to as the 'caudate putamen' (CP).

<sup>10</sup>Some of these features were described in section 2.1.1 in reference to clinical diagnostic criteria for addiction: most notably craving and behavioral signs of cognitive dissonance.

<sup>11</sup>Such as eating palatable food, exercise, or social bonding.

dopamine levels in this pathway up to 50%, methamphetamine can increase them by 1200%.<sup>[185]</sup> The mode of administration is also important: the faster a drug absorbs and enters into the brain, the more reinforcing (and addictive) it is. This is an important point for tobacco, because nicotine from a cigarette is absorbed into the brain within seconds and produces high drug concentrations comparable to those administered intravenously. Thus cigarettes are more addictive in this sense than other forms of nicotine that are delivered more slowly (e.g. nicotine patches), or other drugs not administered intravenously or by inhalation (e.g. alcohol).<sup>12</sup><sup>[186]</sup>

In addiction, dopaminergic pathways exhibit pronounced shifts in the prediction of rewards, the incentive value assigned to reinforcers, and the association of learned cues to specific rewards that persist for years after abstinence.<sup>[183]</sup> These characteristics have been observed in virtually all drug addictions, as well as in non-drug addictions such as the consumption of excessive quantities of sugar,<sup>[187]</sup> or water;<sup>[188]</sup> over-eating;<sup>[189, 190]</sup> sex;<sup>[191]</sup> and compulsive patterns of behaviors such as kleptomania, gambling, shopping, and Internet use.<sup>[192]</sup> The events underlying these shifts seem to involve mesolimbic, mesostriatal, and mesocortical dopamine pathways, and have been explained in terms of two mechanisms: (1) physical tolerance, and (2) the conditioning of neutral stimuli into drug-related cues.

### **Physical tolerance mechanisms**

When neurochemical pathways in the brain are subjected to abnormal, sustained levels of excitation, they readapt their activation levels through a number of homeostatic mechanisms to produce a state of physical tolerance. Tolerance mechanisms are drug-specific and can occur through different pathways.<sup>13</sup> In addictions more generally, there are also adaptations in dopaminergic pathways that are associated with behavioral changes. In drug-addicted individuals, consistent observations are that the availability<sup>[193]</sup> and numbers<sup>[194]</sup> of their dopamine receptors are lower, which renders them less physically responsive to the same quantity of their drug of choice.<sup>[195]</sup> This can result in compensatory behavior, in which individuals who have lost their motivation for everyday activities resort to drug use to maintain an acceptable dopamine baseline level.<sup>[194]</sup> This effect has been demonstrated in mice with low dopamine receptor levels, that were trained to drink alcohol: when their receptor levels were

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<sup>12</sup>This is an important point when considering slippery slope arguments: the idea that a regulation on tobacco will justify the regulation of other unhealthy products, such as alcohol and sugar, in a similar way. However, the point made here indicates that cigarettes are—by design—far more addictive than any other legal substance, and so regulations on other unhealthy products are not justified along the same reasoning. See section 5.2 for further discussion.

<sup>13</sup>In the case of nicotine, NACHR becomes desensitized to the effects of nicotine. During periods of abstinence, the desensitized NACHR become responsive again, which triggers cravings and withdrawal symptoms; these symptoms are alleviated during smoking when nicotine binds these receptors. See <sup>[181]</sup>.

replenished through infusions (directly into the NAc), they drank less; when the receptors were again lost to natural attrition, their drinking increased.[196]

The mouse experiment demonstrates that having a low level of dopamine receptors can incite higher levels of drug consumption. For humans, the implication is that those with low dopamine baseline levels are less likely to respond to natural reinforcers, and more likely to show addictive behavioral patterns. This view supports a self-medication hypothesis of addiction.<sup>14</sup> Prolonged drug use can trigger this state. However, low dopamine receptor levels may also be pre-existent before the initiation of drug use, predisposing the individual to addiction.<sup>15</sup> Protracted drug use in such individuals is likely to create a vicious circle in which the drug of choice, while giving some temporary relief, in the long term contributes towards the mental states against which the individual is self-medicating in the first place.

What does this mean for addicted smokers? Nicotine is known to produce reinforcing effects including a mild euphoria, reduced stress and anxiety, and increased energy. These effects are associated with a nicotine-induced increase in dopamine and adrenaline levels. However, these benefits occur only during nicotine intoxication; when the effects of nicotine wear off—typically within two hours—physical tolerance mechanisms contribute to a more unmotivated, dysphoric state of mind, often characterized by cravings and withdrawal symptoms.[197] In other words, smoking does not sustainably increase one’s mental wellbeing; it can only give a transient, subjective sense of pleasure. This explains, to some extent, why smokers tend to describe their smoking as pleasurable, despite the detrimental effects it has on their overall wellbeing.

## Cue conditioning

Upon prolonged drug use, there are also changes in dopaminergic pathways that convert otherwise neutral stimuli into potent drug-related cues. The cue-conditioning process involves prefrontal cortical brain regions that assign an excessive salience to drugs (see section 3.1.2); this activates the amygdala upon exposure to relevant cues. In the amygdala, which directly innervates the NAc, ‘hot’<sup>16</sup> memories are formed. They tend to shift attentional processes towards emotionally salient stimuli, which explains why drug-addicted individuals often spend a lot of time thinking about or procuring drugs, especially

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<sup>14</sup>The self-medication hypothesis of addiction is described and critiqued at length in section 5.1.3. In general, it describes addictive behaviors as coping mechanisms against dysphoric, unmotivated states of mind. These may be partly brought on by a low dopamine baseline level.

<sup>15</sup>The mechanisms behind this, and relevant implications, are described in section 3.2.

<sup>16</sup>‘Hot’ does not refer to temperature, but is a standard term in affective neurobiology which refers to neuroplastic processes related to affect/emotions, impulsive behaviors, lust, and cue-triggered behaviors. ‘Hot’ is used interchangeably with ‘affective’ or ‘affect-driven’.

upon exposure to a relevant cue (e.g. a smell or place they associate with drug use).[198] Cue exposure alone can increase dopamine firing in midbrain and prefrontal regions, which corresponds to craving; as soon as the drug is taken, craving is alleviated, and firing decreases.[199] As a result, cue exposure alone is often sufficient to produce relapse.[200, 201] What this means in the context of tobacco is that tobacco-related cues—such as tobacco advertising, promotions, and sponsorship (TAPS) or watching other people smoke—can trigger intense cravings and relapse, and can significantly undermine the ability of tobacco-addicted individuals to avoid using tobacco.<sup>17</sup>

Furthermore, there is a neuroanatomical dissociation between the processing of conscious and unconscious information; the latter which primarily activates the amygdala.[202] The unconscious activation of this affective pathway is observed, for example, in cocaine-addicted individuals exposed to subliminal cocaine cues: upon exposure, they experience cravings and activation in the orbitofrontal cortex (OFC),<sup>18</sup> limbic system, and striatum.[203] It is thought that this pathway constitutes hot neurological pathways that relay cues detected by the OFC to the amygdala, where they are conveyed as the conscious experience of affect, rather than thought. Cues that trigger these affects can be so subtle that they are not consciously registered.<sup>19</sup> Affective neuroplasticities can run independently of cognitive systems. This may explain in part why addicted individuals often describe their addiction as a ‘split’ between emotional drives, and rational, inhibitory thoughts: having an insatiable desire to take a drug, despite knowing how harmful it is.<sup>20</sup>

Declarative ‘cool’<sup>21</sup> memories are processed in the hippocampus. In general, it is thought that cool processes, mediated by the prefrontal cortex (PFC), work by vetoing hot, subcortical processes (see section 3.1.2). Similarly, cool neuroplasticities in the hippocampus are thought to override hot neuroplasticities in the amygdala. In addiction, however, the hot system becomes less responsive to information provided by the cool system, which further favours an attentional shift towards cue-triggered, affect-driven behavior.[204] Thus, emotions are an important component of addictive decision-making, since emotional processes become less likely to respond to rational thoughts. Resisting drug use may also be more difficult in times of stress, since hot processes are also important in the stress response, which limits hippocampal growth (see section 3.1.5), particularly in early childhood, when hippocampal de-

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<sup>17</sup>This is arguably one reason why smokefree laws in recreational settings contribute to increased cessation success. It was mentioned in section 2.2.1, for example, that smokefree laws in Ireland prevented relapse in 88% ex-smokers.

<sup>18</sup>The OFC is a part of the PFC that has important roles in producing cravings through the detection of drug-related cues, behavioral control, and interpreting the emotional salience of situations. More detail in section 3.1.2.

<sup>19</sup>Further explanation in sections 3.1.2 and 3.2.2.

<sup>20</sup>This ‘split’ is also reflected in Frankfurt’s hierarchy of desires described in section 2.3.1, and the behavioral criteria used to diagnose addictions described in section 2.1.1.

<sup>21</sup>‘Cool’ does not refer to temperature but to neuroplastic processes that are affectively neutral, and related to cognitive, rational function and the inhibition of emotional and impulsive behaviors. They often serve to veto ‘hot’ processes.

velopment is especially sensitive to environmental stressors (see section 3.2.2). For tobacco-addicted individuals, the implication is that it is difficult to simply exercise a rational choice to not smoke; especially when exposed to tobacco-related cues or stress.

## Habit formation

Habit formation is another neuroplastic process, mediated in the dopaminergic mesostriatal pathway which projects into the dorsal striatum. When neurological pathways that enforce a frequently repeated behavior are formed in this structure, the behavior gradually becomes automated—for example, walking—and to change it requires significant conscious effort.[194] Thus, habitual learning is especially relevant to addictive behaviors enforced very frequently. In the case of smoking, an average smoker who smokes 20 cigarettes per day and takes 12 puffs per cigarette is repeating the reinforcement process 240 times per day. An addiction to cigarettes can then become deeply ingrained into an individual’s routine as a ‘habit’, and this routine may further reinforce the addiction through mechanisms in the dorsal striatum.[205]

This particular mechanism raises a number of questions regarding the nature of addictive decision-making, since addictive behavior is then said to be automated and non-voluntary, or a constant struggle between an unconscious ‘habit’ and the conscious resistance to that habit. While a desire for drug-related reward<sup>22</sup> no doubt plays an important role in addiction, it has been argued that addictive decisions are—to some extent—irrational,<sup>23</sup> and that this irrationality is characterized by neuroplastic processes in the mesostriatal pathway that enforce habitual drives.<sup>24</sup> This may imply that addictive behaviors are not in line with the individual’s own motives, reasons, and values and therefore non-autonomous; however, it may be possible to overcome these habitual drives if addicted individuals are able to train their conscious recognition of them, and shift their attentional biases elsewhere (see section 3.1.3).

### 3.1.2 Inhibitory processes in the frontal cortex

The PFC is the most highly evolved cortical structure in the human brain. It consists of two major subdivisions: the OFC and dorsolateral PFC (dlPFC). Closely connected to these is another cortical

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<sup>22</sup>Mediated through the NAc in the dopaminergic mesolimbic pathway—see section 3.1.1.

<sup>23</sup>There is a vast literature in addiction that disputes whether addictive decisions are ‘rational’ (in line with what the individual really wants) or ‘irrational’ (in conflict with what the individual really wants). This thesis will not go too far into this literature—refer to [206].

<sup>24</sup>Schroeder, for example, has argued that: “desires no doubt play some role in what [people with addictions] do. But insofar as [they] are moved by their addictions, they are moved by forces other than desires. And so they are moved irrationally” (pg.394, [207]).

area, the anterior cingulate cortex (ACC). The PFC is often described as the executive control centre of the brain: where long-term decisions are made, alternatives are considered, and behaviors considered socially inappropriate are inhibited. It does this by vetoing subcortical processes that would otherwise endorse the inappropriate action.[208] Thus, the PFC is often considered as the seat of ‘free won’t’: the structure that provides one the ability to exert free-willed, inhibitory control over one’s actions.[209]

### **Communication between the prefrontal cortex and the striatum**

The PFC communicates with dopaminergic networks in the striatum. A consistent finding in the brains of addicted individuals is that dopamine receptor availability is reduced in this network, even months after abstinence. This is associated with reduced activity in various frontal regions including the dlPFC, OFC, and ACC.[183] As mentioned at the start of section 3.1, in addiction, the frontal cortex typically has a lower volume of grey and white matter. This, in turn, is thought to reduce the individual’s capacity to exercise functions mediated by prefrontal regions, including goal-directed behaviors, inhibition of impulsive or socially inappropriate behaviors, and cognitive decision-making.<sup>25</sup>

The extent to which these processes are impaired is also a predictor of the severity of the addiction; this is also the case with nicotine addiction.[210] Thus a common assumption, particularly in brain disease theories of addiction, is that the lack of behavioral control observed in many addictions is a result of prefrontal change, and that these changes are *caused* by prolonged drug use.[29] However, prefrontal changes, especially to the OFC, are also triggered by adverse socioaffective experiences during critical developmental periods. The implication of this is that behavioral (and neurobiological) dysregulations are not necessarily a *result* of drug-taking; these changes could be pre-existent in individuals exposed to stress or other hardships during critical windows of neurodevelopment, or as a result of an inherited predisposition.<sup>26</sup>

### **The right orbitofrontal cortex**

The right side of the OFC is an important prefrontal area for integrating information about the environment with internal affect. It is a dense region of opioid, dopaminergic, and noradrenergic innervations, intimately connected to subcortical regions (amygdala, hypothalamus, and VTA) and sensory inputs (touch, smell, sound, vision, and taste). The OFC evaluates the emotional significance of stimuli, and uses this information to inhibit or permit the activation of limbic regions, create affective neuroplastic changes in the amygdala, and divert attention to emotionally salient situations. Thus, it

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<sup>25</sup>However, it is uncertain whether these changes are a cause or consequence of prolonged drug use.

<sup>26</sup>These points will be discussed further, in reference to neurobiological evidence, in section 3.2.



functions as an emotional detector, and is activated when a situation is interpreted as ‘wrong’.<sup>27</sup>[211] As mentioned in section 3.1.1, cues detected by the OFC are not necessarily consciously registered, and the information it registers is often experienced as affect rather than thought.<sup>28</sup>

This function is important for the development of newborn babies who are not yet able to cognitively register their environment. For example, the OFC of a baby can detect emotional arousal of its mother through her pupil dilations, which—unconsciously—trigger a heightened state of emotional wellbeing in the infant.<sup>29</sup>[212] Thus, the OFC plays an important role in emotional development, and in the correct interpretation of the emotional salience of situations. In other words, the OFC is an important structure for relational aspects of human life, especially emotional wellbeing.

In addiction, there are pronounced changes in OFC function. During detoxification, it is hypoactivated, but during cravings it is hypermetabolic; this hyperactivation corresponds to the intensity of the subjective cravings.[213] In other words, activation of the OFC relays a message to the limbic system that something is ‘wrong’, and that the individual must correct the error by procuring drugs; this is subjectively felt as craving. Activity in the OFC also increases in other compulsive disorders, such as Obsessive Compulsive Disorder (OCD),<sup>30</sup> and so it is thought that the OFC mediates cravings independent of reward. This may explain in part why drug-seeking patterns tend to continue, even when the drug is no longer rewarding.[214] Hence there is a point—especially in severe addictions—at which the drug reduces overall wellbeing *and* loses its potency to produce a pleasurable effect.<sup>31</sup> Hyperactivation of the OFC also occurs during intoxication, but only in addicted subjects;[215] thus, the OFC confers special functions specific to the addictive state. These are most likely related to the excessive emotional salience that the OFC has attributed to the activity.[216]

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<sup>27</sup>‘Wrong’ in the sense of unexpected, anomalous, or threatening. For example, when an individual is hungry, the OFC sends a ‘wrong’ signal—often upon exposure to a food-related cue, such as the smell of food—to alert the brain, which in turn sends a hunger signal in order to encourage the individual to procure food.

<sup>28</sup>In other words, the individual experiences a ‘feeling’ rather than a conscious thought. For example, a decision to eat could be made two ways: noting that it is time to eat (conscious thought), or *feeling* a sudden urge to eat upon exposure to the smell of food, even though it is not yet time to eat (affect).

<sup>29</sup>This point is important in the discussion on addiction susceptibility, because poor interaction between the mother (or primary caregiver) and infant can, via mechanisms mediated through the OFC, affect neurobiological development in a way that predisposes the infant to developing addictions in later life. A healthy development of the OFC, particularly in early childhood, is therefore essential for healthy emotional development (and resistance to developing addictions). A more detailed discussion, in reference to evidence from neurodevelopmental biology, is provided in section 3.2.2.

<sup>30</sup>OCD and addiction are similar in that they both exhibit compulsive behaviors, along with pronounced changes in the dopaminergic mesostriatal pathway. In both disorders, the individual may get a sense of relief when the craving or compulsion is satisfied. However, in OCD, the individual does not obtain a positive reward or ‘high’ from the activity.

<sup>31</sup>This is another point supporting the idea that the ‘pleasure’ associated with addictive activities does not contribute to overall wellbeing.

## Implications for addictive decision-making

What do these points illustrate about the nature of addictive decision-making? A breakdown in communication between the PFC and the striatum results in emotional drives (for example conditioned cues such as those described in section 3.1.1) becoming more internalized, intensified, and pushed beyond conscious awareness. Meanwhile, rational, inhibitory drives elicited by the PFC become more difficult to exercise. The ability to resist drug use is therefore undermined in a bidirectional manner. This effect is likely to be intensified further upon exposure to drug-related cues, as the OFC assigns an excessive emotional salience to them. This results in a stronger attentional bias towards drug-related cues, and—in some cases—a craving for drugs even when drug use is no longer rewarding. In other words, in addiction, the capacity for abstinence is generally undermined through multiple mechanisms that are involved in emotional and behavioral regulation.

In some brain disease theories of addiction, this information is interpreted as implying that addicted individuals have lost their autonomy.<sup>32</sup> This interpretation can have important ethical implications. It has been argued, for example, that people with addictions are not capable of giving informed consent to participate in studies related to their addiction,<sup>[23]</sup> or that the coercive treatment of addictions ‘restores’ lost autonomy.<sup>[30]</sup> However, the reality is more complex: the prefrontal changes described in this section are not *necessarily* and solely the result of prolonged drug use,<sup>33</sup> and they are of degrees. Thus, the inhibition of addictive behaviors is difficult but not necessarily *impossible*, and in most cases this ability will vary depending on the severity of the addiction. This is an important point when considering the nature of autonomy in addiction: if autonomy is undermined to some degree but not completely negated, states may be justified in providing autonomy-promoting conditions, though coercive interventions would be considered hard paternalistic and therefore unethical. One question, then, is whether people with even the most severe addictions still retain some ability to resist drug use.

### 3.1.3 Interoceptive and attentive processes

Interoceptive<sup>34</sup> and attentive processes are relevant to the discussion on autonomy in addiction. As discussed above (in sections 3.1.1 and 3.1.2), neurobiological processes in addiction—such as habitual and cue-triggered drives—are often subconscious or experienced as affect rather than conscious thoughts.

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<sup>32</sup>‘Autonomy’ here follows the description in section 2.3.1: action in accord with one’s motives, reasons, and values. In the context of addiction, it refers to the ability to resist drug use if this is what the agent wants.

<sup>33</sup>They may also be triggered by events prior to the initiation of drug use—see section 3.2.

<sup>34</sup>Recognition of one’s own internal mental states such as emotions, desires, and mental representations.

These drives can become internalized as values or emotional preferences, in a non-autonomous process that was introduced in section 2.3.1 as ‘internalized preference formation’.[142] Becoming aware of these internalized preferences—through interoceptive and attentive processes—is an important step in overcoming an addiction, because it gives addicted individuals an enhanced capacity to shift their attention elsewhere, recognize drug-related scenarios that should be avoided, or exercise a conscious resistance to cravings. This last point draws on Frankfurt’s theory of hierarchical desires: enhancing one’s capacity to resist first-order desires by training the capacity to act in accord with one’s second-order rationalizations. Self-control is another important process that flows from these. This section explores whether this process is possible in terms of the relevant neurobiological mechanisms.

### **Interoception**

Interoceptive ability is diminished in many addictions. Only a small percentage of those who require substance abuse treatment report a perceived need for therapy;[217] many others who do undergo therapy go through phases of ‘denial’. While relatively little is known on the neurobiological mechanisms underlying interoception, it involves parts of the PFC, ACC, parietal cortex, and insula. In addictions, damage to the insula is thought to reduce interoceptive and emotional awareness, while damage to parts of the PFC and ACC has been associated with a lack of awareness about one’s own social incompetence.[218]

Interoceptive ability may also be compromised by the neurological shifts typically observed in addictions: neuroplastic projections into the dorsal striatum that drive habitual behaviors, and cue conditioning processes in the amygdala (see section 3.1.1). Automatized behaviors are rarely consciously registered, so overcoming them requires a high level of self-awareness. Similarly, the recognition of cue-conditioned impulses requires significant interoceptive skills, as well as willful efforts to gain control over them. It logically follows that high levels of self-awareness and self-directed mental effort (‘willpower’) are needed in individuals whose neurochemistry is more strongly directed towards habitual or cue-directed behavior; and so overcoming an addiction requires strong development of these skills as a counter-force to one’s own neurological biases.[219]

### **Neurobehavioral therapy**

In overcoming compulsive disorders such as addiction and OCD,<sup>35</sup> identification with ‘neurological counter-forces’—self-awareness and willpower—and using them over a prolonged period seems to

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<sup>35</sup>The similarities and differences between these two disorders are highlighted in section 3.1.2.

weaken the neuroplastic changes that typify the disorder, thus reversing ‘brain damage’ and restoring lost autonomy. A study in OCD is illustrative.[220] OCD, like addiction, is characterized by compulsive behaviors in which the OFC and basal ganglia<sup>36</sup>—among other regions—are hyperactivated. Positron emission tomography (PET) scans of 18 patients with moderate to severe OCD, free of medications, were done before and after a course in mindfulness training. During this training, they were shown PET scans of their brains, and told that their compulsions were a result of intrusive neurological ‘faults’. They were taught how to overcome these faults by becoming more aware of them, willfully resisting them, and focusing their attention elsewhere. It was thought that this could weaken the neuroplasticities contributing to OCD, and enforce ‘healthy circuitry’ in other brain regions.

Results showed that 12 of the 18 patients had significantly improved, and their improvements corresponded to reduced metabolic activity in the basal ganglia, OFC, and right thalamus. In other words, their self-directed mental efforts had changed the circuitry of their brains in a top-down manner, in structures that would otherwise have triggered compulsive, uncontrolled behavior.[220] Comparable effects have been observed in similar studies on stroke, Tourette’s syndrome,[211] spider phobia,[221] depression[222], stress, schizophrenia, anxiety,[223] and repeat studies with OCD.[224] Similarly, when addicted individuals succeed in conscious efforts to control their cravings, this also reduces activity in the OFC.[225] This has led to a new therapeutic approach termed ‘neurobehavioral therapy’, in which interventions aim to address the underlying neurobiological mechanisms implicated in the disorder, but through behavioral methods such as cognitive behavioral therapy and awareness training.[222]

### **The capacity for top-down neuroplastic change**

What does this mean for addicted individuals? Self-sustained efforts and awareness in countering an addiction could direct neuroplastic changes that support non-addictive behavior, such as the prefrontal inhibition of processes in the amygdala. Self-directed neuroplasticity of this sort has been termed “top-down plasticity”, [226] as it originates in one’s high-order functions and affects neurophysical structure.<sup>37</sup> The implication is that, even in the most severe addictions, the individual cannot be considered non-autonomous on the basis that addiction has neurobiological manifestations, since these can also change in response to the individual’s own efforts. However, it should be emphasized that these efforts can be extremely difficult to exercise, especially in severe cases. This means that it

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<sup>36</sup>Also referred to as the dorsal striatum, the region that produces habitual, automated behaviors such as those described in section 3.1.1.

<sup>37</sup>This is different from “bottom-up plasticity”, in which neurological structures are altered in response to changes in the level of sensory input.

is important to bring out individuals' abilities to overcome their addictions through top-down action. In the clinical context, this may entail making better use of therapies that make people more adept at understanding and controlling their addictions.

Evidence presented in section 2.1.1 also indicates that certain social conditions can present significant challenges to forming these top-down plasticities. For example, those who are constantly exposed to drug-related cues would need to make constant efforts to overcome cravings; those who can easily avoid these cues would only have to exercise these efforts occasionally.<sup>38</sup> This idea has been discussed in the ego depletion hypothesis of addiction: the theory that individuals' self-control—"ego"—resources are depletable, and it is therefore necessary to provide environmental conditions that maximize these resources.[227]

In the context of tobacco, 'ego-depleting' environments may include those in which addicted smokers are constantly exposed to tobacco-related cues, such as TAPS or watching others smoke in public. Restrictions on these—such as bans on TAPS and smokefree laws—are justified as they enhance the ability of addicted smokers to resist smoking. The tobacco industry (TI), which is primarily responsible for creating social environments abundant with tobacco-related cues,<sup>39</sup> should not be absolved for its marketing activities on the basis that addicted smokers—to some extent—retain an ability to avoid using tobacco. On the contrary, a 'free choice' to smoke or not smoke is significantly undermined by the social conditions that the TI itself provides as well tobacco use itself,<sup>40</sup> and so the TI's argument that smoking is a freely chosen activity is still—according to the evidence presented here—inaccurate.

### 3.1.4 Euphoria and affect: The endorphin-opioid system

The EOS has important communications with the dopaminergic reward system, is located throughout similar brain regions (VTA, NAc, PFC, amygdala) and is implicated in addiction. Usually when an addictive drug is taken, or when a rewarding activity is carried out (e.g. sex or exercise), the EOS elicits feelings of hedonic reward, or euphoria, through the release of  $\beta$ -endorphin peptides that bind to opioid receptors in the brain.[228] This euphoria can be blocked by disabling  $\mu$ -opioid receptors (the receptor subtype most implicated in addiction) through a  $\mu$ -opioid antagonist such as naltrexone.<sup>41</sup> Thus, activation of the EOS is necessary and sufficient for producing hedonic reward, in both drug- and non-drug-related behaviors. The EOS also has important functions in pain relief and attachment.

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<sup>38</sup>In later sections, the effects of stress and social support are emphasized; these are also important factors that can enhance or undermine an individual's ability to resist drug use—see the discussions in sections 3.1.5 and 3.2.

<sup>39</sup>A discussion on the marketing activities of the TI is provided in sections 4.3 and 4.4.

<sup>40</sup>Along with these, oppressive and stressful social conditions are also relevant. These conditions are identified and discussed further in section 3.2 and chapter 4.

<sup>41</sup>Naltrexone is often used in the treatment of alcoholism and opioid addiction.

Physical pain is registered in the thalamus, but its subjective impact is experienced in the ACC. Emotional pain is neurologically experienced in the same way: the ACC is activated when a subject feels socially isolated,[229] or sad, and this impact is reduced by activation of the EOS in the ACC.[230]

### **Role of the endorphin–opioid system in early attachment**

The ability of the EOS to reduce the subjective impact of emotional and physical pain is crucial to infants. When an infant is in potential danger (e.g. physical pain, or separated from its parent), it experiences pain as a warning signal, and cries to bring the parent back. When the parent soothes the infant, the EOS is activated, which ameliorates the dysphoria and produces a feeling of safety and attachment.[231] The EOS is also counter–regulatory to the stress response (see section 3.1.5), which further soothes and relaxes the child.[232]

Thus, a proper functioning of the EOS is crucial for secure attachment,<sup>42</sup> and the development of efficient coping mechanisms against emotional pain and stress. If the EOS is impaired, infants lose the motivation to warn their parent when they are in danger. This is observed, for example, in mice lacking the  $\mu$ -opioid receptor.[233] In humans, poorly attached infants tend to tune out to painful surroundings or employ their own, often ineffective, self–soothing mechanisms such as sucking their thumb.[185] Also, since the EOS plays an important role in controlling the stress response, impaired EOS function—triggered by a poor early attachment experience—tends to affect an individual’s ability to cope with stressful situations later in life (see section 3.2.2).

Similar to infants’ thumb–sucking, drug use in later life has been described by the self–medication hypothesis of addiction as an inefficient, temporary coping mechanism against emotionally painful or stressful experiences. A low opioid receptor level, which incites a dysphoric state, may trigger compensatory drug use;<sup>43</sup> addictive drugs such as nicotine then temporarily put the user into a euphoric, soothed state by activating the EOS. A low number or availability of opioid receptors can be a result of a poor early attachment experience or stress (see section 3.2.2), as well as prolonged drug use. Hence there are important interconnections between emotional pain, stress, and addiction; especially if the emotional pain or stress occurs in early life.<sup>44</sup>

In cases of prolonged drug use, a vicious cycle is created which further throws the EOS out of balance:  $\mu$ -opioid receptors are internalized and desensitized, and homeostatic counter–mechanisms

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<sup>42</sup>And vice versa; see section 3.2.2.

<sup>43</sup>This was described in the context of dopamine in section 3.1.1: individuals experiencing an unmotivated, dysphoric state of mind, in part triggered by a low dopamine receptor level, may turn to drug–seeking behavior as compensation.

<sup>44</sup>Therefore it is important to discuss the development of the EOS in early childhood, because this is when a predisposition to addiction through these mechanisms is most likely to develop. For further discussion, see 3.2.2.

(through the dynorphin peptide which binds to  $\kappa$ -opioid receptors) are upregulated.[234] These effects are related to increased craving, and are, to some extent, reversed when the drug user goes into abstinence.[235] Thus, the overall responsivity of the EOS is further reduced through drug use, which in turn contributes to cravings, dysphoria, and stress between periods of intoxication.[179] This may explain in part why individuals addicted to drugs—even drugs such as nicotine, that are legal, socially accepted and presumably rewarding—generally experience higher levels of stress and depression than non-addicted individuals.[236]

### **Implications in the context of tobacco**

What does this mean for addicted smokers? First, emotional pain and stress play an important role in addictive decision making. The implication is that, during times of pain and stress, non-addicted smokers are more likely to develop an addiction, or addictions can become more severe. Emotional hardship, then, is an important trigger for relapse and the onset of tobacco addiction, and social conditions that propagate pain and stress play an important role in this process (further discussion in section 3.2). Second, prolonged smoking reduces overall activity of the EOS, which leads to an overall increase in a smoker's stress levels and therefore a reduced level of mental wellbeing (except during periods of nicotine intoxication). Thus, although smoking can give a transient *sense* of wellbeing, it actually reduces overall wellbeing outside periods of intoxication and contributes to the dysphoric states the smoker is trying to avoid in the first place. In other words, addictive smoking, though perceived as pleasurable, is actually—neurobiologically speaking—detrimental to mental wellbeing through the actions of nicotine on dopaminergic pathways and the EOS. In other words, smoking is not a suitable coping mechanisms against emotional pain or stress; if anything, addictive smoking makes these issues worse.

#### **3.1.5 Stress: The hypothalamic–pituitary–adrenal axis**

As hinted in the above, there is also an important, well-established neurobiological relationship between stress and addiction.

##### **The stress response**

Emotional stress triggers the release of adrenaline and noradrenaline through the autonomic nervous system (ANS) for an acute 'fight or flight' response, and a slower, more protracted response through activation of the hypothalamic–pituitary–adrenal (HPA) axis. The hypothalamus releases corticotropin

releasing hormone (CRH) and arginine vasopressin (AVP), which trigger the release of adrenocorticotrophic hormone (ACTH) from the pituitary, which triggers the release of glucocorticoids from the adrenal gland. Glucocorticoids affect many bodily functions such as the immune system, metabolism, the ANS, and the brain in preparation for ‘fight or flight’. In the brain, they bind to glucocorticoid receptors (GR) and mineralocorticoid receptors (MR). Both receptors also act as genetic transcription factors, so their activation can have long-lasting repercussions on the stress response and related systems,[184] and may be influenced by epigenetic processes (see section 3.2.3).

Given the protracted, widespread effects of the stress response, fine control of the HPA axis is essential. Negative feedback loops exist through GR/MR in the hippocampus and frontal cortex. The OFC, which is an important brain region in addictions (see section 3.1.2), is also able to inhibit the HPA axis through noradrenergic innervations to the hypothalamus, through a corticolimbic circuit that runs from the OFC to the lateral tegmental area.[237] As mentioned in section 3.1.4, the HPA axis also has important communications with the EOS:  $\beta$ -endorphin peptides inhibit the HPA axis through  $\mu$ -opioid receptors, while self-inhibitory EOS mechanisms (dynorphin which binds to  $\kappa$ -opioid receptors) elevate HPA activity. Chronic stress exposure upregulates these inhibitory mechanisms, which in turn reduces the overall activity of the EOS.[238] Morphine, a  $\mu$ -opioid agonist, blunts activity of the HPA axis in times of stress, but not in the absence of stress; thus, the EOS seems to exert a feedback inhibitory function over the HPA axis only when it has already been activated by stressors.[239] The implication is that addictive drugs such as nicotine, which act on the EOS, are likely to have a more potent effect in times of stress.<sup>45</sup>

### **The effects of stress exposure over the life-course**

Stressful experiences, from the prenatal to the adult life, have significant impacts on stress-inhibitory mechanisms, which can throw the system off balance to favour a persistent shift towards activation of the HPA axis. Neurobiological details of this shift, and evidence of stress as the causal basis, are well-characterized in animal models. In humans, due to ethical limitations on research protocols most of the data is associative. Put together, however, evidence strongly suggests that early exposures to stress can have long-lasting impacts on an individual’s reactivity to stress well into adulthood,[184] and that the underlying neurological processes can affect various neurobiological circuits and structures implicated in addiction.

Stress exposure starts *in utero*. When rat mothers are exposed to stress, more glucocorticoids

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<sup>45</sup>In the case of nicotine, there is evidence that smoking (temporarily) ameliorates stress, and that this is a commonly cited reason for smoking, relapsing, or not quitting—see [197].



pass through the placenta to reach the fetus. Consequently, fetal HPA axis activity increases, which slows down brain development,[240] reduces the numbers of GR/MR in the hippocampus,[241] shunts developments of the OFC and ACC,[242] and increases the levels of the stress hormone CRH in the amygdala.[243] In later life, these rats show learning impairments linked to limited growth of the hippocampus, and increased anxious or depressive behaviors linked to stress-related effects on the amygdala. They also demonstrate an enhanced sensitivity to drugs of abuse, through the close interactions of glucocorticoids with the EOS and dopaminergic reward system.[244] Maternal anxiety, depression, stress, and the synthetic equivalent of stress—glucocorticoid treatment—seem to affect human babies in a similar way: activity of the HPA axis is increased, and neural and cognitive developments are slower.[245] Thus, exposure to stress in the prenatal period may affect a number of brain regions implicated in addiction (amygdala, OFC, ACC) in ways that can predispose an individual to addictive behaviors.

In infancy, the hippocampus undergoes a critical growth period which makes it particularly stress-sensitive during this time.<sup>46</sup> Stress-induced damage to the hippocampus may impair its capability to provide GR/MR-mediated feedback inhibition on the HPA axis, which in turn reduces an individual's capacity to cope with environmental stressors. Moreover, it was mentioned in section 3.1.1 that the hippocampus is important for the processing of affectively neutral, 'cool' information, which can veto affect-driven, 'hot' processes in the amygdala. Chronic stress, while reducing hippocampal capacity, also enlarges the amygdala;[247] together, this further favours an attentional shift towards cue-triggered, affect-driven processes mediated by the amygdala, and the impulsive behaviors often observed in addictions.

The PFC, similarly to the hippocampus, vetoes limbic affect-driven processes (see section 3.1.2), and inhibits the HPA axis through GR/MR-mediated feedback inhibition. It is also stress-sensitive, particularly during adolescence when it undergoes a rapid growth spurt.<sup>47</sup> Hence, similarly to the hippocampus, its vulnerability to stress is heightened during a critical developmental period.<sup>48</sup> Stress affects cortical areas in a number of ways. Stress stunts developments of the OFC and ACC, which reduces their capacity to inhibit the HPA axis or mediate pain relief through the EOS.[184] Stress also reduces the numbers of opioid receptors in the PFC. Since the EOS is inhibitory on the HPA axis, impairment of its function further drives the stress response while also limiting other crucial EOS-

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<sup>46</sup>In a study on women with depression, for example, those who had been exposed to early childhood trauma had a lower hippocampal volume than those who had not—see [246].

<sup>47</sup>Further discussion on neurobiological development in adolescence, and how this affects one's susceptibility to addiction, is provided in section 3.2.4.

<sup>48</sup>Repeated sexual abuse, for example, is associated with a reduced hippocampal volume if abuse took place in early childhood, but with a reduced PFC volume if abuse took place in adolescence—see [248].

mediated functions such as pain relief, attachment, and euphoric reward.[232] Impaired EOS function, induced by stress, may also contribute to the dysphoric states that trigger drug use. Furthermore, it was mentioned in section 3.1.2 that impairment of prefrontal function is a predictor of the severity of drug use. Thus, stress-related disruptions of prefrontal development may predispose the individual to higher levels of drug use in later life, or a higher severity of addiction.

### **The relationship between stress and addiction**

There are potent, stress-sensitive neurobiological pathways that can affect an individual's reaction to addictive drugs throughout the life-course. This may explain why stress is such a common trigger for relapse into drug use.<sup>49</sup> It is also relevant in early childhood and in adolescence, when stress exposure may confer a predisposition to addiction.<sup>50</sup> Exposure to stress, or a low coping capacity against stress, can blunt the rewarding effects of a drug through neurobiological mechanisms that may in turn trigger a conversion from casual use to dependence or a higher daily consumption. The rewarding effects of nicotine, for example, are blunted by chronic stress.<sup>51</sup> For addicted smokers, this means that stress is an important trigger for tobacco addiction; yet, as explained in section 3.1.4, tobacco use in these cases actually makes this problem worse. The implication is that the factors that contribute to stress should be addressed in order to help prevent and treat tobacco addictions. This is especially relevant for young children and adolescents, and groups of people more affected by stressful circumstances.<sup>52</sup>

### **3.1.6 A summary of the brain in nicotine addiction**

Throughout this section, some important neurobiological features of addiction were highlighted that help to address some of the questions raised in chapter 2. They are reiterated and answered below, and will be returned to in the development of an ethical framework in chapter 5.

#### **Does addictive smoking provide any overall benefits?**

Evidence in sections 3.1.1 and 3.1.4 indicates that all activities perceived as rewarding, in both addiction and non-addiction, impact dopaminergic circuits and the EOS in ways that elicit a sense of

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<sup>49</sup>This is demonstrated as an association in humans—see [249]. The biological relationship has been observed in rat experiments: in rats trained to take cocaine, drug use initiation or relapse does not occur unless glucocorticoid (stress hormone) levels are above a certain threshold—see [250].

<sup>50</sup>This point is further discussed in sections 3.2.2 and 3.2.3 (early childhood) and section 3.2.4 (adolescents).

<sup>51</sup>One observed mechanism is through the upregulation of an enzyme (acetylcholine esterase-R) which breaks down nicotine in the striatum—see [251].

<sup>52</sup>These points are explored further in section 3.2 (in terms of the neurodevelopmental processes in early childhood and adolescence that can confer a susceptibility to addiction) and chapter 4 (in terms of the social processes that make some people more vulnerable to addiction).

reward, hedonic pleasure, and relaxation. On this level, during nicotine intoxication, smoking can provide these benefits. However, *in addiction* and outside intoxication, the levels of dopaminergic and opioid activation are decreased through homeostatic adaptations. Addictive nicotine use contributes to these adaptations, and so smoking actually contributes to the negative states of mind the smoker is (temporarily) trying to ameliorate. The result is a *transient sense* of pleasure or relaxation, which makes many smokers interpret their smoking as a source of pleasure or stress relief. In general, however, smoking has the opposite effect which in turn also contributes to dependence. In other words, addictive smoking does not provide an overall benefit to the mental wellbeing of smokers and is a counterproductive means to manage stress, dysphoria, and other negative states of mind.

### **Is addictive smoking freely chosen?**

In section 3.1.1, it was shown that, in addiction, there are neurobiological shifts towards cue-driven and habitual behaviors; the result is that exposure to tobacco and tobacco-related cues leads to cravings and cue-driven, habitual behavioral patterns that can be difficult to control. Since these are often not consciously registered, they can be non-autonomously internalized as a strong preference or value towards tobacco. Section 3.1.2 has also shown that, in addiction, the ability to inhibit these processes through the PFC is significantly reduced. Addiction also results in cognitive dissonance, characterized by a conflict between an emotional drive to smoke (mediated through the amygdala and the NAc) and rational, inhibitory thoughts (mediated through the PFC). This is also a conflict between first- and second-order desires, described in Frankfurt's hierarchy of desires.

Adapted into Frankfurt's theory, a first-order desire to smoke (reflected by processes in the amygdala and NAc) overwhelms a second-order desire to not smoke (processes mediated in the PFC). An addictive action, then, is not considered freely chosen because it is not in accord with the second-order desire.<sup>[143]</sup> In addiction it is difficult to act in accord with the second-order desire, because the first-order desire to smoke is often triggered by subconscious processes, and therefore more difficult to consciously control with second-order rationalizations. In clinical diagnostic criteria of addiction, this conflict is characterized by signs of behavioral dissonance.<sup>53</sup> It is also illustrated by the widespread sense of regret—an indicator of cognitive dissonance—among smokers for having started smoking. Conflict is also reflected by the fact that quit attempts among smokers are common, but usually unsuccessful (see section 2.1.1).

Put together, these neurobiological changes can make an addiction to tobacco extremely difficult

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<sup>53</sup>These were described in section 2.1.1; for example, unsuccessful attempts to quit or cut down, or continued use despite knowledge of the harms. Also refer to [22].

to overcome. In other words, nicotine addiction is not trivial and addictive smoking is not simply a ‘free choice’; it significantly impairs an individual’s ability to avoid or cease using tobacco.

### **To what extent is autonomy undermined in tobacco addiction?**

Addiction can make it *extremely difficult* to resist tobacco use. This may imply that having an addiction negates one’s autonomy in this context.<sup>54</sup> However, addiction does not make it *impossible* to resist tobacco use. It is important to make this distinction, because if having an addiction *negates* one’s autonomy, the ability to overcome the addiction using one’s own efforts would be considered non-existent. Autonomy may then be considered to be below a threshold at which more coercive means, such as coerced therapy, are ethically justified for the purpose of restoring one’s autonomy. However, if having an addiction does not negate one’s autonomy, individuals are still considered to have some ability to overcome their addictions using their own efforts. In this scenario, coerced therapy would be considered a violation of autonomy. However, less coercive interventions *that enhance the ability to resist tobacco use* may still be necessary.

As discussed in section 3.1.2, ‘addiction’ is not a black or white concept; the degree of neurobiological change correlates to the severity of the addiction, and this is in turn changeable and variable per individual. Moreover, section 3.1.3 has shown that neurobiological patterns that typify addiction—and other disorders—can to some extent be reversed through ‘top-down’ approaches such as neurobehavioral therapy. Thus, it would be inaccurate to conclude that even the most severely addicted smokers are completely unable to resist smoking (and therefore non-autonomous). However, since the neurobiological effects of addiction make smoking more difficult to avoid, it can be concluded that the autonomy of an addicted smoker—in regards to tobacco use—is diminished somewhat; the degree to which correlates to the severity of the addiction.

There are several implications to this argument. If smokers are still considered autonomous to some extent, the TI may argue that smokers themselves are morally culpable for their actions while the TI is not. However, this argument would be inaccurate, because the neurobiological effects of nicotine clearly undermine the autonomy of most smokers to a significant degree. The capacity for resisting tobacco is further diminished by the TI’s marketing activities, particularly their widespread implantation of tobacco-related cues.<sup>55</sup> Therefore it is necessary to protect addicted smokers not just from tobacco use itself, but also from tobacco-related cues and other autonomy-undermining social

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<sup>54</sup>As in, the mental ability to resist tobacco use.

<sup>55</sup>As well as the TI’s attempts to misinform, target certain groups for smoking initiation, and deny the harms of smoking; see discussion in chapter 4.

factors.<sup>56</sup>

### **What is the nature of addictive decision-making?**

Evidence in sections 3.1.1 and 3.1.4 indicates that, in addiction, there is a strong bias towards affect-driven decisions. Consequently, emotional factors such as values, desires, and relationships are an important aspect of addictive decision-making. This lends support to a relational model of autonomy in addiction, in which social conditions—especially those that affect one’s emotional state—can be autonomy-undermining. It is also an important consideration for tobacco control policies, most of which are based on a libertarian paternalistic approach which assumes that addicted smokers can simply exercise a ‘rational decision’ to not smoke in light of more attractive options (see section 2.2.1). The information presented here suggests that focus should also be put on relational or social factors that may influence smoking behavior.<sup>57</sup>

### **What is the role of the social environment in addictive decision-making?**

The social environment plays an important role in triggering and propagating addictions. Sections 3.1.4 and 3.1.5 in particular have argued that stressors in the social environment, or a poor early attachment experience, can have important neurobiological impacts through the EOS and stress pathways that trigger addictive behaviors. Therefore the social environment can be autonomy-enhancing or autonomy-suppressing, as suggested in relational models of autonomy. Social experiences, such as emotional stress, can also predispose people to developing addictions, and predispositions appear to be of particular relevance in early childhood, adolescence, and to socially disadvantaged groups. A focus on social justice, young children, and adolescents should then be an essential component of the ethical framework developed in this thesis.<sup>58</sup>

## **3.2 Mechanisms of susceptibility**

Not all people who ever try an addictive drug develop an addiction; they are actually a minority. In section 2.1.1, for example, it was mentioned that even for very addictive drugs such as tobacco and heroin, the conversion to dependency rates are estimated at 32% and 23% respectively. Conversely,

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<sup>56</sup>At this point, it is unclear what these factors are; they are identified and discussed further in section 3.2 and chapter 4.

<sup>57</sup>At this point, it remains unclear what these factors are; they will be identified and discussed further in section 3.2 and chapter 4.

<sup>58</sup>How exactly the social environment can enhance or suppress one’s autonomy, and determining how and why policies should respond, requires a deeper inquiry into relevant mechanisms of susceptibility (discussed in section 3.2) and the relevant social and relational factors (discussed in chapter 4).

various non-drug activities not usually considered addictive—such as eating food—can become addictive for some individuals, with neurobiological patterns comparable to those observed in addictions to prototypical drugs of abuse. Thus, there are mechanisms that predispose some individuals to developing addictions more than others. People who are particularly vulnerable to addictions to alcohol, illicit drugs and tobacco are adolescents and groups affected the most by social injustice: certain racial minorities, people in low socioeconomic strata, and people with comorbid mental illness. For policies to properly address this issue, it is necessary to answer the following: what makes these groups more vulnerable, what are the relevant factors involved, and how should policies respond?

It is possible that some people are at a higher *genetic* risk to developing addictions. This may be particularly true for some racial minorities. Some Native groups have already been studied to determine whether their high incidences of alcoholism and other addictions are because of genetic reasons.<sup>59</sup> In section 2.2.3, it was also mentioned that genetic markers are being explored for nicotine addiction, which may form the basis of genetic tests that predict an individual's susceptibility to nicotine addiction. This raises the question of whether—based on the progress of genetic research so far—these tests have any potential as a future intervention, or whether a susceptibility to nicotine addiction is conferred through more complex, environmentally-influenced processes. In other words, mechanisms of susceptibility could be 'hard-wired', for example genetic; but they could also be transient, reversible and sensitive to environmental influences, such as epigenetic or neurodevelopmental. It is necessary, then, to look at genetic, epigenetic, and neurodevelopmental mechanisms of susceptibility; particularly in early childhood, because this is the time when individuals seem to be particularly sensitive to the effects of stress and other emotional impacts.<sup>60</sup>

Adolescents are the age group most likely to initiate drug use and develop addiction. Various epidemiological surveys<sup>61</sup> indicate that the vulnerability to drug use varies across the lifespan: incidences of problematic drug use and addiction peak in adolescence and early adulthood, but level out later in life.[252, 253, 254] This has led to the 'maturing out hypothesis', which suggests that many addictions resolve in later adulthood, as a result of successful adaptation into the adult social environment.[255] A fluctuation of vulnerability to addiction throughout the lifespan, with the most sensitive period being adolescence and early adulthood, could be a result of biological factors, psychosocial influences, or the interaction of both. A question raised, then, is what are the neurobiological mechanisms that

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<sup>59</sup>However, it should be noted that this research has been controversial, due to its essentialist assumptions which may reinforce stereotypes.

<sup>60</sup>This point was highlighted in sections 3.1.4 and 3.1.5 in terms of EOS function and the effects of stress over the life-course.

<sup>61</sup>The Epidemiologic Catchment Area Study, National Epidemiologic Survey on Alcohol and Related Conditions, and National Comorbidity Survey.

make adolescents more vulnerable to initiating drug use and addiction, and how should policies take this into account to protect adolescents from smoking initiation and addiction?

The aim of this section is to discuss mechanisms underlying addiction susceptibility, in order to provide evidence-based indications on how tobacco control policies should tackle the issues of smoking initiation among youth and tobacco-related health inequalities related to social disadvantage. Evidence is provided from the viewpoint of three research areas: genetics, epigenetics, and developmental neurobiology. The discussion on developmental neurobiology is focused on two critical developmental periods that are strongly implicated in addiction: early childhood (the first two years of life), and adolescence. These are then linked back to the neurobiological observations described in section 3.1, in particular the discussions on stress (section 3.1.5) and early attachment experience (section 3.1.4). The central argument of this section is that a neurobiological susceptibility to addiction is conferred primarily by social hardship, particularly if this occurs in early childhood. This argument has various implications, summed up in section 3.2.5.

### **3.2.1 Genetics**

As mentioned in section 2.2.3, there is scientific interest in identifying variants in the genetic sequences that may predispose an individual to nicotine addiction. This has led to further ideas that genetic tests could be used to select individuals more highly predisposed to nicotine addiction, who could then be targeted more in tobacco control policies or for interventions such as the nicotine vaccine. If scientific research points to a reliable association between certain genetic variants and nicotine addiction, such interventions have potential. However, if genetic associations are weak and other mechanisms of susceptibility, related to the social environment, are more relevant, then it is necessary to pay greater attention to the social determinants that render some individuals more susceptible. It is necessary, then, to briefly review the progress of genetic research related to nicotine addiction.

#### **General trends**

Broadly speaking, there does appear to be a heritable component to addictions. Most data in support of this notion comes from twin studies, which indicate a moderate heritability of substance use disorders ranging from 20–50%.<sup>[256]</sup> In general, addictions seem to be more concordant in monozygotic than dizygotic twins, and various addictions, most notably alcoholism, tend to run in families. It is then argued that addictions are a result of partly genetic, and partly environmental factors. The National Institute for Drug Abuse (NIDA) and DSM-5, for example, state that addictions to tobacco, alcohol

and illicit drugs have roughly a 50% genetic variance.[22, 257] The search for specific genes, however, has been more challenging.

In linkage studies, affected families are researched in order to identify genes or loci of interest. However, researchers have been unable to find a single major locus, or a small number of loci, which indicates that the genetic factors underlying addiction are likely to be complex, involving a large number of genes implicated in a wide range of functions, and interacting with environmental and epigenetic factors. A recent study, for example, identified over 1500 genes linked to addiction; 396 were used to construct a map of genes and gene products in five major molecular pathways implicated in addiction.[258] Genome-wide association studies (GWAS), that study specific genes of interest in addicted (case) and non-addicted (control) individuals, have also identified several genes but results have been difficult to replicate.[259] Still, research has highlighted a few genes involved in relevant neurological processes that may play a subtle role in one's reaction to nicotine, thereby increasing the susceptibility to nicotine addiction.

### **Genes encoding the nicotinic acetylcholine receptor**

Genetic variations in drug receptor subunits may result in structural changes that affect their binding properties; for example, a low-affinity variant that binds to the drug less efficiently, thus rendering the individual less sensitive to the drug's effect. Well-characterized examples in the case of nicotine are the genes encoding NACHR subunits that bind to nicotine. There are 12 subunits,  $\alpha 2$ –10 and  $\beta 2$ –4, encoded by *CHRNA2–10* and *CHRNB2–4* respectively. They combine to form functional NACHR, of which  $\alpha 4\beta 2$ -NACHR are the most abundant, and  $\alpha 6$ -NACHR dominates nicotine control of dopaminergic neurons.[260]

Various GWAS have researched the relationship between cigarettes smoked per day (CPD)<sup>62</sup> and variants of NACHR subunit genes. Associations to CPD were found within the *CHRNA5/A3/B4* cluster.[261] Other NACHR genes of significance include *CHRNA6* and *CHRNB2*. An association of *CHRNA6* with CPD is consistent with its corresponding expression of  $\alpha 6$ -NACHR subunits in dopamine-releasing neurons, which makes this subunit particularly relevant to the reward functions of nicotine.[262] *CHRNB2* variants, which encode the  $\beta 2$  subunit, were implicated in nicotine addictions when analyzed together with *CHRNA4*, since both transcripts combine to form the abundant  $\alpha 4\beta 2$  subunit.[263] Thus, examples of genes encoding various NACHR subunits illustrate that genetic variations can affect receptor properties, which in turn may have subtle, yet appreciable effects on

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<sup>62</sup>A behavioral indicator of nicotine addiction.



their binding to nicotine. However, the exact mechanisms behind these are unclear.

### Genes involved in behavior

Otherwise, gene variants associated with behavioral control disorders—such as conduct disorder, impulsivity, antisocial personality disorder and addiction—may influence personality traits by producing different variants of mediators involved in neurological behavioral control pathways. Many associations have been found in GWAS, but are not yet replicable. A meta-analysis of 46 genetic studies on personality, for example, found limited evidence and consistency,[264] so associations are likely to be weak. However, it has been suggested that certain variants in genes involved in the function of mood-regulating monoamines (such as dopamine, adrenaline, noradrenaline and serotonin) may render an individual more susceptible to developing behavioral control disorders after a stressful or traumatic experience. This fits with the observation that stressors in early life increase an individual's vulnerability to behavioral problems, but not everyone who suffered childhood trauma develops these disorders.[265]

Incidences of addiction are higher in some Native populations, such as Native Americans and New Zealand's Maori, and so potential genetic predispositions to addictive behaviors have been studied in these groups. A well-known example is that of MAO-A, an enzyme that breaks down dopamine, adrenaline, noradrenaline and serotonin. Low-activity variants of its gene, *MAOA*, have been associated with aggression, antisocial personality disorders, and alcoholism in ethnic groups such as Maori.[266] These effects are thought to be of special relevance to males, since *MAOA* is an X-linked gene. Among boys maltreated in childhood, for example, those with the low-activity *MAOA* variant had higher chances of developing antisocial problems later in life.[267] However, a similar effect can be observed in females: among sexually abused Native American women, those homozygous for the low-activity *MAOA* variant had high rates of alcoholism and antisocial personality disorder. Women heterozygous for the low-activity variant had intermediate rates of these disorders. However, in the absence of sexual abuse, there was no connection between behavioral disorders and the *MAOA* gene.[268]

Similar examples are demonstrated by the genes for a serotonin transporter (*SLC6A4*), and for catechol-O-methyl transferase (*COMT*), an enzyme that breaks down catecholamines such as dopamine. The product of *COMT* reduces dopamine levels in the PFC; high-activity variants of *COMT* result in a faster breakdown of prefrontal dopamine, which may predispose an individual to addictions or other behavioral control disorders.[269] The product of *SLC6A4* modulates functions in

the amygdala; low-activity variants result in greater sensitivity to fearful or stressful stimuli. Such variants are, in turn, associated with anxiety, depression, and alcoholism, and associations are stronger once previous stress exposures are taken into account.[270] However, drug use initiation in those with the low-activity variant also seems to be attenuated by community involvement or a supportive family network.[271]

## **Environmental influence**

Based on the above, it seems that genetic factors are sensitive to environmental influences. Mechanisms behind gene-environment interactions could be epigenetic, neurostructural, or both. Brain-derived neurotrophic factor (BDNF), for example, is a highly abundant neurotrophin with important functions in aiding neural development and plasticity, encoded by the gene *Bdnf*. BDNF is thus important for the survival and function of dopaminergic neurons in the midbrain, and is expressed in brain regions implicated in addictions: the amygdala, striatum, and PFC.[272] The expression of *Bdnf* is sensitive to stress exposure and prolonged drug use. These involve epigenetic mechanisms, such as gene silencing (see section 3.2.3). Since BDNF is important for the formation of neuroplastic projections, alterations in its expression may affect the neurological structure of reward pathways. Variants in the genetic sequence of *Bdnf* have also been associated with nicotine addiction, although this effect appears to be very subtle.[262] The example of *Bdnf* therefore illustrates how gene-environment interactions, on various levels, add further complexity to the genetic variations that contribute to addiction susceptibility.

Taken together, the phenotypic effects of genetic variations appear to be subtle and/or largely dependent on gene-environment interactions.[265] Research in genes such as *MAOA* and *SLC6A4* demonstrate that, even for individuals genetically predisposed to addictive behaviors, a supportive social environment is able to override a genetic ‘disadvantage’. Thus, social factors play an important role. This particularly applies to socially marginalized groups, among whom a high prevalence of addictive disorders may lead to (misleading) conclusions that this high prevalence exists as a result of genetic rather than societal factors. Preventive efforts should then focus on identifying socially-triggered mechanisms of susceptibility.<sup>63</sup> Furthermore, as the example of *Bdnf* illustrates, neurodevelopmental and epigenetic factors add further complexity, and are both strongly influenced by environmental factors. Below, these processes are discussed in greater detail.

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<sup>63</sup>Yet, this is not reflected in recent medicalized approaches, such as the development of nicotine vaccines and genetic tests for nicotine addiction susceptibility. The ethical implications of these strategies, in relation to the evidence described throughout this section, are discussed further in section 6.4.

### 3.2.2 Early neurobiological development

Sections 3.1.4 and 3.1.5 have discussed how stress exposure, particularly in early childhood, can render individuals more reactive to stress—and therefore addictions—in later life. However, it is not yet clear from these discussions *why* this early time period is so crucial, *how* susceptibility is conferred, and what policies should do about it. There is a general consensus among the public health community that adolescence is a period of vulnerability to addiction, and that preventive efforts should be focused on youth. However, early childhood is also an important—and sometimes overlooked—developmental period, during which adverse experiences can significantly affect one’s vulnerability to (tobacco) addiction in later life.

#### General effects of adverse childhood experiences

The significance of parental influence on mental development throughout childhood was first pointed out some 45 years ago by Bowlby’s attachment theory.[273] Nowadays, the impacts of early adverse childhood experiences (ACE) and insecure attachments are well-known: childhood neglect and abuse reduce cognitive performance, impair social development,[274] and are associated with a 4-fold increase in personality disorders.[275] ACE are also good predictors of later drug abuse. In California, for example, it was estimated that ACE increase an individual’s risk of illicit drug use and addiction 7–10 fold, and account for an estimated 55–65% of all illicit drug addictions.[276] Further, ACE are not uncommon: conservative estimates suggest that, in the United States alone, over 1 million children are exposed to conditions of abuse or severe neglect, or not raised with the stimulation and presence of a regular caregiver.[277] Therefore it is crucial to understand how ACE can affect neurobiological development in ways that predispose individuals to addiction, the relevant implications, and how policies should deal with these implications.

A substantial body of evidence already exists, and so far provides strong indications that a secure attachment experience in early childhood is crucial for healthy socioaffective development. This, in turn, protects children from developing addictions<sup>64</sup> in later life. The first two years of life are especially important, since 80% of human neurobiological development occurs between birth and age two, and is extremely sensitive to external influence.[278] This section, then, focuses on neurodevelopmental processes in the first two years of life, how socioaffective experiences can affect these in ways that later predisposes the individual to addiction, and the ethical implications this has.

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<sup>64</sup>As well as other psychiatric disorders that involve socioaffective dysregulation.

## Early neurodevelopmental processes

At birth, the human brain is a disorganized network of around 100 billion neurons. The brainstem, responsible for vital functions such as breathing, is already fully developed at this stage and subcortical regions such as the limbic system are partially developed. However, the cortex—which develops last—is essentially a cluster of neurons at this point that still need to be myelinated, sent into the correct location, and form synapses with other neurons (synaptogenesis).<sup>65</sup> Synaptogenesis occurs at an astounding rate in the infant brain: an estimated 1.8 million synapses per second.[211] This is also a critical time period for synaptic pruning: the destruction of unused neuronal synapses.[279] Thus, development of the human brain—particularly the cortex—is essentially postnatal, and highly dependent on environmental stimulation, which bestows it with an exceptional capacity to adapt to the outside world.

Early socioaffective experiences particularly influence the development of the OFC, a brain region that plays a key role in addictive neurobiology. For example, as mentioned in section 3.1.2, the OFC is important for connecting sensory signals to limbic drives, regulating social affect, and inhibiting the stress response. It undergoes significant growth between the ages 10–18 months, during which it uses information from the environment to calibrate inner emotional states. This information, as mentioned in section 3.1.1, is often in the form of subtle or subconscious cues, such as facial expression, pupil dilation, body language, or tone of voice.[280]

As such, infants are quite adept at sensing ‘hidden’ details about their caregiver’s feeling or attitude, and will usually respond similarly.<sup>66</sup>[281] A genuine state of emotional arousal in the caregiver results in a similar state of arousal in the infant; this type of interaction is considered “attuned”. This differs from a misattuned interaction, in which the caregiver is proximally separated<sup>67</sup> or not physically present. As such, the infant relies largely on the environment, especially its mother figure, for ‘auxiliary control’ of its inner affective state.[283] She does this by modulating the infant’s reactions in an attuned manner. Initially, socioemotional behaviors are externally regulated, but become increasingly self-regulated as the development of neurological controls, particularly the OFC, becomes more advanced.[284]

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<sup>65</sup>Although this process is not complete until an individual reaches his/her mid 20’s, the most critical time period is during the first two years of life.

<sup>66</sup>For example, when infants interact with female experimenters whose pupils are dilated (a sign of emotional arousal), they are more relaxed than with those whose pupils are constricted: the infants smile more, and appear more at ease—see [282].

<sup>67</sup>‘Proximal separation’ refers to an interaction in which the caregiver is physically present, but not emotionally available to the child.

## The effects of misattuned interaction

The quality of the caregiver–infant interaction affects the infant’s brain chemistry.<sup>68</sup> The more often or intensely an emotional state is created, the more its neuronal pathways are enforced, which in turn affects functional circuits. Brain EEG scans of infants of mothers with depression, for example, found that their brains were significantly different to the brains of infants whose mothers were healthy: at 3–6 months age, electrical patterns were similar to those found in chronically depressed adults.[285] In another study, similar patterns were found in even younger infants (1 month old), and this reflected differences in their behavior, such as inertia and crying less.[286] Thus, the neurological and behavioral effects of misattuned interactions with the primary caregiver are apparent from a very young age, and can lead to psychological and behavioral imbalances similar to those observed in physical separation.[287]

Early social interactions also affect the development of stress pathways.<sup>69</sup> As mentioned in section 3.1.5, early stressful experiences can shunt development of the hippocampus and frontal cortex, which leads to poor inhibition of the HPA stress axis and inner affective states. A poor attachment experience can also affect the development of the EOS, which in turn impairs its ability to mediate feedback inhibition over the HPA axis. The importance of these pathways in addiction has been emphasized in previous sections (sections 3.1.4 and 3.1.5). Hence, stress on the child–parent relationship, even if the parent is physically present, can predispose the child to addiction. As such, neurobiological predispositions to addiction may already be present in individuals before drug use is initiated.

In infants, another important trigger for these predispositions is isolation. Social deprivation, from a young age, results in reduced dopamine levels in mesocortical circuits that connect the VTA to the PFC,[288] significant reductions of dopaminergic neurons in the VTA, highly abnormal chemical patterns in monoaminergic innervation of various cortical and subcortical areas,[289] and increased HPA (stress) activity.[290] Similarly to the brain in addiction (see section 3.1), the brains of Romanian adoptees who have been exposed to severe neglect have lower volumes of white and grey matter, as well as increased amygdala volumes,[291] decreased activity in the PFC and hippocampus,[292] and difficulties in forming emotional attachment to adoptive caregivers.[293] Postnatal maternal separation also increases a child’s stress reactivity,<sup>70</sup> which, in turn, contributes to addiction vulnerability.

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<sup>68</sup>Mechanisms may involve mediators such as BDNF which, as mentioned in section 3.2.1, is a stress-sensitive neurotrophin important for the development and plasticity of neurons.

<sup>69</sup>More specifically, they modulate the productions of the stress hormone CRF,  $\beta$ -endorphin, and glucocorticoid receptors in the frontal cortex—see [212].

<sup>70</sup>More specifically, this is associated with reduced GR expression in the hypothalamus and hippocampus, and regional changes in CRH receptor expression—see [294, 295].

## Policy implications

Put together, all of the functional and structural neurological abnormalities observed in those who, during early childhood, experienced abuse, neglect, or proximal separation from their primary caregiver, closely match the neurobiological features of addiction described in section 3.1. One important observation is that these can occur when a child and caregiver are only *proximally* separated.<sup>71</sup> In other words, a parent does not have to be abusive for these neurobiological predispositions to develop; subjecting the parent to stress or other hardship may be sufficient. At this point, it should be noted that not *all* children who are abused, neglected, or proximally separated from their caregiver will develop a predisposition to addiction. These events, however, increase the *likelihood*, and there are neurobiological mechanisms underlying this likelihood.

What does this mean for policies that aim to prevent addictions? As discussed in chapter 2, a concern in tobacco control is that certain groups of people—typically those at a social disadvantage—are more predisposed to addiction. It is generally accepted that policies should focus their preventive efforts on these groups; less obvious, however, is *how* this should be done. The evidence discussed throughout this section suggests that social stressors<sup>72</sup> that affect the child–caregiver relationship can influence the neurobiological development of the child in a way that predisposes him/her to addiction later in life. The implication, then, is that preventive efforts should focus on parents with young children by, for example, providing support structures that enable parents to provide a better quality of care to their children.<sup>73</sup>

### 3.2.3 Epigenetic processes

Epigenetics consists of the heritable, potentially reversible, and environmentally–sensitive processes that influence gene expression without altering the DNA sequence. It allows the integration of intrinsic and environmental signals within the genome, in order to facilitate the individual’s adaptation to environmental change, and for these integrated signals to be passed on to offspring.

Epigenetic research shows that environmental impacts throughout life—from the prenatal period into adulthood—affect an individual’s epigenome, and that these epigenomic patterns may be passed onto offspring. The epigenome responds readily to the effects of drug use (including tobacco use), and to socioemotional impacts—such as stress, abuse, and neglect—that can predispose to drug use.

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<sup>71</sup>For instance, cases in which a parent is caring for the child but suffers from stress or depression.

<sup>72</sup>For example, social determinants of health such as a low education level, limited job opportunities, lack of social support, or a low income.

<sup>73</sup>This point will be further developed in chapter 5, in light of further evidence—presented in chapter 4—on the social structures and conditions that are associated with addiction vulnerability.

Epigenetic findings are well-replicated, with mechanistic details relatively well-characterized in animal models. However, it is still unclear whether the epigenetic events of addiction in humans are causal, or merely associative.[256] The aim of this section is to briefly discuss epigenetic mechanisms relevant to addiction, and how this research relates to other mechanisms of susceptibility and the neurobiological mechanisms of stress.

### **Epigenetic mechanisms**

Epigenetic modifications occur at the molecular level via three main mechanisms. (1) *Histone modifications*: DNA is stored around a core of histone proteins. For DNA expression to occur, the DNA must unwind from the histones to allow access to transcriptional apparatus. Epigenetic processes can chemically modify histone proteins to affect their structure and binding to DNA. Histone acetylation opens the histone structure to allow gene transcription, and other modifications, such as histone methylation, are generally associated with silencing of the gene by closing the histone structure. (2) *Methylation*: The direct methylation of cytidine-guanosine DNA nucleotides (CpG islands), usually located within the gene's promoter sequence, effectively silences gene expression. (3) *Micro-RNA*: Small non-coding RNAs (microRNA) can exert post-transcriptional effects that affect the final gene product.[296]

### **The effects of maternal care**

In rats, variations in the quality of maternal care affect the offspring's epigenome and its neuroendocrinal response to stress. Offspring that received higher levels of maternal care have an overall lower stress reactivity.<sup>74</sup> These differences emerge in the offsprings' first week of life (infancy), and persist into adulthood, but are reversible if, for example, rat pups receiving low quality care are cross-fostered to a mother giving high quality care.[241]

Similar results have also been reported in humans. Babies exposed to maternal stress or depression in the third trimester of pregnancy have higher cortisol levels than those who are not. This is associated with increased methylation of hippocampal GR promoters, which blocks binding of the transcription factor NGFI-A.[298] Furthermore, a postmortem study in depressed suicide patients also found hypermethylations at the hippocampal GR promoter, but only in those who had suffered abuse and neglect. Those who had not experienced abuse or neglect, or who were only suffering from ma-

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<sup>74</sup>More specifically, they have reduced levels of the stress hormones ACTH and CRH, and increased expression of hippocampal GR, which enhances hippocampal inhibitory feedback on the HPA axis—see [297]. These effects are associated with epigenomic changes in hippocampal GR DNA: methylation patterns at the GR promoter, and histone acetylation, are both altered to facilitate binding of the transcription factor NGFI-A to the promoter—see [241].

for depression, did not have epigenetic markings in their hippocampus.[299] The epigenetic effects of stress on hippocampal function and structure are relevant to addiction; as mentioned in section 3.1.1, cognitive, affectively neutral neuroplasticities in the hippocampus inhibit cue-driven, hot processes in the amygdala, and hippocampal GR/MR inhibit the HPA stress axis. Thus, epigenetically-driven impairments of hippocampal function, triggered by stress exposure, may indirectly contribute to the neurobiological features often observed in addiction.

### The effects of drug use and social stressors

There are also a number of epigenetic modifications that are directly linked to drug use. Prolonged drug use induces epigenetic changes in brain regions involved in reward, such as the NAc. These occur in various genes whose products are involved in a range of functions, such as neural maturation and function,<sup>75</sup> cell signalling,<sup>76</sup> or epigenetic mechanisms.<sup>77</sup>[256] Otherwise, among others, epigenetic changes triggered by drug use have been identified in genes encoding the  $\mu$ -opioid receptor (*OPRM1*), and precursors of the opioid dynorphin peptide (*PDYN*).[256] The *MAOA* gene, for which variation in the genetic sequence are linked to aggressive behaviors and substance abuse (see section 3.2.1), is also subject to epigenetic variations (methylations) within its promoter sequence, and these variations are associated with alcohol and nicotine dependence in women.[300]

*Bdnf* provides an example of a gene that is epigenetically regulated, imprinted, and environmentally sensitive. As mentioned in section 3.2.1, its product, BDNF, is a neurotrophin that plays an important role in the formation of neuroplasticities in reward pathways. Drug use itself can affect *Bdnf* expression: cocaine use, for example, increases the expression of BDNF in the NAc, and levels remain elevated even after withdrawal.[301] This in turn affects drug-seeking behavior: increased levels of BDNF in the NAc appears to trigger drug-seeking behaviors and relapse.[302] This may reflect enforced neuroplasticities, laid down by BDNF, that favour drug-seeking behaviors and the production of drug-related cues.

Social stressors not necessarily related to drug use can also affect *Bdnf* expression. In rodents, stressors such as social defeat decrease hippocampal BDNF expression; this is associated with increased histone methylations (silencing) at the *Bdnf* promoter.[303] Social stress and prolonged social isolation also deacetylate the *Bdnf* promoter, which corresponds to reduced expressions of BDNF within the NAc.[304] Similarly, daily exposure to abusive social interactions silences BDNF expression in the PFC,

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<sup>75</sup>For example *Cdk5*, *Bdnf*, *SNCA*, and *NGF*.

<sup>76</sup>For example *FosB* and *c-fos*.

<sup>77</sup>For example *HDAC-5* (histone deacetylase) and *MeCP2* (methyl CpG binding protein).



through methylation of the *Bdnf* promoter. These effects appear to be transgenerational, as these rodents are abusive towards their own offspring, which in turn also show increased methylations of the *Bdnf* promoter in their PFC and hippocampus. These effects were not reversible by cross-fostering the pups to non-abusive mothers.[305] Thus, stress-triggered, imprinted silencing patterns on the *Bdnf* gene may limit the brain's capacity to produce synapses in regions such as the hippocampus and PFC, that would otherwise inhibit subcortical processes; which further contributes towards the neurobiological changes often observed in addictions.

## Summary

The epigenetic modification of genes implicated in addiction and related neurological functions may be brought on by prolonged drug use, or prior life events such as early stress exposure. Both of these can contribute to the neurobiological features of addiction described throughout section 3.1. The example of *Bdnf* illustrates how a single gene may be subject to all these processes, and how they are imprinted to offspring. Thus, epigenetic mechanisms, in addition to genetic processes, provide another explanation for the familial nature of addiction, and appear to complement the findings and arguments described in section 3.2.2: that socioaffective experiences in early childhood can have sustained biological impacts that predispose the individual to addiction in later life, and that policies should take these into account. Epigenetic research also adds another layer of complexity to genetic research, because it indicates that a predisposition to addiction may involve genetic processes, but that they are not necessarily hardwired.

### 3.2.4 Neurological development in adolescence

As discussed in chapter 2, tobacco use—as well as the use of other psychoactive drugs—is usually initiated in adolescence, during which it is strongly associated with a faster conversion to dependence and a higher addiction severity.[306] Early drug use also predicts the use of other drugs; for example, early smoking that leads to the sequential involvement of alcohol, cannabis, and other illicit drugs.[307] Adolescence is also a time typically associated with high levels of risk-taking and sensation-seeking behaviors, and an increased emphasis on peer relationships.[308] It is thought that this has a survival function, to facilitate family-independent exploration of the environment in preparation for adulthood.[309] However, this could also encourage adolescents to engage in potentially destructive peer-related behaviors, such as smoking. Indeed, the most common reasons for smoking initiation are peer pressure, curiosity and novelty-seeking.[310]

It is thought, then, that adolescents are neurobiologically vulnerable to developing addiction. Adolescence is also a time when incidences of various psychiatric disorders<sup>78</sup> increase;[311] the peak age of onset for any mental health disorder has been estimated at 14 years, and an estimated 75% of psychiatric disorders develop by age 24.[312] Mechanisms of susceptibility in adolescents, as for infants, seem to be related to the developmental schedule of the brain. Neurodevelopment is not uniform: different functional structures have their critical growth periods at different times. The PFC is a late-maturing region, and is not fully developed until individuals are approximately 25 years old.[313] Measures of prefrontal function<sup>79</sup> improve significantly during adolescence and early adulthood, and these improvements are accompanied with significant changes in the activity, neuroanatomical structure, and functions of the PFC.[314] Good prefrontal function is, as discussed in section 3.1.2, important for the inhibition of addictive drives.

### **Development of the frontal cortex**

During adolescence, the volume of prefrontal grey matter declines,[315] whereas white matter density increases steadily in the frontal cortex until it reaches its maximum volume when individuals are in their mid 20's.[316] This increase in white matter is associated with increases in prefrontal activity between ages 7–22,[317] and increased myelination of neurons which helps to facilitate and strengthen neuronal signals.[318] Myelination at this stage seems to be especially important in neurons involved in the communication between cortical and subcortical brain regions. A further neuroanatomical process significant in adolescence is the localized pruning of synapses within prefrontal areas.[319, 320, 321] In other words, adolescence is a time when prefrontal functions are organized, strengthened, and connected to subcortical structures. Since prefrontal function is the seat of 'free won't', the capacity to exercise self-control over one's behaviors is still developing until early adulthood (age 25) is reached.

In adolescence, neurobiological changes in addictive reward circuitry are also observed. In rat brains, significant pruning of dopamine receptors takes place in the striatum during adolescence.[322] Adolescent rat brains also show rapid developments in the connections between the ACC<sup>80</sup> and the amygdala, marked by significant fibral growths into the ACC, which suggests that adolescence is a period during which integration of the affective and inhibitive processes is enhanced.[323] Key to this integration is also a proper development of the OFC. However, the OFC appears to follow a late developmental schedule in adolescence, since its activity in adolescents is relatively low, matching

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<sup>78</sup>Such as anxiety, mood disorders, eating disorders, personality disorders, and substance abuse.

<sup>79</sup>Such as tasks that test skills in complex problem solving, working memory, abstract and logical thinking.

<sup>80</sup>Rats have no ACC; 'rat ACC' refers to the medial PFC, which is the rat equivalent—in terms of function—to the human ACC.

that of children more than adults. This is accompanied with exaggerated activity in the NAc,[324] which together suggests that adolescents have not yet fully developed their prefrontal capacity to veto affect-driven behaviors, as a result of the relatively slow maturation of the OFC. These observations are highly relevant to addiction, because efficient connections are needed from subcortical to cortical regions, particularly the OFC, for the inhibition of affect-driven, impulsive behaviors, and these connections are typically impaired in addiction.

### **Effects on behavior**

It is thought that the neurofunctional characteristics of adolescent brains contribute to age-specific adolescent behaviors, and their heightened susceptibility to problematic drug use.[309] Performance on the Iowa Gambling Task,<sup>81</sup> for example, improves significantly with age, which suggests that the capacity to inhibit risky, irrational behaviors is not complete until adulthood.[325, 326] Outside the clinical context, adolescents are the age group most likely to engage in behaviors such as dangerous driving, unprotected sex, and substance abuse.[327] This, to some extent, could be due to psychosocial factors. However, the above also suggests that adolescent behaviors are influenced by neurobiological development, in a way that predisposes them to affect-driven behaviors.

Consequently, they are more susceptible to peer pressure, and more likely to experiment with drug use; and since their cognitive, prefrontal capacities are not fully developed, they are prone to these behaviors despite having some presumed awareness of the risks.[328, 329] The effects of prolonged drug use on the prefrontal cortex (described throughout section 3.1) may further impair cognitive capacity, which could explain, to some extent, why most initiations take place in adolescents and why most addictions develop before prefrontal development is complete. Therefore adolescents—as well as young adults under age 25—are especially susceptible to smoking initiation and developing addictions to tobacco. The implication is that preventive efforts should be focused not just on adolescents, but also on young adults aged below 25.

### **The effects of stress**

Adolescents may also be more susceptible to the effects of stress,<sup>82</sup> due to hormonal fluctuations that occur during adolescence. While this link is poorly understood, and likely to be complex and reciprocal,[311] it is possible that sex hormones affect the levels of hormones involved in the stress

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<sup>81</sup>A gambling exercise that tests risk-taking behavior. Most people select cards from the ‘good deck’; exceptions are people with prefrontal damage, substance abuse problems, or high self-reported levels of risk-taking.

<sup>82</sup>The effects of stress, in turn, influence addictive neurobiology; see section 3.1.5.

response.<sup>83</sup> The capacity to cope with stress is also significant for adolescents, and predicts later drug use.<sup>84</sup> As indicated previously (in sections 3.1.5 and 3.2.3), the ability to regulate the stress response may be compromised if persistently exposed to stress from a young age.<sup>85</sup> Studies on adolescent rats also note that feedback inhibitory systems on the HPA stress axis are not fully developed until adulthood.[341] Given the important relationship between stress and addiction, a heightened predisposition to stress in adolescence may, among other factors, contribute to the development of addictions. The implication is that, in order to protect adolescents from smoking initiation and addiction, they may need extra support in dealing with stressors in their social environment.

### **Policy implications**

There is an important link between adolescent age and a heightened susceptibility to smoking initiation and developing addiction, that is reflected on both neurobiological and psychosocial levels. Psychosocially, adolescence is an introduction to the adult world, peer affiliations, and novel stimuli. Neurobiologically, adolescence is a critical developmental period for the PFC, which means that, as in addiction, stress- and affect-driven responses are not properly inhibited. It was also mentioned that the brain, in both adolescence and (adulthood) addiction, is characterized by a lack of connections between prefrontal and limbic regions, and impaired or under-developed prefrontal function. These findings support the maturation hypothesis, and partially explain why most onsets of addictions, as well as other psychiatric disorders, occur before neurobiological maturation is completed at approximately age 25.

What are the implications of these points for tobacco control policies? First, adolescents are not yet fully autonomous; their prefrontal capacity to exercise an autonomous, informed decision to smoke is still developing. It is important to allow this capacity to develop properly, since not doing so effectively undermines the potential of adolescents to become fully autonomous. Interventions that promote future autonomy by restricting tobacco, then, are not a violation of freedom because adolescents are not yet fully autonomous. Second, the importance of protecting adolescents from smoking initiation is already widely recognized by the public health community. Nevertheless, evidence in this section indicates that people should be protected from smoking initiation (and subsequent addictions) until

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<sup>83</sup>This could explain why some studies have observed sex-specific responses to social stressors. Rat females exposed to social stress, for example, react more persistently than males, and as a result also develop a heightened sensitivity to drugs such as nicotine and amphetamine—see [331, 332, 333].

<sup>84</sup>For example, after peer pressure and novelty-seeking, the most significant predictor of adolescent alcohol use was found to be the self-perceived level of stress—see [334].

<sup>85</sup>Six longitudinal studies on alcohol use, for example, followed individuals from birth through to the late 40's and found that adversities such as low socioeconomic status, poor family relations, and poor academic performance in childhood and adolescence predicted adult alcohol use patterns—see [335, 336, 337, 338, 339, 340].

age 25, when prefrontal development is complete. In other words, there is an argument for extending current restrictions, such as a minimum age for tobacco sales law (currently 18 years in most places) to people aged below 25.

Third, given the strong association between ACE and addiction, adolescents from socially disadvantaged backgrounds may be dually predisposed to addiction: as a result of age *and* social hardship. Such adolescents may require extra support. Fourth, given the relational nature of smoking initiation, peer-based interventions may be particularly useful in preventing smoking initiation and encouraging cessation among adolescents and young adults.<sup>86</sup>

### 3.2.5 A summary of addiction susceptibility

The social environment is important: all mechanisms of susceptibility discussed throughout this section—genetics, epigenetics, and neurobiological development—are sensitive to environmental factors. Variants in genes such as *MAOA* and *SLC6A4* show phenotypic effects only when social factors such as community support or childhood abuse are taken into account; epigenetic mechanisms are highly sensitive to conditions such as stress; and neurological development is significantly influenced by early socioaffective experiences, in particular the quality of the child-caregiver relationship. Moreover, the role of hard-wired genetic factors in conferring a susceptibility to nicotine addiction appears limited, particularly when weighed up against socially-influenced processes. Thus, interventions such as the genetic tests for nicotine addiction—introduced in section 2.2.3—are unlikely to have much potential as a reliable preventive strategy.<sup>87</sup>

Although not everyone who is exposed to adverse experiences will eventually develop an addiction, evidence throughout this section has shown that it increases the likelihood, and that there are multiple biological mechanisms underlying this likelihood. Supporting this view, it is also generally agreed that social factors—such as socioeconomic status, social relationships, ACE, and the availability of drugs—play an important role in addiction susceptibility. In the context of tobacco addiction (as well as other drug addictions), it is generally agreed that the groups most affected by addictions also tend to be affected by social disadvantage. Furthermore, as mentioned in chapter 2, the importance of addressing social determinants of health and issues of social injustice has also been recognized in public health ethics.

The information presented throughout this section builds on these arguments by showing *how* social disadvantage can confer a neurobiological vulnerability to addiction by acting on neurobiological

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<sup>86</sup>These points are discussed further in chapter 5.

<sup>87</sup>An ethical analysis of this intervention is provided in section 6.4.

circuits involved in the stress response, emotional regulation, and social attachment. This offers an important clue for policies: the importance of autonomy–promoting social environments and attuned child–caregiver relationships. It was also shown that this, in part, requires that parents are in a good state of mental wellbeing. This point, then, is especially relevant to parents with mental illness, or parents who lack adequate support from family or the community. There are also more severe scenarios, such as child abuse, that are likely to have more serious impacts on child development. For tobacco control policies, this means that the interconnections between tobacco use and wider issues, such as ACE, should be recognized.<sup>88</sup> This section, then, adds further strength to the arguments that autonomy in addiction is relational, since development of the ability to avoid addictive behaviors partly depends on relational and social factors. State interventions, then, should aim to maximize positive freedom by creating autonomy–promoting conditions. In other words, relational autonomy, positive freedom, and social justice are important concepts to be considered in the ethical framework of this thesis.

This section has also emphasized the importance of protecting adolescents *as well as young adults below age 25* from smoking initiation and addiction. As discussed in section 2.3, measures that protect the best interests of children—who are not yet fully capable of making sound judgements—are relatively uncontroversial. However, many adolescents, and certainly most young adults aged 18–25 years, are generally considered capable of exercising rational decisions. Nevertheless, the evidence presented throughout section 3.2.4 suggests that, at least in the context of tobacco use, this ability is not yet fully developed; furthermore, it may be diminished if smoking initiation occurs before age 25 as a result of the psychoactive effects of nicotine. There is therefore an argument for extending current protections for children and young adults aged below 25.

Put together, this section has highlighted some important considerations for the ethical framework regarding the issue of addiction vulnerability. However, it is still unclear what the social factors or processes that predispose youth and socially disadvantaged people to addiction are. These factors are, according to the evidence presented so far, related to issues such as ACE, stress, dysphoria, and misattuned social relationships. There are social processes that contribute to these problems, and they are an important target for policies; they should be identified and incorporated into the ethical framework. In particular, it is unclear what exactly constitutes ‘social disadvantage’: is it related to economic hardship, or are the underlying issues more complex than that? Why are some racial

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<sup>88</sup>This could be done, for example, by integrating tobacco control efforts into programmes that aim to deal with ACE, or focusing preventive efforts on groups of children and adolescents who have been affected by ACE or other hardship—more discussion in chapter 5.

groups—such as Natives—more affected by addictions than others, and how should policies address these issues? It is necessary, then, to elucidate the types of social disadvantage that are associated with addiction.

There are other factors that have contributed in important ways to the vulnerability of certain groups. Notably, the TI has targeted socially disadvantaged groups and children in their marketing efforts, which has contributed to an increased smoking prevalence among these groups. How ‘addiction’ is perceived also affects patterns of tobacco use and tobacco control policies. It is thus necessary to build on the information presented so far by looking more closely at the social contexts in which tobacco use and addiction developed, ways in which social perceptions on addiction have influenced policies, and the marketing strategies of the TI.





## Chapter 4

# The social context and the tobacco industry

The aim of this chapter is to look at the wider social and commercial contexts of tobacco use and addiction: the social contexts in which addictions to tobacco—and addictions more generally—develop; ways in which social perceptions of addiction can change and influence policies; and the marketing strategies of the tobacco industry (TI) that have contributed to the current situation. Together, this information broadens and contextualizes what has been presented so far. For example, it has been argued in chapters 2 and 3 that tobacco use presents a serious and ongoing public health crisis, is highly addictive for most, and that addiction significantly impairs one's ability to avoid using tobacco. Why, then, is smoking defended by the TI as a 'freely chosen' activity, and what are the social contexts within which the TI has succeeded in propagating this argument? The same point applies to the idea that smoking relieves stress: this argument persists, although evidence in chapter 3 indicates otherwise. Further, what are the social factors that make youth and some socially disadvantaged groups more predisposed to addiction than others, and how has the TI been involved in increasing their vulnerability?

This chapter is structured as follows. Section 4.1 looks at the wider social contexts in which addictions to psychoactive drugs have developed, how this can affect socially disadvantaged groups, and how this influences the perception and treatment of addictions. Section 4.2 looks at the evolution of moralistic drug policies and their implications. Sections 4.3, 4.4, and 4.5 describe the marketing and research activities of the TI and how this influences social perceptions, research, and policies on tobacco. Implications of these discussions are summarized in section 4.6.

## 4.1 The social context of addiction

### Early drug use

The use of psychoactive drugs is not new; it has a history that is thought to date back at least 8,000 years.[342] Tobacco, marijuana, coca,<sup>1</sup> and opium<sup>2</sup> were consumed by local settlers in areas where they were first grown, long before their discovery by Europeans. Back then, drug use was socially unproblematic, often used in rituals, and perceived as harmless or fashionable.[343] Opium was introduced to Europe in the form of laudanum, a medicinal tincture, in the 16<sup>th</sup> century; coca and marijuana in the 19<sup>th</sup> century.[344] Tobacco was brought into Europe in the 16<sup>th</sup> century, although the modern cigarette was not developed until the late 19<sup>th</sup> century.[38] Meanwhile, alcohol was already a popular local brew in many world regions, and consumed as a staple or recreational drug.[343]

### Early disease views of addiction

Although drunkenness was common, the term ‘addiction’ was not substance-related and carried no negative connotation; it simply referred to an intense devotion comparable to voluntary servitude, such as to the family or religious practice.[34] Perceptions on drug use—particularly alcohol—began to change, however, in the early 19<sup>th</sup> century. Frequently inebriated people, termed ‘drunkards’, started to describe their desire for alcohol as ‘overpowering’ or ‘irresistible’.[345] This raised early questions of volition regarding the use of alcohol, that are still reflected in modern debates. The prevailing perception—that ‘drunkards’ simply had an intense affection towards drinking and inebriation—was challenged by individuals such as the doctor Benjamin Rush. Rush described the phenomenon as an ‘addiction’ to alcohol, that developed gradually and progressively, similarly to many diseases; except that this disease affected the will.[346]

Although inebriation was viewed as sinful, the overall view on ‘addicts’, at least in the beginning, was sympathetic. Consequently, they were not coerced into therapy or criminalized; instead, early drug regulations appeared in the form of ‘temperance movements’.[345] These movements were based on Rush’s disease conception of alcoholism: that the substance, in some people, caused an ‘addiction’ disease; that abstinence was the solution; and that people should be sympathetic to chronic inebriates.[346] Temperance movements focused mostly on alcohol, but also other drugs, including tobacco.[347]

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<sup>1</sup>Precursor of cocaine and its alternative forms, e.g. ‘crack’ cocaine.

<sup>2</sup>Early form of an opioid drug. More recent opioids include heroin, morphine, and synthetic analogues such as codeine and methadone.

## Reasons for the paradigm shift

Throughout the 19<sup>th</sup> century there had been an important paradigm shift: ‘addiction’ changed from a devotion into a disease, and policy shifted from tolerance to temperance. Several factors may have contributed to this. Technological developments, for example, had increased the potency and availability of drugs. In the case of tobacco, two important 19<sup>th</sup> century developments in the production process gave birth to the modern cigarette. The first was flue-curing, a drying process that makes tobacco milder, more acidic, and therefore more inhalable. This in turn allows nicotine to be delivered deeply into the lungs, which makes cigarettes more addictive. The second was the Bonsack machine, which allowed the automated production of cigarettes on a mass scale.[39]

Such technological ‘improvements’, along with developments in transportation methods, explain to some extent why drug availability and consumption increased. However, it does not necessarily explain why some people started to relate differently to these drugs. Alcohol, for example, was consumed for centuries before world trade opened up, and has changed little in terms of its pharmacological properties; yet only became significantly ‘addictive’ around the 19<sup>th</sup> century. In line with current social patterns of addictive drug use (its concentration among socially disadvantaged groups), certain forms of drug use also became associated with distinct groups of people. Changes in social life therefore offer an important explanation as to why ‘addiction’ became a ‘disease’.

## Social transformation

Throughout the 19<sup>th</sup> century, important social transformations took place as a consequence of the Industrial Revolution, which, originating in the UK, lasted from the end of the 18<sup>th</sup> century into the 19<sup>th</sup> century. The Revolution brought significant improvements in technology-led mass and efficient manufacturing methods, the establishment of a free market ideology, and rapid, undirected growth in national material welfare. Land was expropriated on a scale unlike anytime before; labour was reduced to a market value (hours paid for salary); countrysides were overwhelmingly industrialized and urbanized, and people from rural communities, seeking work, moved into urban dwellings while others emigrated abroad.<sup>3</sup>[348]

It is generally understood that this resulted in the severe dislocation of people’s lives, as cultures and communities evolved and sometimes annihilated, and social thought predominantly orientated itself towards more individualistic, materially driven pursuits.[34] However, human beings are inher-

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<sup>3</sup>Although there were other reasons for migrating at that time, it may be reasonably concluded that overseas employment was one of them.

ently relational,<sup>4</sup> and so our values are largely rooted in social life: protecting one's social standing and relationships.[348] The social transformations that resulted from industrialization required people to become more self-interested, and more self-sufficient, which forced them to detach from traditional community life and find new ways to cope with mounting social pressures.[34] Thus, it has been argued that material growth came with inevitable consequences that resulted from a mass-scale destruction of collective and cultural identities: demoralization, crime, social perversion, and a stronger tendency towards 'vice-like' behaviors such as drunkenness.<sup>5</sup>[348]

By then it had become clear that, for some people, the relationship to alcohol or other drugs had changed from a positive pleasure into a dependency. This could have been partly because of changes in how drug use became labeled and perceived, and partly because of increased social pressures. The latter has led to ideas that addiction is, more generally, a coping strategy for individuals against dislocation from their sociocultural origin, one another, and themselves, and primarily the result of a modern free-market society that is continuously camping its members against one another in a 'rat race' pursuit towards economic progress.[34] This construal of addiction, termed the 'social dislocation theory of addiction', also ties in closely with the self-medication hypothesis of addiction.<sup>6</sup>

### **The effects of social dislocation**

Predictably, drug use became more problematic among the most dislocated groups, for whom the failure to establish emotional or financial self-sustenance became too much. Alcoholism, for example, was associated with the urban poor, while opium addictions were prevalent among Chinese immigrants in America who were socially marginalized from the mainstream and subjected to harsh working conditions.[343] Such patterns continue to this day: data from epidemiological surveys[349, 350] and ethnographic studies[351, 352] repeatedly indicate that drug addictions are concentrated in areas with severe socioeconomic deprivation, social injustice, crime, and scarce social opportunities. Consistent observations across various cultures also support this idea. The colonization and dismantling of indigenous cultures have led to escalated incidences of aggressive violence and substance abuse among these communities. Problematic drug use, particularly alcoholism, is a significant issue among, for example, Native Canadians[353] and New Zealand's Maori.[354]

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<sup>4</sup>The neurobiological evidence in chapter 3 attests to this; for example, the healthy emotional development of infants depends largely on attuned relationships with a primary caregiver.

<sup>5</sup>What constitutes a 'vice' is subjective and in part depends on cultural and social factors. In this context, however, repeated drunkenness—resembling alcoholism—was considered a vice.

<sup>6</sup>The self-medication hypothesis was introduced in section 3.1.1. It holds that addiction is a coping strategy against dysphoric or uncomfortable states of mind, brought about by life within a stressful or oppressive environment. It is discussed and critiqued at length in section 5.1.3.

One may argue that these effects are not a result of social dislocation, but economic hardship.<sup>7</sup> However, there are numerous examples in which economic hardship has not resulted in addictions, or in which economic revival has been ineffective.[34] The Nushuaua Innu of Canada, for example, were moved from their shanty town to Natuashish, an attractive, well-funded town carved into the wilderness, following a national scandal.<sup>8</sup> It was thought that an economic revival would correct drug abuse, violence, and problematic drinking among the Nushuaua Innu, but it did not: problems with drug and alcohol addiction, unemployment, child abuse, and violence continued, among an estimated 70% of the community.[355, 356] Programmes that foster cultural revival, however, have been more successful.<sup>9</sup> The Canadian Shushwap community of Alkali Lake, for example, had a cultural revival and sobriety programme that decreased the rates of alcoholism from 90% to 5% within ten years.[357]

Therefore, as in the words of economist Karl Polanyi, it may be argued that:

“... almost invariably economic inferiority will make the weaker yield, but the immediate cause of his undoing is not for that reason economic; it lies in the lethal injury to the institutions in which his social existence is embodied. The result is loss of self-respect and standards, whether the unit is a people or a class, whether the process springs from so-called culture conflict or from a change in the position of a class within the confines of a society.” (pg.164, [348])

Polanyi’s argument implies two things: that addictions were in part triggered by a loss of self-respect and standards, and that these were largely a result of social injustice. Put together with the neurobiological evidence discussed in chapter 3, this suggests that social dislocation is a source of emotional stress and dysphoria, which can affect neurobiological functions and development in a way that predisposes individuals to addictions. This may be conferred through changes in the stress response, emotional development, or neuroplastic changes within dopaminergic reward pathways or the endorphin–opioid system (EOS). Particularly, individuals raised from an early age in such environments are more likely to develop addictions as a result of neurodevelopmental predispositions conferred during early childhood, which explains why addictions tend to persist over generations within the same social clusters.[34] Hence the social institutions that contribute to stress or other dysphoria—such as those outlined here—are in part responsible for addictions.<sup>10</sup>

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<sup>7</sup>It has also been argued that there are genetic reasons behind this, but these claims are most likely inaccurate—see section 3.2.1.

<sup>8</sup>A videotape surfaced of six Nushuaua Innu children sniffing gasoline fumes, screaming they wanted to die.

<sup>9</sup>This by no means implies that tobacco control movements should absolve the TI and instead focus solely on reviving indigenous cultures. The point is that sociocultural dislocation seems to contribute in important ways to the development of addiction, and should be one of the issues—along with issues related to TI activity—that should be addressed.

<sup>10</sup>Other factors, such as the TI, are also responsible—see sections 4.3, 4.4, and 4.5.

As a consequence of these social changes, a contradiction had evolved: a social attitude that encouraged the seeking of external pleasures, but only selectively towards morally ‘worthwhile’ or socially valued pursuits. Thus, the pursuits of money, work, property, and other such commodities became a way of life, while socially undesirable ‘vices’ became increasingly sinful. This is where perceptions on addictive drugs departed into increasingly moralized temperance movements, even though their use was actually propagated by social transformations at that time.

## 4.2 Moralistic perceptions and policies

Towards the end of the 19<sup>th</sup> century, the increasing popularity of potentially addictive drugs, including tobacco, started to represent a social crisis associated with unproductivity, crime, and moral decay, especially among racial minorities and people in low socioeconomic strata.[38, 358, 359] The paradigm shifted accordingly: ‘addiction’, formerly a disease, became seen as an immoral and stigmatized choice, a view now known as the ‘moral choice’ theory of addiction.<sup>11</sup> Accordingly, policies shifted from temperance movements towards prohibition: drug regulations became increasingly punitive towards and throughout the 20<sup>th</sup> century, and tended to intensify at a time when there was conflict between a minority group and the mainstream.[359]

### Policy response

Throughout the 20<sup>th</sup> century, states started regulating and banning the sales of marijuana, cocaine, heroin, morphine, alcohol, and tobacco. In the case of tobacco, some states had banned tobacco sales to minors, while others had banned them completely. Cessation clinics opened up, and social movements opposed smoking in public places.[38] These were sometimes based on human rights rhetoric: the right of non-smokers to be free from the nuisance of second-hand smoke (SHS).<sup>12</sup> [360, 361] However, tobacco later escaped these regulations.<sup>13</sup> Similarly, a ban on alcohol could not be sustained,<sup>14</sup> and so both drugs remain legally available to this day. In contrast, marijuana, cocaine, morphine, heroin, and many subsequent ‘designer drugs’, such as LSD, MDMA (Ecstasy), and amphetamine, were

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<sup>11</sup>Moral choice theories of addiction assume that addictive behaviors are freely chosen and socially unacceptable; the appropriate solution, then, is to deter drug use by enforcing the perception that it is immoral. These theories are discussed and critiqued in greater detail in section 5.1.

<sup>12</sup>Back then, little was known on the negative health impacts of SHS exposure, and so SHS-related harm referred more to moral harm. Nowadays, arguments that oppose SHS exposure tend to focus on the adverse health effects caused by SHS, described in section 2.1.1.

<sup>13</sup>For reasons related mostly to TI activity, explained in sections 4.3 and 4.4.

<sup>14</sup>The USA, for example, passed the 18th Amendment in 1920 which banned alcohol sales. However, the result was an illegal trade in poor quality alcohol, which often resulted in methanol poisoning, and so the law was repealed 12 years later—see [343].

prohibited through increasingly strict policies that criminalized drug users and exaggerated facts about the dangers of drugs.[359]

As of now, most drug policies<sup>15</sup> are in line with three international conventions under the United Nations (UN): the 1961 Single Convention on Narcotic Drugs;<sup>[362]</sup> the 1971 Convention on Psychotropic Substances;<sup>[363]</sup> and the 1988 Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances.<sup>[364]</sup> Together, they aim to achieve global co-operation in limiting the production, trade, and possession of addictive drugs, and preventing the abuse of addictive medicines. In most countries, possession or trade of drugs covered by the conventions are illegal, and punished with severe penalties such as lengthy imprisonments, and—in some cases—death penalties. Although the conventions do not necessarily endorse such heavy sentencing, a strong moralistic echo remains in their language. For example, the 1961 Single Convention on Narcotic Drugs states that:

“...addiction to narcotic drugs constitutes a *serious evil* for the individual and is fraught with social and economic danger to mankind ...” (own emphasis, preamble, [362])

This is a stark contrast to the language used in the World Health Organization Framework Convention for Tobacco Control (WHO FCTC) treaty, which reflects human rights and public health principles (see section 2.2.1). This most likely reflects the moralistic views on addiction that prevailed at the time. This portrayal has repeatedly been disputed by critics of the stigmatization and punishment of drug users, critics of a “War on Drugs”,<sup>16</sup> and proponents of a more sympathetic treatment of addicted individuals based on harm reduction, medical therapy, and/or social reform.

### Issues with moralistic policies

There are good grounds for criticizing punitive anti-drug policies: there is little evidence that they work, yet plenty of evidence that they bring significant negative impacts onto society and the lives of illicit drug users.<sup>17</sup> Most notably, punitive policies are often stigmatizing to addicted drug users, which results in their marginalization from society and treatment services. Stigma also tends to put guilt and stress on addicted individuals; these negative emotional states are, in turn, likely to worsen the addiction. Arguments in chapter 3 strongly supports this idea, since neurobiological evidence

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<sup>15</sup>For most prototypical drugs of abuse except alcohol and tobacco.

<sup>16</sup>The “War on Drugs” is an anti-drug campaign that started in the USA but has since spread to other countries. Its aim is to suppress illegal drug trade and use, and comprises strict prohibitions on drug use, traffic and production, military intervention, the incarceration of drug users and traffickers, and media campaigns focused on discouraging drug use. One famous example is a 1980’s campaign in which drug users were advised to “Just Say No” to drugs.

<sup>17</sup>A full critique of punitive approaches to drug policy, such as the War on Drugs, is beyond the scope of this thesis—see [31].

indicates that stress and other dysphoric states of mind are important triggers for the onset or relapse of addictive drug use. In other words, a moralistic policy that stigmatizes addicted drug users is like to be counterproductive; this is an important point that should be considered in tobacco control policies.<sup>18</sup>

Therefore the view that drug use is a “serious evil” is not an appropriate ethical basis for policy, which should be based on public health principles, such as promoting the social conditions and options that support a healthy lifestyle. Nevertheless, punitive anti-drug policies continue to dominate in many countries, and the moral choice theory of addiction remains a highly criticized, though not-yet-dormant description of addiction. Tobacco addiction, however, has managed to escape this portrayal;<sup>19</sup> in large part as a result of the marketing activities of the TI.

### 4.3 Marketing strategies of the tobacco industry

Although tobacco was one of the drugs targeted by temperance movements and early prohibitions, it escaped legislation and departed from most other addictive drugs to become a socially accepted, legal product.<sup>20</sup> This is not because tobacco is significantly less harmful than these drugs;<sup>21</sup> this was mostly a result of the persistent marketing tactics of the TI that took place within a modern culture that was increasingly embracing consumerism, freedom, and materialistic pleasure.<sup>22</sup>

#### Early tobacco promotions

At the start of the 20<sup>th</sup> century, the USA’s TI, which is where most modern TI has its origin, was reorganized into an oligopoly that would eventually consist of five major stakeholders: Philip Morris, the American Tobacco Company, R.J. Reynolds, Liggett & Myers, and Lorillard. At this point, cigarettes could be produced on a mass scale, and were already quite addictive because of the flue-curing process.<sup>23</sup> The companies, vying for market share, used aggressive promotional strategies for their cigarette brands that were usually targeted at non-smokers, particularly youth, women, and the

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<sup>18</sup>This is particularly relevant for measures that aim to denormalize tobacco, since they can stigmatize smokers. An ethical analysis of this approach is provided in section 6.1.

<sup>19</sup>For the most part; although this has not yet happened to a similar scale with tobacco, it is notable that the stigmatization of smokers, particularly those in socially disadvantaged groups, is becoming a problem in recent attempts to denormalize tobacco. See section 6.1 for further discussion.

<sup>20</sup>This initially took place in developed regions such as North America and Western Europe; however, a similar pattern of spread has now occurred in developing countries, particularly those in Asia.

<sup>21</sup>As argued in section 2.1.2, the harms of tobacco compared to other drugs (including illicit drugs such as heroin and cocaine), in terms of chronic harm, addictiveness, and social costs related to healthcare expenditure, are significant.

<sup>22</sup>It was also, in part, because data showing the causal link between smoking and chronic diseases was not yet widely available. However, as argued below, the TI was also largely responsible for this.

<sup>23</sup>A process that makes tobacco more inhalable and therefore more addictive—see section 4.1.



military.<sup>24</sup>[38]

Consequently, during World War I (1914–1918), there was a marked increase in tobacco business. Cigarettes were supplied to men drafted into the military, and became increasingly popular as their pharmacological effect<sup>25</sup> gave a temporary relief from the stresses of the War. As 19<sup>th</sup> century sensibilities became increasingly sympathetic to the hardship of soldiers, cigarettes became viewed as a source of comfort, and to regulate their use was increasingly viewed as petty and harsh.[38] As illustrated by a 1919 opinion piece:

“As for the poor fellows lying mangled in shell holes or in field and evacuation hospitals, with life slowly ebbing away from a body soon to become dreamless dust—who would be heartless enough to “prohibit” this last and only solace?” [365]

The pressures propagated by social transformations, that had started in the previous century (see section 4.1) and continued into the 20<sup>th</sup> century, may have also made the soothing properties of nicotine in cigarettes especially popular. This was noted as early as 1889:

“... there is an ever increasing subjection to the influence of this narcotic, whose soothing powers are requisitioned to counteract the evil effects of the worry, overpressure and exhaustion which characterize the age in which we live.” [366]

The TI, aware of this, promoted cigarettes as a viable source of stress relief. As a higher smoking prevalence was noticed among people with comorbid mental illness and the socially marginalized, the TI started targeting the homeless, the mentally ill, and war veterans who had used cigarettes during their service.<sup>26</sup> The TI’s reasons for targeting these groups was because they were considered more ‘impressionable’; [367] more openly, however, they propagated the ideas that mentally ill or socially marginalized people benefit from using cigarettes as a form of self-medication, that they are unable or unwilling to quit, and that quitting smoking is a low priority for them. Hence it is plausible that the TI are—to some extent—responsible for propagating tobacco-related health inequalities that result from social injustice, and for spreading misinformation regarding the ostensible stress-relieving effects of smoking. Even though research [368]—including the evidence presented in chapter 3—proves

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<sup>24</sup>The reason these groups were targeted is because, at that time, they were considered more vulnerable. People in the military were often exposed to highly stressful circumstances, while women were starting to become more liberated. Accordingly, cigarettes could be marketed as symbols of relaxation and female liberation. Youth were—and still are—targeted because they are more prone to developing addictions.

<sup>25</sup>Through the reinforcing properties of nicotine—see section 3.1 for a more detailed description.

<sup>26</sup>The TI would target these groups by, for example, supplying free cigarettes and making claims that smoking helps to relieve stress—see [367].

otherwise, and people are generally rated as more highly stressed when they smoke,[369] stress relief is still commonly cited as a reason for smoking.

Consequently, military troops and aid workers returned from the War, addicted to cigarettes. There was little knowledge on the long-term harms of smoking, and tobacco did not cause intoxication, so it was increasingly viewed as a harmless pastime. More and more people took it up, and those that did remained loyal clientele to the TI (mostly because of nicotine addiction). A similar pattern occurred during World War II (1939–1945); most likely because of intensified marketing activities by the TI during this time, and the stresses caused by the War.[39]

### **Smoking normalization**

As cigarettes became increasingly popular, widespread, and more intensively marketed by tobacco companies, they started to symbolize ‘modern’ values such as consumerist freedom and pleasure amidst the stresses of everyday life. Women, as they gained more independence, were heavily targeted by tobacco promotions. Consequently, smoking also became a symbol of feminist independence, glamour, and sex appeal.

Largely because of the normalization<sup>27</sup> efforts by the TI, smoking had become ubiquitous in the developed world by the 1930’s. Consumption had risen enormously: in the USA, for example, it had increased from an annual 50 cigarettes per adult (1880) to almost 1,000 in 1930,[38] and by 1964, 42% of American adults were smokers.[1] Cigarettes symbolized leisure, sociability, attractiveness, and freedom, while brand choice became an assertion of individuality and social status. This symbolism is still echoed in ‘liberal theories of addiction’.<sup>28</sup> Cigarettes were intensively promoted on TV, on billboards, in printed media, and in sports events. Movie placements were also common: film stars such as Sylvester Stallone, Clint Eastwood and Sean Connery were paid to smoke in movies,[39] and in 1987–1988 alone, Philip Morris provided free tobacco-related props to 56 movies.[370] Such advertising was, and remains, extremely effective; epidemiologists have suggested that around half of smoking initiations are because of movie placements.[371] Hence the TI have played a major role in the normative shaping of smoking as a social activity, which in turn has led into a major public health crisis.<sup>29</sup>

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<sup>27</sup>‘Normalization’ in this context refers to smoking normalization, the process by which smoking becomes perceived as a normal and socially accepted activity.

<sup>28</sup>Liberal theories of addiction assume that addictive behaviors are freely chosen; hence they are similar in this sense to non-addictive behaviors, and should not be considered socially unacceptable on the basis that they are ‘addictive’. These theories are critiqued in section 5.1.1.

<sup>29</sup>Normalization efforts by the TI are currently minimized by measures that restrict tobacco advertising, promotions, and sponsorships (TAPS), or that denormalize smoking (e.g. smokefree laws). These approaches, which in part aim to change the social connotations of smoking, are discussed further in section 6.1.

## Tobacco promotions to children

Furthermore, there is equivocal evidence from internal TI documents,<sup>30</sup> academic studies, and the TI's marketing campaigns that the TI was promoting cigarettes to children as young as 13 years old.[372] Internal documents are littered with memos indicating these intentions. For example, in a 1957 TI memo:

“Hitting the youth can be more efficient even though the cost to reach them is higher, because they are willing to experiment, they have more influence over others in their age group than they will later in life, and they are far more loyal to their starting brand.”(pg.77, [373])

The TI was also aware, from at least the late 1960's, that smoking represents a rite of passage into adulthood which is then sustained through nicotine addiction.<sup>31</sup> A 1969 memo from Philip Morris is illustrative:

“A cigarette for the beginner is a symbolic act. I am no longer my mother's child, I'm tough, I am an adventurer . . . As the force from the psychological symbolism subsides, the pharmacological effect takes over to sustain the habit.”(pg.3-4, [374])

In the 1980's, R.J. Reynolds launched a campaign for its Camel cigarette brand, featuring a cartoon camel character named Joe Camel.[375] This was clearly a children's campaign, and a highly successful one at that; a 1991 US study found that Joe Camel had reached 30% of children as young as three years old, and that most children (91%) aged six recognized Joe Camel as much as they recognized Mickey Mouse, and associated Joe Camel with cigarettes.[376] Meanwhile, R.J. Reynolds publicly claimed that:

“We don't want young people to smoke. And we're running ads aimed specifically at young people advising them that we think smoking is strictly for adults . . . Kids just don't pay attention to cigarette ads, and that's exactly as it should be.”[377]

However, it is clear that these TI-sponsored 'anti-smoking campaigns', by telling teenagers that “smoking is for adults”, were actually reinforcing smoking as a symbol of adulthood, and were therefore

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<sup>30</sup>In 1998, a lawsuit against the TI forced the release of over 40 million previously confidential industry documents onto the internet. They are now available for all to see at <http://legacy.library.ucsf.edu/>. These, along with an excellent literature on the subject,[38, 39, 373, 375, 370, 378] have successfully exposed the clandestine and corrupt activities of the TI over the last eight decades.

<sup>31</sup>This rite of passage effect provides a justification for the tobacco free generation (TFG) proposal. More discussion on this approach in section 6.2.

an indirect advertising strategy to encourage youth smoking.[375] Sports sponsorships were also a popular and highly effective marketing strategy, that particularly influenced children, even though the TI openly claimed that such sponsorships were targeted to adult smokers.[379, 380] The ethical implication that is in turn presented is that children need to be especially protected from tobacco use and the deceptive marketing practices of the TI. This issue is ongoing and important, since—as discussed in section 2.1.1—smoking initiation is limited almost exclusively to children, and many of these initiations are in response to peer pressure, TI activity, and the positive social connotations associated with smoking.<sup>32</sup>

### **Ongoing challenges**

As a result of these promotional activities, the TI has gained an enormous amount of financial and political power. Nowadays, global TI revenue is estimated at half a trillion US dollars annually,<sup>33</sup> which is similar in size to the gross domestic product of Poland, Sweden, Venezuela, or Saudi Arabia.[8] The implication is that it is very difficult to overcome TI-funded resistance to effective tobacco control policies. Over the last six decades, as evidence surfaced about the negative health effects of smoking, public health efforts have attempted to reduce smoking prevalence, regulate tobacco sales, and restrict the influence of the TI. However, the TI has relentlessly fought these efforts, often through covert tactics, such as refuting scientific evidence demonstrating the harms of tobacco, influencing scientific research, and falsely appealing to notions of freedom and human rights in public discourse.

In what follows (sections 4.4 and 4.5), some of the covert ‘scientific’ activities of the TI are described, and ways in which these activities continue to create ethical considerations for the development of tobacco control policies.

## **4.4 Tobacco industry–funded science and debate**

The TI has been funding scientific research since 1953: first through the Tobacco Industry Research Council, later the Council for Tobacco Research and Center for Indoor Air Research,[381] and in more recent times through more indirect means, such as universities,[382] or independent research organizations such as the non-profit Life Sciences Research Office or the Institute for Science and Health. While such institutions have declared independence from TI bias, their panel members tend

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<sup>32</sup>The importance of protecting children is increasingly recognized in more recent policy approaches, such as tobacco harm reduction, tobacco denormalization strategies, or the TFG proposal. Implications of these strategies are discussed in chapter 6.

<sup>33</sup>These sales are coming from virtually all countries and regions in the world; however, notable contributors include China, Russia, and Eastern Europe.

to be funded directly by the TI or are selected and approved by the TI, thus creating a conflict of interest.[383] TI-funded research was ostensibly set up in order to “cooperate closely with those whose task it is to safeguard the public health”.[384] Yet, it was—and remains—essentially part of a public relations strategy that ultimately aims to protect the TI’s financial and political interests.

Early TI-independent evidence of the association between cigarette smoking and lung cancer surfaced in the 1950’s.[385] The TI publicly denied this evidence,[384] while secretly accepting it;[39] meanwhile, the TI’s own research demonstrated that cigarettes cause lung cancer, other chronic diseases, and addiction.[375] These results were suppressed in favour of more benign findings, and did not surface until the 1990’s as a result of legal proceedings.[39] From the 1970’s, the TI also understood the health problems posed on non-smokers by SHS.[370] However, as independent evidence accumulated that SHS was harmful and causal of lung cancer in non-smokers,[386, 387] the TI more openly denied this and looked for ways to protect its reputation.

#### **A ‘safe cigarette’**

In the 1950’s, the TI began the search for a ‘safe cigarette’ that would deliver low tar (carcinogen) levels, but a high nicotine level to sustain addiction (and therefore tobacco sales). Such a cigarette is technically impossible to develop; so instead, the TI sought ways in which cigarette design could be altered to give an illusion of safety. Inhalation was made easier by adding bronchial dilators and creating menthol cigarette varieties. Ammonia was added to freebase nicotine, thus creating a stronger nicotine ‘hit’ at lower concentrations.[39] Filters and ventilation holes were added, ostensibly to lower the amount of harmful constituents inhaled, and tar and nicotine levels were reduced in so-called ‘light’ cigarettes. However, the net result was that smokers compensated by covering the ventilation holes,[388] and inhaling harder to obtain more nicotine. This forces carcinogenic particles into deeper parts of the lung; the cancers that result are more difficult to detect and treat.[39]

In other words, due to the TI’s ill-founded efforts to reassure smokers, cigarettes have become, if anything, deadlier than before. Lung cancer risk has actually risen for smokers—tenfold in men, and double in women—between 1959 and 2010.[1] The ethical implication is that a lack of transparency and regulation on the design of tobacco products has intensified the public health problem. The TI understood all along that ‘safe cigarette’ developments were futile; however, the goal was simply to increase delusory confidence in its products. As a 1971 industry memo illustrates:

“The question as to whether such cigarettes are really safer does not matter ... even our Health people wonder whether low tar and nicotine cigarettes are a good idea.”[389]

In a more recent context, but in a similar fashion, the TI has started developing a number of ‘alternative’ products to cigarettes, most notably electronic nicotine delivery systems (ENDS). Based on the negative experience with ‘safe cigarettes’, many tobacco control advocates are concerned that ENDS will weaken effective tobacco control policies or even worsen the public health situation, for the same reasons as before: a lack of transparency, insufficient regulation on design, and the ill intentions of the TI.<sup>34</sup>

### **Confounding variables**

Otherwise, TI-funded scientific research was primarily focused on ‘confounding variables’, such as diet, genetic factors, and stress, that could undermine research showing a link between smoking and addiction or chronic disease. Numerous “Special Projects” were set up, in which scientists and academics were recruited to publish TI-friendly research, stimulate pro-tobacco debates, protect the TI in litigations, and promote the ostensible benefits of tobacco; all in ways that showed minimal TI involvement. As such, recipients of TI funding were instructed not to disclose that their research was mainly for litigation purposes, and payments were often made indirectly so that academics could avoid disclosing their involvement with the TI.[390]

The TI was aware, for example, that nicotine addiction could be more strongly sustained through stress or discomfort,[391] and so the TI recruited Hans Selye, a prominent physiologist, to promote cigarettes as a suitable source of stress relief. Selye, during his career, wrote 1700 articles, 39 books, was nominated for the Nobel Prize 10 times, and became renowned as the ‘father’ of stress research. However, his work was also used in lawsuits against the TI, and to argue against the causal link between smoking and chronic diseases. Essentially, the theory he helped to promote was that stress causes chronic disease, and smoking is a suitable self-medication against stress (and therefore risk of chronic disease). Selye’s research was also used to trivialize the addictiveness of nicotine, arguing instead that smoking is sustained through stress.[392]

The evidence presented in chapter 3 shows that, indeed, there is an important neurobiological connection between smoking and stress. This is also reflected in trends that show an increased smoking prevalence during times of war and other social hardship (see section 4.3). However, research on this connection has been misinterpreted by the TI, Selye’s research, and the common (mis)conception that smoking is an effective source of stress relief. As chapter 3 shows, it is not; smoking can provide a temporary stress relief during intoxication, but otherwise actually raises overall stress levels. In

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<sup>34</sup>However, they may also forward public health goals by providing a less harmful alternative to those who are unable or unwilling to quit using nicotine products—ethical discussion is provided in section 6.3.

other words, people often smoke in an attempt to relieve stress; but the idea that smoking is an effective means of doing so is a common misconception that has been propagated by the TI and its beneficiaries. Policies, then, should aim to address this misconception, and other misinterpreted lines of evidence—such as genetic research<sup>35</sup>—that may be used to absolve the TI.

### **‘Free choice’ arguments**

Another common argument propagated by the TI is that smoking is a pleasurable, freely chosen activity and is therefore an exercise of liberty. The TI, however, has been aware of the addictiveness of nicotine since at least the 1970’s. The TI was also aware that it could undermine the argument that smoking is a ‘free choice’. As illustrated in a 1973 TI memo:

“To some extent the argument revolving around “free choice” is being negated on the grounds of addiction. The threat is that this argument will increase significantly and lead to further restrictions on product specifications and greater danger in litigation.”[393]

To a large extent, the TI was correct; neurobiological evidence in section 3.1 demonstrates that addiction significantly *undermines* autonomy, thus making it more difficult for tobacco-addicted individuals to avoid using tobacco. In other words, the TI’s ‘free choice’ argument does not hold. Consequently, there are actually good grounds for stricter regulations on tobacco, based on its addictiveness.<sup>36</sup>

To circumvent these, the TI paid academics to write about tobacco in ways that made it look comparable to other legal substances such as tea, coffee, chocolate, and alcohol, in order to trivialize the addictiveness and health risks of tobacco, and to emphasize cigarette smoking as a claim to ‘freedom’ or as enhancing quality (as opposed to quantity)<sup>37</sup> of life.[169] Attempts to regulate cigarette smoking for the purpose of protecting public health were then painted as an unreasonable intrusion on personal liberty, or a slippery slope<sup>38</sup> towards banning tea, coffee, chocolate, and alcohol.[170] This reversed the argument: tobacco, instead of being correctly viewed as an addictive, autonomy-undermining product, was construed as a consumer choice. The concept of ‘freedom’ was thereby narrowed,<sup>39</sup> as pro-liberty

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<sup>35</sup>Further discussion in section 4.5.

<sup>36</sup>These are discussed in light of ethical concepts and theories in chapter 5.

<sup>37</sup>In the beginning, the TI did not even publicly acknowledge that smoking reduces the quantity of life. However, as evidence for the causal link between smoking and lung cancer became more conclusive, the TI started to rely more on arguments that smoking improves the quality of life by enhancing pleasure and relaxation. However, these claims are—according to the neurobiological evidence presented in chapter 3—also weak.

<sup>38</sup>‘Slippery slope’ refers to the argument that the rationale behind regulating tobacco will result in similar regulations for other unhealthy products. However, this argument holds little merit—further discussion in chapter 5.

<sup>39</sup>In section 2.3, two types of freedom were described: positive and negative. The narrowing of the concept of ‘freedom’ by the TI was into its negative sense.

arguments were used to argue for a minimal state, rather than for interventions that would protect or promote autonomy. Consequently, most pro-liberty arguments in the context of tobacco tend to be associated with minimal tobacco restrictions, even though—due to the addictiveness of tobacco—this is inaccurate; having an option to smoke actually limits freedom if it results in an addiction, and for most smokers this is indeed the case.

### **Pro-tobacco human rights arguments**

As discussed in section 2.3.4, the TI has also applied liberty claims into human rights debates in order to promote a ‘right to smoke’. The TI became especially interested in human rights arguments in the 1970’s, when it became clear that SHS was posing a serious health threat to non-smokers. Knowing that this could result in smoking restrictions in public places, the TI set up a number of smokers’ rights groups in order to oppose such restrictions.[375] While these groups were argued to promote ‘freedom of choice’, they were in fact, in the words of British American Tobacco:

“a more direct public relations/political campaign . . . primarily based on protecting the rights of smokers.”[394]

Yet it seems that these rights, rather than being applied universally, were in fact intended for subsets of people to whom cigarettes could be more easily marketed. In the words of a R.J. Reynolds executive:

“We just reserve the right to smoke for the young, the poor, the black and the stupid.”[395]

In other words, TI-funded human rights arguments were, broadly speaking, a framing tool to build support for pro-tobacco social movements that would resist effective tobacco control policies. It is unlikely that these arguments have any theoretical rigour, since they are essentially based on the conjecture that smoking is a freely chosen activity that can be translated into a liberty right. However, as argued above (and in chapter 3), addictive smoking is not freely chosen, and therefore not an exercise of liberty; even if it were, it is doubtful—given the serious and widespread health impacts associated with smoking—that it could be translated into a liberty right.<sup>40</sup>

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<sup>40</sup>Further discussion on these points is provided in section 5.2.3.



## 4.5 Tobacco industry–funded genetic research

The TI has, in recent years, also turned its attention to genetic research. Scientific interest in the genetics of (tobacco) addiction has—as discussed in sections 2.2.3 and 3.2.1—occurred in a context of improved scientific research methods such as functional magnetic resonance imaging (fMRI), positron emission tomography (PET), and genetic sequencing. However, it was also argued—in section 3.2.1—that, due to the limited evidence that supports the role of genetic factors in (tobacco) addiction, it is unlikely that genetic factors have a significant role in predicting susceptibility, and that genetic tests for nicotine addiction are unlikely to have much potential as a preventive tool. However, the TI has been investing significantly in such research, which—as with other TI–funded research—is ethically problematic.

### Tobacco industry investment in genetic research

A significant proportion, if not the majority of recent TI–funded work, is focused on genetics. Between 1990 and 1995, for example, 52% of British American Tobacco’s research budget was directed towards genetic research, most of which focused on genetic susceptibilities to lung cancer, pharmacogenetics, and behavioral (addiction) genetics.[396] Other tobacco companies, such as Philip Morris, have sponsored universities such as Virginia Commonwealth University to carry out work related to pharmacogenetics and behavioral genetics.[39] As with most other TI–funded work, TI involvement in this research has rarely been disclosed, and results have been subject to a strong interpretation bias, as contrasting evidence (showing no genetic involvement) is trivialized or ignored, and results showing the significance of a genetic factor are exaggerated, unrepresentative, or—in some cases—false.[396]

### Implications of tobacco industry–funded genetic research

Why should the TI have such a keen interest in showing the relevance of genetic factors in lung cancer or addiction? As discussed in section 4.4, the TI has been involved for decades in researching ‘confounding variables’ that may distort evidence demonstrating a link between smoking and addiction or chronic disease.<sup>41</sup> Similarly, genetic factors may be used to obscure the facts, by arguing that genetics play a more important role in triggering tobacco addiction than other factors, such as the social environment, TI marketing activities, or the nicotine in tobacco. Subsequently, focus could be shifted from these factors onto a set of ‘susceptible individuals’, to whom prevention and treatment

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<sup>41</sup>They have explored this previously in, for example, the context of stress—see section 4.4.

strategies are targeted. Meanwhile, those at a lower risk would be left alone.<sup>42</sup> These intents are well illustrated in a 1996 memo from a public relations firm to Philip Morris:

“A simple test might eventually be devised to tell a smoker whether or not he is at risk. This would put the burden of any consequence from smoking on the individual, and would clear the way for the non-susceptible population to smoke with a clear conscience.” [397]

Moreover, genetic research could protect the TI in litigations, by arguing that nicotine addiction is ‘genetic’, and so only a minority of smokers are ‘addicted’ while the rest smoke out of choice. Similarly, the TI may argue that smokers who developed chronic diseases, such as lung cancer, did so because of genetic reasons. Genetic research could also be fed into popular media, to create the perception that smoking-related diseases are genetic vulnerabilities rather than caused by smoking tobacco *per se*, and solutions to these diseases are rooted in genetic rather than public health-based interventions. TI-funded academics have already made claims in popular media that genetic tests will eventually become available to smokers, to determine those who will develop lung cancer from those who will not.[398] This, in turn, may compromise the success of (or compliance to) otherwise effective tobacco control policies that are based on reducing the overall consumption and availability of tobacco.<sup>43</sup> Thus it is important for policies to correct any misperceptions that a susceptibility to nicotine addiction is ‘genetic’; focus should be kept on more complex social and relational factors that confer susceptibility,<sup>44</sup> and on measures that restrict the overall availability and use of tobacco.

### **The medicalization of addiction**

Genetic research on nicotine addiction—which may be funded by the TI—also contributes to the geneticization of addiction, and medicalized views such as ‘brain disease’ theories of addiction.[27] In such conceptualizations, caution should be taken not to exclude social determinants that have important influences on addictive behaviors.<sup>45</sup> Nevertheless, brain disease theories have gained popularity in recent years, as evidenced by their adaptation into recent clinical definitions of addiction. The National

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<sup>42</sup>However, it is evident from the discussions in section 3.2.1 that it would be misleading to conclude that a susceptibility to nicotine addiction is genetic, because there are other, socially-influenced processes involved that policies should focus on.

<sup>43</sup>I have also co-discussed this point in a recent paper. It was argued that TI-funded genetic research is not in the public interests; therefore it should not be permitted access to public resources—such as biobanks—that are secured for the public interest. See [399].

<sup>44</sup>These factors were discussed at length in section 3.2, and in terms of social processes in section 4.1.

<sup>45</sup>Brain disease theories of addiction argue that addictive drugs ‘hijack’ the brain’s dopamine circuitry, which results in a cue-directed, predominantly automated bias towards drug-seeking behavior, and loss of behavioral control which impairs the drug user’s ability to resist drugs. In section 3.1, it was argued that this presents too simplistic an account of addiction. Brain disease theories of addiction are discussed and critiqued at length in section 5.1.2.

Institute on Drug Abuse (NIDA), for example, states that: “addiction is a chronic, often relapsing brain disease that causes compulsive drug seeking and use.”[257] Similarly, the American Society for Addiction Medicine (ASAM) defines addiction as: “a primary, chronic, neurobiological disease, with genetic, psychosocial, and environmental factors influencing its development and manifestations.”[400] It was also mentioned in section 3.2.1 that, according to NIDA and DSM–5, roughly 50% of susceptibility to addiction is attributable to genetics. NIDA, for example, has stated that:

“A person’s genetic makeup plays an important role in his or her addiction vulnerability and, possibly, in the decision to take drugs in the first place. Research shows that approximately 50 percent of the predisposition to addiction can be attributed to genetics.”[401]

The implications of these definitions, as well as a geneticized approach to selecting susceptible individuals, is that they neglect the wider social context,<sup>46</sup> or may undermine effective policies based on a psychosocial approach.<sup>47</sup> These definitions may also influence how addictions are perceived, prevented, and treated.<sup>48</sup> The idea that neurological processes determine addictive behaviors could support neuro–essentialism: the view that human behaviors, thoughts, and emotions are essentially a result of neurological activity. The belief that neurological processes are ‘hijacked’ by drugs has led to arguments that addicted individuals are not autonomous. However, the neurobiological evidence discussed throughout chapter 3 shows that these views are inaccurate. A heavily medicalized or neuro–essentialist approach, such as that advocated by some brain disease theorists, also tends to support genetic determinism—the view that human health and behavior are predetermined by an individual’s genetics—and a genetic–based approach to predicting and preventing addiction.[21] However, as argued, this would not only be inaccurate, but it would also give scope for the TI to absolve itself from its marketing and research practices. Thus it is important for policies to avoid a too heavy medicalized or geneticized view of (tobacco) addiction, and to maintain focus on the research and implementation of psychosocial approaches to treating and preventing addiction.<sup>49</sup>

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<sup>46</sup>Such as the destruction of the social and cultural identities of some indigenous groups, discussed in section 4.1.

<sup>47</sup>A psychosocial approach involves identifying and addressing the social factors that propagate addictions e.g. poor family dynamics, employment status, ACE, social opportunities, and social welfare structures.

<sup>48</sup>As the discussions above show, this has also been the case with other theories of addiction: moral choice theories, liberal theories, and the self–medication hypothesis of addiction.

<sup>49</sup>This does not necessarily imply that all medicalized interventions should be outruled; some interventions, such as the nicotine vaccine, may have potential within a psychosocial treatment approach—see discussion in section 6.4.

## 4.6 Summary

### The effects of social hardship

This chapter has built on arguments made in preceding chapters by illustrating the social processes that policies should pay attention to. In chapter 2 it was mentioned that socially disadvantaged groups such as racial minorities, people in low socioeconomic strata, and the mentally ill tend to suffer more from addiction, while chapter 3 showed the neurobiological relationship between stress/dysphoria and addiction. This chapter, by providing a sociohistorical context of (tobacco) addiction, has discussed the types of social disadvantage that underlie addiction and ways in which these have been exploited by the TI.

In general, it is hardship of a *social or relational*—rather than economic—nature that results in a loss of self-respect and standards; this contributes to the stress, dysphoria, and other negative states of mind that trigger and sustain addictions.<sup>50</sup> The implication for policies, then, is that focus should be shifted onto the social processes that contribute to this hardship, and support should be provided to those most affected. Principles such as relational autonomy, relational solidarity, and social justice<sup>51</sup> are important in this respect, as their emphasis is on a relational approach to public health: understanding the importance of relationships and the community in promoting good health.

More specifically, it was argued that indigenous groups have been severely dislocated from their societies and cultural identities as a result of colonization or other social change. Reinstating or recognizing these and building better support networks for indigenous groups is therefore a necessary component of policies that aim to minimize addiction (including tobacco addiction) among these groups. A similar principle applies to other marginalized groups who have been exposed to social hardship and who, similarly, have responded with high incidences of addiction. It was also argued that moralistic approaches to addiction are ineffective; people should be supported—not socially pressurized—into non-addiction. This should be done using a relational approach, by appealing to support from the community and important relationships such as family, friends, or a partner.

### The relationship between social context, addiction theory, and policy

It is also clear that there is an important relationship between social context, how people relate to the use of a psychoactive substance, and how this is perceived by society. Social perceptions in turn

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<sup>50</sup>Economic hardship may contribute to these. However, it is not the *necessary* and *only* factor which explains why not all groups living in poverty suffer disproportionately from addictions, though many socioeconomically deprived groups tend to have higher incidences of illicit drug use, alcoholism, and smoking.

<sup>51</sup>These principles were introduced in section 2.3.3; for a definition of these principles, see page 51.

influence policies; this, in turn, reflects the importance of having an appropriate conceptual basis on which to build a policy. For instance, when an important social transformation occurs—such as the dismantling of a culture—pressure is put on affected individuals, which increases the tendency to relate differently to the use of a psychoactive drug. This special relationship to drug use—‘addiction’—may be perceived by a society in various ways. If perceived as a self-medication or a disease of the will, the result is a relatively sympathetic approach: the former focused on psychosocial intervention, and the latter on medical treatment. If perceived as a social pest, the result is a moralized approach and the further marginalization of addicted drug users. If perceived as a pleasurable pursuit in line with modern, consumerist values, there is a tendency to justify the use of certain drugs for the purpose of ‘recreation’.

Normative perceptions of addiction more generally have also undergone various shifts. The earliest views on addiction described in section 4.1—that addiction is a devotion to a pursuit, and is not socially problematic—is similar to the more recent ‘liberal’ theories of addiction, in which addictive drug use is described as a pursuit of pleasure. In this view, addictive behaviors are not compulsive, and should not be stigmatized, since they are comparable to other pleasurable, freely chosen activities such as eating chocolate. Regulations are then considered as unethical intrusions on freedom and liberty rights. Although there is an element of pleasure in many addictions, liberal theories of addiction do not capture other important elements of the disorder (such as its effects on autonomy, described in chapter 3); the implication is that effective policies are undermined, addictions remain untreated, and the wider issues ignored.

Ideas that followed in early temperance movements—Rush’s disease conception—are echoed in more recent ‘brain disease’ theories of addiction. Both views tend to describe addictive behaviors as arising not from character weakness but from a disease that affects the will, and so they tend to promote a sense of sympathy towards addicted drug users. The main difference between these theories is that modern brain disease theories draw on neurobiological and genetic research, and advocate for the treatment of addictions using medical therapies (rather than abstinence alone). Otherwise, ‘moral choice’ theories of addiction, that have dominated drug policies throughout the 20<sup>th</sup> century and beyond, tend to put a moral judgement on addictive behavior, which has led to a largely unsympathetic, abstinence-based treatment of addictions. While neither of these theories have dominated conceptions of tobacco addiction since the 1920’s, hints of them are starting to appear in tobacco control policies. Smoking cessation therapy, for example, is based largely on a medicalized approach;<sup>52</sup>

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<sup>52</sup>Cessation therapies recommended in current policy frameworks—such as the WHO FCTC—include medicines such as varenicline, bupropion, and approved nicotine replacement therapies (NRT)—see section 2.2.1.

further medicalization may endorse strategies such as nicotine vaccines or genetic tests. There are also moralistic undertones in recent ideas to denormalize tobacco.<sup>53</sup> However, this approach may backfire given the negative experiences with moralistic policies for illicit drugs outlined in section 4.2. Hence focus should be maintained on a psychosocial approach as opposed to one heavily orientated towards a moral choice or brain disease theory of addiction.<sup>54</sup>

Other theories of addiction mentioned (social dislocation theory and the self-medication hypothesis) are also relevant to tobacco addiction. Since addictive smoking is a means of coping with dysphoria, stress, or social dislocation, social circumstances have an important role in increasing an individual's susceptibility to developing addictions. The implication, then, is that solutions to preventing and treating tobacco addictions should be rooted in social change. However, the TI has used self-medication hypotheses to justify smoking among mentally ill and homeless populations, and so care should be taken to not use these theories as a means to justify smoking or to negate promoting social change. Correct interpretation of the evidence, however, may actually forward public health goals.

### **Influence of the tobacco industry**

The TI has had a major influence in shaping the current situation by playing on social contexts,<sup>55</sup> influencing social perceptions,<sup>56</sup> and changing how people relate to tobacco use.<sup>57</sup> The TI, by keeping its strategies as opaque as possible, has been able to influence public discourse, research, and the acceptance of tobacco control policies. It also influenced ethical debates on tobacco, by portraying smoking as an exercise of freedom and liberty rights, and tobacco regulations as undermining these. Consequently, the TI is in large part responsible for the current public health situation described in section 2.1: a vast number of tobacco-related diseases and mortalities, difficulties in overcoming nicotine addiction, and problems associated with SHS exposure. Furthermore, because the TI took advantage of the impressionability of specific groups (such as youth, people with comorbid mental illness, and racial minorities), the TI is also largely responsible for tobacco-related health inequalities, and the fact that smoking initiation occurs primarily among children. Thus, the TI has had a powerful role not just in increasing smoking prevalence, but also in shaping how tobacco addiction has been perceived, researched, prevented, and treated over the years.

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<sup>53</sup>Tobacco denormalizing strategies were introduced in section 2.2.3; there are concerns that they lead to the stigmatization and social marginalization of smokers. These concerns are discussed further in section 6.1.

<sup>54</sup>I have also emphasized this point in [402]. It was argued that moral choice and brain disease theories of addiction are inaccurate and ethically problematic descriptions of addiction, and so a psychosocial theory should be adopted.

<sup>55</sup>For example, by promoting cigarettes during times of hardship such as World War I.

<sup>56</sup>For example, by obfuscating evidence that cigarettes are harmful, propagating the misconceptions that habitual smoking relieves stress or is freely chosen, or by normalizing smoking.

<sup>57</sup>For example, by increasing the addictive potential of cigarettes.

This creates a number of implications for tobacco control policies. As mentioned in chapter 2, the TI has an enormous amount of economic and political power which makes it a powerful adversary to tobacco control efforts. Although it is practically difficult<sup>58</sup> to dismantle the TI, it is possible to regulate and expose the TI's marketing and research activities. The regulation of TI activities already forms an important part of policy frameworks such as the WHO FCTC. This includes measures such as the banning of all direct and indirect TAPS and the establishment of procedures to ensure that policy decisions are kept free from the domination of vested interests.[6] In recognizing the fundamental incompatibility between the interests of health research and the interests of the TI, some research institutes—such as NIDA and various universities—have restricted or banned TI-funded research.[399] Therefore more can and should be done in regulating TI activity. States should ensure that bans on all TAPS and policies to prevent TI lobbying in government and other policy-making sectors are better implemented. There should also be stricter regulations on TI involvement in academia and research. This may entail the banning of all research funded directly or indirectly by the TI, or at least very stringent guidelines on the disclosure, publication, and public dissemination of research funded directly or indirectly by the TI.

Due to the covert nature of the TI's tactics, these regulations alone may not offer sufficient protection from TI activity. It is also important, then, to make policymakers, health researchers, academics, and the general public more aware of the TI's surreptitious activities so that they can be better prepared to counteract them. This idea builds on from the principle of transparency,<sup>59</sup> which refers to how policy decisions are made: free from the domination of specific interests, and in a clear, accountable manner. This principle should be built on to promote clear and accountable decision-making not only by keeping policymakers' decisions transparent, but also by establishing health communication and education initiatives that go further in promoting awareness of the TI's marketing and research activities.

As such, there should be education programmes to expose the TI's covert research tactics and to correct misperceptions such as the ideas that smoking is an effective means to relieve stress, that addictive smoking is freely chosen, that predisposition to nicotine addiction is genetic, or that smoking is an exercise of freedom and liberty rights. In targeting the general public, these education programmes should particularly focus on socially disadvantaged groups, who are targeted the most for misinformation by the TI. It is also important to track and expose the TI's involvement in research

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<sup>58</sup>Or impossible—practical and economic analyses are beyond the scope of this thesis.

<sup>59</sup>This principle was introduced in section 2.3.3, and defined on page 50.

developments such as nicotine vaccines, genetic tests, and cigarette alternatives,<sup>60</sup> to make academics and health researchers aware of how their work may be (mis)used by the TI, and to anticipate ways in which the TI may use new information to counter effective tobacco control policies or to absolve itself in legislations. It is also important to reverse the normalization efforts the TI has made over the decades by normalizing non-smoking. These efforts should be targeted particularly to children, given their vulnerability to TI marketing. In other words, dealing with challenges related to TI activity not only requires regulating TI activity and keeping policy decisions transparent, but also exposing the TI's marketing and research strategies and tackling the social dimensions over which the TI has had a strong influence in previous decades.

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<sup>60</sup>Especially ENDS—see section 6.3.



## Chapter 5

# An ethical framework for tobacco control policy

The central aim of this thesis is to develop an ethical framework for tobacco control policy. As argued in chapter 2, there are a number of ethical implications that may arise as a result of tobacco control policies, including more recent strategies such as the tobacco-free generation (TFG) proposal, tobacco harm reduction, tobacco denormalization, nicotine vaccines, and genetic tests. Addressing these implications requires an ethical framework that is context-sensitive and that takes into account relevant features of addiction. Preceding chapters have highlighted important features that should be considered in the framework.

### **Arguments so far**

Chapter 2 argued that the public health impacts of tobacco use are sufficiently serious to warrant intervention. Thus, the goals of measures that aim to minimize overall smoking prevalence, protect others from exposure to second-hand smoke (SHS), protect children from initiation, minimize tobacco-related health inequalities, and help people overcome their addictions to tobacco are ethically justified. These goals, then, should be incorporated into the ethical framework. The last two are related to addiction; chapter 2 argued that this is a serious problem in the context of tobacco, since addiction affects the majority of smokers, can seriously impair the ability to quit, and has a disproportionate effect on socially disadvantaged people. It was also argued that it is important to have an accurate conceptual account of addiction, because how addiction is conceptualized can have important—and ethically problematic—results on how addiction is prevented and treated. For instance, if addicted individuals are considered non-autonomous, they may be subjected to coerced therapy; if their addictive

behaviors are considered freely chosen, a *laissez-faire* policy or moralistic approach may result.

It was argued in chapter 3 that addiction is autonomy-undermining, in the sense that it can seriously impair the ability to avoid using tobacco through neurobiological changes that occur in dopaminergic pathways, the prefrontal cortex (PFC), and the endorphin-opioid system (EOS). Addictive behaviors are often motivated by emotional processes, and so emotional factors such as values, desires, and relationships are an important aspect of addictive decision-making. They may also be motivated by ideas that smoking relieves stress or is pleasurable; however, these do not contribute to mental wellbeing due to homeostatic adaptations in dopaminergic reward pathways and the EOS. Hence the argument that smoking is a source of pleasure or stress relief is a common misconception that policies should aim to correct, and restrictions should not be offset based on these ‘benefits’. One may argue, then, that some smokers *prefer* a transient sense of pleasure or relaxation, even if they are aware it contributes to overall stress and dysphoria. However, chapter 3 argued that these preferences are internalized *through a non-autonomous process*,<sup>1</sup> and are often a source of cognitive dissonance.

Nevertheless, it is possible in addiction to resist tobacco use and to reverse neurobiological changes by training the capacity for self-control and self-awareness. A supportive social environment can bring out this capacity. An environment in which tobacco-related cues—such as tobacco industry (TI) marketing (tobacco advertising, promotions, and sponsorships—TAPS) and smoking in public places—are minimized reduces the triggering of cravings and relapse through dopaminergic reward pathways, and can make it easier for smokers to quit. Stress is another important social trigger for addiction through its effects on the EOS and dopaminergic pathways; minimizing the social factors that trigger stress, and promoting supportive social relationships, are other ways in which addiction and relapse can be prevented. The social environment is therefore autonomy-promoting or autonomy-undermining; this in turn reflects the fact that autonomy in addiction is relational, and that society, the TI, and the state have a responsibility to provide autonomy-promoting conditions.

Chapter 3 also looked at mechanisms of susceptibility. Genetic factors play a relatively minor role in conferring a susceptibility to addiction; the social and relational environment, particularly in early childhood, has more important effects. More specifically, it was argued that proper development of neurobiological functions, particularly the orbitofrontal cortex (OFC), requires an attuned interaction between infants and their primary caregiver; an insecure attachment experience can disrupt this development, which can predispose the child to developing an addiction later in life.

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<sup>1</sup>Through a process termed ‘internalized preference formation’, introduced in section 2.3. It often involves the conditioning of subconscious tobacco-related cues through dopaminergic reward pathways that, upon exposure, can trigger strong cravings for tobacco use.

This in turn reflects the importance of social support systems aimed at parents with young children, especially parents living with a mental illness or in stressful circumstances. In chapter 4, it was argued that the social factors that contribute to these circumstances involve social dislocation, the oppression of groups (such as indigenous people), stress, and a loss of self-respect and standards that may or may not be accompanied by economic hardship. Further, individuals are more likely to develop addiction not only in adolescence, but also in early adulthood before age 25; hence there is a case for protecting young adults below age 25 from smoking initiation. Such protection should be targeted to young people in socially disadvantaged groups, who—as argued above—are most vulnerable to developing addiction.

Chapter 4, in highlighting the marketing and research activities of the TI, also argued that there should be more regulation on TI activity and exposure of its covert marketing strategies, involvement in scientific research, and targeting of vulnerable groups. Many of the TI's covert tactics have become known in recent years thanks to the online availability of internal industry documents since the late 1990's; however, these tactics are not always communicated to the public and other stakeholders (e.g. policymakers, academics) in media or education campaigns.

Further, as discussed in section 4.5, the TI is—more recently—looking for even more opaque ways in which to be involved in newer developments, and so these issues are particularly relevant to interventions such as genetics, vaccines, and tobacco harm reduction. Policies should also work to protect vulnerable groups from TI marketing, reverse the TI's efforts to normalize and glamorize smoking, and correct misleading arguments often used to support smoking in pro-tobacco debates: notably that smoking is an effective means to relieve stress, that predisposition to nicotine addiction is genetic, and that smoking is an exercise of freedom and liberty rights.

### **What should an ethical framework protect?**

Following from these arguments, what should an ethical framework for tobacco control policy protect? A number of ethical concepts and theories were highlighted in chapter 2; these were generally aimed at preserving freedom and/or health. The ethical framework of this thesis, then, should aim to protect health. Given the autonomy-undermining effects of addiction, it should also promote positive freedom: freedom created by state interventions that protect or promote autonomy. This should not involve the coercive treatment of addictions, since addiction does not negate autonomy. Autonomy in addiction is relational, so the framework should emphasize the importance of autonomy-promoting social conditions and social support systems in promoting autonomy in addiction. Further, opportuni-

ties for developing autonomy are not spread equally, and tend to be linked to social injustice, so social justice should comprise an important aspect of the framework. In other words, a relational approach to tobacco control—with relational autonomy as a central consideration—should be advocated by the ethical framework of this thesis.

These ideas apply primarily to the context of addiction, but as mentioned in chapter 2, not *all* smokers are addicted to tobacco. One may argue, then, that a regulatory framework based on negative freedom—minimal state interference—should be used to address non-addictive tobacco use. However, this approach is problematic for various reasons.

First, people who are non-addicted can still develop addiction, particularly in response to stress. It is then necessary to also provide autonomy-promoting social conditions in the *prevention* of addiction. Second, people below age 25 are—due to ongoing neurodevelopment until that age—vulnerable to smoking initiation and addiction, which means it is necessary to protect this group from smoking initiation. Third, tobacco use—addictive or not—directly affects the health of others, which justifies restrictions on the basis of the harm principle. Fourth, people who are not addicted to tobacco may initiate and continue smoking as a result of misinformation propagated by the TI.

Therefore the ethical framework of this thesis should, while focusing on relational autonomy (see above), also continue to build on current measures such as those advocated for in the World Health Organization’s Framework Convention on Tobacco Control (WHO FCTC). This includes measures that protect others from SHS, and that protect young people—including those below age 25—from smoking initiation. There should also be measures that, in line with WHO FCTC, discourage smoking and encourage cessation among non-addicted smokers, and that restrict the marketing activities of the TI.

## **Aims and structure**

The aim of this chapter is to develop these points into an ethical framework for tobacco control policy. Section 5.1 starts by building a conceptual foundation for the framework: an account of the relevant features of addiction that should influence tobacco control policies. Section 5.2 develops this into an ethical framework for tobacco control policy by returning to the ethical concepts and theories that were introduced in chapter 2: liberal theory, public health ethics, and human rights.

## 5.1 Conceptual foundation: Towards a definition of ‘addiction’

The question of “what is addiction?” is an important one: as argued in chapter 4, policies tend to be affected in significant and often ethically problematic ways by their conceptual foundation. Four theories of addiction were introduced in chapter 4: moral choice theories, liberal theories, brain disease theories, and the self-medication hypothesis. All four theories are influential and relevant in the context of tobacco, yet they are potentially problematic in the policies they advocate. They are analyzed in this section in light of the evidence presented in preceding chapters.<sup>2</sup> Relevant aspects are then used to build a conceptual foundation for the ethical framework of this thesis.

### 5.1.1 Liberal theories of addiction

Liberal theories of addiction make the following claims: (1) addictive behavior is action that is freely chosen, and not different in this sense to non-addictive behavior; (2) drug addictions are essentially large appetitive desires similar to appetites for natural behaviors such as eating or sex; (3) there is an element of pleasure (and pain) in all chosen behaviors, including those that may be interpreted as ‘addictive’.

#### Underlying philosophy and implications

Liberal theories of addiction are supported by philosophers such as Foddy and Savulescu.[32] They argue that these theories are similar to moral choice theories of addiction, in that both interpret addictive actions as freely chosen. However, liberal theories of addiction—in contrast to moral choice theories—consider addictive behaviors as morally *acceptable* to the extent that they do not harm others,<sup>3</sup> and are thus rooted in liberal ideology. Addictive behaviors—that are simply a way of acting that might be perceived as an addictive-like state—are actually freely chosen, and should be permitted. However, one tension with this argument is that it presumes that addictive behaviors are freely chosen; yet, neurobiological evidence in section 3.1 indicates that they are not. ‘Freedom’ in this context is mistakenly narrowed into its negative sense: the freedom created by minimal interference. However, a necessary precondition for positive freedom—autonomy—does not fully pre-exist in addiction, and needs to be created by state interventions that promote autonomy. This important point is missing

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<sup>2</sup>It has already been argued that moralistic approaches to drug policy are unethical, due to the problems that have resulted in the context of illicit drug use—see section 4.2. They are also considered inappropriate, because of their stigmatizing effect on addicted drug users which is likely to worsen addictions. Therefore moral choice theories of addiction are not analyzed at depth in this section, although a reference to them is made in section 5.1.5.

<sup>3</sup>‘Harm to others’ in this case excludes ‘moral harm’, which was defined in section 2.3.2 as actions that disagree with others’ moral values but are otherwise harmless.

in liberal theories of addiction.

Historically, liberal theories of addiction match the earliest observations of addiction, when drug use was considered socially unproblematic and was mostly for ritualistic or recreational purposes. More recently, the TI has also used this theory to describe smoking as a pleasurable pastime comparable to consuming chocolate or alcohol.<sup>4</sup> Smokers are then depicted as individuals who freely choose to smoke, whether to improve their cognitive performance, to relax, or to enjoy the taste; and to regulate this pleasure would be unethical.<sup>5</sup>[169, 170] Thus, accepting a liberal theory of addiction could endorse a *laissez-faire* policy that, like other unhealthy lifestyle behaviors, does not restrict smoking on the basis that it is ‘addictive’.<sup>6</sup> Restriction, then, would have to be justified within a liberal framework such as Mill’s harm principle. Furthermore, based on the assumption that addictive smoking is freely chosen, restriction is—in theory—effectively achieved via encouragement or discouragement measures such as incentives and disincentives.<sup>7</sup> However, before this paradigm is accepted, it is first necessary to ask: to what extent is addiction a large, appetitive desire that is, like many non-addictive behaviors, pleasurable and freely chosen?

### **Addiction: A freely chosen pleasure?**

According to the neurological observations described in chapter 3, liberal theories of addiction do, to some extent, match the description. All addictive drugs and rewarding activities increase neurological activity within dopaminergic reward pathways and the EOS, in both addiction and non-addiction, to elicit sensations of reward, pleasure, and relaxation. To this extent, all addictive drugs and naturally rewarding behaviors can be pleasurable and can elicit an appetite. However, the degree to which this occurs varies considerably; addictive drugs hit these circuits at a far higher magnitude,<sup>8</sup> and tobacco—which is inhaled and contains additives to enhance the nicotine ‘hit’—does this within seconds. Such hyperactivation can, in turn, contribute to long-term neurobiological changes. From section 3.1, it is clear that tobacco use is often associated with these long-term changes; they affect brain circuits and

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<sup>4</sup>The use of chocolate and alcohol also has health implications, although both substances are far less addictive than tobacco and the chronic health burden that results from their use is arguably less.

<sup>5</sup>However, these ideas are inconsistent with more recent research activities of the TI such as the development of genetic tests and electronic nicotine delivery systems (ENDS), since these suggest that addiction has impacts on behavior that warrant medical intervention. Despite this, the TI typically remains silent on the potentially autonomy-undermining effects of addiction, and continues to advocate for a ‘free choice’ argument.

<sup>6</sup>A theory of addiction that assumes addiction is a free choice could also endorse an approach that holds addicted individuals as morally accountable for their actions, and punishes or stigmatizes them accordingly if the behavior is considered to be morally repugnant in accordance with social norms. However, as argued in section 4.2, this approach has been counterproductive and is considered unethical in this thesis—see section 5.1.5 for further discussion.

<sup>7</sup>This approach is based on libertarian paternalism, in which healthy behavior is encouraged, while unhealthy options are still permitted. See the discussion in section 2.3.3.

<sup>8</sup>As argued in section 3.1, natural rewards such as food can increase dopamine levels by 50%, whereas the most addictive drugs can increase them by 1200%; a difference of 24-fold.

regions in ways that can impair behavioral and emotional control along with many other functions. These patterns can, in turn, impair the individual's autonomy, and do not tend to exist in individuals taking the same drug but in a non-addictive manner.

Therefore liberal theories of addiction are correct to the extent that they can describe *non-addictive* drug use: cases in which the long-term neurobiological changes that typify addiction have not (yet) formed, and individuals describe their drug-taking as 'casual'. In times when drug use was socially unproblematic and mostly for ritualistic or recreational purposes, a liberal theory of addiction was probably the most fitting description. In the modern context, however, it can only account for casual drug users and not those who are 'addicted': as in, displaying behavioral signs of cognitive dissonance, cravings, and other symptoms.<sup>9</sup> 'Liberal theories of addiction' are therefore more accurately 'liberal theories of casual drug use'. Furthermore, although addictive behaviors are to some extent large appetitive desires that elicit an element of pleasure, the claim that they are 'freely chosen' does not stand, since there are other complex features in addiction affecting autonomy in addiction that are better captured in other theories.<sup>10</sup>

### **Implications for tobacco control policy**

The above suggests that, in order to accept a liberal theory of addiction as a conceptual basis for tobacco control policies, casual smokers would have to comprise a vast majority of smokers. However, as argued in section 2.1.1, the majority of smokers are—to some extent—addicted to tobacco, so most smokers' relationship to tobacco use would not be accounted for under a liberal theory of addiction. This has some implications for tobacco control policies. First, policies based on providing information or weakly discouraging smoking are more likely to work on casual or weakly addicted smokers, but not more severe cases.<sup>11</sup> Indeed, in places where policies have taken this approach, this appears to be the case and has led to the 'hardening hypothesis': the idea that, when smoking prevalence in a population decreases, the smokers that remain are on average more severely addicted. Thus, another conceptual framework—that goes beyond liberal theories of addiction—is necessary, especially to account for more severe addictions.

Second, the assessment of a 'slippery slope' argument in tobacco<sup>12</sup> should take into account the

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<sup>9</sup>These symptoms, which form the diagnostic criteria for 'tobacco use disorder' in the 5<sup>th</sup> Diagnostic and Statistical Manual of Mental Disorders (DSM-5), were outlined in section 2.1.1.

<sup>10</sup>Such as brain disease theories or the self-medication hypothesis—refer to sections 5.1.2 and 5.1.3 respectively.

<sup>11</sup>As argued in chapter 3, neurological changes in areas such as the prefrontal cortex, dopaminergic reward pathways, and EOS can significantly impair the ability to avoid using tobacco, and so addiction is autonomy-undermining.

<sup>12</sup>Slippery slope arguments are based on the idea that, if tobacco use is restricted, the use of other unhealthy substances—such as coffee, sugar, and alcohol—will also be restricted on the same grounds.

proportion of users who are addicted, and the addictiveness<sup>13</sup> of the product. For example, it is often argued—usually by the TI—that restricting tobacco use would also justify similar restrictions on other unhealthy products such as alcohol. However, the proportion of alcohol users who are addicted is notably lower: as mentioned in section 2.1.1, a minority of alcohol users (2–9%) are addicted, whereas for tobacco, addicted users comprise the majority. While a liberal theory of drug use could account for the majority of alcohol users, it can only account for a small minority of tobacco users and so the slippery slope argument does not hold.

### 5.1.2 Brain disease theories of addiction

Brain disease theories of addiction make the following claims: (1) addictive behaviors result from maladaptive neurobiological functions; (2) prolonged drug use is the cause of these neurobiological malfunctions; (3) at first drug use is voluntary, after which neurological processes take over; (4) predispositions to addiction are conferred in part by genetics, and in part by environmental factors; (5) there is a strong scientific evidence basis for all of these claims.

### Underlying philosophy and implications

Brain disease theories, as discussed in chapter 4, evolved from early disease conceptions of addiction and as a result of advances in neuroscientific research methods. They also form the basis of most modern clinical definitions of addiction.<sup>14</sup>

The acceptance of a brain disease theory of addiction would, due its heavily medicalized focus, have a number of implications. First, prevention and treatment paradigms may shift into a more medicalized or geneticized approach which neglects psychosocial interventions; yet a psychosocial approach is crucial in helping people overcome their addictions, and—based on the evidence in chapter 3—genetic factors play a minor role in addiction susceptibility. Second, medical and genetic approaches could be misused by vested interests such as the direct-to-consumer (DTC) genetic testing industry or the TI, which is likely to be ethically problematic.<sup>15</sup> Third, the assumption that neurological processes ‘take over’ may lead to ideas that addicted individuals are not autonomous. Fourth, assuming that

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<sup>13</sup>This may be measured by pharmacological properties, such as the mode of administration, or behavioral criteria such as the conversion to dependency rate. For tobacco, as argued in section 2.1, ‘addictiveness’ in this respect is very high even in relation to many illicit drugs, because of its administration mode (inhalation), design (i.e. additives in cigarettes that freebase nicotine and enhance its absorption), and high conversion to dependency rate.

<sup>14</sup>The literature which discusses brain disease theories as a conceptual basis of addiction is very rich and crosses many aspects of decision theory, philosophy, the social sciences, behavioral psychology, and neuroeconomics. A full discussion of this is beyond scope; see [27, 28, 88, 205, 206, 403, 404, 405].

<sup>15</sup>Ethical implications that arise from TI activity in this context were discussed in sections 4.4 and 4.5; further discussion of this point is provided in section 6.4.



prolonged drug use is *causal* of addiction, paradigms could shift to ‘blaming the drug’, a sense of sympathy towards addicted individuals, and moral absolution of their actions.[406] It would also result in policies that restrict the availability of drugs as much as possible. Thus it is necessary to review brain disease theories in light of the evidence presented throughout chapter 3, to determine the extent to which they correctly describe tobacco addiction.

### **Addiction: A brain disease?**

From chapter 3, it is clear that there are distinct neurobiological features that typify<sup>16</sup> addiction. Neurostructural and neurofunctional changes in dopaminergic pathways, the EOS, and the PFC affect thoughts, emotions, and behaviors and often persist even years after abstinence. Outside intoxication, activity in dopaminergic reward pathways and the EOS is reduced which can lead to compensatory drug-seeking behavior. The ability to resist drug-taking is also hampered through multiple mechanisms. The ability of the PFC to inhibit behaviors is reduced, and attention shifts towards emotional stimuli.<sup>17</sup> These processes are, as brain disease theorists suggest,[194] often triggered by exposure to drug-related cues. Addictive behaviors can also result in automated, habitual patterns through dopaminergic plasticities in the dorsal striatum. These habits are often beyond conscious awareness and, consequently, can be difficult to control. All of these changes may also occur in non-drug addictions, and so there are characteristic neurobiological features, in many drug and non-drug addictions, that are in turn reflected in addictive behaviors.<sup>18</sup> However, these behaviors are not necessarily involuntary, and the neurobiological features are not necessarily independent of psychosocial processes or *caused* by drug use *per se*.

All of these neurobiological changes can make it very difficult in addiction to avoid seeking or using a drug. Despite this, section 3.1.3 argued that it is possible to overcome these through top-down behavioral control, in which the individual’s voluntary thoughts and behaviors are applied in order to reverse neurobiological changes. However, it was also argued that social factors are important in helping individuals to successfully exercise this top-down control.<sup>19</sup> This may entail, for example, minimizing drug-related cues in the social environment, providing emotional support, or providing

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<sup>16</sup>As discussed throughout chapter 3, these neurobiological features contribute to addictive behaviors, but are not necessarily the sole cause. However, they are strongly associated with addictive behaviors, and can be said to ‘typify’ neurobiological changes often observed in addiction.

<sup>17</sup>This occurs as ‘hot’ (affect-driven) processes become less responsive to ‘cool’ (inhibitory) processes. This also matches ideas from brain disease theorists who describe addiction as involving “neural hijack” (see [28]) or a struggle between “rational” and “irrational” selves (see [403]).

<sup>18</sup>These behaviors often reflect cognitive dissonance, and are used to diagnose addiction.

<sup>19</sup>This does not necessarily imply that addicted individuals are *incapable* of overcoming an addiction without the appropriate social circumstances; the point is that a supportive social environment enhances this capacity.

therapies that teach individuals how to control their addiction. The burden in remaining abstinent, then, should not be completely on the individual; the state and the community both have roles in facilitating individual's efforts in overcoming their addictions. Thus brain disease theories are correct to the extent that addiction is an autonomy-*undermining* condition, although this comes *in degrees*, is *potentially reversible*, and is dependent to some extent on *the social environment*. In other words, addicted individuals cannot be considered non-autonomous on the basis that addiction has neurological manifestations.

Since all drugs of abuse contribute, to some extent, to neurobiological pathologies in addiction, brain disease theorists have argued that drug use is the *cause* of these features. However, chapter 3 has shown that—while prolonged drug use contributes to these—they can also be triggered by stress exposure or emotional traumas that occurred prior to the initiation of drug use. These events can predispose individuals to developing addictions in later life, particularly if they occurred during sensitive developmental periods such as early childhood. This leads into the next point, regarding the question of susceptibility: is a predisposition to addiction conferred in large part by genetic make-up? Section 3.2.1 suggests not: although genetics play a subtle role, there is no 'addiction gene', and genetic factors only become relevant when environmental factors, such as childhood abuse, are taken into account.<sup>20</sup> Hard-wired genetic mechanisms are also further complicated—along with environmental factors—by epigenetic and neurodevelopmental mechanisms, and so the brain disease theory's claim that susceptibility is conferred 50% through genetic<sup>21</sup> factors is, most likely, inaccurate.

### **Implications for tobacco control policy**

The above arguments have several implications for tobacco control policies. First, psychosocial approaches should not be abandoned in favour of a medicalized or geneticized approach on the basis that tobacco addiction has neurobiological or genetic manifestations. Second, it is incorrect to blame tobacco as the sole cause of tobacco addictions, or to morally absolve addictive behaviors on this basis, even if having tobacco widely available makes it more difficult for addicted smokers to avoid using or buying tobacco. Policies should, however, aim to minimize the exposure of addicted smokers to tobacco or tobacco-related cues by reducing the availability of tobacco, restricting TAPS, and restricting smoking in public places. Third, an addiction *undermines* autonomy to a variable degree, but does not *negate* it; hence it is incorrect to argue that addicted smokers are completely incapable of avoiding tobacco use.

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<sup>20</sup>This is also an important point in the discussion on genetic tests for nicotine addiction susceptibility in section 6.4.

<sup>21</sup>In this instance, 'genetic' refers to the hard-wired genetic sequence.

Thus, brain disease theories of addiction are useful in that they highlight some important neurobiological features of addiction using an evidence-based approach, and in this sense they go beyond liberal theories of addiction. However, their most vital flaw is that they dichotomize neurobiological/genetic processes from environmental factors and assume that addictions are *caused* by drug use, even though chapter 3 shows that neurobiological, genetic, and social processes are closely intertwined, and social processes—as well as drug use—contribute to addictive neurobiology and behavior. The gaps that remain in brain disease theories, however, may be bridged by looking at the self-medication hypothesis of addiction.

### 5.1.3 The self-medication hypothesis of addiction

The self-medication hypothesis of addiction, introduced in section 4.1, makes the following claims: (1) social pressures or a mental illness bring about negative states of mind; (2) some individuals will try to self-medicate against these negative states of mind<sup>22</sup> as a coping strategy; (3) addictive drug use is one such strategy.[33]

#### Underlying philosophy and implications

The self-medication hypothesis goes beyond liberal theories and brain disease theories of addiction, in that it highlights the importance of the social factors that trigger addictions and acknowledges the connection between neurobiological and psychosocial aspects of addiction.

More broadly, but along a similar vein, addictive behaviors have been described as an escape from negative affect,[185, 204] and a social disease.[34, 407] Alexander, for example, has argued that addiction is a coping strategy against the negative affective states elicited when individuals are dislocated from their sociocultural origin, one another, or themselves.[34] Thus, society plays an important role in the propagation of addictions. Peele, for example, has argued that society actually encourages self-medication (and therefore addiction), since it continuously encourages its members to seek relief from outside sources:

“We are taught—in many cases by the institutions themselves—that we need school, need marriage, need a steady job, need medicines. What we really need is to be whole in ourselves, to take charge of our own health and education and emotional development.

We need to be confident that we can cope with, learn from, and enjoy the people and

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<sup>22</sup>One may also argue that self-medication, in this sense, is also an attempt to enhance agency in the short-term: as in, to temporarily achieve a *sense of* self-control. This sense of self-control may come as part of the (temporary) positive states of mind triggered by drug intoxication.

things that make up our environment. Because that wholeness is so hard for us to achieve, addiction is not, as we like to think, an aberration from our way of life. Addiction *is* our way of life.” (pg 181, [408])

The implication of these theories is that autonomy in addiction is generally viewed as being largely dependent on social conditions. Self-medication hypotheses also advocate for a stronger psychosocial focus in the treatment and prevention of addictions, and a more sympathetic view towards drug-addicted individuals along the social margin. Some writers, such as Alexander, have argued that some level of drug use is necessary for severely addicted individuals in order to sustain a normal, productive life, and to demand complete abstinence would be inhumane.[34] The TI has taken this argument a step further to promote smoking as an appropriate self-medication against the stresses of everyday life or mental illness;<sup>23</sup> the implication is that this endorses a *laissez-faire* policy, since restrictions are then considered inhumane.[170] This view, however, also assumes that addictive drug use ameliorates the negative states of mind the user is trying to escape. Therefore, it is necessary to assess—in light of the neurobiological evidence presented throughout chapter 3—the extent to which addictive drug use effectively mitigates negative states of mind, and the extent to which addiction is triggered by social factors.

### **Addiction: A coping strategy?**

In section 3.1, it was shown that physical tolerance mechanisms in addiction reduce overall activity within dopaminergic reward pathways and the EOS, which—outside intoxication—can result in a baseline state in which the individual feels more unmotivated, dysphoric, and stressed. This can result in drug use as a compensatory behavior. However, it was also shown that this compensation is temporary; outside intoxication, drug use actually contributes to these tolerance mechanisms and the negative states of mind the individual is trying to avoid. This explains, in part, why addicted smokers actually experience higher levels of stress and depression on average when they smoke: because the negative affect that accumulates in between intoxications raises the overall stress level.[236] Thus, addictive smoking is a self-medication, albeit a highly counterproductive one. The implication is that, contrary to the TI’s claims, smoking—especially for addicted smokers—does *not* contribute to the overall wellbeing of individuals, and should not be subject to a *laissez-faire* policy on the grounds that this would be more ‘humane’.

Chapter 3, in line with the self-medication hypothesis, also highlighted the importance of stress

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<sup>23</sup>For further discussion, refer to section 4.3.

in addiction. Stress is an important trigger for sustaining addiction and relapse, because of its close interactions with the EOS and dopaminergic reward pathways. Both stress and prolonged drug use contribute to dysphoria, emotional pain, and a diminished capacity for emotional attachment; these in turn contribute to prolonged drug use. The implication is that people are more susceptible to developing an addiction or relapsing into drug use while going through periods of emotional pain or stress. Even rats trained to take morphine[409, 410] or cocaine[411] show more addictive behaviors when socially oppressed. Housed in standard laboratory cages, rats predictably administer high levels of their drug. However, rats moved into an “environmentally enriched” condition—a more attractive, larger space, with toys and other rats (informally called “Rat Park”)—self-administer significantly lower amounts of drug, or no drug at all, even if the drug is provided in a tasty sugar solution.[409, 410, 411] Thus, it appears that in both humans and rat models, the effects of social oppression play a significant role in triggering addictive drug use.

As sections 3.1.5 and 3.2 show, stressful or negative events across the life-course can also predispose an individual to addictions, particularly if these events take place during a sensitive neurobiological development period such as early childhood. Since exposure to negative affect also influences development of the PFC, and damage to the PFC is a predictor of addiction severity, exposure to negative affect can influence not only *whether* an individual develops an addiction, but also the *severity* of that addiction. The extent of the damage caused—and therefore the extent to which an individual is predisposed to (severe) addiction—depends partly on *when* negative experiences took place (i.e. predisposition is higher if they occurred during an important developmental phase), the *severity* of the experience, social support structures, and many other complex factors. Thus, social factors can strongly increase the likelihood that an individual will develop an addiction, and there are clear neurobiological mechanisms underlying this likelihood.

An implication of the above arguments is that people are more predisposed to addictions when they are affected by social hardship. Accordingly, smoking is typically clustered among people from low socioeconomic strata, the socially marginalized, and people with comorbid mental illness, as well as racial minority groups strongly affected by social dislocation. The underlying reasons for this are not only economic, but—as argued in chapter 4—more accurately related to the destruction of social and cultural identities. Thus, it is noteworthy that there are psychosocial connotations to drug habits as giving some people a sense of identity and social belonging:

“ . . . the lure of its ability to confer a sense of belonging, interdependence of fate, and common purpose to individuals who would otherwise feel themselves to be standing alone

in a hostile world . . .” (pg.10, [351])

It is also typically more difficult for socially marginalized individuals to overcome their addictions. People with comorbid mental illness, for example, tend not to ‘mature out’ of their addictions.[33, 412] In the context of tobacco, this has resulted in the “hardening hypothesis” (see section 2.2.2). Furthermore, a recent study in over 20,000 smokers found that few factors are as highly associated with persistent smoking as depressive symptoms.[413, 414] The implication is that the social environment plays an important role in conferring a resistance to drug addictions, and in this sense, the social environment can be autonomy-promoting or autonomy-undermining.

### **Implications for tobacco control policy**

The result of the above conceptual approach is a policy heavily focused on psychosocial intervention: minimizing the social factors—such as stress and social dislocation—that contribute to addiction, aiding the psychosocial integration of marginalized groups, and reviving their social and cultural identities. Otherwise, the arguments above, along with those in section 3.2, have highlighted the importance of social hardship<sup>24</sup> in propagating addictions; minimizing this, and focusing support on parents with young children and socially disadvantaged groups, could reduce the incidences or severities of tobacco addictions along with these coexistent problems.

Therefore the self-medication hypothesis is attractive to the extent that it emphasizes the necessity for a stronger psychosocial focus in treating and preventing addictions, and recognizes addiction as a neurobiological disorder that originates—to a large extent—from social contexts. This applies especially to the most socially disadvantaged groups: racial minorities, the socially marginalized, people in low socioeconomic strata, and people with comorbid mental illness. A social environment, then, is recognized as either harnessing or undermining one’s capacity to avoid addictive drug use. What this means for addicted individuals is that they should be treated with support and respect, in order to harness their capacity to resist drug use. Drug use itself is, however, not a suitable self-medication as it makes the situation worse and does not address the psychosocial factors underlying the addiction.

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<sup>24</sup>Such as a comorbid mental illness, stress, and adverse childhood experiences (ACE).

#### 5.1.4 A definition of ‘autonomy’ in addiction

##### Addiction comprises relational autonomy

Social environments can be autonomy-suppressing or autonomy-promoting, and the welfare of individuals and of their community are interconnected. To return to the Rat Park experiments,<sup>25</sup> standard laboratory cages are an example of autonomy-suppressing environments that lead to increased self-administration of drugs in rats, while the enriched environment, “Rat Park”, is an exemplary autonomy-promoting condition. In the context of human addiction, autonomy-promoting conditions are those that provide opportunities for healthy lives, psychosocial integration, and that harness the capacity to overcome an addiction. Autonomy-suppressing conditions are those that evoke stress, pain, or other negative affective states, or that regularly expose individuals to drug-related cues.

##### Autonomy is undermined in addiction

To return to one of the research questions of this thesis: is addiction a condition that, by definition, undermines autonomy, and if so *to what degree* and *on which basis*? Based on the neurological processes described throughout chapter 3 and section 5.1.2, addiction is a condition that, *by definition, does not negate but undermines the capacity for autonomous action* regarding the addiction,<sup>26</sup> and the degree to which this occurs is *proportional to the severity of the addiction*. Further, this capacity can shift over time: when a casual drug user develops an addiction, when a mild addiction becomes severe, or when an addiction becomes less severe as a result of successful intervention. It can also shift over the life-course: for example, the capacity is increased in proportion to prefrontal development during adolescence. Thus, autonomy in addiction should be considered as a *dynamic capacity*<sup>27</sup> that depends in part on neurological development, in part on the individual’s own efforts, and in part on psychosocial factors.

##### Addictive preferences are internalized neurobiological adaptations

One may argue, then, that addictive behaviors are in line with the individual’s values<sup>28</sup> and are therefore fully autonomous.[32] However, a strong value towards an addictive behavior is not necessarily

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<sup>25</sup>Described in section 5.1.3.

<sup>26</sup>It is important to emphasize that autonomous actions are only undermined in the context of decisions regarding drug use. Decisions in other life aspects are not necessarily affected on the grounds of having an addiction.

<sup>27</sup>In other words, autonomy is derived from a mental ability to act autonomously. Competency can affect autonomy, but is not the same concept because autonomous action requires more than just competency; it also requires that the action is in accord with one’s own motives, values, and reasons.

<sup>28</sup>For example, in the case of smokers who are addicted but nevertheless want to smoke and want to be addicted.

formed through an autonomous process, because in addiction, autonomy-suppressing conditions can result in the formation of adaptive preference formations: adaptations to unjust or difficult social circumstances that are then internalized as one's *own* preferences.<sup>[142]</sup> This may be particularly true, for example, for individuals suffering from comorbid mental illnesses that are not addressed, or people living in harsh social circumstances with little support. A drug addiction then develops as an adaptation to these conditions, and is internalized as a strong preference towards that drug. This internalization can be observed on a neurobiological level (see evidence in section 3.1). Following Frankfurt, it may be observed as actions based on one's first-order desires.<sup>29</sup><sup>[143]</sup> This process is not autonomous, because it does not contribute to self-realization, wellbeing, or the formation of autonomous values and preferences.<sup>30</sup> Thus, addictive behaviors cannot be considered autonomous on the basis that they are in line with a said value.

## Policy implications

The question of whether addiction undermines or negates autonomy is an important one, because they justify different levels of intervention.<sup>31</sup> Addiction *undermines* autonomy and autonomy in addiction is relational, so conditions that contribute to the development of addiction, including the option to use an addictive drug and the social conditions that contribute to addiction, are—potentially—autonomy-undermining.

It follows that these conditions are not compatible with freedom, since free action requires that the individual has the autonomous capacity to act in accord with one's motives. In other words, freedom does not arise from having an option to become addicted, or from conditions that contribute to the development of addictions. Approaches based on preserving negative freedom through minimal state interference are then inappropriate, because they assume that the necessary conditions for freedom are pre-existent. In the context of addiction, however, they are not, since it is precisely the autonomy-undermining conditions that trigger and propagate addictions. Therefore it is necessary to adopt an approach that maximizes freedom in its *positive* sense, by creating conditions that protect or promote autonomy. In the context of drug addiction, this requires states to eliminate the social conditions that trigger addictions, provide social conditions that promote non-addiction, and restrict the availability

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<sup>29</sup>Frankfurt's hierarchy of desires was introduced in section 2.3.1. He argued that an individual who is consonant with his drug use is a wanton, because his drug use is driven by first-order desires for the drug ("A wants to X") rather than a reflection on this desire ("A *wants to* want to X"). Frankfurt considered this to be a non-autonomous process.

<sup>30</sup>This point was also made in light of neurobiological evidence in section 3.1.

<sup>31</sup>As discussed in section 3.1.6, if autonomy is negated, the individual is considered incapable of avoiding drug use; this may justify coercive interventions, such as coerced therapy. If autonomy is undermined, it means that the individual can, to some extent, still avoid drug use (although the ability is affected somewhat). This does not justify coercive intervention, but it may justify interventions that help to maximize the ability to resist drug use.



of addictive drugs. States should also aim to minimize the factors that contribute to social injustice, since these contribute in important ways to the social environments that trigger addictions in certain groups of people.<sup>32</sup>

### 5.1.5 A summary of the relevant features of addiction

#### ‘Addiction’: A neurobiopsychosocial disorder with social roots

Addiction is a disorder that should be thought of not as a behavior, but as *a relationship to a behavior*. This relationship has distinct neurobiological and psychological features: the neurobiological features described throughout chapter 3, and psychological patterns in which addicted individuals describe their drug use as a coping strategy, beyond their control, or as simultaneously rewarding as it is destructive. This relationship is largely rooted in social aspects, so addiction should be thought of not as a free choice, a brain disease, or a self-medication, but more precisely as a *neurobiopsychosocial* disorder that originates largely from negative affective states triggered by the social environment. Thus, emotional factors such as desires and relationships are an important aspect of addictive decision-making: they can trigger addictions and relapse, or predispose individuals to addictions in later life if they adversely affect neurobiological development, particularly during critical developmental periods.

Autonomy in addiction is also subject to neurobiopsychosocial influences. As argued in section 5.1.4, social environments, along with drug use itself, can undermine one’s wellbeing and autonomy, and the extent to which these are undermined is proportional to the severity of the addiction. Thus, the concept of ‘addiction’ should not be thought of as categorical (i.e. ‘addiction’ versus ‘non-addiction’) but as a *dynamic continuum*. On one extreme are drug users who are unaddicted, and whose autonomy is unaffected by drug use. On the other extreme are drug users who are severely addicted and whose autonomy is undermined to a significant extent. In between that are drug users whose addiction, in a clinical context, would be described as “mild” or “intermittent”. The continuum is dynamic, however, since addictions can progress into more severe forms, improve as a result of successful therapy, or non-addictive drug use can progress into an addiction if, for example, the individual is exposed to high levels of stress. However, in none of these cases is autonomy undermined to the extent that the individual is entirely incapable of resisting drug use.

Consequently, tobacco control policies should maximize freedom by providing autonomy-promoting conditions; this, in turn, requires policymakers to acknowledge the complex social factors that underlie

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<sup>32</sup>If states provide all the necessary social conditions, this does not absolve the TI or suggest that tobacco use should not be restricted. There are additional reasons for restricting tobacco, such as its harm to others through the effects of SHS, that warrant further restrictions—further discussion in section 5.2.

addiction susceptibility, and that these contribute to the formation and sustaining of addictions.

### Policy implications

The above points provide five important considerations for tobacco control policies. First, it is necessary to minimize the social factors that can predispose individuals to tobacco addictions: social injustice, ACE, poor parenting, stress, and so on. These issues are complex, and are already widely recognized as problematic;<sup>[137]</sup> however, a better recognition of the important connection between these and tobacco addiction—on neurobiological and psychosocial levels—can help governments to develop better smoking cessation and prevention programmes. This should include a stronger focus on socially disadvantaged groups who tend to be most predisposed. Second, the importance of emotional factors in addictive decision-making means that smoking cessation interventions should take into account the emotional and social contexts of smoking. Although current programmes based on rational disincentives do work to some extent,<sup>33</sup> policies should not assume that all addicted smokers can simply exercise a rational decision to not smoke.

This leads into the third point, regarding moralism and the stigmatization of smokers. It was mentioned in section 4.2 that people addicted to illicit drugs—particularly those from socially marginalized or poor communities—have been stigmatized and marginalized on the basis of their drug use being morally repugnant. Although smoking has never been moralized to this extent, a moralistic approach is starting to echo in recent attempts to denormalize tobacco. However, the arguments throughout this thesis have shown that this approach would be counterproductive, for two reasons. First, since a moralistic approach assumes that addicted smokers can exercise a rational decision to not smoke, their smoking is (incorrectly) thought to reflect a weakness of character rather than a diminished choice-making capacity.<sup>34</sup> Second, addiction is, particularly in many severe cases, a coping strategy against negative affect. Thus if addicted smokers are stigmatized for being unable to quit smoking, it is likely to propagate guilt in these individuals who are then encouraged to smoke more in order to cope with this guilt. This can make the addiction worse, and has the added effect of marginalizing these people further from the mainstream and distancing them from treatment services.<sup>35</sup>

Fourth, although moralizing smoking is potentially counterproductive, having the option to smoke—

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<sup>33</sup>Measures based on the WHO FCTC, for example, are based on this approach, and have been highly effective in reducing smoking prevalence. However, severely addicted individuals tend to be less responsive to such measures—see section 2.2.1.

<sup>34</sup>One may argue that, because autonomy is not negated in addiction, both elements are involved: a partially diminished choice-making capacity and partial weakness of character. However, this would be an oversimplification, because addictive behaviors involve more than a partial loss of autonomy or a perceived ‘weakness’ of character; they are also influenced by societal factors such as smoking normalization efforts by the TI.

<sup>35</sup>Further discussion and ethical analysis of these points is made in section 6.1.

even if it gives some temporary pleasure—can undermine autonomy; it is therefore necessary to restrict the availability of tobacco. The extent to which the availability of a drug should be restricted depends on its addictiveness: heavy restrictions on tobacco are justified, due its high addictive potential. Fifth, the discussion on autonomy throughout section 5.1.4 raises important points on the coercive treatment of addictions. Since addiction is not a condition that voids the capacity for autonomy, coerced therapy can only be justified on the grounds of hard paternalism. However, even in such cases, there is no guarantee that therapy would work. Treatment approaches based on mobilizing the individual's will and resolve are non-coercive and perhaps more effective if they help people to regain a lost sense of self-control. Therefore there are very few ethical grounds on which it is possible to justify the coerced therapy of addicted smokers.<sup>36</sup>

## **5.2 Towards an ethical framework for tobacco control policy**

This chapter so far has highlighted features of addiction that should be considered in tobacco control policies, and has thereby built a conceptual foundation for the ethical framework of this thesis. The next step is to incorporate these into an ethical framework for tobacco control policy, by building on relevant ethical concepts and theories. These were introduced in section 2.3: Mill's liberal theory and public health ethics theories. These theories are revisited in sections 5.2.1 and 5.2.2 respectively, and discussed in terms of their applicability to the ethical framework of this thesis. Human rights, which have often been used to support both pro-tobacco and pro-regulatory arguments, are discussed in section 5.2.3 in light of arguments made throughout this thesis. Section 5.2.4 builds on these discussions to describe an ethical framework for tobacco control policy, which is conveyed through a set of ethical considerations. Section 5.2.5 briefly summarizes and discusses this ethical framework, and outlines its application and relevance to tobacco control policy.

### **5.2.1 Application of Mill's liberal theory**

#### **Mill's theory as an ethical basis: The harm principle**

Mill's liberal theory is instructive for the ethical framework of this thesis to the extent that people's actions should be restricted for the purpose of protecting others from harm (the harm principle).[42]

The harm principle already forms part of the ethical basis of the WHO FCTC, as it includes provisions

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<sup>36</sup>Until now, most ethical issues related to the coercive treatment of drug addictions have been related to illegal drugs (and not tobacco). However, some new interventions may become coercive, especially if a medicalized approach to treating addictions is adopted. The implications this presents in the context of tobacco are discussed in section 6.4.

to protect others through the implementation of smokefree laws in public indoor areas. There is also emerging evidence that SHS exposure in public outdoor places, such as outdoor dining areas,[415] sidewalk cafes, and parks,[416] is harmful, particularly when smokers are seated in proximity to others. Thus, smokefree laws in some outdoor spaces may also be ethically justified if more evidence emerges. Children, who are particularly sensitive to the effects of SHS, should also be protected from SHS exposure in private indoor spaces such as cars and the home. Although implementing smoking bans in private areas—particularly the home—may be ethically problematic and therefore difficult to enforce, it is possible to encourage parents to create smokefree homes in non-coercive ways (discussed in section 6.1).

### **Mill's theory as an ethical basis: Protecting children**

Mill's theory also considers interventions to protect children's best interests to be ethical, as children are not yet in "the maturity of their faculties" (pg.12, [42]). This justifies measures such as an age restriction on buying tobacco. This age restriction is usually set at 18 years, but this thesis—using neurobiological evidence—has argued that people should be protected from smoking initiation until age 25, when prefrontal development is complete. Although people aged 18–25 years are arguably capable of making sound judgements, they are vulnerable to developing an addiction if drug use is initiated at this age; this is particularly the case for highly addictive drugs such as tobacco. An early tobacco addiction could, in turn, undermine their neurobiological development. Thus there is an argument for protecting young adults under age 25 as well as adolescents from tobacco, on the grounds of their neurobiological vulnerability to drug use and addiction. Therefore Mill's idea of protecting children, which already forms the basis of some existing measures (e.g. minimum age of sale laws), is also incorporated into the ethical framework of this thesis, and—for reasons related to the neurodevelopmental schedule in early adulthood—broadened to include people aged below 25 years.

### **Limitations in applying Mill's liberal theory**

Measures that protect others and children could also be viewed as paternalistic, since—as discussed in section 2.2.1—they also discourage smoking among adults. Within Mill's liberal framework, paternalistic interventions directed at adults are only justified if the adult is *incapable* of making voluntary or knowledgeable decisions. Smoking is—to some extent—still voluntary and knowledgeable, but it is not completely a 'free choice' as claimed in some pro-tobacco arguments, and the capacity for free

choice hinges in part on the conditions provided by the state.<sup>37</sup>

Therefore the application of Mill's liberal framework in this context is limited, because it assumes that the necessary conditions for freedom pre-exist in addiction and that freedom should be maintained by minimal state intervention. As a result, Mill's liberal framework—as discussed in section 5.1.1—can only account for non-addicted smokers, for whom a necessary precondition for freedom—autonomy—is still fully intact. Yet they only comprise a minority of smokers, and can still develop an addiction in response to various factors; some which may be triggered by an autonomy-undermining social environment.

An ethical framework for tobacco control should therefore consider freedom in its positive sense. It should also be more sensitive to the features of addiction,<sup>38</sup> the social contexts and injustices that contribute to addictions,<sup>39</sup> and the interconnectedness between freedom and health. By broadening Mill's liberal framework and his concept of 'freedom', and developing his ideas further into the context of tobacco addiction, it may be possible to arrive at an ethical framework that similarly holds freedom as the basis of human individuality and flourishing. The main difference, however, is that this freedom would originate from autonomy-promoting state interventions rather than a minimal state.

## Summary

Mill's liberal framework offers a starting point for thinking about the importance of preserving freedom, and how a harm assessment can be used to justify interventions. It also includes two important aspects that form the basis of some existing tobacco control measures and that will be applied into the ethical framework in section 5.2.4: the harm principle, and the protection of children (in this case also broadened to include young adults below age 25).<sup>40</sup> However, Mill's liberalism needs to be developed further using other ethical frameworks that recognize the importance of providing infrastructural conditions for health and minimizing health inequalities, and that are more sensitive to the relevant features of addiction.

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<sup>37</sup>This point also applies to non-addicted smokers, because they may develop an addiction in response to various factors, such as exposure to intense emotional stress—see section 5.1.1.

<sup>38</sup>Those highlighted in chapter 3 and section 5.1; most notably its autonomy-undermining effects, and responsiveness to social and emotional triggers.

<sup>39</sup>Those highlighted in section 3.2 and chapter 4, most notably ACE, social dislocation, stress, oppression, and other social hardship.

<sup>40</sup>It is acknowledged that young adults aged 18–25 are capable of exercising rational decisions in many aspects of life, and should not be denied the right to do so. However, in the context of the use of highly addictive drugs such as tobacco, it is necessary to extend protections until the age at which people are—neurobiologically—more protected from addiction, and the full development of their autonomous capacity in this context is enabled. See section 3.2.4 for further discussion.

## 5.2.2 Application of public health ethics theories

### Libertarian paternalism as an ethical basis

Libertarian paternalism was introduced in section 2.3.3 as an influential approach in public health in which people are encouraged to make healthier lifestyle decisions in a non-coercive way.<sup>41</sup> Measures that fit into the scope of libertarian paternalism include discouragement measures such as those under the WHO FCTC,<sup>42</sup> and incentives.<sup>[41]</sup> There is evidence that incentives work, to some extent, in the context of addictions.<sup>[417]</sup> In contingency management programmes, for example, addicted drug users are given vouchers worth a specific amount of money whenever a drug-negative urine sample is provided. The value of the voucher increases with each consequent negative urine sample, but is reset to a low value when a positive urine sample or no sample at all is turned in.<sup>[418]</sup> Although good success has been reported in these programmes, it is uncertain how sustainable the effects of incentives would be given the chronic nature of addiction, particularly in severe cases. Still, such programmes show that individuals do tend to respond to better options in the context of drug use, and so providing attractive alternatives to smoking may encourage some people to quit permanently, particularly if the individual is not severely addicted.

To what extent is libertarian paternalism useful in the context of tobacco? Measures under the WHO FCTC aim to discourage tobacco use. Based on experience with these measures,<sup>43</sup> their effects seem to become less effective as addictions become more severe. Another concern with discouragement is that some measures, such as tobacco denormalization, are potentially stigmatizing for smokers.<sup>44</sup> Thus, measures based on discouragement should be non-stigmatizing and assumed to work primarily for non-addicted or mildly addicted smokers. Libertarian paternalism is useful, then, in that it recognizes that human decision-making is not always in line with what the individual really wants, and that healthy behavior should be encouraged in a non-coercive way. However, it is still focused on preserving negative—rather than positive—freedom, and is insufficiently sensitive to the relational nature of autonomy in addiction, the social conditions that underlie addictions, and the social injustices that propagate tobacco-related health inequalities. Therefore libertarian paternalism can be incorporated into universal measures in which non-addicted or mildly-addicted people are discouraged from

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<sup>41</sup>One may argue that it is still coercive in the sense that the state attempts to influence people's decisions. However, 'non-coercive' here refers to the idea that the unhealthy option is still permitted, and that individuals are not strictly forced into healthier options.

<sup>42</sup>Increasing the prices of tobacco, placing off-putting pictorial warnings on cigarette packs, media campaigns, and banning flavourings and additives in cigarettes in order to make them less desirable—see section 2.2.1.

<sup>43</sup>See section 2.2.2.

<sup>44</sup>The moralization and stigmatization of smokers is unethical, and could be counterproductive for severely addicted smokers. An ethical discussion on tobacco denormalization strategies is provided in section 6.1.

smoking and addictions are thereby prevented, but this should be done in combination with measures that are more sensitive to the contexts and features of severe addictions.

### **Stewardship as an ethical basis**

The Nuffield Council's stewardship model, introduced in section 2.3.3, stipulates that:

*“Concerning goals, public health programmes should:*

- aim to reduce the risks of ill health that people might impose on each other;
- aim to reduce causes of ill health by regulations that ensure environmental conditions that sustain good health, such as the provision of clean air and water, safe food and appropriate housing;
- pay special attention to the health of children and other vulnerable people;
- promote health not only by providing information and advice, but also by programmes to help people overcome addictions and other unhealthy behaviours;
- aim to ensure that it is easy for people to lead a healthy life, for example by providing convenient and safe opportunities for exercise;
- ensure that people have appropriate access to medical services; and
- aim to reduce health inequalities.

*In terms of constraints, such programmes should:*

- not attempt to coerce adults to lead healthy lives;
- minimise interventions that are introduced without the individual consent of those affected, or without procedural justice arrangements (such as democratic decision-making procedures) which provide adequate mandate;
- seek to minimise interventions that are perceived as unduly intrusive and in conflict with important personal values.” (pg. xvii, [43])

The arguments of the stewardship model fit quite closely to those made in this thesis. In line with Mill's theory, it correctly recognizes the need for states to protect others from exposure to SHS (“aim to reduce the risks of ill health that people might impose on each other”), and to protect the health of children. However, it goes beyond Mill's theory in that it also recognizes the need to pay attention to the health of vulnerable people and to minimize health inequalities. Focus, in line with the arguments

in this thesis, is on the infrastructural conditions and support systems for good health, including: “regulations that ensure environmental conditions that sustain good health”, and “programmes to help people overcome addictions and other unhealthy behaviours”. This may include the provision of therapies that help people to overcome their addictions, minimization of tobacco-related cues, and support systems for socially disadvantaged groups. The stewardship model also correctly advocates for a non-coercive approach: to “minimise interventions that are introduced without the individual consent of those affected”, and to “not attempt to coerce adults to lead healthy lives”.

### **The limitations of stewardship**

Thus the stewardship model correctly recognizes freedom in both its negative *and* positive sense. It also shares the goals of the ethical framework of this thesis: to minimize overall smoking prevalence, prevent smoking initiation among children, minimize tobacco-related health inequalities, help people to overcome addictions, and protect others from SHS. However, there are a few points of weakness in the stewardship model. An ethical framework for tobacco control should avoid stigmatizing addicted smokers, but it is not clear what the stewardship model’s stance is on this. It also does not specify whether addictive decisions tend to be influenced by social or emotional contexts, or whether they are purely rational in nature (and, therefore, whether addiction treatments should take into account social or emotional factors). In other words, it is insufficiently sensitive to the *relational* features of addiction. The stewardship model is also insufficiently context-sensitive. In the Nuffield Council’s case study on tobacco,[43] for example, it is recommended that the TI acts in more socially responsible ways. It is argued, for instance, that:

“It is ethically inconsistent for tobacco . . . companies advertising and selling their products in developed countries to claim corporate social responsibility, and yet apply different standards for protecting consumers in different countries . . . [the TI] should implement a voluntary code of practice that universalises best practice in terms of consumer protection.”  
(pg.113, [43])

Yet, evidence from chapter 4 indicates that expecting authentic corporate social responsibility from the TI is likely to be problematic, because previous corporate social responsibility initiatives of the TI were actually designed to encourage smoking, particularly among children.<sup>45</sup>

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<sup>45</sup>For example, the TI had ‘corporate responsibility’ initiatives in the form of TI-funded anti-smoking campaigns for children. However, these campaigns were actually aimed at encouraging smoking initiation among youth, because they portrayed smoking as an adult-like behavior.[39]



Other tobacco restrictions advocated by the stewardship model are similarly modest and context-insensitive. It is recommended, for example, that tobacco companies refrain from: “understating risks, and from exploiting the apparent desirability of . . . smoking, particularly in ways that appeal to children and young people” (pg.116, [43]). However, ways in which the TI has targeted children in its marketing go beyond simply understating risks and exploiting the desirability of smoking. In chapter 4, it was argued that the TI are largely responsible for normalizing smoking in the first place, and that they have targeted children in indirect ways, for example by claiming that smoking is ‘for adults’, or through movie placements. Further, the stewardship model recommends “the raising of the minimum age for the purchase of tobacco from 16 to 18 years” (pg.116, [43]), but this recommendation does not consider the neurodevelopmental factors that predispose people under age 25 to tobacco, which—as argued in section 3.2.4—is an important basis for extending protections to all people aged below 25. The case study also pays little attention to the social nature of tobacco addiction, and thus fails to properly recognize the requirement for autonomy-promoting social conditions.

### **Limitations of the intervention ladder**

The stewardship model also comprises an intervention ladder, which orders types of state intervention according to their level of intrusion, with the top level being the most restrictive:

- Choice elimination
- Choice restriction
- Disincentives
- Incentives
- Change of default policy
- Enable choice
- Provide information
- Do nothing or monitor.[43]

This approach follows that of employing the least restrictive means in mitigating a harm.[155] The intervention ladder is essentially an extension of Mill’s liberal theory and libertarian paternalism, as its aim is to strike a balance between negative freedom and health. The main difference is that it

will permit more intrusive interventions—such as choice elimination—in the most extreme cases: for example, banning drink driving in order to prevent killing others in car accidents.

An issue with the intervention ladder, then, is that it camps freedom and health against one another, even though in addiction there are important interconnections between the two. As argued, addiction is a condition that undermines health *and* autonomy; interventions that aim to prevent and treat addictions maximize health and autonomy, and therefore positive freedom. It logically follows that, at least in the context of tobacco control policy, interventions that aim to prevent and/or treat the most severe addictions should be prioritized; however, the intervention ladder cannot take this into account as its aim is to balance health with negative freedom. In other words, an ethical framework for tobacco control policy should not only be viewed as a code of restraint, but also as a means of maximizing opportunities for positive freedom and the conditions that promote it on an equal basis.[145]

## **A relational approach to tobacco control**

A relational conception of public health, which recognizes the importance of relationships and the community in promoting good health, is supported by three principles: relational autonomy, social justice, and relational solidarity.<sup>46</sup>[45]

All three principles are relevant to the arguments in this thesis, as they reflect the importance of relationships and the social environment in addiction. The principle of relational autonomy correctly recognizes the need to provide autonomy-promoting conditions that can prevent the triggering and sustaining of addictions. The principle of social justice aims to correct systematic social disadvantages that contribute to ill health; it would advocate for support systems that help to prevent and treat addictions among socially disadvantaged groups, in part by addressing the underlying factors that contribute to addiction. The principle of relational solidarity, which argues for a solidarity committed to social justice, would advocate for support systems that help the social integration of marginalized groups, or social support to those who need it most; for example, parents with young children living with a mental illness or in stressful circumstances. The principle of reciprocity relates closely to the principle of relational solidarity, as it argues for support systems that enable individuals to fulfil their ethical duties; for example, better support systems that help individuals to stay tobacco-free.[155] Aspects of these principles, then, should be integrated into the ethical framework of this thesis.

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<sup>46</sup>These principles were introduced in section 2.3.3, and their definitions are provided on page 51.

## **Building on transparency**

The TI has been identified as a powerful adversary to tobacco control efforts, with a vast influence that goes beyond influencing policy decisions directly. Transparency—which was introduced as an ethical principle in section 2.3.3—is therefore important when considering the activities of the TI, but should be built on to include further measures such as the regulation and exposure of the TI’s marketing and research activities.

As discussed in chapter 4, the TI has influenced policies by propagating misleading argument and claims about tobacco use, influencing scientific research, and normalizing smoking in a way that helps to resist effective tobacco control measures. Addressing TI-related issues, then, should entail more than simply exposing the TI’s involvement in policy decisions: it should also correct misperceptions that the TI has propagated, and regulate and expose its marketing tactics so that people are better protected. This approach should be particularly targeted to those who are more vulnerable to the TI’s marketing practices, such as children. Transparency could also be used to communicate the ethical basis and rationale of tobacco control policies, in order to gain better support for them and to protect against counter-arguments propagated by the TI.

## **Summary**

Libertarian paternalism and stewardship provide a useful starting point for thinking about how interventions should strike a balance between negative freedom and health, provide conditions more conducive to health, minimize health inequalities, and encourage healthier lifestyles free from tobacco. What is missing, however, is sensitivity to some important features of addiction that have been described throughout chapters 3 and 4: social, commercial, and relational influences, including the social injustices that contribute to addiction, the interconnection between health and positive freedom in addiction, and the relational nature of autonomy in addiction.

Relational autonomy, in recognizing the important effects of autonomy-promoting social conditions, can strengthen the ethical framework and make it more context-sensitive. Along with the ethical considerations discussed so far, it may also fit into a human rights-based approach to tobacco control. What follows, then, is a discussion of human rights that are relevant to addiction and tobacco control, and how they—based on the arguments of this thesis—may support a human rights-based approach to tobacco control policy.

### 5.2.3 Application of human rights

Human rights were introduced in section 2.3.4.<sup>47</sup> It was mentioned that the right to health generally forms the basis of pro-regulatory arguments, while rights to liberty, self-determination, and privacy have been used to support pro-tobacco arguments. Other rights, relevant to the context of tobacco, were also introduced: the right to life, the right to social conditions conducive to health, equality rights, children's rights, and the right to social and cultural participation. In this section, these rights are returned to, and their relevance is discussed in light of the arguments presented throughout this thesis.

#### Rights to life and health

The rights to life (UDHR article 3) and health (ICESCR article 12) form the ethical basis of the WHO FCTC and the general basis of human rights arguments in support of tobacco control. In ICESCR, the right to health is defined as a right to “enjoyment of the highest attainable standard of *physical and mental health*”, which also includes the “prevention, treatment and control of *epidemic, endemic, occupational and other diseases*”. Smoking is an *epidemic* that threatens the life of self and others, and can have serious effects on one's *physical and mental health*. Hence measures that aim to minimize the public health-related burden of tobacco use are supportive of the rights to life and health. This includes measures advocated by the WHO FCTC, any approach that provides infrastructural conditions to facilitate non-addiction and minimize tobacco use (such as stewardship), or measures based on the harm principle, which protect the rights to life and health of those who would otherwise be exposed to SHS.

#### Right to social conditions conducive to health

This thesis has highlighted the importance of the social environment in the development of addictions. This was argued to be particularly relevant for young children, whose neurobiological development is particularly sensitive to these social influences. This idea is not reflected in current tobacco control policy frameworks such as the WHO FCTC, but it is captured in frameworks that recognize the importance of preserving positive freedom and relational autonomy. Such frameworks, then, also support the right to social conditions conducive to health (UDHR article 25), defined as: “the right to

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<sup>47</sup>They were introduced in reference to international human rights treaties under the United Nations (UN): the Universal Declaration of Human Rights (UDHR),[161] the International Covenant on Civil and Political Rights (ICCPR),[162] the International Covenant on Economic, Social, and Cultural Rights (ICESCR),[163] the Convention on the Rights of the Child (CRC),[164] the International Convention on the Elimination of all forms of Racial Discrimination (ICERD),[166] and the Convention on the Rights of Persons with Disabilities (CRPD).[167]

a standard of living adequate for the health and well-being of [persons] and of [their] family, including . . . necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond [their] control.” This could include the provision of autonomy-promoting social conditions and support systems, to provide better opportunities for people and their families to lead addiction- and tobacco-free lives. This applies particularly to socially disadvantaged groups who may require additional support, and parents with young children who need support in order to support the healthy development of their children. This last point is also relevant to children’s rights, discussed below.

### **Right to social and cultural participation**

In section 4.1 and beyond, it was argued that certain racial minorities—such as indigenous groups—suffer disproportionately from addictions in large part because of the mass-scale destruction of their social and cultural identities. Reinstatement of social and cultural identity, or reintegration into the mainstream society, should therefore—for these groups—be an important aspect of interventions to support non-addiction. This idea is not captured in the WHO FCTC, but it is supported by relational autonomy and social justice. In line with these, it is recognized in human rights that: “everyone has the right freely to participate in the cultural life of the community” (UDHR article 27). Going further, ICCPR article 27 states that: “in those states in which ethnic, religious or linguistic minorities exist, persons belonging to such minorities shall not be denied the right, in community with the other members of their group, to enjoy their own culture, to profess and practice their own religion, or to use their own language.” Thus in promoting relational autonomy on an equal basis, an ethical framework that encourages the social and cultural participation of racial minorities is more supportive of these human rights.

### **Children’s rights**

Throughout this thesis it has also been argued that children, due to their vulnerability, should be fully protected from tobacco, SHS exposure, and the marketing activities of the TI. This idea is widely recognized in current policy frameworks such as the WHO FCTC and even in the most liberal frameworks, such as Mill’s liberalism. It has been argued that these protections should be focused on those who are—due to neurodevelopmental reasons—particularly vulnerable: adolescents and young infants.

The WHO FCTC emphasizes the support of children’s rights more broadly through the CRC

treaty. In line with articles in CRC, there are a number of rights that can be used to support various measures to protect children. Children have a right to a “clean and safe environment” (CRC article 24), and a right to life, which requires that “governments . . . ensure that children survive and develop healthily” (CRC article 6). Children also have a right to be protected from “the use of harmful drugs” (CRC article 33). Measures that protect children from smoking initiation and SHS exposure are supportive of these rights. Going further, it was also argued in section 3.2.2 that a resistance to addiction can be conferred by promoting family solidarity and secure relationships between young children and their primary caregiver(s). Thus a relational approach can also support the right of children to be: “properly cared for and protect[ed] from violence, abuse and neglect by their parents, or anyone else” (CRC article 19). Protecting children from the TI’s exploitative marketing practices also supports children’s right to: “be protected from any activity that takes advantage of them or could harm their welfare and development” (CRC article 36).

### **Equality rights**

Issues related to social injustice have been highlighted throughout this thesis. They are not adequately addressed by current measures since smoking is increasingly concentrated among socially disadvantaged groups, but may be better dealt with by ethical frameworks that emphasize the social factors that contribute to addiction, particular in relation to social disadvantage. Thus a relational approach to tobacco control can lend more support to equality rights, in which individuals are all accorded equal access to human rights: “without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status” (UDHR articles 2 and 7, ICCPR articles 2 and 26, ICESCR article 2).

Racial minorities are also protected under ICERD, while people with disabilities are protected under CRPD. This may include those with: “mental . . . impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others” (CRPD preamble). Thus, severe forms of schizophrenia, depression, or substance abuse may fall under this scope. Such individuals are entitled to: “enjoyment of the highest attainable standard of health without discrimination on the basis of disability” (CRPD article 25). These rights may be used to protect groups who are most vulnerable to tobacco-related health problems: the mentally ill, racial minorities, and other socially disadvantaged groups. This includes protection from using tobacco as well as the TI.<sup>48</sup>

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<sup>48</sup>Although there are social barriers that limit the actualization of these rights, these rights could be emphasized in support of tobacco control efforts, or restrictions on TI activity that targets these groups.

## **Rights to liberty and self-determination**

Rights to liberty and self-determination have been used to resist tobacco regulations and to argue for a “right to smoke”. However, these arguments rely on a negative conception of freedom, and are therefore wrong-footed; freedom should be correctly broadened into its positive sense to include freedom that arises from state interventions that protect or promote autonomy. As a result of the same mistake, policy frameworks built on a negative conception of freedom (such as the WHO FCTC) are often viewed as a compromise to liberty rights in order to advance a right to health. However, policy frameworks that aim to advance *relational autonomy* are supportive of both health and freedom; it logically follows that they are also compatible with the rights to health and liberty. Since they protect autonomy, they also support the right to self-determination.

In other words, there is no liberty right to smoke—an autonomy-limiting option—but there is a liberty right (UDHR article 3, ICCPR article 9) to options that do not potentially undermine autonomy. The right to self-determination is defined as a right to “freely pursue [one’s own] economic, social and cultural development” (ICESCR article 1 and ICCPR article 1). Although there are economic, social, and cultural aspects to smoking, it does not contribute to the *development* of any of these;<sup>49</sup> hence there is no self-determination right to smoke.

## **Right to privacy**

Otherwise, pro-tobacco arguments may focus on the right to privacy which is defined as individuals not being subjected to: “arbitrary interference with his privacy, family, home or correspondence” (UDHR article 12, ICCPR article 17). It may be argued that, provided that smoking is restricted to private spaces where no one else is involuntarily exposed to SHS, a right to smoke may be construed as a privacy right. However, this thesis argues that smoking, due to its addictiveness, does not contribute to wellbeing, the integrity of identity, the development of personality, or the ability to establish and develop relationships with others in order to merit protection as a privacy right. It is on the basis of this argument that a previous legal appeal for the recognition of smoking as a privacy right was denied.[419, 420] A privacy right to smoke may also be denied on the basis that smoking is *sui generis* as a public health threat; it was emphasized in section 2.1.1, for example, that tobacco is the only legally available substance that, when used correctly, kills half of its users. It is also addictive for most users; it is therefore unlikely that a privacy right may be engaged in the support of tobacco use.

Furthermore, the welfare of an individual and of the community are strongly interconnected in

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<sup>49</sup>See the arguments in chapter 4.

the context of tobacco, due to the social nature of smoking and addiction and the widespread harms that result from tobacco use. There are few circumstances, then, in which smoking may be considered ‘private’. This idea is also reflected in human rights, as they permit balancing in order to meet “the just requirements of morality, public order and the general welfare in a democratic society” (UDHR article 29).

## Summary

To summarize, there is a broad scope for the use of human rights as an ethical basis for tobacco control policies, and these are well-aligned with the ethical arguments and concepts that have been presented throughout this thesis. In particular, an ethical framework which focuses on relational autonomy—creating autonomy-promoting social conditions, particularly for socially disadvantaged groups—would support a number of important human rights not supported in current frameworks, such as the right to social and cultural participation and the right to social conditions conducive to health. It would also support the rights to liberty and self-determination, which are often used to support pro-tobacco arguments. Human rights, then, should be integrated with the concept of relational autonomy into an ethical framework for tobacco control policy.

### 5.2.4 Description of the ethical framework

It has been argued throughout this thesis that, due to the autonomy-undermining effects of addiction, interventions that aim to prevent or treat addictions promote both health and positive freedom. For addictions, which represent the majority of smokers, priority should be on such interventions. Policies should also be sensitive to the social, relational, and commercial contexts of addiction and tobacco use.

For these reasons, *relational autonomy* is foundational to this ethical framework as it recognizes the interconnections between health and freedom and the importance of an autonomy-promoting social environment. As argued previously, these are essential in addressing autonomy-undermining disorders such as addiction, and in promoting non-addiction in a way that supports the most socially disadvantaged groups. Relational autonomy, in supporting non-addiction, supports the rights to life and health (UDHR article 3, ICCPR article 6, ICESCR article 12); by focusing on social conditions it supports the right to social conditions conducive to good health (UDHR article 25); and in promoting autonomy, it supports the rights to self-determination (ICESCR article 1, ICCPR article 1) and liberty (UDHR article 3, ICCPR article 9).



Existing policy frameworks such as the WHO FCTC, though partially effective, are insufficiently sensitive to relational features of addiction or issues related to social injustice. Still, the foundation of the WHO FCTC provides useful considerations for tobacco control policies. For instance, the harm principle provides an ethical justification for protecting others from SHS. Libertarian paternalism supports measures that can effectively deter non-addicted people—particularly children—from smoking. In line with current policies, an ethical framework should also protect young people from tobacco and address issues related to TI activity. Though these ethical considerations are all limited by their negative conception of freedom, they are autonomy-preserving in cases of non-addiction where autonomy is still considered intact. Thus an ethical framework centred around relational autonomy should incorporate these aspects when considering the non-addicted population, but build on these with a series of measures that go further in recognizing the social and relational aspects of addiction.

What follows is the description of an ethical framework for tobacco control policy that builds on these ideas. Its approach is conveyed through a set of ethical considerations, with relational autonomy at their foundation. They are discussed in terms of their potential effect on tobacco control policies and relevance to human rights discussed in section 5.2.3. The framework is summarized as a list in appendix C, and as a diagram—which shows the interconnection between relational autonomy and the ethical considerations—in appendix D.

## Goals of the ethical framework

An ethical framework for tobacco control policy should be centred around relational autonomy. It should aim to preserve health by creating the conditions that promote good health, and to preserve freedom through interventions that promote or protect autonomy. This justifies measures that aim to minimize overall smoking prevalence,<sup>50</sup> and that, more specifically: (1) minimize SHS exposure; (2) prevent smoking initiation; (3) encourage cessation and help smokers to overcome their addictions; and (4) minimize tobacco-related health inequalities.

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<sup>50</sup>Tobacco control policies can adopt the goal of eradicating tobacco (such as a tobacco ‘endgame’), provided that the measures implemented also aim to prevent and treat tobacco addictions. This is then considered to be a policy that maximizes the opportunities for good health and non-addiction, which in turn increases the opportunities for health, autonomy, and positive freedom. If the goal is tobacco control (rather than elimination) through measures that promote health and non-addiction, opportunities for health and positive freedom are also created, although to a lesser extent. This thesis advocates for both, because whether states can implement a tobacco endgame strategy depends in part on governance, anti-tobacco climate and other factors; a full discussion of these is beyond the scope of this thesis.

## **Focus on the social environment**

Autonomy-promoting conditions should be created by minimizing the social factors that can predispose people to addiction. Stress, adverse childhood experiences (ACE),<sup>51</sup> and poor family dynamics should be addressed by providing support systems. These, in turn, would protect the right to social conditions conducive to good health (UDHR article 25). Secure relationships between young children and their primary caregiver are important in protecting children from developing addictions in later life, so secure family relationships should be encouraged by providing support to parents, particularly those who are raising young children within a stressful environment. Social dislocation should be minimized by helping racial minorities—such as indigenous groups—socially integrate or to have their social and cultural identities reinstated. This would also support their rights to cultural participation and identity (UDHR article 27, ICCPR article 27).

It is also important to recognize the relational contexts of decision-making while addicted. It is known that smoking cessation tends to occur in social clusters: partners quitting together, and friends quitting together.[81] Thus there should be a stronger focus on involving peers, family, partners, and other important relationships in helping individuals to overcome their addictions. A similar concept should be used in preventing youth from initiating smoking. Such programmes have already been piloted with reported success.[421, 422]

## **Minimizing tobacco-related cues in the environment**

In recognizing that exposure to tobacco or tobacco-related cues can be autonomy-undermining, relational autonomy also facilitates changes in the social environment that minimize the exposure to tobacco and tobacco-related cues. As argued in section 5.1.4, minimizing the exposure to tobacco-related cues and reducing the availability of tobacco can prevent relapse and enhance cessation success: for example, by banning the display of tobacco products, limiting the number of tobacco retailers, banning TAPS, and restricting smoking in public areas including outdoor spaces. In supporting people's choices to live without addiction more easily, such measures support the rights to life and health (UDHR article 3, ICCPR article 6, ICESCR article 12), as well as rights to self-determination (ICESCR article 1, ICCPR article 1) and liberty (UDHR article 3, ICCPR article 9).

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<sup>51</sup>Addressing ACE also supports children's right to be protected from violence (CRC article 19).

## Focus on socially disadvantaged groups

Policies should minimize tobacco-related health inequalities by focussing on the needs of socially disadvantaged groups such as people from low socioeconomic strata, the homeless, people with comorbid mental illness, and racial minorities.<sup>52</sup> This supports equality rights (UDHR articles 2 and 7, ICCPR articles 2 and 26, ICESCR article 2) and the rights of those protected by specialized human rights treaties, such as racial minorities (ICERD) and people with severe mental illness (CRPD). Accordingly, socially disadvantaged people should be protected from TI exploitation and more social opportunities and support systems should be available to them. People with mental illness—particularly schizophrenia, depression, and substance use disorders—should have their needs met through therapy and support programmes. Undoubtedly the importance of social justice as a constituent of promoting relational autonomy has already been widely recognized in public health.<sup>[45]</sup> However, tobacco addiction has important interconnections to these issues which need to be recognized and reflected more in tobacco control policies. This could be done by, for example, weaving tobacco control interventions into support programmes designed to tackle these issues.

## Reciprocity

Reciprocity<sup>53</sup> requires that individuals should be facilitated in fulfilling their ethical duties. Thus it applies in cases where an ethical obligation is put on individuals, and the state facilitates them in this obligation by providing support or an alternative option. For example, it is argued above that there should be secure relationships between young children and their primary caregiver. Reciprocity, then, would require that the state provides support systems<sup>54</sup> to parents with young children in order to ease pressure off parents and help them to raise their children more effectively. Support systems should particularly be targeted to parents with young children who lack support: parents who are raising a child without support from a partner or extended family, suffering from a mental illness, or who are raising their children within a stressful socioeconomic environment. It is also argued (on the basis of the harm principle—below) that smokers should refrain from smoking in certain areas in order to protect others from SHS. Reciprocity would require that smokers are assisted in doing so by, for example, providing alternative places to smoke or cessation support.

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<sup>52</sup>This reflects the idea of social justice, which has been described as an ethical principle elsewhere—see definition and discussion on page 51.

<sup>53</sup>The idea of reciprocity has previously been referred to as an ethical principle—see page 50.

<sup>54</sup>Support may come in various forms; for example, financial support, support in allocating time to raise children (e.g. an increase in paid maternity/paternity leave), support in raising children (e.g. better/more affordable childcare or nursery facilities), or counselling services for parents who are suffering from mental illness or stress.

## Minimizing stigma

Stigma involves the identification and marking of a trait that is considered socially undesirable (e.g. smoking), which then leads to a series of consequences that generally include the social marginalization of people who exhibit the undesired trait (smokers).[423] In the context of smoking, stigma may evolve as a result of perceptions of smoking as a voluntary behavior that holds smokers morally culpable,<sup>55</sup> fears of being harmed by SHS exposure, or laws and social structures that segregate smokers from non-smokers.[424]

Tobacco control policies should avoid stigma, as it puts stress and guilt on individuals which can make an addiction worse and lead to their marginalization from necessary treatment services. This is a particularly important consideration for measures that aim to denormalize tobacco.<sup>56</sup> Where there are multiple ways in which to achieve a desired goal (for example the denormalization of tobacco to prevent smoking uptake among youth), the least stigmatizing should be chosen and where stigma is a possibility, there should be additional interventions that aim to minimize stigma among affected groups. These may entail measures such as education initiatives in which a neutral or supportive approach towards smokers is encouraged.

## Non-coercive addiction treatment

For the purpose of this ethical framework, ‘coercive treatment’ refers to the forced treatment—such as medical treatment—of addicted smokers.<sup>57</sup> As argued, coercive interventions may be carried out on addicted individuals on the (erroneous) assumption that they are, because of their addiction, not autonomous. Such interventions are unethical because an addiction does not negate a person’s ability to avoid tobacco use. Though medical therapies may be given with informed consent, treatments should prioritize helping individuals to overcome their addictions by mobilizing their will and resolve, training their capacity for volitional self-control, and focusing on positive changes within the social environment.<sup>58</sup> Mobilizing will and resolve in severe tobacco addictions may include, for example, helping the individual to identify reasons to quit smoking and playing on those reasons in further

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<sup>55</sup>As discussed in section 4.2, this happened in the context of illicit drug use as the use of psychoactive drugs became increasingly perceived as an immoral choice. This resulted in a ‘moral choice’ theory of addiction, in which addicted drug users were stigmatized, socially marginalized, and often punished by law for their drug use.

<sup>56</sup>Further discussion on this point is provided in section 6.1, in light of recent attempts to denormalize tobacco.

<sup>57</sup>Other measures may also be considered coercive in certain circumstances. For example, tobacco taxation may raise prices to a level at which poorer smokers are forced to cut down, though it is unlikely they would have to quit completely. In such cases, free or affordable alternative options—such as nicotine replacement therapy (NRT)—should be provided. Not giving adults an option to initiate smoking may be considered coercive, though this is more accurately an ‘option elimination’ rather than a ‘coerced therapy’ as it would not force them into withdrawal or unwanted medical procedures.

<sup>58</sup>For further discussion on this last point, see the above discussion ‘focus on the social environment’.

therapy. Training one's capacity for self-control could entail, for example, neurobehavioral therapies and learning how to become more aware of tobacco-related cues. In supporting non-coercion, this also supports the right to consent.

### **Building on existing frameworks**

In encouraging better health among the population, three ethical considerations—all which build on current policy frameworks—should be incorporated into tobacco control policies: libertarian paternalism, the harm principle, and the protection of young people.

Libertarian paternalism recognizes the importance of encouraging a tobacco-free lifestyle. It should be applied to in a non-stigmatizing way,<sup>59</sup> to encourage non-smoking particularly among non-addicted people such as casual smokers, youth, and the non-smoking adult population. Youth may respond more to certain discouragement measures—such as smokefree laws, retail restrictions, warning labels, and taxation—so these measures should be targeted specifically to them. The emphasis of libertarian paternalism on encouraging a healthy lifestyle supports the rights to life (UDHR article 3, ICCPR article 6), health (ICESCR article 12), and children's rights to life and healthy development (CRC article 6).

The harm principle, which is derived from Mill's liberal philosophy, protects others—especially children—from tobacco-related harm including SHS exposure. It protects non-smokers' rights to life (UDHR article 3, ICCPR article 6) and health (ICESCR article 12), children's rights to life and healthy development (CRC article 6), and children's right to a safe and clean environment (CRC article 24). Accordingly, it requires that all indoor areas, especially those in which children are present, are made smokefree. As argued in section 5.2.1, it may also apply to some outdoor spaces where smokers are sat in close proximity to others, such as outdoor dining areas. In implementing smoking restrictions, the stigmatization and social marginalization of smokers should be avoided by implementing additional measures.<sup>60</sup>

Building on Mill's theory, an ethical framework should also protect youth—which in this context includes all children, adolescents, and young adults below age 25—as much as possible from smoking initiation, addiction, and the TI. Relevant interventions include fully protecting youth from the marketing practices of the TI (including TAPS);<sup>61</sup> implementing measures that deter youth from ini-

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<sup>59</sup>To avoid clashing with other aspects of the ethical framework—see above discussion on 'minimizing stigma'.

<sup>60</sup>See the above discussion on 'minimizing stigma' and discussion in section 6.1.

<sup>61</sup>Protecting youth from the TI's more deceptive practices may also include educating youth on these practices so that they can be better protected from them. This point is developed further below, in the discussion 'dealing with tobacco industry activity'.

tiating smoking,<sup>62</sup> and regulating the retail environment such that individuals below age 25 cannot initiate smoking.<sup>63</sup> This supports a number of rights, most notably children's rights to life and healthy development (CRC article 6), protection from harmful drugs (CRC article 33), and protection from exploitation by the TI (CRC article 36).

### **Dealing with tobacco industry activity**

Tobacco control policies should address issues that result from TI activity, described in chapter 4. Achieving co-operation from or dismantling the TI is, due to its vast political and economic power, practically difficult. Instead, this framework advocates for a two-pronged approach: regulation and education. TI marketing and involvement in academia, research, and politics should be regulated. In addition, policymakers, academics, researchers, and the general public should be educated on the TI's marketing tactics in order to better protect people from them. This applies particularly to groups such as youth and socially disadvantaged minorities, who tend to be targeted most by the TI. Protecting these groups from the TI also supports the rights of children (CRC article 36) and the mentally ill (CRPD article 16) to be protected from exploitation. Counter-strategies of the TI should also be anticipated when developing tobacco control measures, and tobacco control policies should be transparent about their ethical basis in order to build public support for tobacco control measures and to minimize opportunities for the TI to thwart these measures with misleading counter-debate.

### **5.2.5 Discussion of the ethical framework**

The ethical framework for tobacco control policy, described in section 5.2.4, has incorporated information throughout this thesis into a set of ethical considerations with relational autonomy at their foundation. It builds on ethical frameworks that already exist, such as Mill's liberalism, libertarian paternalism, stewardship, ethical principles for public health, and human rights. These have been made more context-sensitive by considering the features of addiction (particularly its effects on autonomy), the sociorelational contexts in which addictions develop, and the sociohistorical and commercial contexts that have led into the current public health situation with tobacco. This ethical framework therefore builds on current tobacco control measures—most of which are based on libertarian paternalism—by emphasizing the importance of the social environment in preventing and treating tobacco addictions, the importance of social justice, and the interconnectedness of tobacco addiction

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<sup>62</sup>These are discussed above in relation to libertarian paternalism.

<sup>63</sup>This could be achieved by raising the minimum age of sale of 25. However, it has also been suggested that tobacco sales could be phased out to all younger generations to prevent initiation across the life-course. An ethical discussion on this is provided in section 6.2.

with other important social issues. The framework also lends a stronger ethical foundation for tobacco control policies by providing an ethical justification for the measures it endorses and by showing how these measures are supportive of human rights.

### **Interrelation between ethical considerations**

The ethical framework describes a number of ethical considerations that policies should take into account. They are all based on the idea that policies should preserve health and positive freedom by maximizing relational autonomy. Relational autonomy therefore forms the underlying foundation of the ethical framework and is a common thread between the ethical considerations.

The ethical considerations are not assigned any particular order of importance, because their scope varies depending on the particular context. For instance, considerations related to ‘non-coercive addiction treatment’ apply to the *addiction treatment* setting, whereas considerations that build on current measures (libertarian paternalism, the harm principle, and protecting youth) apply more in the context of preventing the development of addictions and tobacco-related diseases among *non-addicted smokers or non-smokers*, particularly youth. Meanwhile, the first five considerations—focus on the social environment, minimizing tobacco-related cues, focus on socially disadvantaged groups, reciprocity, and minimizing stigma—are concerned more with preventing addictions and ethical issues concerning *addicted smokers*, while the last consideration—dealing with tobacco industry activity—focuses on the *tobacco industry*. Thus the relevance and importance of each consideration depends on the policy that is being analyzed, and the specific concerns raised by that policy.

Some ethical considerations interrelate and complement each other, while others may conflict. Where conflict is inevitable, a balance between ethical considerations may be established by creating a trade-off between the ethical considerations or by targeting certain measures to the relevant populations. For example, ethical considerations that focus on social change in order to prevent and treat addiction—for example focus on the social environment, focus on socially disadvantaged groups, and minimizing stigma—complement each other as they all seek ways in which to provide a supportive, autonomy-promoting social environment. This applies particularly for those who are most predisposed to severe addiction. Ethical considerations that focus on measures to deter smoking, particularly among youth, apply particularly to non-addicted smokers or non-smokers and are also complementary to each other: libertarian paternalism, the harm principle, and protecting youth. However, in some cases deterrent measures may come into conflict with other ethical considerations (such as minimizing stigma), in which case a balance should be established: implementing measures

to deter people from smoking, but in a way that minimizes possible stigma towards smokers as much as possible. This may be done by avoiding certain measures or by implementing additional measures, some which may be targeted to protect those most likely to be subjected to stigma.<sup>64</sup>

### **Application and relevance**

The ethical framework does not advocate for a single ‘one size fits all’ policy, because which tobacco control policy is implemented depends in part on political, economic, cultural, and other such factors—a discussion of which is beyond the scope of this work. For example, some states may opt for a tobacco ‘endgame’ if there is strong support, while others may opt for tobacco control or a harm reductive approach. Therefore this ethical framework is intended to be used a guidance tool for tobacco control policies. Accordingly, any given tobacco control policy may be assessed in light of the ethical framework and its considerations, in order to give indications on how ethical issues associated with that particular policy may be avoided. The framework also provides an ethical grounding for tobacco control policies, which allows the rationale of a policy to be better articulated; this, in turn, can help to improve the credibility of the policy and gain public support. In other words, the ethical framework benefits tobacco control policies in two ways: (1) it offers a comprehensive ethical assessment of tobacco control policies that cannot be provided by existing frameworks, and (2) it can help to gain support for a given policy by providing a robust ethical justification for that policy.

### **Practicability**

While a full discussion on the practical implementation of this ethical framework is beyond the scope of this work, an initial concern may be that it calls for interventions that require a lot of resources. For example, it is argued that autonomy–undermining social environments should be addressed; this may include state programmes that focus on issues such as ACE. The welfare of the community and of its individuals are strongly interconnected, and evidence throughout this thesis has shown that a healthy community is more likely to produce healthy individuals; healthy individuals, in turn, contribute to the productivity and flourishing of a healthy community. Therefore, even individuals who are not directly affected by these issues—or tobacco–related harm—will still benefit by contributing to the collective benefit brought about by such state programmes. Furthermore, to tackle related social issues such as ACE does not necessarily require tobacco control programmes to allocate specific funds for preventing

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<sup>64</sup>For example, the most potentially stigmatizing measures may be avoided in favour of less stigmatizing ones, while measures to reduce stigma—such as education initiatives—may be implemented. Further discussion on this point is made in section 6.1.



ACE; if state programmes already exist to counter child abuse, tobacco control could simply be woven into these as an interrelated issue. Hence the ethical framework recommends—at the very least—that the *interconnectedness* of tobacco addiction to these issues is recognized.<sup>65</sup>

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<sup>65</sup>In other words, tobacco control could be integrated into social programmes that address social disadvantage, or social programmes could be integrated into tobacco control programmes. *How* they are integrated depends on various factors, including economic; a comprehensive discussion of these is beyond the scope of this work.



## Chapter 6

# Application of the ethical framework

A number of more recent approaches to tobacco control policy were introduced in section 2.2.3. They are all based on the idea that current regulations based on the World Health Organization Framework Convention for Tobacco Control (WHO FCTC), while effective, should be supplemented with an additional approach that addresses the remaining issues. This approach may entail the denormalization of tobacco or a tobacco-free generation (TFG) proposal to prevent initiation among youth; providing cigarette alternatives—such as low nitrosamine smokeless tobacco (LN-SLT) or electronic nicotine delivery systems (ENDS)—to addicted smokers, or a medicalized approach that draws on genetic and vaccine research. However, these strategies are all potentially ethically problematic.

The aim of this chapter is to provide an ethical analysis of these approaches by applying the ethical framework developed in chapter 5. This is done by first discussing ethical implications related to each approach—in reference to the literature, current debates, and the arguments throughout this thesis where appropriate—and then proceeding with an ethical analysis in reference to the framework developed in this thesis. This chapter is divided into five sections: section 6.1 looks at tobacco denormalization; section 6.2 at the TFG proposal; section 6.3 at tobacco harm reduction; and section 6.4 at nicotine vaccines and genetic tests. Section 6.5 then provides a summary of the arguments throughout this chapter, and the implications of these arguments for future tobacco control policies.

### 6.1 Tobacco denormalization

Tobacco denormalization<sup>1</sup> was introduced in section 2.2.3. As discussed in section 4.3, the tobacco industry (TI) has made considerable efforts over the last few decades to ‘normalize’ smoking as a

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<sup>1</sup>‘Tobacco denormalization’, as mentioned in section 2.2.3, refers to measures used to indicate that tobacco use is not, or should not be, a normal social activity.

socially desirable behavior. These efforts have, in turn, played a very important role in increasing smoking prevalence and encouraging smoking initiation among children. As mentioned in section 4.3, children are particularly responsive to normalization cues;<sup>2</sup> thus tobacco denormalization is essentially the reverse of smoking normalization, which similarly aims to change the social connotations of smoking in a way that influences smoking initiation patterns among youth.

### **Ways to denormalize tobacco**

There are various ways in which it is practically possible to denormalize tobacco use.<sup>3</sup> First, cues that contribute to the normalization of smoking can be omitted by banning all tobacco advertising, promotions, and sponsorships (TAPS), banning tobacco displays, and by implementing plain packaging.<sup>4</sup> As discussed in section 4.3, youth are particularly responsive to TAPS and other smoking normalization cues, and tobacco packaging is used by the TI to forge early ‘smoker identities’. Restricting these is therefore likely to minimize smoking initiation among youth. Second, smoking as a social behavior can be made more rarely observed by implementing smokefree laws in indoor and outdoor public spaces. Smokefree laws are argued to be the most effective means of denormalizing smoking, as they reduce the general visibility of smoking and weaken the association between lifestyle and smoking, particularly when implemented in recreational settings.[425] In endgame strategies, smoking bans are focused on outdoor areas where children often go—such as playgrounds, schools, and parks—to protect children from smoking initiation and to focus denormalization efforts on youth.

Otherwise, media and educational campaigns can be used to denormalize tobacco more explicitly, in various ways. First, media campaigns can be used to address misperceptions regarding smoking as a social behavior through an approach termed ‘social norms marketing’.[425] For example, youth typically overestimate smoking prevalence among their peers, which may encourage them to initiate smoking. Media campaigns can then be used to educate youth, by informing them that only a minority of their peers actually smoke. This strategy can also be used to address other common misperceptions, for example ideas that smoking helps to relieve stress, or that addictive smoking is a free choice. Second, media campaigns can expose the deceptive marketing practices of the TI; this approach is more accurately TI denormalization rather than tobacco denormalization. Third, media

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<sup>2</sup>It is estimated by some epidemiologists, for example, that up to half of all smoking initiations are triggered by movie placements that normalize or glamorize smoking—see section 4.3.

<sup>3</sup>Not all of these strategies may be ethical, however—further discussion below.

<sup>4</sup>As discussed in section 2.2.1, it is possible for the TI to market tobacco by ‘brand stretching’, in which non-tobacco products are marketed under the same logo and design as a tobacco product. This is more difficult, however, with a plain packaging mandate which prohibits any logos or designs on tobacco packaging. In this way, plain packaging is an effective tool to minimize any opportunities for the TI to indirectly advertise their products.

campaigns can actively portray smoking as a socially undesirable or unacceptable behavior. An advert campaign by the UK's National Health Service, for example, portrays smoking as an unattractive trait that leads to romantic rejection and social isolation, with the tagline: "if you smoke, you stink".[425] Smoking, then, is discouraged not by highlighting its health effects, but by emphasizing its negative social connotation.

The denormalization of tobacco can thus be achieved in various ways. All tobacco denormalization measures share a similarity with other discouragement measures (for example those based on the WHO FCTC), in that their aim is to discourage smoking without prohibiting it. However, they go a step further by attempting to change how individuals *perceive* or *feel about* smoking; altered perceptions and feelings, in turn, influence behavioral patterns related to smoking. As mentioned in section 2.2.3, this may occur in ways that are potentially stigmatizing to smokers or in a way that may exacerbate tobacco-related health inequalities.

### 6.1.1 Ethical issues related to tobacco denormalization

#### Stigma

There is evidence that tobacco denormalization strategies are stigmatizing to smokers, often as an unintended by-product of the policy.[425] Tobacco denormalization strategies that stigmatize smokers can reduce smoking prevalence, both by reducing smoking initiation among youth and encouraging smoking cessation among adults.[426] It has been argued that stigma is therefore ethically justified on consequentialist grounds, provided that the stigma is temporary and helps to reintegrate individuals who are stigmatized. Since smoking prevalence is higher among some disadvantaged groups, it was also argued that these groups stand to benefit more from this temporal stigma.[14]

However, it has also been argued that socially disadvantaged groups are more resistant to discouragement measures, and may actually respond to stigma by smoking more as a coping strategy against the guilt and stress propagated by the stigma.[427] This thesis, similarly, has argued that this is largely because these groups tend to suffer from more severe addictions; addictive decisions are, in turn, very much influenced by emotional factors, with stress being a particularly potent trigger. The result is that, in severely addicted individuals, stress and guilt (and therefore stigma) act as a relapse trigger through dopaminergic pathways, stress pathways, and the endorphin opioid system (EOS), and in this way can actually contribute to the sustaining and triggering of tobacco addiction.

## Segregation and social marginalization

There is also evidence that smokers, in response to tobacco denormalization and stigma, may form ‘smoking islands’: social groups in which smoking is viewed as socially acceptable. Individuals in these ‘islands’ tend to be marginalized from the non-smoking mainstream,[81] and are less responsive to tobacco control policies and the effects of tobacco denormalization.[428] The threat of social marginalization may also encourage some smokers to hide their smoking, which in turn could compromise their healthcare and distance them from treatment services.[423] Studies have found that some smokers with symptoms of smoking-related diseases are likely to delay seeking treatment because of concerns about stigma, and that smokers who perceive more stigma are more likely to hide their smoking status from healthcare professionals.[15] However, as argued in section 5.1.4, treatment is necessary; particularly for severely addicted smokers who lack adequate support.

Furthermore, measures that segregate smokers from non-smokers, such as outdoor smoking bans, may be perceived as overly restrictive or stigmatizing if they make it more difficult for smokers to integrate with non-smokers.[429] Although segregation is temporary,<sup>5</sup> it may discourage smokers from visiting places where smoking is not permitted. There is also evidence that some smokers, feeling unable to smoke in public, smoke more in private places such as the home as a result of public smoking bans.[78] This, in turn, contributes to the formation of ‘smoking islands’. It could also result in others in the home, such as children, being exposed to higher levels of SHS. One interesting point to note here is that, in section 2.2.1, it was mentioned that some smokers have responded to smokefree laws by actually smoking *less* in their own homes. This is thought to be a result of raised awareness on the detrimental effects of exposing others in the home, particularly children, to second-hand smoke (SHS).[77] However, the points made here suggests that not all smokers respond to smokefree laws equally, and that some may respond in more counterproductive ways.

## Tobacco-related health inequalities

Stigma may also be compounded for smokers who are already stigmatized for other traits. This particularly applies to people with a low socioeconomic status, the mentally ill, or racial minorities; notably, groups among whom smoking is concentrated. This, in turn, may exacerbate tobacco-related health inequalities. Yet, tobacco-related health inequalities are becoming more strongly recognized as a significant problem for tobacco endgame strategies, as smoking prevalence decreases further and the inequality gap increases.[430] Tobacco-related health inequalities have also been expressed as a

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<sup>5</sup>As in, segregation is only necessary while the smoker is actively smoking.

major concern and priority in all endgame strategies that plan to denormalize tobacco. The Scottish strategy, for example, states that:

“We will not achieve our ambition of a tobacco-free Scotland without addressing the stark socio-economic inequalities in smoking prevalence rates. . . . Tackling health inequalities and their underlying causes is part of our *collective responsibility* to advance the *right to life* and to increase life expectancy, taking steps to protect us all, particularly children, from risks to life. Such measures are also clearly required to advance the *right to the highest attainable standard of health*.” (pg.2, [98])

Thus, to minimize tobacco-related health inequalities is not only viewed as a practical matter, but also as a collective responsibility to promote equal access to the rights to life and health, and to protect children. These ethical ideas fit very closely to those of the ethical framework developed in this thesis: emphasis on protecting human rights, protecting the healthy development of children, the importance of social justice as an underlying cause of health inequalities, and recognition that overcoming these is a collective responsibility shared by society, the state, and individuals themselves. The Scottish strategy, accordingly, aims to focus its efforts on low-income groups, prisoners, and the mentally ill, and to integrate tobacco control measures into support programmes that focus on health inequalities, child health, and social care.[98] However, these strategies may be blunted by parallel denormalization efforts that contribute to the stigma and marginalization of socially disadvantaged smokers. Furthermore, although all endgame strategies mentioned in section 2.2.3 have prioritized the targeting of groups among whom smoking prevalence is higher, the exact strategies behind this remain unclear. In Finland, for example, socioeconomically deprived groups are to be targeted through media campaigns, although the exact content of these campaigns has not been specified.[99]

## **Implications**

It is necessary to seek ways in which to denormalize tobacco that do not stigmatize or marginalize smokers; particularly those who are at a social disadvantage or who are severely addicted. This point was already highlighted in the development of the ethical framework in chapter 5; recent attempts to denormalize tobacco are a case in point. What follows, then, is an ethical analysis of tobacco denormalization strategies, in reference to the ethical framework for tobacco control policy developed in this thesis.

### 6.1.2 Ethical analysis of tobacco denormalization

The ethical framework developed in this thesis argues that tobacco control policies should promote relational autonomy. This also entails minimizing smoking prevalence and addressing the following: exposure to SHS, smoking initiation, cessation and helping people overcome their tobacco addictions, and tobacco-related health inequalities. The purpose of the tobacco denormalization strategies discussed is to discourage smoking initiation among younger generations. Focus, then, is on preventing initiation while other aspects of tobacco use—SHS exposure, cessation, and tobacco-related health inequalities—may be affected as a by-product of the strategy. In what follows, tobacco denormalization strategies are analyzed in reference to the framework and each of its ethical considerations that support relational autonomy as described in section 5.2.4.

#### Building on existing frameworks

*Protecting young people:* Tobacco denormalization strategies focus on protecting younger generations from smoking initiation by creating a social environment in which they do not want to start smoking. Removing cues that normalize smoking, such as TAPS, protect youth from the TI. Media campaigns that denormalize the TI, targeted to youth, can also protect youth from the deceptive marketing practices of the TI. Measures that make smoking a rarely observed activity in society, such as smokefree laws in public spaces (both outdoor and indoor) can protect youth from initiation, especially if smoke-free areas are implemented in areas where they often go: for example playgrounds, youth centres, and schools. Therefore all denormalization strategies, particularly those targeted at youth, can protect them from smoking initiation. This, in turn, supports children's rights to life and healthy development (CRC article 6), protection from harmful drugs (CRC article 33), and protection from exploitation by the TI (CRC article 36).

*Libertarian paternalism:* Tobacco denormalization strategies aim to discourage smoking among youth. Although there is not much evidence that tobacco denormalization increases cessation, there is strong evidence that it increases smokers' motivations and attempts to quit.[425] For smokers who are not (or only mildly) addicted, this means that tobacco denormalization movements can have a positive motivational influence. This is also reflected in rates of smoking prevalence, which show a marked decrease after the implementation of discouragement measures (see section 2.2.2). However, for more severely addicted smokers, having a motivation to quit does not necessarily translate into successful cessation. The implication is that denormalization measures should be implemented along with cessation programmes and therapies that help addicted smokers to quit. This feeds into the idea



of reciprocity (discussed below).

*Harm principle:* Certain tobacco denormalizing measures, such as smokefree laws in some outdoor areas, may offer extra protection from SHS. It was also mentioned in section 6.1.1 that smokers—as a result of denormalization movements—may avoid smoking in their homes or quit altogether, thereby protecting others in the home—particularly children—from SHS. However, it was also argued that some denormalization measures, such as smokefree outdoor areas, may result in some people smoking more in their homes. Denormalization strategies should prevent this effect by providing alternative options for smokers (see discussion below on reciprocity), or by helping them to find places to smoke such that others in the home are not exposed to SHS.<sup>6</sup>

### **Focus on the social environment, minimizing tobacco-related cues, and minimizing stigma**

Put together, these ethical considerations require policies to minimize social factors—such as stress—that predispose people to addictions, to minimize tobacco-related cues in the environment, and to exert social pressure in a supportive, non-stigmatizing way. Therefore denormalization movements should remove normalizing tobacco-related cues in the environment and promote pro-regulatory social movements, while avoiding the stigmatization of smokers. This requires a separation of the denormalization strategies that are potentially stigmatizing from those that have a more neutral social connotation.<sup>7</sup>

As mentioned above, there are various ways to approach tobacco denormalization: (1) tobacco normalization cues, such as TAPS, could be removed from the social environment; (2) smoking can be made more rarely observed by implementing smokefree public areas; (3) media can be used to address misperceptions regarding smoking; (4) the TI could be denormalized; and (5) smoking could be portrayed as socially undesirable. Of these five approaches, the last is most obvious in encouraging a negative social connotation towards smokers, and is therefore unethical.<sup>8</sup> The other four, however, are less likely to produce a negative social connotation towards smoking—or smokers—because their focus

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<sup>6</sup>In Scotland, for example, the ‘REFRESH’ project aims to encourage parents with young children to not smoke in the home. This is done by going into the homes of smokers with young children, measuring the air quality in the home, and educating the parents on the effects this can have on their child. They are then provided with personalized advice on how air quality in the home can be improved, for instance by suggesting alternative places to smoke. See [98].

<sup>7</sup>In separating actions that are ‘potentially stigmatizing’ from those that have a ‘neutral social connotation’, it is recognized that even the more socially ‘neutral’ actions may—to some degree—be considered stigmatizing. The point, then, is that they lie along a continuum, and actions that lean further towards being ‘socially neutral’ should be prioritized over those that lean further towards ‘stigmatizing’.

<sup>8</sup>Media campaigns are not necessarily stigmatizing if smoking is indirectly portrayed as socially undesirable as a public health matter; for example with the message that ‘smoking is unhealthy’. This indirectly implies that, since smoking is unhealthy, it is also socially undesirable. However, this would be more accurately described as a health-related warning campaign. More direct messages, such as ‘smoking is unhealthy and socially undesirable’ has more potential to stigmatize smokers as it portrays smokers as unhealthy *and* socially undesirable.

is on portraying smoking as a *rare* (but not necessarily a stigmatizing) activity, or on denormalizing the TI. Denormalization of the TI is likely to produce a negative perception of the TI, but not smokers, as smokers are then portrayed as victims of the deceptive practices of the TI.<sup>9</sup>[425] Such movements support relational autonomy, and may therefore—as argued in section 5.2.4—also support the rights to life and health (UDHR article 3, ICCPR article 6, ICESCR article 12), social conditions conducive to good health (UDHR article 25), self-determination (ICESCR article 1, ICCPR article 1), and liberty (UDHR article 3, ICCPR article 9).

### **Focus on socially disadvantaged groups**

Tobacco denormalization efforts should support equality rights (UDHR articles 2 and 7, ICCPR article 2 and 26, ICESCR article 2) by paying attention to the needs of socially disadvantaged groups: racial minorities, the mentally ill, and people in low socioeconomic strata. As mentioned in section 6.1.1, such groups may be subjected to compound stigma, if they are already stigmatized for a trait that puts them at a social disadvantage, and in addition are stigmatized for smoking. Problems with stigma are likely to be exacerbated if such groups remain unresponsive to tobacco denormalizing measures, for example by forming ‘smoking islands’; hence these groups should be included in denormalization movements in a non-stigmatizing way, and a neutral or supportive towards them should be encouraged. These groups should also be protected from exploitation by the TI, and provided better opportunities and support to overcome their tobacco addictions. As with the Scottish strategy, this could be done by weaving tobacco control into social support programmes. Denormalization measures could also be targeted to these groups by focusing on how the TI has contributed to tobacco-related health inequalities by creating the misleading idea that smoking is a suitable self-medication. This last point relates to the discussion on dealing with TI activity (below).

### **Reciprocity**

Smokers should be helped in overcoming their addictions, rather than being socially pressurized or stigmatized into quitting. As mentioned above (in discussing libertarian paternalism), tobacco denormalization movements can provide a motivation to quit but they do not necessarily provide an ability to quit,[425] so denormalization should be coupled with cessation therapies that help to *enable* severely addicted smokers to quit.

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<sup>9</sup>Denormalization of the TI is not unethical, because the TI’s activities can hardly be described as acceptable—see chapter 4.

Further, some denormalizing measures—such as smokefree outdoor areas—put further restrictions on where people can smoke, which can possibly—as mentioned in section 6.1.1—make smokers feel stigmatized or segregated from non-smokers. Reciprocity, then, would approach this issue by providing alternative places where people can smoke such as smoking shelters within designated outdoor non-smoking zones. Smokers could also be encouraged (rather than forced) to comply to outdoor smoking bans, by educating them on the importance of denormalizing tobacco to protect younger people from smoking initiation and by creating smokefree areas in a bottom-up (rather than top-down)<sup>10</sup> manner.

### **Non-coercive addiction treatment**

In discussing reciprocity (above), it was argued that tobacco denormalization measures should be accompanied with cessation services to help smokers quit. Such cessation services should focus on helping smokers identify reasons for quitting, building their motivation to quit, and train them to exercise self-control over their cravings and addictive actions. Focus should also be on the social factors that trigger relapse, and encouraging positive support from significant relationships e.g. family and friends. Although priority should be on these types of intervention, medical therapies or nicotine replacement therapies could also be administered to further assist smokers in their quit efforts.

### **Dealing with tobacco industry activity**

The ethical framework advocates for stricter regulations on TI marketing and activity in research, lobbying, and debate. All these measures can help to denormalize tobacco. The TI may also be denormalized via media campaigns that expose the TI's deceptive marketing practices, and by drawing on internal TI documents that demonstrate the TI's persistent targeting of youth and socially disadvantaged groups. Denormalization of the TI is also effective in gaining public support for tobacco regulations.<sup>11</sup> Denormalization efforts could also focus on dispelling myths that the TI has propagated about tobacco; for example, ideas that smoking is a marker of adulthood, is stress relieving, or that addiction is a 'free choice'. The latter may also help to reduce stigma for addicted smokers, since—as mentioned in section 6.1.1—one of the reasons why stigma evolves is the perception of smoking as a voluntary behavior that holds smokers morally culpable. Social norms marketing may,

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<sup>10</sup>'Bottom-up' here refers to tobacco control measures that originate from building support from the public; for example, a community movement that encourages people to smoke in designated areas. 'Top-down' measures originate from laws to which people are required to comply; e.g. a law that only permits people to smoke in designated areas.

<sup>11</sup>For example, in the Netherlands the public has typically been very resistant to tobacco control measures. More recently, however, lobbying activities of the TI in Dutch politics were exposed. Since then the Dutch public has started to become more supportive of tobacco control efforts, and regulations on tobacco have become a significant topic of discussion. See [431].

similarly, be used to address common misperceptions.<sup>12</sup> These approaches, in making people more aware of the TI's exploitative practices, can support the rights of children and the mentally ill to be protected from exploitation by the TI (CRC article 36, CRPD article 16).

## 6.2 The tobacco-free generation proposal

The TFG proposal was introduced in section 2.2.3. As mentioned in section 2.2.3, the proposal raises questions regarding the extent to which smoking should be regulated in order to protect youth from smoking initiation. Also, due to its specific targeting of younger generations, it may lead to a neglect of other important and ongoing issues, such as the low success rates in smoking cessation or tobacco-related health inequalities. This section, then, discusses in greater detail the ethical objections and implications that may arise as a result of the TFG proposal (section 6.2.1), and provides an ethical analysis of the TFG proposal in reference to the ethical framework developed in this thesis (section 6.2.2).

### 6.2.1 Ethical issues related to the TFG proposal

#### Free choice arguments

The TFG proposal may be contested on the grounds that it is overly restrictive on individual freedom. In a UK debate, for example, the TFG proposal was termed authoritarian, “fascist”, and incompatible with liberal values.<sup>[432]</sup> However, as argued throughout this thesis, having the option to develop an addiction is not compatible with the notion of freedom, because addiction is a disorder that is autonomy-undermining. Cigarettes are, by design, highly addictive and addicting for most users;<sup>13</sup> therefore it is not unethical to deny the option to initiate smoking, particularly if this involves children and young adults who, as argued in section 3.2.4, have not yet fully developed their capacity for making rational, long-term decisions and who are neurobiologically more vulnerable to developing addiction. However, one may argue that addictions are less likely to form in adults who initiate smoking after age 25, and so the TFG proposal is unethical where it involves older, consenting adults who choose to

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<sup>12</sup>As discussed above, social norms marketing can be used to correct misperceptions on smoking prevalence, which is typically overestimated by adolescents. In some schools, this approach has been used to discourage alcohol use with messages such as: “the majority (66%) of student-athletes drink alcohol once per week or less often or do not drink at all” and “the majority of athletes (71%) do not use alcohol to relieve academic pressures”.<sup>[425]</sup> This makes alcohol use appear uncommon, but necessarily morally repugnant, while at the same time dispelling myths regarding its use.

<sup>13</sup>One may argue that having an option to smoke is not freedom-undermining provided that the individual does not develop an addiction. However, non-addicted ‘casual’ smokers represent a minority of smokers, and even they can develop an addiction in response to stress or other triggers—see the discussion in reference to neurobiological evidence in section 3.1.

initiate smoking. In such cases, further ethical justification for the TFG proposal over a less restrictive approach—such as raising the minimum age of sale to 25—may be necessary.

### **Protecting youth through less restrictive means**

The importance of protecting young people above age 18 from initiation is increasingly recognized. The TI has understood the importance of targeting people in the age 18–21 bracket, since this is a critical time for solidifying nicotine addictions. The TI typically attempts to deter these individuals from quitting, or to recapture those who have quit.[433] Accordingly, in places such as Hawaii and the city of New York the minimum age for tobacco sale has been raised to 21 years.[434] This thesis has argued that people should be protected from smoking initiation until age 25, so an alternative—perhaps less restrictive—alternative to the TFG proposal is to raise the minimum age of sale to 25 years. What are the advantages, then, of the TFG proposal over raising the minimum age of sale? The answer to this question requires a deeper exploration of the nature of initiation among youth.

As discussed in section 4.3, smoking is commonly viewed by youth as a rite of passage into adulthood. This is clearly reflected in the marketing campaigns of the TI, which has long recognized that smoking is initiated as a marker of adulthood which is later sustained through nicotine addiction. Laws that permit smoking in later life, similarly, reflect the idea that smoking is a normal adult behavior. Not permitting smoking to younger generations, regardless of their age, sends the message that smoking is not a rite of passage and not a normal activity at any age. Another important aspect of the TFG proposal is that it progressively denormalizes smoking as an outdated behavior, as the age gap between youth and the youngest smokers increases.[106] Denormalization is, in turn, an effective strategy for deterring smoking initiation (see the discussion in section 6.1).

Furthermore, research suggests that most underage youth who smoke do not buy tobacco themselves, but obtain it from older peers. These older peers are, generally speaking, established smokers themselves, able to legally buy tobacco, and in frequent contact with younger people who buy tobacco from them.[433] So another effect of the increasing age gap is that, over time, it becomes more difficult for younger generations to obtain tobacco from people born just before the cut-off date. Advocates for the TFG proposal generally acknowledge that some children, particularly those born around the cut-off date (e.g. in 2000 and 2001) will initiate smoking regardless of the new law. However, it is argued that this effect will wear off as smoking prevalence gradually drops, smoking is progressively denormalized with each year, and the age gap between tobacco-free generations and those born just before the cut-off date increases.[106] In other words, the TFG proposal is—potentially—advantageous

over raising the minimum age of sale to 25 in that it gradually increases the age gap between smokers and tobacco-free generations. However, whether this would be advantageous in reality remains to be seen, since neither intervention—a law restricting tobacco sales to over 25’s or the TFG proposal—has been implemented or piloted anywhere.

### **Slippery slope arguments**

Another ethical objection to the TFG proposal is based on a slippery slope argument:<sup>14</sup> the argument that it will justify the phasing out of other unhealthy products such as alcohol, coffee, and sugary food. However, as argued in section 5.1.1, tobacco is *sui generis* as a legal product that represents such an extensive health threat: it is—by design—far more addictive than any other legal product, both in terms of its pharmacological addictiveness and the proportion of users who are addicted, and kills half of its users. Unlike other legal products such as alcohol, sugar, and coffee, there is no level at which smoking or exposure to SHS can be considered ‘safe’, and so the general precaution ‘use in moderation’ does not apply to tobacco. The implication is that, as argued in section 5.1.1, restrictions on tobacco should not be extrapolated to other substances: a similar phase-out on coffee, alcohol, or sugary food would require a separate justification. In other words, the slippery slope argument does not apply.

### **Stigmatization of smokers**

It has also been argued that the TFG proposal’s prohibitive approach will lead to the ‘demonization’ of smokers.<sup>[435]</sup> As in the case of many illicit drugs, such as heroin and cocaine, prohibition could lead to a moralized approach to policy (see section 4.2), and the stigmatization and social marginalization of smokers. However, the TFG proposal, unlike many illicit drug policies, does not criminalize smokers because the restriction is on tobacco sales, not tobacco use. Hence the burden of compliance would lie on tobacco retailers, not smokers.<sup>[106]</sup> The TFG proposal is also unlikely to result in a moralistic approach to tobacco policy, because it is based on public health principles rather than the idea that smoking is morally repugnant. However, this should be emphasized in social movements that promote or support the TFG proposal (further discussion in section 6.2.2).

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<sup>14</sup>‘Slippery slope’ arguments were described in section 5.1.1. In the context of tobacco, they are based on the idea that a restriction on tobacco will justify restrictions on other unhealthy, legal products such as alcohol or sugary food.

## **Inequality issues**

The TFG proposal may also be considered unethical on the basis that it permits a choice to smoke to the people born before the cut-off date, while denying it to those born after it. It may be argued that this presents an inequality of liberties, which is based on an arbitrary premise (date of birth).[432] In the UK, for example, it was argued that:

“A ban of this nature is totally incompatible with the fundamental principle of equality for all adults before the law. There can be absolutely no debate that the rights and obligations of a person born on 31<sup>st</sup> December 1999 are identical with those of someone born on 1<sup>st</sup> January 2000.”[435]

However, as this thesis has argued, it is not unethical to deny one the option to initiate smoking, because having this option is not compatible with the notion of ‘freedom’ (see above discussion on ‘free choice arguments’). Going further, policies that support non-smoking support relational autonomy as they protect people from tobacco addiction. Thus, people born before the cut-off date do not have unequal liberties. They also do not have an unequal advantage to ‘rights and obligations’, since—as argued in section 5.2.3—there is no right to smoke, and if anything, a right to liberty is actually supported by measures that contribute to the prevention or treatment of addictions. The only viable argument related to inequalities, then, is the consequentialist argument that the TFG proposal could lead to strain between individuals born before and after the cut-off date. Smokers born before the cut-off date could also be stigmatized as a result of the progressive denormalization of smoking. This may result in ethical issues such as those discussed in section 6.1. These issues are discussed further in section 6.2.2.

## **Further concerns**

The TFG proposal may also be contested on the grounds that it only targets smoking initiation, and therefore has an overly narrowed scope: other important issues, such as SHS exposure, overcoming addictions, or tobacco-related health inequalities, are not addressed. There are further concerns that the TFG proposal will not work, since previous attempts to prohibit alcohol were unsuccessful and resulted in poor compliance, illicit trade, and a public health crisis as a result of illegally produced alcohol contaminated with methanol.[436] With tobacco, similarly, if the public opposes the TFG proposal, there could be an increase in illicit tobacco trade. It was also argued that youth may feel more compelled to initiate smoking as a result of the TFG proposal’s ‘forbidden fruit’ effect.[435]

Public opposition could, in turn, lead to compliance issues and public protests which may impede the success of the TFG proposal. Based on the history of the TI,<sup>15</sup> it is almost certain that the TI will try to propagate or support any arguments that oppose the TFG proposal. Ways in which these issues could be averted are discussed below,<sup>16</sup> in reference to the ethical framework for tobacco control policy developed in chapter 5.

## 6.2.2 Ethical analysis of the TFG proposal

The ethical framework of this thesis is based on supporting relational autonomy. This requires policies to minimize overall smoking prevalence and to address smoking initiation, exposure to SHS, cessation and overcoming addiction, and tobacco-related health inequalities. The TFG proposal directly addresses the first aspect (smoking initiation), while other aspects may be affected indirectly. However, it has relatively little focus on relational aspects such as the social conditions that may trigger smoking initiation among socially disadvantaged youth, or ways in which the TFG proposal—besides outlawing tobacco sales to younger generations—could help to support an autonomy-promoting social environment. What follows, then, is an ethical analysis of the TFG proposal in reference to the ethical framework described in section 5.2.4.

### Building on existing frameworks

*Protecting youth:* The TFG proposal protects an entire cohort from smoking initiation and addiction because the retail environment is regulated such that people aged under 25 years cannot initiate smoking. It does this by phasing out the ‘rite of passage into adulthood’ effect, by progressively denormalizing smoking, and by phasing out tobacco sales to groups that are often targeted for TI promotions. This in turn supports children’s rights to life and healthy development (CRC article 6), protection from harmful drugs (CRC article 33), and protection from exploitation by the TI (CRC article 36). Since the TFG proposal protects younger cohorts from tobacco-related death and disease throughout the life-course, it also supports the human rights to life (UDHR article 3, ICCPR article 6) and health (ICESCR article 12).<sup>17</sup>

*Libertarian paternalism:* In order to maximize these effects and to protect youth further from the

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<sup>15</sup>As in, the TI’s deceptive marketing practices and attempts to subvert effective tobacco control policies with normalization efforts, scientific research, biased arguments, and other strategies—see chapter 4.

<sup>16</sup>A full discussion of practical issues related to the TFG proposal, such as illicit trade, is not done here because—as mentioned in chapter 1—this kind of analysis would require a more in-depth inquiry into localized factors that are beyond the scope of this work. The discussion below therefore only touches on the aspects most relevant to this work.

<sup>17</sup>I have co-discussed elsewhere ways in which the TFG proposal is potentially supportive of human rights such as the rights to life and health, without unduly violating rights to liberty, self-determination and privacy—see [174].



TI, the TFG proposal should be implemented along with measures that deter youth from smoking and that restrict TI activity: warning labels, taxation, and restrictions on TAPS.<sup>18</sup> *Harm principle*: The TFG proposal would, over time, protect people from SHS exposure as smoking is progressively phased out. However, smokefree laws are arguably more effective at protecting people from SHS in the short term, and should not be neglected in favour of the TFG proposal. In other words, effective tobacco control measures in line with the WHO FCTC should be implemented alongside the TFG proposal in order to avoid neglecting other important tobacco-related issues besides smoking initiation, and to maximize the impact of the TFG proposal.

### **Focus on the social environment and minimizing stigma**

The social and relational nature of addictive decision-making should be taken into account, and—in supporting the TFG proposal—efforts should be made to prevent or treat addictions by providing autonomy-promoting social conditions. This can help people born after the cut-off date who, despite the tobacco phase-out, initiate smoking anyway and develop tobacco addiction. Accordingly, social conditions that contribute to addiction—such as stress, poor family dynamics, and adverse childhood experiences (ACE)—should be addressed. This could be done by weaving the TFG movement into support programmes designed to tackle these issues and by recognizing the interconnectedness of these issues to smoking initiation and addiction. Social and relational factors should also be used to encourage cessation. As mentioned in section 5.2.4, given the relational nature of smoking initiation and addiction, smoking cessation should not be encouraged to individuals but among peer groups who have initiated smoking together.[422] Cessation should also be encouraged by harnessing support from family and friends.[421]

Although the TFG proposal does not directly affect current smokers, some smokers may feel encouraged to quit if society sends the message that it is moving towards a tobacco-free state.[16] A positive influence from social relationships (for example, between younger and older generations) could then be used to support people in older cohorts to give up smoking. Tobacco-free youth could, for example, encourage their parents to quit smoking. In these ways, the TFG proposal could incorporate a psychosocial approach to cessation that encourages non-smoking within social clusters. This idea matches research that indicates smoking cessation generally occurs in this way,[81] and that a common reason for cessation is pressure from loved ones.[80] Social pressure should be exerted in a supportive manner, without stigmatizing smokers who are unable to quit. A negative portrayal of smokers should

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<sup>18</sup>This also supports an environment with minimal tobacco-related cues, protecting addicted smokers from relapse.

be avoided (see section 6.1). Such an approach would, in turn, support the rights to life and health (UDHR article 3, ICCPR article 6, ICESCR article 12), and social conditions conducive to health (UDHR article 25). In maximizing the ability of people—both those born before and after the cut-off date—to quit smoking, the rights to self-determination (ICESCR article 1, ICCPR article 1) and liberty (UDHR article 3, ICCPR article 9) are also supported.

### **Reciprocity and non-coercive addiction treatment**

As argued above, a TFG movement may encourage some smokers to quit; yet having an increased motivation to quit does not necessarily result in successful cessation (see section 6.1). *Reciprocity*: It is important for TFG movements to provide cessation services, both to people born before *and* after the cut-off date. Incorporating these ideas as an integral aspect of the TFG proposal would also help to minimize the gap between groups born before and after the cut-off date. *Non-coercive addiction treatment*: Such cessation services should employ a non-coercive approach, in which social changes to support non-addiction are encouraged, (see above discussion on ‘focus on the social environment’), and in which individuals are helped in identifying reasons to quit and ways in which to maximize resistance to addictive cravings.

### **Focus on socially disadvantaged groups**

The TFG proposal would, in theory, minimize tobacco-related health inequalities as it phases out smoking initiation to *everyone* born after the cut-off date. However, compliance may be unequal, because people from socially disadvantaged backgrounds tend to engage more in illicit or problematic substance use.[36] This may lead to tobacco-related health inequalities as a result of non-compliance. Non-compliant youth could, in turn, be socially marginalized and stigmatized as a result of the progressive denormalization of smoking. It is important, then, for TFG movements—in supporting relational autonomy—to recognize that tobacco addiction is not an isolated problem but strongly interconnected to the issue of social injustice. It is also necessary for TFG movements to monitor compliance across different social groups, and to encourage the least compliant groups—in a non-stigmatizing way—to become part of the TFG movement. This could be done by providing them with cessation therapy and addressing the social factors that propagate addiction. Paying attention to the needs of socially disadvantaged groups in turn supports equality rights (UDHR articles 2 and 7, ICCPR article 2 and 26, ICESCR article 2).

## **Dealing with tobacco industry activity**

To maximize the effect of the TFG proposal, all TI activities targeted towards young people—particularly TAPS—should be strictly regulated. The TFG proposal should also be supported by a movement that educates people—particularly youth—on the TI’s practices, particularly its targeting of children and young adults. This, in turn, helps to raise awareness on the necessity to protect youth from smoking initiation, and can help to build support and compliance to the TFG proposal. The public, policymakers, and other stakeholders should also be properly educated on the ethical basis and rationale of the TFG proposal, including its health and human rights aspects. It should be emphasized, for example, that people below age 25 are particularly vulnerable to developing addiction, and should be protected from initiation. It should also be emphasized that the option to smoke is not compatible with freedom, and that there is no ‘right to smoke’; so the TFG proposal is not restrictive beyond a point that is unethical, or a violation of liberty rights. TFG movements should also address popular misconceptions: fears that the TFG proposal will criminalize or demonize smokers or that it will result in a slippery slope towards banning alcohol and unhealthy food.

## **6.3 Tobacco harm reduction**

Tobacco harm reduction, which was introduced in section 2.2.3, would involve providing cigarette alternatives such as LN–SLT or ENDS to addicted smokers in order to help wean them off cigarettes. As discussed in section 2.2.3, both products are potentially harmful and may be used by the TI to subvert effective tobacco control policies. Nevertheless, if LN–SLT or ENDS can contribute to the minimization of tobacco–related public health impacts without creating further implications, their use is not fundamentally incompatible with the ethical framework of this thesis. What follows is a discussion of the potential ethical implications that may arise as a result of permitting a market for LN–SLT and ENDS (section 6.3.1), and an ethical analysis in reference to the ethical framework of this thesis (section 6.3.2).

### **6.3.1 Ethical issues related to tobacco harm reduction**

#### **The message of tobacco harm reduction**

Those who advocate for tobacco harm reduction generally argue that smokers should have access to less harmful alternatives if they are unable or unwilling to quit using nicotine. Not permitting this option is then considered moralistic and in conflict with public health principles.[437] The TI, however,

also strongly advocates for tobacco harm reduction. The tobacco company Philip Morris, for example, argues that tobacco harm reduction should be sought on the grounds that tobacco use, despite public health efforts, will continue:

“Harm reduction policies are based on the view acknowledged by virtually all public health organizations that tobacco use will continue well into the future . . . The recognition that people will continue to smoke has led many public health authorities to the conclusion that developing tobacco products that have a reduced risk of causing disease is a crucial element of tobacco policy.”[438]

However, this view goes against other strategies such as tobacco denormalization and the tobacco-free generation proposal, that aim to near-*eliminate* tobacco consumption. It sends the conflicting message that tobacco use will continue, while endgames imply that states are moving towards becoming tobacco-free. Further, endgame ideas, as well as current tobacco control policies based on the WHO FCTC, send the health message that smokers should be encouraged to quit smoking completely and that non-smokers should never initiate. However, products such as LN-SLT and ENDS have been promoted with the conflicting message that *reducing* tobacco consumption—rather than complete cessation—is sufficient.[17] It is argued, then, that policies should continue to encourage complete cessation and not become too distracted by a harm reductive approach.[439] Others have warned that the TI is simply using harm reductive sentiments to sustain addictions to nicotine, in order to undermine current tobacco control efforts and encourage smoking among youth.[440]

### **Potential to reduce harm**

It was mentioned in section 2.2.3 that both LN-SLT and ENDS are, albeit less harmful than cigarettes, still potentially harmful to self and others. A question, then, is whether the harm threshold of these products is sufficiently low to be considered under a tobacco harm reduction strategy. For LN-SLT, the harm threshold relative to cigarettes is low,<sup>19</sup> so if cigarette smokers make a complete switch to LN-SLT, they are significantly less likely to suffer health complications. Others around them would also be less exposed to SHS. This applies particularly to smokers who are unable or unwilling to quit using nicotine, or for whom conventional cessation therapies, such as nicotine patches or varenicline, do not work.[441] Thus it has been argued that there is a case, from an ethical and public health perspective, to permit severely addicted smokers access to LN-SLT.[18, 19] For ENDS, however, the

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<sup>19</sup>As mentioned in section 2.2.3, the harm threshold of LN-SLT in relation to that of cigarettes is 5–9%—see [113].

potential harms and benefits of a complete switch from cigarettes are less clear, and it is uncertain whether the vapour from ENDS is harmful to the health of others.<sup>20</sup> Accordingly, it is recommended that the use of ENDS in public places is subject to the same restrictions as tobacco, and that their use and marketing is regulated until more evidence emerges.[17]

### **Potential as a cessation strategy**

There are further questions regarding the potential use of LN-SLT and ENDS as smoking cessation aids. It has been argued that many smokers are able to quit without a cessation aid, and so replacement products such as LN-SLT and ENDS are unnecessary.[102] However, most cessation attempts are unsuccessful, even with conventional cessation aids.<sup>21</sup> This thesis also argues that tobacco addiction can be extremely difficult to overcome, particularly for individuals regularly exposed to tobacco-related cues, stress, and other addiction triggers; therefore more effective approaches to cessation are needed.

Smokers who do not respond favourably to conventional cessation aids could then have the option of switching to LN-SLT or ENDS.[120] However, evidence so far indicates that the use of ENDS is more likely to result in dual use with cigarettes rather than a complete switch to ENDS.[17] Similar issues may be observed with LN-SLT,[19] especially in places where it is poorly regulated. Furthermore, simply switching from cigarettes to another product does not necessarily take into account the social or relational factors that contribute to an individual's addiction; yet this thesis argues that, due to the social and relational nature of addictive decision-making, a sociorelational approach should be adopted in smoking cessation. This should involve the positive influence from family, friends, and other important relationships, and address the social circumstances that trigger addiction. It was also argued that individuals are capable of training their own resistance to addiction, and so cessation therapies should attempt to harness the will, resolve, and self-control of addicted smokers. Failing that, however, LN-SLT and ENDS could still be provided as a last-resort option for severely addicted smokers who are unable or unwilling to quit using nicotine, or who need access to an alternative product while undergoing cessation therapy.

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<sup>20</sup>This is, as mentioned in section 2.2.3, because ENDS are relatively new to the market and an assessment of their long-term impact on the health of self and others has not yet been possible—see [17].

<sup>21</sup>In section 2.1.1, for example, it was mentioned that, even with approved cessation aids, success rate for cessation is just 25%.

## Concerns raised by tobacco industry activity

As mentioned in section 2.2.3, there are also concerns that the TI will market LN–SLT and ENDS in ways that will worsen the current public health situation. As mentioned in section 4.4, recent attempts of the TI to find a ‘safe alternative’ to cigarettes echoes earlier attempts of the TI to find a ‘safe cigarette’; however, this was essentially a strategy to improve the TI’s corporate image, and actually made the public health situation worse.[39] Similarly, the TI’s current marketing activities, particularly for ENDS, are concerning. ENDS are promoted as ‘healthy’ and ‘safe’ even though their health benefits and safety remain unproven. They are advertised as a useful cessation aid despite the fact that they seem to result mostly in dual use. ENDS are also promoted as appropriate products to use in smokefree public areas,[120] even though the ENDS vapour is not necessarily safe for others. The latter has also raised concerns that the unregulated use of ENDS in public will renormalize smoking as a social activity. This, in turn, may undermine current tobacco denormalization efforts.<sup>22</sup> Otherwise, the marketing of ENDS emulates similar ideas as those in earlier promotions of tobacco: ENDS as a symbol of independence, lifestyle choice, success, and glamour.[17]

ENDS are also marketed to youth and designed in ways that encourage initiation.[442] This could, in turn, result in nicotine addiction or sustained use of ENDS. There are also concerns that it acts as a ‘gateway’ into smoking cigarettes. Some ENDS take the form of everyday items such as pens and USB memory sticks,[17] and are sold in a wide variety of flavours that mimic sweets, with names such as ‘coconut bomb’, ‘peppermint blast’, and ‘vanilla cupcake’.[442] Consequently, youth experimentation with ENDS has increased significantly in recent years, and many of these youth are also using cigarettes.[17] Similarly, the use of LN–SLT among youth is a concern, especially in places where SLT is poorly regulated and designed to be highly addictive. It was mentioned in section 2.2.3 that, in places such as South Africa and India, the use of SLT seems to encourage nicotine addiction and cigarette smoking in later life, and that this is in large part due to a lack of regulation.

The unregulated marketing of LN–SLT and ENDS can also trigger dual use in addicted smokers. One study, for example, found that adverts for ENDS can trigger cravings for cigarettes in addicted smokers and ex–smokers.[120] According to the neurobiological evidence in section 3.1.1, TAPS are tobacco–related cues that can trigger cravings and relapse, and are in this sense autonomy–undermining. The similarities between LN–SLT/ENDS and cigarettes suggests that adverts and promotions of LN–SLT and ENDS may also act as tobacco–related cues, and are therefore potentially

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<sup>22</sup>This could, in turn, encourage smoking initiation among youth since they are especially responsive to tobacco (de)normalization measures—see section 6.1.

autonomy-undermining and should be restricted.

### **The need for a regulatory framework**

From the above, it is clear that many issues associated with the use of LN-SLT and ENDS are a result of loose regulations on their use, marketing, and design. A proper regulatory framework is therefore key if these products are to be incorporated into tobacco control policies as a harm reductive strategy. Accordingly, the WHO recommends restrictions on ENDS that are similar to those currently imposed on cigarettes. These include tight regulations on the advertising, promotions, and sponsorships of ENDS; banning the use of ENDS in public places; warning labels and media campaigns that inform consumers on the potential risks of using ENDS; and prohibiting sales to youth. The WHO also recommends restrictions on the nicotine content in ENDS and omitting all flavours, harmful additives, and toxic by-products.[17] A similar regulatory framework could also be secured for SLT in countries where the use of SLT is permitted, or places in which the use of LN-SLT may be considered as part of a harm reductive strategy.[18]

### **6.3.2 Ethical analysis of tobacco harm reduction**

LN-SLT and ENDS are not necessarily incompatible with the ethical framework of this thesis, provided that they: (1) significantly reduce the health risks to cigarette smokers and others; (2) help addicted smokers to completely quit using cigarettes; and (3) do not undermine other tobacco control efforts, particularly the protection of youth from initiation and developing addiction. In line with the ethical framework, greater emphasis should be on autonomy-promoting social conditions in supporting relational autonomy. LN-SLT and ENDS both have a potential to reduce tobacco-related health risks for severely addicted smokers, *provided that* their use, marketing, and design is strictly regulated within a framework similar to the one recommended by the WHO.[17] Additional recommendations are provided in reference to the ethical considerations that form the ethical framework of this thesis, and in considering relational autonomy—the underlying foundation of these considerations.

### **Building on existing frameworks**

*The harm principle:* LN-SLT and ENDS are both potentially harmful to others, particularly to children exposed *in utero* or while breastfeeding, so pregnant and breastfeeding women should be encouraged to quit using LN-SLT and ENDS. This, in turn, protects children's right to a healthy development (CRC article 6). Although the precise health effects on others as a result of exposure to

ENDS vapour is uncertain, it may affect the health of others in a similar way to SHS. To prevent this, the use of ENDS should be banned in all indoor public places, at least until their long-term safety has been proven. This, in turn, supports others' right to health (ICESCR article 12), and children's right to a clean and safe environment (CRC article 24).

*Protecting youth:* Youth should be completely protected from the use and marketing of ENDS and SLT by restricting all advertising, promotions, and sponsorships of LN-SLT and ENDS, and banning all flavours and designs of LN-SLT and ENDS that may be attractive to youth. Youth should also be protected as much as possible from experimenting with these products. Since LN-SLT and ENDS are only intended to be used by those who are already addicted to cigarettes, their provision should be limited to addicted smokers. This could be done, for example, by supplying LN-SLT or ENDS on prescription to addicted adult smokers who have failed to quit with other cessation approaches or who wish to switch to a less harmful alternative. This approach, by making LN-SLT and ENDS less available, also sends the message that these products are intended for cessation—not recreation—and thereby minimizes the likelihood that youth will experiment with them. This, in turn, protects children's rights to life and healthy development (CRC article 6), protection from harmful drugs (CRC article 33), and protection from exploitation by the TI (CRC article 36).

*Libertarian paternalism:* For the purpose of harm reduction, LN-SLT and ENDS are not intended to be a recreational product but a cessation option for severely addicted smokers. In other words, addicted smokers should be able to benefit from the reduced health risks of switching to LN-SLT or ENDS, while youth should be prevented from initiating their use altogether. This therapeutic application should be reflected in their regulation. This, as suggested above, could be achieved by having LN-SLT and ENDS available on prescription rather than simply discouraging their use.

### **Minimizing tobacco-related cues in the environment**

As mentioned in section 6.3.1, adverts, promotions, and sponsorships of products similar to cigarettes—such as LN-SLT and ENDS—can trigger cigarette cravings in addicted smokers or ex-smokers. They therefore act as tobacco-related cues and should be restricted. The use of ENDS emulates smoking, which is another potential relapse trigger so their use should be restricted in public places.

### **Focus on the social environment, social disadvantage, reciprocity, and stigma**

*Focus on the social environment:* The social and relational contexts of addiction should be recognized. Cessation programmes, then, should encourage a positive social influence from peers, family, partners,



and other important social relationships to help people overcome their tobacco addictions. *Focus on social disadvantage:* In this respect, focus in particular should be on the needs of socially disadvantaged groups, who are more likely to have severe addictions and less likely to respond to other tobacco control measures. They may also be marginalized from treatment services if they are stigmatized as a result of their smoking. Socially disadvantaged people may therefore benefit from making a complete switch to ENDS or LN-SLT, especially if a lack of support or stress from their social circumstances makes it difficult to completely quit using nicotine.

*Reciprocity:* People should be facilitated in living tobacco-free lives. Tobacco harm reduction is compatible with this approach if LN-SLT and ENDS are provided as a last-resort option to severely addicted smokers. Providing them with an alternative can also bring them closer to other treatment services. *Minimizing stigma:* However, particularly when referring to socially disadvantaged people, interventions related to the use of LN-SLT and ENDS should be non-stigmatizing towards smokers or people using LN-SLT or ENDS.

### **Non-coercive addiction treatment**

Smokers should not be forced into cessation or switching to the use of LN-SLT or ENDS. Instead, cessation strategies should help smokers to mobilize their will and resolve to quit, and train their capacity for self-control through neurobehavioral therapies or by becoming more aware of tobacco-related cues. These approaches, along with those that pay attention to changes within the social environment, should be prioritized in cessation. Failing that, however, LN-SLT and ENDS could be provided to smokers who are still unable or unwilling to quit using nicotine, or who wish to use a less harmful alternative to cigarettes while undergoing therapy. In such cases, smokers should be urged to make a complete switch to LN-SLT or ENDS rather than engaging in dual use with cigarettes.

### **Dealing with tobacco industry activity**

As part of a tobacco harm reduction policy, potential ways in which the TI may use LN-SLT or ENDS to undermine effective tobacco control policies should be anticipated. It is also necessary to expose the the TI's deceptive marketing practices to the general public, policymakers, and other stakeholders, and to clearly communicate the reasons why LN-SLT and ENDS should be subjected to a tight regulatory framework. It is apparent from section 6.3.1 that the TI's involvement in popularizing products such as LN-SLT and ENDS is problematic; these issues should be avoided by implementing a strict regulatory framework on the marketing and use of LN-SLT and ENDS such as that recommended by

the WHO,[17] and regulate or closely monitor TI involvement in any scientific research on LN–SLT and ENDS. Ethical issues associated with the TI’s marketing of LN–SLT and ENDS, as well as the products themselves, should be communicated to the public. This, in turn, may increase the public acceptance of restrictions on LN–SLT and ENDS.

## **6.4 Nicotine vaccines and genetic tests**

Two medicalized approaches to preventing nicotine addiction—nicotine vaccines and genetic tests for nicotine addiction susceptibility<sup>23</sup>—were introduced in section 2.2.3. As mentioned in section 2.2.3, concerns have been raised regarding the efficacy, application, and ethical implications of these two interventions. This is largely due to their potential for coercive use, the involvement of vested interests such as the TI, and the potential of these interventions to medicalize and geneticize nicotine addiction. What follows is a discussion of some of the potential ethical implications of nicotine vaccine and genetic tests (section 6.4.1) and an ethical analysis of these two interventions in reference to the ethical framework of this thesis (section 6.4.2).

### **6.4.1 Ethical issues related to nicotine vaccines and genetic tests**

#### **Issues related to genetic tests for nicotine addiction**

The role of genetic factors in conferring a susceptibility to nicotine addiction was discussed in section 3.2.1. It was argued that, based on current research, they are unlikely to play an important role, particularly in light of evidence that illustrates the environmentally–sensitive neurodevelopmental and epigenetic processes that can contribute to addiction susceptibility. Thus it is highly unlikely that genetic tests for nicotine addiction will have much potential as a useful predictive tool; either to target ‘high–risk’ individuals for interventions such as the nicotine vaccine, or as a way of informing future lifestyle behavior.

These genetic tests may also result in a number of undesirable consequences. Individuals identified at a genetic ‘low risk’ of developing tobacco addiction may feel encouraged to smoke, even though nicotine addiction can still develop in non–addicted smokers at a ‘low’ genetic risk (for example in response to stress or social hardship). Conversely, ‘high risk’ individuals may experience anxiety, stigma, discrimination, or be subjected to unwanted interventions such as the nicotine vaccine.[127]

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<sup>23</sup>As mentioned in section 4.5, there are other genetic tests being developed in this context: genetic tests for susceptibility to tobacco–related diseases such as lung cancer and cardiovascular disease, and pharmacogenetic tests to determine which cessation therapy is most suitable for a smoker. For the purpose of this discussion, focus is primarily on genetic tests that predict susceptibility to nicotine addiction.

The belief that nicotine addiction is influenced by genetic factors can also make smokers less confident about their ability to quit, and more likely to believe that medical—rather than social—interventions are necessary for successful cessation.[443] Otherwise, genetic tests for nicotine addiction provide permanent information on one’s inherited traits. Some of this information may be stigmatizing, or become a source of stigma or discrimination if future research shows an association with other disorders, such as behavioral disorders or addictions to illicit substances. Interventions such as the nicotine vaccine will not protect individuals from these disorders, or from the discrimination and stigma associated with them.

If genetic ‘high risk’ associations are found in certain groups, such as a racial minority, they may be subjected to compound stigma on the basis of having a genetic ‘inferiority’. The idea of a connection between race and genetic inferiority is highly contentious, and goes against the principles of the ICERD human rights treaty;[166] nevertheless, as mentioned in section 3.2.1, geneticists have researched variants of the *MAO-A* gene in New Zealand’s Maori population to see if they contribute to an increased tendency towards aggressive behavior. Further, an association between race and intelligence was explored in *The Bell Curve*. The basic argument was that Hispanic and African Americans are genetically predisposed to a lower IQ.[444] However, this study turned out to have fundamental methodological flaws; it is now known that race is not a reliable predictor of intelligence.[445] Likewise, a predisposition to addiction—based on the evidence illustrated throughout section 3.2—has less to do with hard-wired genetics than the stressful, oppressive social circumstances that many racial minorities are exposed to. Consequently, a geneticized approach to predicting a susceptibility to nicotine addiction in racial minorities is likely to be stigmatizing, scientifically inaccurate, and a distraction from important social factors that predispose them to addiction.

### **Issues related to the nicotine vaccine**

The nicotine vaccine, similarly to genetic tests for nicotine addiction, may result in unwanted behaviors. Nicotine vaccination does not protect individuals from the act of smoking or the chronic health effects—to self and others—that accompany it; nevertheless, some vaccinated individuals may feel encouraged to smoke.<sup>24</sup> This may apply in particular to adolescents who are at the highest risk of smoking initiation, yet too young to give consent; if they are vaccinated against their will, they may smoke despite having the vaccination.

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<sup>24</sup>An interesting comparison may be drawn with the Human Papillomavirus (HPV) vaccine. The vaccine protects females from cervical cancers caused by sexually transmitted HPV, so there have been fears that the HPV vaccine could encourage girls to engage in more sexually promiscuous behaviors. See [446].

Is the coercive vaccination of children ethical in this context? Coercive nicotine vaccination in children has been contested on the grounds that it limits a child's right to an open future.[447] This right to an open future is, in this argument, assumed to include the right to enjoy the beneficial effects of nicotine:

“For some [smoking] provides pauses and breathing spaces in a hectic daily life, for others [smoking] is an important part of group interactions. Active nicotine vaccination not only blocks the effects of nicotine, it also blocks the child from choosing to exploit the social functions of smoking.” (pg.345, [447])

However, the option to initiate using a drug that is extremely harmful to self and others, highly addictive, and therefore autonomy-undermining is not compatible with the notion of freedom. Furthermore, the potential benefits of smoking—described in section 3.1—are relatively small and transient in comparison to its harms, both to self and others. Hence a child's right to an ‘open future’ does not cover the option to initiate smoking. It logically follows that the vaccination of children against nicotine cannot be considered unethical along this reasoning. However, it may be considered unethical on the basis that the nicotine vaccine cannot prevent the act of smoking, so children are still exposed to the health risks of smoking, even if they can no longer become addicted to nicotine or enjoy other nicotine-related benefits from smoking.

Since the nicotine vaccine can also be used to aid smoking cessation, there are further concerns that addicted individuals may be subjected to coercive vaccination on the grounds that they are unable to avoid drug use.[128] It has been argued that such a treatment could ‘restore’ the autonomy that is lost as a result of having an addiction.[30] However, this thesis has argued that addiction does not negate autonomy. In the context of tobacco addiction, coerced nicotine vaccination—even in the case of severe addictions—is therefore unethical and likely to be highly counterproductive. It would also be inhumane, as it forces addicted smokers into nicotine withdrawal against their consent.

### **The medicalization of nicotine addiction**

Another important contention to the nicotine vaccine is the highly social nature of smoking, particularly smoking initiation. As discussed in section 3.2.4, youth usually initiate smoking as a result of peer pressure, or in response to the idea that smoking is a normal or socially desirable adult behavior. Accordingly, this thesis argues that an important aspect of preventing smoking initiation is to tackle the social factors that contribute to initiation.

It may then be argued that the nicotine vaccine, like many other vaccines, confers a form of ‘herd immunity’,<sup>25</sup> and thereby tackles some of the social aspects of smoking. Vaccinated individuals, for example, are less likely to take up smoking if it is less rewarding, or more likely to quit in early adulthood. This, in turn, may reduce smoking initiation among peer groups, or contribute to the denormalization of smoking as a common adult behavior.[450] The idea of social herd immunity has also been explored in the context of cocaine vaccination.[451] In both cases, it is based on the idea that the use of addictive drugs is a socially imitated behavior, that spreads among peers like a ‘social epidemic’.[452]

The arguments and evidence presented throughout chapters 3 and 4 clearly indicate that addiction and tobacco use are highly subject to social influence, and so this thesis does not dispute the idea that they are—at least to some extent—a type of *social* epidemic. The solution should then be rooted in social change. A fundamental flaw of the nicotine vaccine, then, is that it approaches the idea of social contagion from a medicalized perspective, without necessarily addressing the social factors responsible for this contagion.<sup>26</sup> In other words, it assumes that *nicotine* is the only ‘disease vector’ that people should be inoculated against, whereas in reality there are other important influences such as the social environment and the TI. These should not be neglected in pursuit of an overly medicalized strategy. Medicalization is not necessarily unethical in itself; nicotine addiction, for example, has important neurobiological features that should be recognized. However, *over*-medicalization is problematic,[454] as it may result in a straying from effective tobacco control measures that address important social factors, such as those based on the WHO FCTC, as well as more recent strategies such as tobacco denormalization or the TFG proposal.

### **Vested interests**

A final issue—especially in the context of genetic tests—is the role of vested interests such as the TI and the direct-to-consumer (DTC) genetic testing industry. As discussed in sections 2.2.3 and 4.5, the TI has funded research on genetics and vaccines and is keen on promoting the idea that there are

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<sup>25</sup>If a sufficiently large proportion of a population is vaccinated against a disease, herd immunity will prevent disease transmission to members who are not immune. This is important for some vaccinated individuals who are unable to build sufficient immunity. Therefore the use of vaccines is often justified not only for individual protection, but also community protection via herd immunity.[448] In the context of nicotine vaccines, if a sufficiently large proportion of youth are vaccinated against nicotine, smoking becomes less desirable and therefore less common. This may reduce peer pressure to smoke, and protects individuals who are susceptible to developing nicotine addiction through a ‘social’ form of herd immunity. I have also discussed this idea elsewhere—see [449].

<sup>26</sup>Interestingly, the idea of ‘inoculating’ youth against smoking initiation has been explored from a social perspective. This involves reinforcing negative perceptions about smoking in pre-adolescents, in order to prevent them from softening their views and experimenting with smoking in later adolescence.[453] This strategy, similarly to nicotine vaccination, is intended to confer an ‘immunity’ to smoking; only that ‘social inoculation’ does this by reinforcing perceptions, while the nicotine vaccine does this by modulating the immune system.

‘safe smokers’.<sup>27</sup> The TI could also mislead the public into believing that a predisposition to nicotine addiction is genetic, and can be ‘cured’ by medical means. However, this would be inaccurate; evidence in this thesis shows that even ‘casual’ smokers can develop an addiction in response to stress or other hardship, and that predisposition, as well as prevention and treatment, are all rooted in social aspects.

There are also concerns over how the DTC genetic testing industry will try to capitalize on the belief that nicotine addiction is ‘genetic’.[455] A pharmacogenetic test related to smoking, called ‘NicoTest’, is already commercially available. NicoTest assesses whether smokers wishing to quit would respond better to cessation therapy with bupropion or nicotine replacement therapy (NRT). However, the test was found to be based on poor and selective scientific evidence; most of which was produced by people involved in the commercial development of NicoTest.[456] The way in which popular media reported the NicoTest is also concerning, as it was described as a test for ‘the smoker’s gene’.[457, 458] However, the evidence in section 3.2.1 shows that there is no ‘smoker’s gene’, and that to promote such a gene is misleading.

#### **6.4.2 Ethical analysis of nicotine vaccines and genetic tests**

The ethical framework of this thesis is based on the conception of addiction as “a *neurobiopsychosocial* disorder that originates largely from negative affective states triggered by the social environment” (quoted from pg.137). Consequently, a policy that adopts an overly medicalized approach is unlikely to be compatible with the ethical framework developed in this thesis, unless it can be made more responsive to the social contexts of tobacco use and addiction. What follows is an analysis of nicotine vaccines and genetic tests for nicotine addiction in light of the ethical considerations in the framework.

#### **Ethical considerations not supported by either intervention**

Nicotine vaccines and genetic tests are medicalized approaches to preventing and/or treating nicotine addiction. Consequently, they pay little attention to the social factors that can predispose people to addiction, and may even undermine these by encouraging the perception that nicotine addiction is genetically ‘hard-wired’. This could, in turn, distract focus from important measures that address the social factors that trigger or propagate addictions: tobacco-related cues, tobacco normalization efforts by the TI, and weak social support structures. For this reason, neither intervention sufficiently focuses on the social environment or on minimizing tobacco-related cues in the environment.

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<sup>27</sup>It was argued that this is ethically problematic, because the TI could use vaccines and genetic tests to falsely reassure smokers or to encourage vaccinated or ‘low risk’ youth to initiate smoking. Popular conceptions that nicotine addiction is ‘genetic’ could be used to protect the TI in litigations, under the misleading claims that smokers are addicted because of their ‘genetics’, or that smokers at a low genetic risk of addiction are smoking by ‘choice’—see section 4.5.

The ethical framework argues that the needs of socially disadvantaged groups, who are more likely to smoke, should be addressed by focusing on the social circumstances that predispose them to addiction. However, nicotine vaccines and genetic tests do not focus on these and, as argued above, may distract policies from them by overly medicalizing the issue. Moreover, tobacco-related health inequalities may be exacerbated if these groups have no access to nicotine vaccination for cessation purposes.<sup>28</sup> It was also argued in section 6.4.1 that genetic tests could result in the stigmatization or discrimination of racial minority groups if they are thought to be more genetically susceptible to addictions and other ‘undesirable’ traits. For these reasons, neither intervention has an adequate focus on minimizing issues related to social disadvantage or stigma.

In the context of nicotine vaccines or genetic tests, it is also difficult to build on existing frameworks. The harm principle advocates for the protection of others from tobacco-related harm, particularly SHS. However, neither intervention aims to minimize SHS exposure. They may even result in increased SHS exposure if focus is shifted from effective tobacco control measures (e.g. smokefree laws) to a medicalized approach, or if people are encouraged to smoke as a result of having a genetic ‘low risk’ or nicotine vaccination. Libertarian paternalism advocates for measures that deter the non-addicted population, particularly youth, from smoking. However, discouragement measures may be undermined by interventions that imply that smoking—at least for some people—is ‘safe’. It was also argued that all children, adolescents, and young adults below age 25 should be protected from smoking initiation, addiction, and the TI. However, neither intervention can protect children from smoking initiation or TI marketing; the TI may even respond by arguing that smoking is safe for vaccinated or genetically ‘low’ risk children.

### **Are both interventions fundamentally incompatible with the ethical framework?**

A remaining question, then, is whether there is any potential for nicotine vaccines or genetic tests for nicotine addiction to be incorporated into an ethical tobacco control policy. The use of genetic tests is particularly ethically contentious, because they are fundamentally flawed: as discussed in section 3.2, a susceptibility to addiction is not hard-wired but socially influenced, even where genetic factors are involved. This gives a large scope for ethical implications and for vested interests, notably the TI and the DTC genetic testing industry, to propagate misleading beliefs about nicotine addiction. This could, in turn, undermine effective, universally targeted tobacco control measures such as those under the WHO FCTC. Based on these reasons, genetic tests for nicotine addiction are not considered

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<sup>28</sup>The nicotine vaccine is not likely to be very cost-effective, and so it has been argued that it may propagate tobacco-related health inequalities if people in low socioeconomic strata are unable to afford the vaccine. See [459].

compatible with the ethical framework of this thesis and will not be considered further here.

The prophylactic use of nicotine vaccines in adolescents is, based on the above discussion, also likely to be ethically problematic. Nevertheless, the nicotine vaccine could—similarly to LN-SLT and ENDS—be provided as a last-resort cessation therapy for smokers who wish to use it as a self-binding strategy. What follows, then, is an ethical analysis of nicotine vaccines in reference to the remaining ethical considerations: non-coercive addiction treatment, reciprocity, and dealing with tobacco industry activity. Together, they provide indications on how an intervention such as the nicotine vaccine may be used in more ethical ways.

### **Non-coercive addiction treatment**

Therapies should focus on harnessing the will and resolve of addicted smokers, training their capacity for self-control, and making positive changes within the social environment. Therapies such as the nicotine vaccine should not be administered coercively. The nicotine vaccine may, however, be administered voluntarily as a self-binding strategy for smokers who wish to quit. By lowering the reward value of smoking, this strategy could also enhance the motivation to quit, or the capacity for self-control. Therefore the non-coercive nicotine vaccination of addicted smokers is not necessarily incompatible with the ethical framework. It supports the right to consent and—if it helps people in overcoming their addictions—rights to liberty (UDHR article 3, ICCPR article 9), self-determination (ICESCR article 1, ICCPR article 1), life (UDHR article 3, ICCPR article 6), and health (ICESCR article 12).

### **Reciprocity**

People who wish to quit smoking should be facilitated in doing so. As argued above, there may be certain people who opt for a nicotine vaccine in certain circumstances; perhaps to enhance a motivation to quit or in cases where other interventions are not effective. Therefore smokers who wish to overcome their addiction should not be denied nicotine vaccination, provided that they are attempting other treatments and have consented to having the vaccine.

### **Dealing with tobacco industry activity**

It is important to regulate marketing and research activities of the TI and other vested interests (such as the DTC genetic testing industry) in this area, and to anticipate ways in which they may use this research to undermine tobacco control efforts. Misleading claims made by industries should



be corrected and communicated to the public, policymakers, and other stakeholders. These include ideas that addiction susceptibility is genetic and therefore immutable; that genetic tests are based on accurate and unbiased evidence; that medicalized interventions should take precedence over social ones; and that vaccines confer an ‘immunity’ to smoking. Furthermore, contact between vested interests and scientific researchers working in relevant fields should be regulated or exposed to keep a better track of conflicts of interests that may result in misinterpretations of scientific data. Researchers themselves should also be made aware of ways in which their research may be misrepresented outside the scientific community.[460] They should also be encouraged to actively dispute any misleading claims in popular media, and to avoid accepting funds from vested interests such as DTC genetic testing companies and the TI.

## 6.5 Summary

The discussions throughout this chapter demonstrate the extent to which four recent approaches to tobacco control are compatible with the ethical framework, and how potential issues can be minimized by drawing on the ethical considerations in the framework.

Section 6.1 discussed how tobacco denormalization efforts may result in the stigmatization of smokers, especially those in socially disadvantaged groups. This is incompatible with the ethical framework, which aims to minimize stigma and tobacco-related health inequalities. Consequently, tobacco denormalization efforts should not promote a negative social connotation of smoking, and instead focus on social norms marketing, denormalizing the TI, and minimizing tobacco-related cues. Accompanying strategies were suggested in order to make denormalization efforts more in line with the ethical framework. These include the provision of adequate cessation services, so that those who are motivated to quit as a result of denormalization efforts are facilitated in doing so. Policies should also try to encourage—rather than force—smokers to become part of tobacco denormalization movements by educating them on the importance of tobacco denormalization in protecting children, and by providing them with alternative places to smoke in outdoor smokefree areas.

Section 6.2, in analyzing the TFG proposal, explored the limits of prohibition. It was argued that, though the TFG proposal is likely to be considered overly restrictive, it still lies within the limits of the ethical framework because having an option to initiate smoking is not compatible with the notion of ‘freedom’. The TFG proposal may be advantageous over minimum age of sales laws in that it progressively denormalizes smoking and makes it increasingly difficult for underage youth to obtain

tobacco from older peers. However, more evidence is needed to ascertain this. To make the TFG proposal more compatible with the ethical framework, it should be integrated into support programmes for socially disadvantaged youth. The TFG proposal should also be used as a positive social movement to encourage smoking cessation among older generations, and be accompanied with education programmes that communicate the ethical basis of the TFG proposal, common misperceptions, and ways in which the TI has targeted youth for smoking initiation.

Section 6.3 highlighted issues in finding better cessation options for addicted smokers, and in regulating the influence of the TI. Products such as LN-SLT and ENDS have potential to be used as appropriate harm reductive options, especially for severely addicted smokers who are unable or unwilling to quit using nicotine. However, LN-SLT and ENDS should be used as a last resort, because cessation should prioritize a sociorelational approach and training one's internal capacity to resist smoking. Furthermore, due to the myriad of issues that result from poor regulations on the use, design, and marketing of LN-SLT and ENDS, these should be strictly regulated. It was suggested that policies could make LN-SLT and ENDS available to addicted smokers on a prescription system, while educating the public on the reasons why LN-SLT and ENDS need to be tightly regulated.

Section 6.4 explored the limits of medicalization in addiction. It was argued that the over-medicalization of addiction, through interventions such as nicotine vaccines and genetic tests for addiction susceptibility, can result in a number of ethical implications. Genetic tests were considered incompatible with the ethical framework of this thesis, due their scientific inaccuracy and large potential for misuse by vested interests such as the TI and the DTC genetic testing industry. The nicotine vaccine may have a scope for ethical usage as a last-resort cessation option; however, its preventive use in children is likely to be ethically contentious, and smoking initiation should be prevented through interventions focused on the social aspects of initiation.

These strategies, though distinct in their approaches, may complement one another. For example, it was argued in section 6.1.1 that tobacco denormalization measures may distance some smokers from treatment services. This is likely to apply especially to smokers from socially disadvantaged groups who are subjected to compound stigma. However, it was also argued in section 6.3.1 that a harm reductive approach can bring them in closer proximity to treatment services. So implementing these strategies together, and targeting harm reductive options to socially disadvantaged groups, may further minimize issues related to stigma and tobacco-related health inequalities. All strategies also highlight the importance of protecting youth from smoking initiation, and of providing better cessation options for smokers. Tobacco denormalization measures and the TFG proposal may motivate some smokers to

quit, which increases the demand for cessation services. LN-SLT, ENDS, nicotine vaccines, and other cessation therapies suggested in this thesis may then fulfil this demand. Further issues of importance, highlighted in all strategies, is that effective tobacco control measures—such as those based on the WHO FCTC—should not be neglected. Education of the public is also crucial, especially where restrictions are involved, or where there is scope for the TI to spread misperceptions or undermine the success of the policy.



# Chapter 7

## Conclusion

### 7.1 Research findings and implications

Tobacco control policies, it has been argued, should aim to maximize individual freedom by providing conditions that promote or protect autonomy. The approach to enable autonomy, however, has been a particular one that requires an interventionist approach in which policies tackle the complex social factors that contribute to the formation and sustaining of tobacco addictions, and in which the relevant roles of the state, the community, society, as well as individuals themselves are recognized. It is a theory of *enabling* autonomy, then, rather than a theory in which having options trumps everything else.

#### **The features of tobacco use and addiction that should guide tobacco control**

The first sub-aim of this thesis was:

*To discuss the relevant features of tobacco use and addiction that should guide tobacco control policies, in terms of public health impacts and neurobiological impacts.*

Tobacco use, even in comparison to the use of illicit drugs and alcohol, is a serious threat to public health which also affects societies and the environment. The regulation of tobacco, then, is not simply an issue of balancing public health against the individual freedom to smoke, since tobacco use has serious and ubiquitous impacts that illustrate the interconnectedness between individual action and the welfare of others. Furthermore, second-hand smoke (SHS) is harmful and potentially deadly to others, particularly children. Interventions that protect others from SHS exposure, such as smokefree laws, are therefore justified on the basis of the harm principle. Measures that discourage smoking are

also justified, on the grounds that they protect public health and the welfare of the community. These measures also support the rights to life and health, and children's rights to healthy development and a safe, clean environment.

Tobacco is—by design—also highly addictive, even in comparison to illicit drugs such as cocaine and heroin. Consequently, most tobacco users experience some degree of addiction. Addiction, in turn, has important effects on neurobiological functions that can affect decision-making and behavior. Changes in dopaminergic mesolimbic, mesostriatal, and mesocortical pathways results in neurobiological shifts towards habitual, cue-conditioned behaviors and a reduced ability to inhibit these through the prefrontal cortex (PFC). The result is that exposure to tobacco-related cues, such as tobacco advertising, promotions or sponsorships (TAPS) or watching someone smoke, often results in tobacco cravings that can be very difficult to control. Addiction also influences the functioning of the endorphin opioid system (EOS), which is involved in emotional attachment and the relief of pain and stress; the result is that emotional factors—such as emotional stress and pain—can also trigger addictive behaviors.

Policies, then, should minimize tobacco-related cues in the environment by restricting TAPS and smoking in public spaces, and should focus on the emotional factors—such as stress and pain—that trigger and sustain addictions. Policies should also not assume that addicted smokers can simply exercise a rational decision to not smoke, even in light of better options. Restrictions on tobacco should not be offset on the basis that smoking is pleasurable or stress relieving. Neurobiological evidence does indicate that, during intoxication, nicotine increases activity in dopaminergic pathways and the EOS in a way that elicits a sense of pleasure and relaxation (the nicotine 'high'). However, outside intoxication, homeostatic adaptations in these pathways result in overall reduced activity, and addictive nicotine use contributes to these adaptations; so the idea that smoking is an effective means of counteracting stress or dysphoria is a common misconception.

The neurobiological effects of addiction can have particularly strong impacts on children and young adults below age 25, because development of the PFC is not complete until approximately age 25. The implication is that, for people below this age, the ability to avoid tobacco use is not properly developed and may be diminished if smoking is initiated before age 25. Individuals under age 25 are thus more likely to initiate smoking, and more susceptible to addiction; this is reflected by the fact that smoking initiation is limited almost exclusively to people below age 25, and that most tobacco addictions develop by this age. Most policies already protect people below age 18, but they should also protect people aged 18–25 on the basis of their neurobiological vulnerability to addiction.

Tobacco control policies are already based on the idea that smoking should be discouraged, that others should be protected from SHS exposure, and that children should be protected from smoking initiation. This thesis builds on these ideas by drawing on neurobiological evidence, to argue that people aged below 25 years should be protected from smoking initiation, and that more focus should be put on the social factors that can trigger and sustain addictive tobacco use. Neurobiological evidence is also used to illustrate that the idea that smoking is pleasurable or stress-relieving is a common misconception, and that restrictions should not be offset on these grounds.

### **Autonomy, health, and freedom in tobacco addiction**

The second sub-aim of this thesis was:

*To determine how tobacco addiction affects autonomy, and how tobacco control policies should aim to maximize health and freedom.*

To be autonomous is to have the mental ability to act in accord with one's motives, reasons, and values. In the context of tobacco use, 'autonomy' refers to the ability to avoid tobacco use. Addiction is autonomy-undermining, due to the various neurobiological changes that occur in addiction; particularly the impaired ability of the PFC to inhibit cue-triggered drives. This often results in cognitive dissonance: having a desire to smoke despite wanting to quit. This is also reflected in the low success rates in smoking cessation. Despite these effects, addiction is not autonomy-negating because it is possible for addicted smokers to resist tobacco use and to—at least partially—reverse neurobiological changes through their own, top-down efforts. This effect, demonstrated in approaches such as neurobehavioral therapy, can be potentiated by helping individuals to build their own capacities for self-control, self-awareness, and the resolve to overcome the addiction. A supportive environment in which addiction triggers—such as stress and tobacco-related cues—are minimized can also increase this capacity.

Thus, autonomy in addiction is above a threshold at which more coercive means, such as coerced therapy, are necessary; yet below a point at which no intervention is necessary. The observation that social conditions can promote or undermine autonomy lends support to the idea that addiction comprises relational autonomy. Freedom, then, should be construed in a positive sense: freedom created by state interventions that protect or promote autonomy. This in turn requires interventions that prevent or treat addictions. This is an important consideration for tobacco control policies, because tobacco is addictive and therefore autonomy-undermining for most users. In other words,

positive freedom is rooted in the social conditions that promote non-addiction, and the ability to overcome one's own neurological biases.

This argument builds on previous knowledge, by showing how neurobiological evidence supports a relational conception of autonomy in addiction, and that policies should create positive freedom through state interventions that promote non-addiction and therefore autonomy. This contrasts with the argument that freedom should be created through minimal state intervention; this view is inaccurate because autonomy—a necessary pre-condition for freedom—does not exist in addiction and should be created by the state. The arguments made here can lend further strength to pro-regulatory arguments: freedom, when correctly viewed, is supported by interventions that prevent and treat addiction, which means that the maximizing of freedom in this context requires an interventionist rather than a minimal state that prioritizes measures that promote non-addiction. This, in turn, supports liberty and self-determination rights. Relational autonomy also reflects these ideas, and should form the ethical foundation of tobacco control policies.

### **How tobacco control policies should account for addiction vulnerability**

The third sub-aim of this thesis was:

*To elucidate how tobacco control policies should account for the vulnerabilities of certain groups of people to addiction.*

Socially disadvantaged groups, such as certain racial minorities, people in low socioeconomic strata, and people with comorbid mental illness are more susceptible to tobacco addiction. This is in part because of neurobiological changes, similar to those observed in addiction, that occur prior to the initiation of drug use. The most critical time period in which these changes are shaped is the first two years of life, when neurodevelopmental processes—involving brain regions and pathways involved in addiction—are particularly responsive to external stimuli such as the child-caregiver relationship. A poor early affective experience can predispose the child to addiction later in life. Epigenetic processes, many which are stress-sensitive, can also influence neurobiological processes in ways that predispose individuals to addiction later in life. The implication is that policies should, in the prevention of addictions, aim to facilitate better bonding between young children and their primary caregiver, and focus efforts on parents with young children who are living with a mental illness or in stressful, unsupportive circumstances.



Policies should also focus on the social processes that can trigger and sustain addictions. Stressful, oppressive social environments in which people are socially dislocated contribute to the dysphoric, unmotivated, and negative states of mind that trigger addictions. Indigenous groups in particular have been severely dislocated from their societies and cultural identities as a result of colonization. Building better support networks for indigenous groups and reinstatement of their social and cultural identities should be an important part of policies that aim to minimize addictions among these groups. Improvement of social circumstances more generally, and providing better support systems of a social and relational nature, can provide resistance to addiction. The role of genetic factors, in contrast, is limited, since genetic processes also seem to depend in part on social processes. This is an important point for scientific approaches that have looked for an ‘addiction gene’ in indigenous groups such as New Zealand’s Maori; their higher prevalence of addiction is most likely due to social oppression or hardship rather than genetic make-up.

It is generally agreed that social factors play an important role in addiction susceptibility. This thesis builds on these arguments by showing how social disadvantage can confer a neurobiological vulnerability to addiction by acting on neurobiological circuits involved in the stress response, emotional regulation, and social attachment. It also highlights the importance of an attuned child-caregiver relationship during early childhood, and how issues related to poor childcare—such as abuse—are interconnected to tobacco addiction. Policies, then, should focus on the social processes that contribute to addiction susceptibility, and on helping parents who are raising young children in stressful or unsupportive circumstances. The importance of social justice in tobacco control is also emphasized, which in turn supports equality rights and the healthy development of children.

### **A conceptual account of addiction**

The fourth sub-aim of this thesis was:

*To develop a conceptual account of addiction that can inform an ethical framework for tobacco control policy.*

Addiction is a neurobiopsychosocial disorder that is largely rooted in social aspects, and should be thought of as *a relationship to a behavior*. This relationship has distinct neurobiological features, and psychological patterns that often reflect cognitive dissonance regarding drug use and an impaired ability to avoid it. Emotional factors such as values, desires, and relationships are an important aspect of addictive decision-making: they can trigger addictions and relapse, or predispose individuals to

addictions in later life if they adversely affect neurobiological development, particularly during critical developmental periods. Addiction therefore comprises relational autonomy: the social environment—along with drug use itself—can undermine or promote autonomy, and the extent to which autonomy is undermined is proportional to the severity of the addiction. Addictions are also dynamic: they can progress into more severe forms, improve as a result of successful therapy, and non-addictive drug use can become addictive, particularly in response to triggers such as stress. However, in all cases individuals retain some ability to resist drug use.

This conception can be used to critique other theories of addiction that have influenced policies. ‘Liberal theories of addiction’ are correct to the extent that an addictive activity, such as tobacco use, elicits a sense of reward. However, they do not capture other important elements of addiction, most notably its autonomy-undermining effects; hence ‘liberal theories of addiction’ are more accurately ‘liberal theories of casual drug use’, and should not be used as a conceptual basis for addiction. ‘Moral theories of addiction’ are also inappropriate, because they similarly assume that addictive behaviors are freely chosen. They also put a moral judgement on addictive behavior, which can result in the stigmatization and social marginalization of addicted drug users in an attempt to deter drug use. This approach is likely to backfire, however, as the guilt and stress propagated by stigma often results in stress and dysphoria, which—as neurobiological evidence indicates—are potent triggers for addictive behaviors. ‘Brain disease theories’ go further in that they acknowledge the neurobiological processes that undermine autonomy in addiction. However, they pay insufficient attention to the social factors that can trigger and sustain addiction, and—incorrectly—advocate for an overly medicalized approach.

Focus should therefore be on a psychosocial approach. The ‘self-medication hypothesis of addiction’ fits most closely with this view, as it assumes that addictive drug use is a coping strategy against painful or stressful circumstances. However, it should be emphasized that it is a highly counter-productive one, because addictive drug use—including smoking—actually contributes to the negative states of mind the individual is trying to temporarily relieve. In other words, theories that argue addiction is a coping strategy should not be used as a means to justify addictive drug use on the basis that this is more humane. However, they do—correctly—advocate for more supportive social circumstances in which individuals can be helped in overcoming their addiction, and there is a large body of neurobiological evidence that can support this claim.

### **Considerations related to tobacco industry activity**

The fifth sub-aim of this thesis was:

*To discuss how tobacco control policies should address ethical issues that arise as a result of tobacco industry (TI) activity.*

The TI has had an important influence in shaping the current public health situation with tobacco. It has influenced public discourse, scientific research, social perceptions on tobacco use, and tobacco regulations, often in opaque ways; the result is that there are various misconceptions regarding the use of tobacco that still prevail in public discourse. In particular, ideas that smoking relieves stress, is freely chosen, or is an exercise of liberty rights; more recently, the idea that a susceptibility to nicotine addiction is conferred by genetic factors. The TI has also invested significantly in the normalization of smoking, research focused on medicalized approaches to tobacco control (vaccines and genetics) and tobacco harm reduction, and the targeting of vulnerable groups such as children, people with comorbid mental illness, and racial minorities. The TI therefore remains a powerful adversary to tobacco control efforts.

The issues represented by TI activity are well documented and it is widely known that tobacco control policies should pay attention to possible ways in which the TI will try to undermine effective tobacco control policies. It is also generally agreed that it is practically difficult to dismantle the TI, due to the vast reach of its economic and political power. However, it is possible to regulate the marketing, research, and lobbying activities of the TI, and to expose the misperceptions it has spread to protect people from the TI's marketing tactics through awareness. For example, it can be used to show that the conceptual basis of the TI's argumentation is wrong. Framing in tobacco debates, then, is no longer an issue of health (pro-regulation) versus freedom (pro-tobacco); tobacco control measures can be supported within a framework that emphasizes their protection of freedom *and* health. This adds further strength to pro-regulatory arguments, and can be used to minimize opposition based on—often misled—pro-tobacco arguments. Human rights can add further strength, since the rights often drawn on in pro-tobacco debates (rights to liberty and self-determination) actually support an interventionist approach. Education efforts should be focused on people most targeted by the TI, such as children. It is also important to track and regulate the TI's involvement in more recent developments such as genetic research and tobacco harm reduction, and to reverse its smoking normalization efforts.

### **An ethical framework for tobacco control policy**

The central aim of this thesis was:

*To develop an ethical framework for tobacco control policy.*

The ethical framework for tobacco control policy developed in this thesis conveys its ideas through eight ethical considerations.

**Focus on the social environment:** Policies should minimize stress, adverse childhood experiences, social dislocation, and poor family dynamics. For racial minorities (e.g. indigenous groups), social integration or reinstatement of their social and cultural identities should be encouraged. Secure relationships should be promoted between young children and their primary caregivers. Social relationships should be involved in smoking prevention and cessation programmes. These support the right to social conditions conducive to good health (UDHR article 25).

**Minimizing tobacco-related cues in the environment:** Policies should ban all tobacco advertising, promotion, and sponsorships, limit the amount of tobacco retailers, and restrict smoking in public places. In supporting non-addiction, this supports the rights to life and health (UDHR article 3, ICCPR article 6, ICESCR article 12), self-determination (ICESCR article 1, ICCPR article 1), and liberty (UDHR article 3, ICCPR article 9).

**Focus on socially disadvantaged groups:** Policies should provide support to socioeconomically deprived groups, socially marginalized people, racial minorities, and people with comorbid mental illness. These groups should also be protected from targeting by the tobacco industry. This supports equality rights (UDHR articles 2 and 7, ICCPR articles 2 and 26, ICESCR article 2) and the rights of those protected by specialized human rights treaties, such as racial minorities (ICERD) and people with severe mental illness (CRPD).

**Reciprocity:** People should be facilitated in fulfilling their ethical duties, for example by providing support or alternative options.

**Minimizing stigma:** Policies should avoid interventions that are potentially stigmatizing, and should promote a neutral or sympathetic approach towards smokers.

**Non-coercive addiction treatment:** Individuals should not be forced into treatment on the basis of having an addiction. Treatment should focus on harnessing the will and resolve to quit, training an individual's capacity for self-control, and making changes in the social environment to support non-addiction.

**Building on existing frameworks:** (1) *Libertarian paternalism:* Measures should deter smoking among non-addicted people, especially youth. This supports the rights to life (UDHR article 3, ICCPR article 6), health (ICESCR article 12), and children's rights to life and healthy development (CRC article 6). (2) *Harm principle:* Others, especially children, should be protected from second-hand smoke. This protects non-smokers' rights to life (UDHR article 3, ICCPR article 6) and health (ICESCR article 12), children's rights to life and healthy development (CRC article 6), and children's right to a safe and clean environment (CRC article 24). (3) *Protecting youth:* All children, adolescents, and young adults below age 25 should be protected from smoking initiation, addiction, and the tobacco industry. This supports children's rights to life and healthy development (CRC article 6), protection from harmful drugs (CRC article 33), and protection from exploitation by the TI (CRC article 36).

**Dealing with tobacco industry activity:** Policies should regulate all tobacco industry marketing and involvement in research, academia, and politics. They should also anticipate the industry's counter-strategies, expose the industry's marketing, research, and debate activities, especially to vulnerable groups such as youth and socially disadvantaged. This supports the rights of children (CRC article 36) and the mentally ill (CRPD article 16) to be protected from exploitation. There should also be transparent communication regarding the ethical basis of tobacco control policies.

These ethical considerations build on existing public health ethics theories, liberal theory, and current tobacco control measures—most of which are based on libertarian paternalism—by emphasizing the importance of the social environment in preventing and treating tobacco addictions, the importance of social justice, and the interconnectedness of tobacco addiction with other important social issues. The framework also lends a stronger ethical foundation for tobacco control policies by providing an ethical justification for the measures it endorses, and by showing how these measures are supportive of human rights.

### **Addressing ethical implications associated with more recent strategies**

The sixth sub-aim of this thesis was:

*To discuss how tobacco control policies should address potential ethical implications associated with more recent strategies including tobacco denormalization, the tobacco-free*

*generation (TFG) proposal, tobacco harm reduction, nicotine vaccines, and genetic tests for nicotine addiction.*

Concerns have already been raised in the literature regarding these strategies. This work builds on these discussions, to provide an original ethical analysis of these interventions in light of the ethical framework developed in this thesis. The four strategies, which all have quite distinct approaches and issues, were analyzed in chapter 6. They all highlight the importance of educating the public, regulating TI activity, protecting youth from smoking initiation, and the challenges in finding better cessation options for smokers.

Approaches such as tobacco denormalization and the TFG proposal may motivate some smokers to quit, which increases the demand for cessation services; it is necessary, then, to look for better cessation alternatives. These should focus on social or relational interventions, such as involving friends, family, a partner or other important relationships in cessation; social support systems targeted to socially disadvantaged groups; minimizing tobacco-related cues such as TAPS; and helping smokers train their capacities for self-control. A demand for better cessation options may be fulfilled with alternative products such as low nitrosamine smokeless tobacco (LN-SLT) or electronic nicotine delivery systems (ENDS), or a nicotine vaccine; however, these should not be prioritized over social and relational interventions.

More specific ethical issues were also identified with each strategy. Tobacco denormalization efforts may stigmatize smokers, particularly those in socially disadvantaged groups; this is incompatible with the ethical framework. Thus stigma should be minimized by focusing on denormalization measures that carry a neutral social connotation of smoking (and smokers); for example denormalization of the TI. The TFG proposal, though restrictive, is still considered to be within reasonable limits because having an option to smoke, particularly for young people, is not compatible with freedom. Permitting the use of LN-SLT and ENDS has potential to help smokers, particularly those who are severely addicted, to quit smoking; however, due to the issues represented by poor regulations on the use, design, and marketing of LN-SLT and ENDS, these should be strictly regulated. Policies could make LN-SLT and ENDS available to addicted smokers on a prescription system, and educate the public on the reasons why LN-SLT and ENDS need to be tightly regulated. Nicotine vaccines, similarly, may be provided as a cessation option for smokers. Their use in preventing addictions, however, is likely to be ethically problematic, and genetic tests for nicotine addiction were also found to be incompatible with the ethical framework.

## 7.2 Limitations

There are a number of practical aspects that were beyond the scope of this discussion. The ethical framework developed in chapter 5 advocates for a number of interventions that go beyond what is recommended in current regulatory frameworks such as the WHO FCTC. It is unclear how these measures fit into regulatory frameworks that already exist, whether global (e.g. the WHO FCTC), or local (e.g. state legislations). It may be that legal, political, and practical realities impose limits on certain interventions. These may or may not be related to TI activity, for example TI lobbying in the political sphere. In the legal sphere, regulations on tobacco may be challenged using trade agreement that exist under the World Trade Organization and bilateral or regional treaties. These are highly relevant and complex issues that deserve consideration elsewhere, but were beyond this work as a comprehensive analysis on these would require a deeper look at regulatory, political, legal, and other such systems that may also vary between states.

Another issue with this framework is that it calls for interventions that may require a lot of resources, such as social programmes that facilitate better bonding between young children and their primary caregivers. This puts an economic and infrastructural demand on states, particularly those where resources are limited. Although economic analyses and impact assessments are beyond the scope of this work, it was suggested that, to minimize economic burdens, tobacco control could be woven into state programmes that already exist to counter related social issues.

This thesis has taken an interdisciplinary though theoretical approach in which ethics, reviews from the perspective of various sciences, and reflections upon policy are integrated. Focus, then, is on ethical and practical considerations that are relevant for policies; a deeper philosophical enquiry integrating political theory, moral theory, or jurisprudence theory is beyond scope. Chapter 5, in this respect, draws on various conceptual approaches in addiction to build an account of addiction that can be used as a conceptual basis for the ethical framework. It is possible to go further in discussing the metaphysics of addiction, how this relates to questions regarding the nature of decision-making, free will, the relational constitution of personhood, and so on. It is also possible to go further into the philosophy of concepts used (e.g. health, freedom, pleasure), or the philosophical basis of ethical frameworks used (e.g. human rights). However, these were considered beyond scope to maintain focus on ethics insofar as it can guide policies, and how scientific approaches—most notably neurobiological—can strengthen the ethical and conceptual foundation of tobacco control policies.

Analysis in this thesis was focused primarily on developed places where tobacco control policies

are relatively advanced, in order to facilitate a more original analysis on the more recent issues in tobacco control policy. For this reason, some region-specific issues were omitted from analysis. For example, it was mentioned that in Asia there is a gender imbalance in smoking; smoking prevalence is higher among men, but women are increasingly targeted by TI marketing. This raises issues related to women's rights. In countries with tobacco agriculture, tobacco farmers are often subjected to poor working conditions which raises issues related to worker's rights. For many developing countries, a lack of economic resources means that it is particularly difficult to implement tobacco regulations, resist legal challenge, or TI lobbying; however, a discussion of these issues requires a deeper analysis of the infrastructures within these states, which is beyond the scope of this work. For this reason, this thesis also does not advocate for a "one size fits all" approach to tobacco control policy; it is recognized that local, cultural, infrastructural, and other such factors can influence policies, and that a more tailored set of guidelines would require a deeper inquiry into these relevant contexts. Instead, focus is on the development of an ethical framework for tobacco control policies more generally, with which any given tobacco control strategy can be analysed in terms of its ethical and conceptual rigour.

The ethical framework developed in this thesis was used to analyze four recent approaches to tobacco control: tobacco denormalization, the TFG proposal, tobacco harm reduction, and medicalized interventions (nicotine vaccines and genetic tests). There are other recent approaches that could have been included, such as tobacco endgames that target tobacco supply or that gradually eliminate nicotine from cigarettes. However, these endgames require co-operation from the TI, which—as history indicates—is practically difficult to achieve. Different variations of tobacco harm reduction have been suggested, such as the gradual elimination of nicotine from tobacco, or permitting a market for products such as LN-SLT and ENDS while concurrently phasing out cigarettes. However, most debates on tobacco harm reduction focus on whether a market for alternative products should be permitted in addition to (not instead of) a market for cigarettes, and so focus was kept on conventional tobacco harm reduction. Otherwise, the limits of prohibition—discussed in reference to the TFG proposal—could have been discussed in light of a complete prohibition of tobacco sale and import such as that implemented in Bhutan. However, few places—except Bhutan—have considered such an approach.

### **7.3 Future research**

This study opens up new questions, particularly in relation to how approaches recommended in the ethical framework can be put into practice. Further research, then, could focus on practical, economic,



political, and legal structures that may facilitate or impede their implementation, and ways in which such challenges may be overcome. It was mentioned, for example, that the social support structures recommended by the ethical framework may demand significant economic resources unless tobacco control can be implemented as a part of current social support structures. Future analysis could, for example, look at current social support structures and how they can be used to facilitate a more ethical tobacco control policy. There may also be social barriers—for example social perceptions on addiction—that limit the actualization of an ethical policy; future work could look at how these issues may be addressed. Future studies might also look at whether the ethical framework can be developed into a unified regulatory framework such as the WHO FCTC, or whether the framework should be used to develop a set of tailored policies that better fit local requirements. Analysis may then look at these local factors, for example cultural, social, political, regulatory, and other such variations. Alternatively, the ethical framework can be used to analyze other tobacco control strategies, such as tobacco endgames that target tobacco supply or nicotine content, a tobacco prohibition, different variations of tobacco harm reduction, or other medicalized interventions should they be developed in future.

Otherwise, the conceptualization of addiction developed in this thesis may inform a more philosophical study that looks at how this conceptual approach influences ideas about free will, decision-making, personhood, and the relational constitution of personhood. Neurobiological evidence that supports these ideas may be useful in these philosophical enquiries. Some of the arguments made, and the evidence used in support of these ideas—for example the importance of social justice in public health—may also apply to other disorders, such as other addictions. This work therefore opens up questions on how other addictive or unhealthy substances (e.g. alcohol, illicit drugs, unhealthy foods) should be regulated, or how behavioral addictions (e.g. gambling, internet gaming) should be prevented and treated. The work done here would suggest a similar interdisciplinary approach. In this line of work, some of the interventions advocated for by the ethical framework could be researched further and used to develop more effective prevention and treatment programmes for addiction. Such research may focus on areas such as the application of neurobehavioral therapies in addiction, peer-based prevention and cessation programmes, the positive effects of social integration on addiction neurobiology, and how such methods compare to more conventional treatment approaches such as nicotine replacement therapy.



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# Appendix A

## Abbreviations

**ACC**—anterior cingulate cortex; **ACE**—adverse childhood experience; **ACTH**—adrenocorticotrophic hormone; **ANS**—autonomic nervous system; **ASAM**—American Society of Addiction Medicine; **AVP**—arginine vasopressin; **BDNF**—brain-derived neurotrophic factor; **CEDAW**—1979 Convention on the Elimination of All Forms of Discrimination Against Women; **COMT**—catechol-O-methyl transferase; **CP**—caudate putamen; **CPD**—cigarettes smoked per day; **CRC**—1990 Convention on the Rights of the Child; **CRH**—corticotropin releasing hormone; **CRPD**—2006 Convention on the Rights of Persons with Disabilities; **DALY**—disability-adjusted life years; **dIPFC**—dorsolateral prefrontal cortex; **DSM-5**—Diagnostic and Statistical Manual of Mental Disorders, 5<sup>th</sup> edition; **DTC**—direct to consumer; **ENDS**—electronic nicotine delivery systems; **EOS**—endorphin-opioid system; **FCTC**—Framework Convention for Tobacco Control; **fMRI**—functional magnetic resonance imaging; **GR**—glucocorticoid receptor; **GWAS**—genome-wide association studies; **HPA**—hypothalamic-pituitary-adrenal; **ICCPR**—1976 International Covenant on Civil and Political Rights; **ICERD**—1965 International Convention on the Elimination of All Forms of Racial Discrimination; **ICESCR**—1976 International Covenant on Economic, Social and Cultural Rights; **LN-SLT**—low-nitrosamine smokeless tobacco; **MAO**—monoamine oxidase; **MR**—mineralocorticoid receptor; **NAc**—nucleus accumbens; **NACHR**—nicotinic acetylcholine receptor; **NIDA**—National Institute on Drug Abuse; **NRT**—nicotine replacement therapy; **OCD**—Obsessive Compulsive Disorder; **OFC**—orbitofrontal cortex; **PET**—positron emission tomography; **PFC**—prefrontal cortex; **SHS**—second-hand smoke; **SIDS**—Sudden Infant Death Syndrome; **SLT**—smokeless tobacco; **SN**—substantia nigra; **TAPS**—tobacco advertising, promotions, and sponsorship; **TFG**—tobacco-free generation proposal; **TI**—tobacco industry; **UDHR**—1948 Universal Declaration of Human Rights; **UN**—United Nations; **VTA**—ventral tegmental area; **WHO**—World Health Organization.





# Appendix B

## Definitions

**‘Psychoactive drug’** refers to a drug that crosses the blood–brain barrier and elicits changes within the central nervous system.

**‘Drug of abuse’** refers to a psychoactive drug commonly associated with social or public health problems. This could be due to addictive use, or due to non–addictive, but socially problematic use e.g. alcohol binge drinking. Use of drugs in these manners is also referred to as **‘problematic drug use’** or **‘drug abuse’**.

**‘Addictive drug’** refers to drugs, licit or illicit, that contribute to neurobiological changes—primarily in dopaminergic reward pathways—that are associated with the clinical and behavioral features that typify addiction. All addictive drugs are thus psychoactive. Though the extent of their addictive potential varies per person, drug, mode of administration, and other factors, typical examples include nicotine, alcohol, cocaine, opioids, and amphetamines.

**‘Drug use’** is used interchangeably with **‘substance use’**, or in the context of a specific drug e.g. nicotine use’, to refer to any use of a psychoactive drug, for whatever purpose, both addictively and non–addictively.

**‘Addictive drug use’** refers to a type of drug use in which the individual has developed an addictive relationship towards his/her use of a drug. This addictive relationship is characterized by various neurological patterns, behaviors, and psychological features (such as craving) that are further described and discussed throughout this thesis (particularly chapters 2 and 3).

**‘Casual drug use’** is used interchangeably with **‘non–addictive drug use’**, and refers to a type of drug use in which individuals have not developed an addictive relationship towards their use

of a drug.

**‘Recreational drug use’** refers to casual drug use that is purely for the purpose of increasing positive pleasure.

**‘Self-medicating drug use’** is used interchangeably with **‘maintenance drug use’**, and refers to drug use, often (but not always) addictive, for the purpose of treating negative symptoms such as emotional stress, depression, or dysphoria.

**‘Addiction’** is used interchangeably with **‘dependence’** and refers to a disorder characterized by distinct clinical and behavioral features, as well as neurobiological changes that can affect thoughts and behavior. These, in turn, influence how an individual relates to an activity e.g. drug-taking. These features and changes are described throughout chapters 2 and 3. It is recognized that ‘addiction’ is not a black or white concept; there are varying degrees of addiction that can range from severe to mild.

**‘Drug addiction’** refers to an addiction to an addictive drug.

**‘Behavioral addiction’** is used interchangeably with **‘non-drug addiction’** and refers to an addiction to an activity not related to drug use, for example gambling, shopping, or eating.

## Appendix C

# Summary of the ethical framework

**Goals of the ethical framework:** To minimize overall smoking prevalence and to: (1) minimize second-hand smoke exposure; (2) prevent smoking initiation; (3) encourage cessation and help smokers to overcome their addictions; and (4) minimize tobacco-related health inequalities.

**Focus on the social environment:** Minimizing stress, adverse childhood experiences, social dislocation, and poor family dynamics. For racial minorities (e.g. indigenous groups), social integration or reinstatement of social and cultural identities should be encouraged. Secure relationships should be promoted between young children and their primary caregivers. Social relationships should be involved in smoking prevention and cessation programmes.

**Minimizing tobacco-related cues in the environment:** Banning all tobacco advertising, promotion, and sponsorships, limiting the amount of tobacco retailers, and restricting smoking in public places.

**Focus on socially disadvantaged groups:** Providing support to socioeconomically deprived groups, socially marginalized people, racial minorities, and people with comorbid mental illness. These groups should also be protected from targeting by the tobacco industry.

**Reciprocity:** Helping people to fulfil their ethical duties, for example by providing support or alternative options.

**Minimizing stigma:** Avoiding policies that are potentially stigmatizing and promoting a neutral or sympathetic approach towards smokers.

**Non-coercive addiction treatment:** Individuals should not be forced into treatment on the basis of having an addiction. Treatment should focus on harnessing the will and resolve to quit,

training an individual's capacity for self-control, and making changes in the social environment to support non-addiction.

**Building on existing frameworks:** (1) Libertarian paternalism: measures to deter smoking among non-addicted people, especially youth. (2) Harm principle: protect others, especially children, from second-hand smoke. (3) Protecting youth: protect all children, adolescents, and young adults below age 25 from smoking initiation, addiction, and the tobacco industry.

**Dealing with tobacco industry activity:** Regulating all tobacco industry marketing and involvement in research, academia, and politics; anticipating the industry's counter-strategies; exposing the industry's marketing, research, and debate activities, especially to vulnerable groups such as youth and socially disadvantaged; transparent communication regarding the ethical basis of tobacco control policies.

## Appendix D

# Diagram of the ethical framework

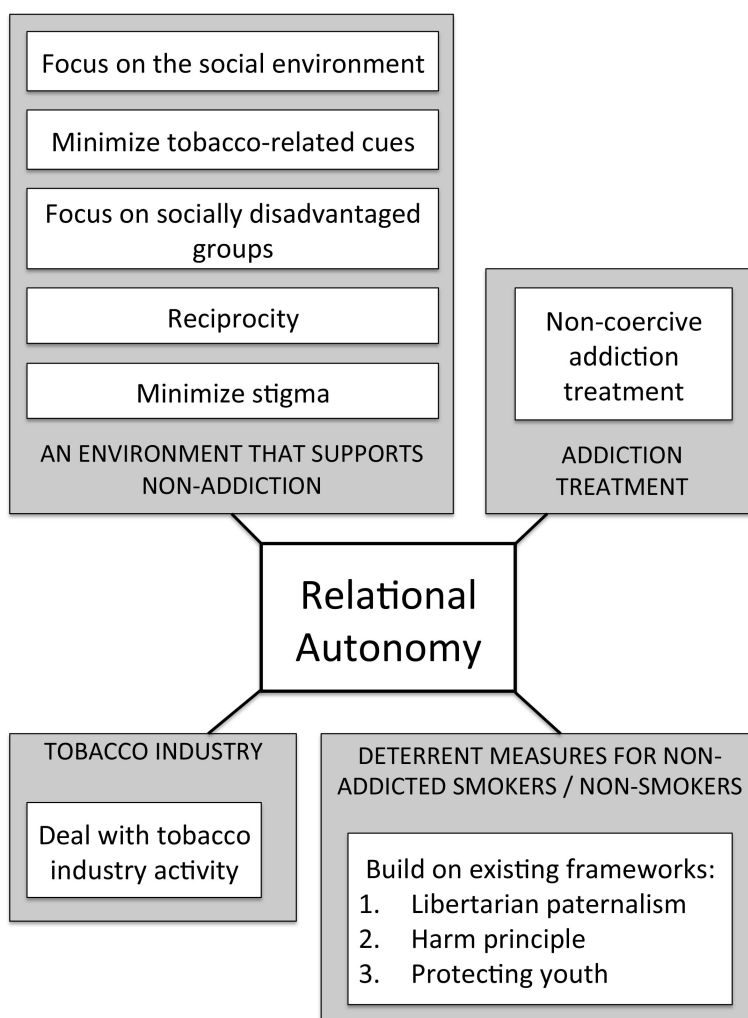


Figure D.1: A diagram of the ethical framework for tobacco control developed in this thesis. The ethical framework comprises several ethical considerations (white boxes with smaller text), with relational autonomy as their foundation (white box in the centre). The scope of these considerations vary and overlap; this is depicted in the grey boxes.