



## **FEDERAL RESEARCH PROGRAM ON DRUGS**

### **Summary**

#### **ALCOLAW**

**The Law of 2009 concerning the selling and serving of alcohol to youths: from state of the art to assessment**

**Contract - DR/00/071**

Coördinator and promotors:

dr. Tina Van Havere, HoGent

Prof. dr. Bénédicte Deforche & Prof. dr. Freya Vander Laenen, UGent

Prof. dr. Cécile Mathys & Prof. dr. André Lemaître, ULG

Researchers and partners:

Nicky Dirkx & Peer Van der Kreeft, HoGent

dr. Bart De Clercq, Thomas Buijs, & dr. Joris Van Damme, UGent

dr. Sarah van Praet & Adam El Houti, ULG

**HoGent**  
EDUCATION  
HEALTH  
SOCIAL WORK



Published in 2017 by the Belgian Science Policy  
Avenue Louise 231  
Louizalaan 231  
B-1050 Brussels  
Belgium  
Tel: +32 (0)2 238 34 11 - Fax: +32 (0)2 230 59 12  
<http://www.belspo.be>

Contact person: Aziz Naji  
Tel: +32 (0)2 238 36 46

Neither the Belgian Science Policy nor any person acting on behalf of the Belgian Science Policy is responsible for the use which might be made of the following information. The authors are responsible for the content.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without indicating the reference :

Van Havere, T., Dirx, N., Vander Laenen, F., De Clercq, B., Buijs, T., Mathys, C., van Praet S., Deforche B., El Houti, A., Van Damme, J., Van der Kreeft, P., & Lemaître A. ***The Law of 2009 concerning the selling and serving of alcohol to youths: from state of the art to assessment.*** Summary. Brussels : Belgian Science Policy 2017 – 34p. (BRAIN-be - (Belgian Research Action through Interdisciplinary Networks)

## Inhoud

<b>INTRODUCTION</b>	<b>4</b>
<b>CHAPTER 1: LITERATURE REVIEW OF THE MINIMUM LEGAL DRINKING AGE</b>	<b>5</b>
INTRODUCTION.....	5
1.1    EFFECTIVENESS OF THE MINIMUM LEGAL DRINKING AGE.....	6
1.2    UNITED STATES, CANADA & NEW ZEALAND.....	6
1.1.1.    Effect of MLDA on alcohol consumption	7
1.1.2.    Effect of the MLDA on alcohol-related crashes	7
1.1.3.    Effect of the MLDA on other social/health problems	8
CONCLUSION.....	10
<b>CHAPTER 2: LOGIC MODEL OF ADOLESCENT ALCOHOL CONSUMPTION</b>	<b>10</b>
CONCLUSION.....	12
<b>CHAPTER 3: TRENDS IN ALCOHOL CONSUMPTION</b>	<b>12</b>
<b>CHAPTER 4: TRENDS IN ALCOHOL-RELATED HEALTH OUTCOMES</b>	<b>14</b>
1.1.    EVALUATING MLDA LEGISLATION: DATA AVAILABILITY AND RECOMMENDATIONS .....	15
<b>CHAPTER 5: STUDY OF THE KNOWLEDGE AND APPLICATION OF THE 2009 LEGISLATION BY YOUNG PEOPLE AND SELLERS</b>	<b>16</b>
1.1.    SURVEY WITH YOUNGSTERS: DISCUSSION .....	16
1.3    INTERVIEWS WITH SELLERS: DISCUSSION.....	18
<b>CHAPTER 6: FEASIBILITY STUDY ON TEST PURCHASING RESEARCH (“MYSTERY SHOPPING”)</b>	<b>21</b>
1.1.    RESULTS.....	21
1.3.1    Well-defined goals	22
1.3.2    Legal clarification	22
1.3.3    A well elaborated protocol	23
1.3.4    Accompanying the young person	23
1.3.5    Reference age	23
<b>CHAPTER 7: A PRACTICE-BASED PERSPECTIVE ON THE 2009 LEGISLATION BY PREVENTION WORKERS AND HEALTH PROMOTERS</b>	<b>23</b>
1.1    SOCIETAL STANDARDS AND ENFORCEMENT .....	23
1.2    DISTINCTION IN TYPE OF ALCOHOL AND AGE LIMITS: THE FORBIDDEN FRUIT THEORY.....	24
1.3    PARENTS: CRUCIAL PARTNERS IN MANAGING YOUNGSTER’S RESPONSIBLE ALCOHOL CONSUMPTION THROUGH PARENTAL MONITORING .....	25
1.4    MINIMUM LEGAL AGE ON DRINKING ALCOHOL .....	25
1.5    AVAILABILITY.....	26
1.6    RAISING AWARENESS AND PREVENTION .....	26
1.7    MARKETING AND PROMOTION.....	27
CONCLUSION OF CHAPTER 7 .....	28
<b>CHAPTER 8: FOCUS ON ENFORCEMENT</b>	<b>28</b>

## Introduction

Alcohol consumption is a widely discussed topic in the field of health issues in the world. Delaying the onset of drinking should be a key issue in alcohol prevention (WHO, 2014b). Although age limits on the use of alcohol exist throughout Europe, alcohol use by youngsters of 15 and 16 years of age is common (Mulder & De Greeff, 2013a). Also in Belgium, where the minimum age limit for the use of alcohol is 16, it is clear that the majority of less than 16 year olds already drank alcohol in their life (Melis, Rosiers, & Geirnaert, 2014). Indeed, a recent study related to alcohol use among adolescents in Europe (Steketee, Jonkman, Berten, & Vettenburg, 2013) showed, from a sample size of 33.566 students from 25 countries (from 11 to 18 years old,  $x$  age= 13,90), that overall lifetime prevalence rate for beer, wine and breezers was 60,1% and 34,2% for spirits. Similar data were found in Belgium by the CRIOC study (2010) including 2.519 youths (from 10 to 17 years olds) where 65% of them had already drunk alcohol and 28% drank at least one glass of alcohol every week.

Many factors may contribute to these high figures of underage alcohol consumption, but easy access to alcohol is generally assumed to play a significant role (Gosselt et al., 2007). Availability can be influenced by national policies that restrict supply and availability; such seems to be a proven effective policy (Babor et al., 2010). One of the possible measures taken by a government to reduce availability is establishing a minimum legal drinking age which has been a proven effective national health policy measure (Achterberg, 2011). Therefore, the legislation in Belgium was adapted in 2009. However, a newly introduced alcohol policy relies on retailers' willingness to refuse to sell alcohol to underage customers. Before they are willing to comply, their knowledge of the new legislation is key. Indeed, another study of CRIOC (2009) including 160 sellers and shops showed that underage youths, using the mystery shopping method, obtained alcohol in 8 out of 10 selling points. Some possible reasons of non-compliance have been suggested but have not been clearly examined (e.g. motivational, psychological, economic, educational reasons) (Centre de Recherche et d'Information des, 2010; Kuendig et al., 2008). Finally, legal age restrictions without enforcement at different levels (federal, regional and local) are not sufficient (Gosselt, van Hoof, de Jong, & Prinsen, 2007) and so different levels (federal, regional and local) should pay attention to enforcement. The effect of enforcement is considered to be twofold: it influences the direct availability of alcohol and it influences the societal norms, attitudes and beliefs in society (Mulder & De Greeff, 2013a)(Wagenaar, 2011 in Mulder & de Greeff, 2013).

So far, the Belgian alcohol law from 2009, has not been evaluated. Therefore, the aim of this project is sixfold.

WP 1. A critical analysis of relevant indicators of the new law of 2009 on drinking age limits which influence the behaviour of young people. Views on enforcement.

WP 2. Evaluate empirically the impact of the alcohol law from 2009 on alcohol availability and consumption.

WP 3. Evaluate the knowledge of sellers and young people regarding the 2009 law.

WP 4. Feasibility study on test purchasing research ("mystery shopping")

WP 5. A practice-based perspective on the 2009 legislation by prevention workers and health promoters

WP6: General conclusions and policy recommendations

## Chapter 1: Literature review of the minimum legal drinking age

### Introduction

According to the latest available data, the World Health Organization ranks the harmful use of alcohol among the top five risk factors for disease, disability and death in 2012 (WHO, 2014b). Worldwide, approximately 5.9% of deaths are attributable to alcohol consumption, making alcohol use a greater global health issue than HIV/Aids and worldwide violence. This result is even more significant when taking into account that half of the world's population does not consume alcohol (Anderson, Møller, & Galea, 2012). Additionally, alcohol is causally related to more than 200 acute and chronic medical conditions (Room, Babor, & Rehm, 2005), resulting in an estimated 5.1% of the global burden of disease and injury. For Belgium specifically, the WHO estimated that in 2010, 5.8% of the population suffered from an alcohol use disorder (WHO, 2014b). In addition to physical and mental health problems, harmful alcohol consumption is very often associated with socioeconomic consequences and it can also lead to substantial harm caused to other individuals such as relatives and friends, or, in the case of an accident, even strangers. For the society at large, the global burden of disease and injury is relevant considering the significant impact of harmful use of alcohol on social and economic costs (WHO, 2014b). In Belgium, a recent study has investigated the social cost of legal and illegal drug use, including alcohol consumption, in 2012 (Lievens et al., 2016). By measuring both direct (e.g. hospital visits), indirect (e.g. productivity loss) and intangible costs (the non-financial welfare costs) of substance use, the authors calculated that the overall social cost of substance use accounted for 1.19% of Belgium's GDP. The results also showed that 45%, roughly 2.1 billion euro, of the overall economic burden of legal and illegal drug use was caused by the effects of alcohol consumption (Lievens et al., 2016).

Within this framework of alcohol consumption, epidemiologic research has paid special attention to harmful alcohol consumption by young people. In Belgium, alcohol consumption by adolescents is common. A recent survey showed that 41.4% of 12-14 year olds had consumed alcohol at some point in their life, a percentage that increased to 89.8% for 17-18 year olds (Melis et al., 2014). Within the public health framework, alcohol consumption by adolescents should be of major concern for numerous reasons. Throughout adolescence, significant structural and developmental changes cause the brain to evolve at a high pace, an evolution that is said to continue until the mid-twenties (Giedd, 2004). Alcohol has been shown to act as a neurotoxin throughout adolescence, suggesting that heavy alcohol consumption can lead to significant long-term effects on the brain structure and function, thus adversely impacting adolescent development and future health (Tapert & Schweinsburg, 2005). Most notably, the association between early onset of alcohol consumption and problematic substance use later in life has been researched extensively, showing that early drinking initiation greatly increases the likelihood of heavy alcohol consumption and the development of an alcohol use disorder later in life (Hingson, Heeren, & Winter, 2006; Hingson & Zha, 2009; Pitkänen, Lyyra, & Pulkkinen, 2005). Moreover, for each year drinking initiation is delayed, the likelihood of developing an alcohol use disorder is reduced by approximately 14% (Grant & Dawson, 1997). In addition, age of drinking initiation has also been linked to an increased risk of both intentional and unintentional injury that drinkers may inflict on themselves and others (Hingson & Zha, 2009; Swahn, Bossarte, & Sullivent, 2008). Moreover, an extensive body of research has examined the social, health and economic consequences of underage alcohol consumption. Results showed that underage consumption is a major factor in intentional and unintentional injuries and deaths (Institute of Medicine National

Research Council, 2004), unprotected sexual activity (Champion et al., 2004) , mental health issues (Windle, 2003), delinquent behavior (Miller, Levy, Spicer, & Taylor, 2006) and decreased academic performance (Dee & Evans, 2003).

In an effort to curb the adverse impact of alcohol on population health, one strategy that has been used by many governments, is to restrict adolescent access to alcohol by imposing minimum legal drinking age (MLDA) legislation. In December 2009, the Belgian government amended its existing alcohol legislation, to prohibit access to distilled alcoholic beverages to adolescents under the age of 18 and access to all (both distilled and fermented) alcoholic beverages to adolescents under the age of 16. This restriction applied to both the possession by adolescents, as well as alcohol sales by retailers, bars and restaurants (B.S. 31 December 2009). As such, the effectiveness of the legislation is contingent on several factors, including the willingness of both supply and demand to comply with the law.

### **1.1 Effectiveness of the minimum legal drinking age**

In order to gain a valid estimation of the effect of MLDA legislation, the alcohol consumption patterns and outcomes of adolescents, subjected to the law, should be compared to those of adolescents not subjected to it. To achieve valid results, it is of great importance that the test and control group are very similar in all aspects other than their subjection to the law. Over the years, researchers have applied two main research designs to do this (Carpenter & Dobkin, 2011b). A first design, called panel approach, is to investigate consumption patterns before and after a change in legislation, or between similar areas with different MLDA legislation. In Belgium, the minimum age changed in 2009. So, one may expect that adolescents aged 15-18 right before the law was changed, grew up in different circumstances as those aged 15-18 right after 2009 - when the MLDA legislation was changed. A second research design applies to any given period of time when a minimum age is in place. Since the MLDA functions as a discrete cut-off point, this design compares people who are just under the minimum age with those who are just over. Both groups are likely to be similar, except for their subjection to the MLDA. A disproportionate increase in alcohol consumption or alcohol-related outcomes would indicate that the MLDA legislation is an effective means to curb underage drinking. This design is called the regression discontinuity method and was first applied by Thistlethwaite and Campbell (1960) as an alternative to the ex-post-facto experiment. Compared to the panel approach, a regression discontinuity design has fewer limitations that threaten validity.

### **1.2 United States, Canada & New Zealand**

A large body of research on the effectiveness of the minimum legal drinking age has accumulated over the past few decades. The vast majority of this research was conducted in the United States since their MLDA changed several times over the years. The National Minimum Drinking Age Act was implemented in 1984, through which the federal government sought to harmonize all states' MLDA legislation to set 21 as the nationwide minimum age. By 1988 all states had done so accordingly. Also in Canada recent changes have led researchers to analyze consequences of the adaptation of the MLDA. In Canada the minimum legal drinking age is 19 years in every province and territory, except for Alberta, Manitoba and Quebec, where the MLDA is 18 years (Canadian Center on Substance Abuse, 2015). Apart from the United States and Canada, the most relevant MLDA research originated from New Zealand. New Zealand lowered its minimum legal drinking age from 20 to 18 in 1999.

Research can be categorized in three broad sections: effects on alcohol consumption, alcohol-related traffic accidents and other social/health issues.

### 1.1.1. Effect of MLDA on alcohol consumption

Several of the early studies concluded that MLDA's are inversely related to alcohol consumption (Hingson et al., 1983; O'Malley & Wagenaar, 1991). O'Malley and Wagenaar (1991) investigated the relationship between the minimum age and self-reported drinking and found that high school seniors consumed more alcohol in states where the MLDA was lower. Even after controlling for socio-demographic and other variables, a higher MLDA was found to be a significant predictor of lower alcohol consumption. This study suggested that the effects had a long-term impact, leading to less alcohol consumption even after becoming of age, which was later confirmed by several other studies (Krauss, Cavazos-Rehg, Agrawal, Bierut, & Grucza, 2015; Norberg, Bierut, & Grucza, 2009; Plunk, Cavazaos-Rehg, Bierut, & Grucza, 2013).

In a comprehensive review of the effects of the MLDA on alcohol consumption in the United States, Wagenaar and Toomey (2002) analyzed all published studies on the MLDA in the period between 1960 and 1999. They identified 33 high quality studies that investigated the relation between the MLDA and alcohol consumption. Of these studies, only 33% found a significant inverse relation between the MLDA and alcohol consumption, whereas only 1 study found a significant positive relation (Hingson et al., 1983). Other studies at that time, did not find significant evidence of the relationship between MLDA and alcohol consumption (Rooney & Schwartz, 1977) or questioned the actual significance of the MLDA (Grabowski & Morrissey, 2001).

In response to these mixed results, Carpenter and Dobkin (2011b) introduced the regression discontinuity approach to determine the MLDA effect. Their study concluded that increasing the MLDA from 18 to 21 significantly reduced drinking frequency and binge drinking. These findings were later confirmed by several studies (Gruenewald, 2011; Subbaraman & Kerr, 2013).

Similar to the United States, early Canadian research used a panel approach to investigate the effects of the MLDA changes on alcohol consumption (Smart & Finley, 1976; Vingilis & Smart, 1981). Overall results confirmed the inverse relationship between MLDA and alcohol consumption.

In New Zealand, several research studies have examined the negative consequences of a lower MLDA on alcohol consumption (Boes & Stillman, 2013). In contrast to US research on alcohol consumption, Boes and Stillman (2013) did not find any evidence that lowering the MLDA has led to increases in average alcohol consumption or binge drinking among 15-17 or 18-19 year-olds. Huckle, You, and Casswell (2011) on the other hand found a modest increase in alcohol consumption among 18-19 year-olds but a much more substantial increase among 16-17 year-olds.

### 1.1.2. Effect of the MLDA on alcohol-related crashes

Early research (by O'Malley and Wagenaar (1991) found that the minimum legal drinking age reduced traffic crashes. Moreover, the effect on car crashes was found to continue long after reaching the minimum age. Other research confirmed these results by showing that the implementation of a uniform MLDA of 21 in the United States reduced the prevalence of drinking and driving (Klepp, Schmid, & Murray, 1996; Saffer & Grossman, 1987). Voas, Tippetts and Fell found similar results for all 50 states between 1982-1997, observing that on average, after controlling for driving exposure, beer

consumption and other relevant legal changes, the rate of fatal accidents involving intoxicated young drivers was 19% lower in those states that had a higher MLDA (Voas, Tippetts, & Fell, 1999).

In their overview study of the 1960-2000 period, Wagenaar and Toomey (2002) identified 57 studies, of which 65% reported significant effects, with 98% of these finding an inverse relationship and a mere 2% finding the opposite. Similarly, a systematic review by Shults et al. (2001) identified 33 studies that met their qualification criteria and found that a change to MLDA 21 resulted in a 10% to 16% decrease in alcohol-related crash outcomes. The effects were consistent across follow-up times.

More recent studies confirm the early findings and reaffirm the considerable evidence that MLDA legislation reduces the amount of underage alcohol-related traffic fatalities (Fell, Fisher, Voas, Blackman, & Tippetts, 2008; Ponicki, Gruenewald, & LaScala, 2007; Voas, Tippetts, & Fell, 2003; Voas, Tippetts, Romano, Fisher, & Kelley-Baker, 2007). A very impactful study is that of Fell et al. (2008), to examine the relationship between the MLDA-21 and the ratio of underage, drinking to non-drinking drivers. Despite controlling for many variables, the MLDA was found to be associated with a 16% decline in the ratio of drinking to non-drinking drivers. In comparison, Blood Alcohol Control (BAC) legislation was only associated with a 5% decline.

Canadian research on the effects of the MLDA changes on alcohol-related traffic accidents (Bako, Mackenzie, & Smith, 1976; Vingilis & Smart, 1981; Warren, Simpson, Page-Valin, & Collard, 1977) revealed less consistent results. A 2001 study however did find reductions in fatal, alcohol-related crashes with MLDA increase (Hedlund, Ulmer, & Preusser, 2001). Research by Callaghan and his colleagues (using the regression discontinuity approach) found that between 2000-2012, drivers in Quebec, who are just older than the minimum age, experienced an abrupt and significant increase of approximately 6% in motor vehicle collisions, as well as a significant 11.1% increase in nighttime motor vehicle collisions (Callaghan, Sanches, Gatley, & Stockwell, 2014).

In line with these results, a study in New Zealand Kyri et al. (2006) found that the alcohol-related traffic accident rate for males ages 18-19 increased by 12% after the MLDA legislation was changed in 1999. For females the study even found a 51% increase. Moreover, the study also found a 14% increase in accident rate for males ages 15-17 showing that the MLDA change did not merely affect people closely around the minimum age but also those significantly younger. A recent study by Huckle and Parker (2014) reevaluated data between 1994-2010 to examine if the MLDA effect on alcohol-related traffic crashes persists in the long run. Prior to the law change, drivers aged 18-19 were at a similar risk as 20-24 year-olds to be involved in alcohol-related traffic crashes. Directly following the law change, 18-19 year olds saw their odds increase by 15%. In the long run, Huckle and Parker found 18-19 year olds to have a 21% higher chance of being involved in an alcohol-related car accident, thus concluding that the MLDA effect persists in the long run.

### **1.1.3. Effect of the MLDA on other social/health problems**

Limited research is available however on other social and health related problems. In their systematic review, Wagenaar and Toomey (2002) found 24 published studies that assessed the effects of MLDA changes on indicators of these issues. Overall, some evidence was found of an inverse relationship between MLDA and social/health problems, with 35% of the higher quality studies finding a significant association. The evidence was not found to be as consistent as the evidence on associations with alcohol consumption and alcohol-related traffic accidents. More recently, Carpenter and Dobkin



(2009) examined the causal link between the MLDA and suicide, homicide and other external causes of death, using the regression discontinuity approach. Their study found a 10% increase in deaths due to external causes right after young people reached the minimum age, as well as a noticeable increase in suicides, but no changes in homicide rates.

Extensive research confirms the association between alcohol consumption and suicide (Brent, 1995; Hufford, 2001; Shaffer, Garland, Gould, Fisher, & Trautman, 1988). Estimations are that 33-66% of adolescent suicide victims have an increased blood alcohol content (BAC) (Brent, 1995). In a more recent study, Miller, Teti, Lawrence, and Weiss (2010) examined the alcohol involvement in suicide attempts in 1997 for 20 US states. They observed a sharp increase in suicide attempts through poisoning between the ages of 20-21, suggesting the MLDA works as protective factor. Using a regression discontinuity design, Carpenter and Dobkin (2009) found noticeable discontinuities in alcohol-related deaths due to suicide, confirming a 16% increase in suicide rate at the minimum age.

Research by Callaghan and his colleagues found an impact of the MLDA on overall mortality in Canada between 1980-2009. Results showed that, in provinces with MLDA 18, young men, slightly older than the minimum age, had a significant increase in all-cause mortality of 14.2% from a broad class of injuries. Specifically focusing on mortality from motor vehicle collisions, the study found a 12.7% increase immediately after reaching the minimum age. Provinces with MLDA 19 showed similar results although the impact was clearly lower: male, all-cause mortality jumped up by 7.2%. They found some mortality increases among female drinkers but these jumps were not statistically significant (Callaghan et al., 2014).

Callaghan and his colleagues first applied the regression discontinuity approach on all Canadian in-patient hospital admissions between 1997-2007. The results showed that, compared with the baseline hospitalization rate just prior to the minimum age, admissions of both males (17.3%) and females (21.1%) that had just come of age, rose significantly for alcohol-use disorders, as well as for suicide events for the combined sample (9.6%). Moreover, they saw a significant increase in a broad class of injuries for males (Callaghan, Sanches, & Gatley, 2013). A follow-up study bolstered these results by not only looking at in-patient records (which only represents a fraction of all alcohol-related morbidity), but also including emergency department records. The study focused on Ontario, the most populous state in Canada, and used census data on alcohol-related in-patient and emergency department data. Results showed significant increases in both in-patient and emergency department events upon reaching the minimum age, with suicide cases even skyrocketing as much as 51.8%. These results are in line with findings from Carpenter and Dobkin (2011a) in the only American study on the relationship between the MLDA and morbidity. In their study, Carpenter and Dobkin found that emergency department visits and hospital admissions increased by 69.4 and 9.2 per 10,000 population on an annual basis at the minimum age. These rates were found to be due mainly to increases in male accidental injuries, alcohol overdoses and injuries inflicted by others.

In New Zealand, significant changes in negative alcohol outcomes have been found: Everitt and Jones (2002) studied patient intoxication at emergency department of Auckland Hospital. The study found a 50% increase in the fraction of 18-19 year-olds appearing intoxicated as well as a smaller increase in 15-17 year-olds. Conover and Scrimgeour (2013) expanded this study by incorporating all hospitalizations in public hospitals between 1993 and 2006. Using both a difference-in-difference and

a regression discontinuity approach, they found a substantial increase in alcohol-related hospitalizations for newly eligible drinkers (24.6% for males, 22% for females).

## Conclusion

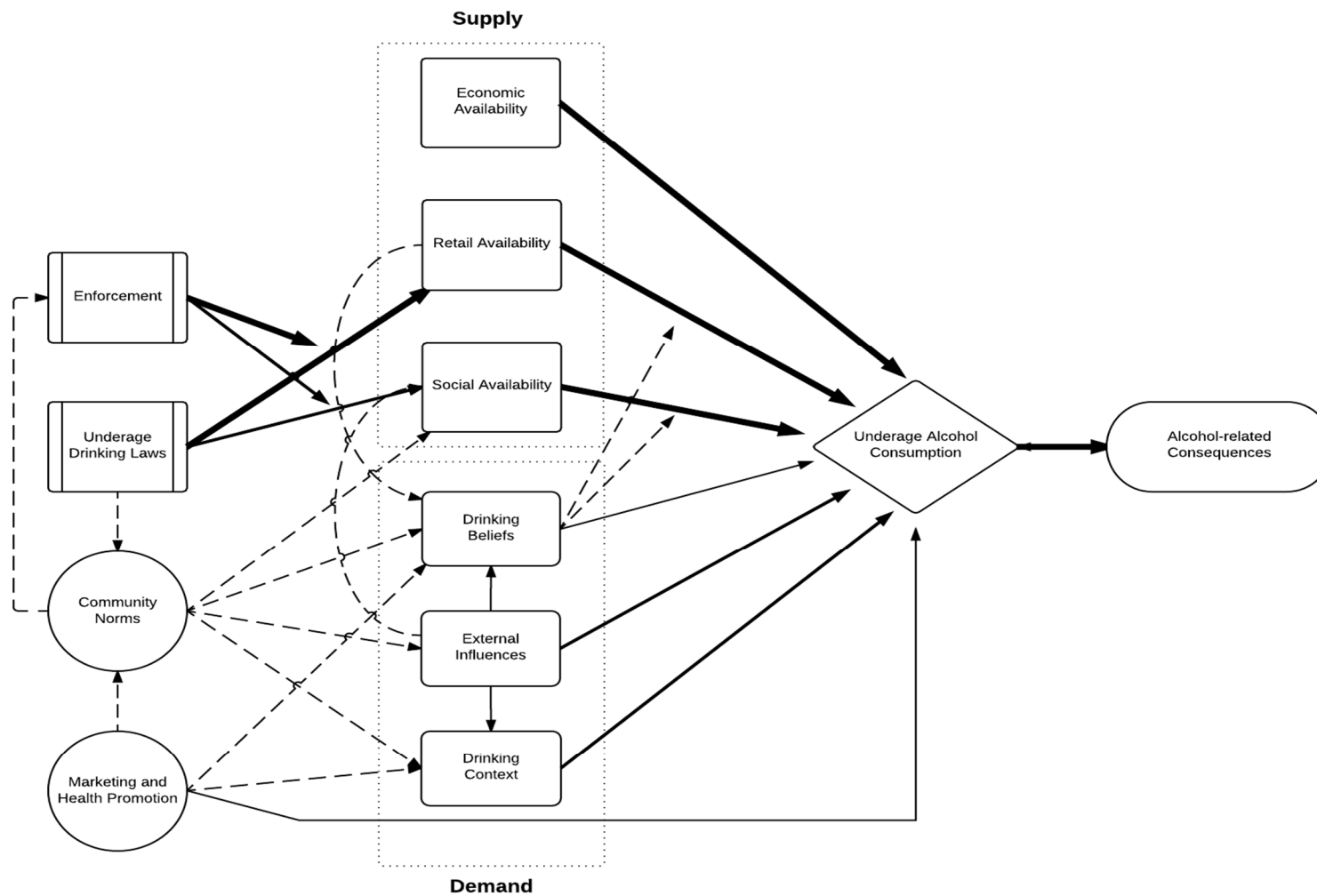
Research – be it for the most part US, Canadian and New Zealand studies - provides evidence of the beneficial impact of minimum legal drinking age legislation on public health. A plethora of studies indicated that a higher minimum age leads to reduced alcohol-related traffic accidents, mortality and morbidity rates among young people. The studies on the consumption of alcohol within the group of young people show mixed results: a substantial group finds no significant effects, some only a minimal effect, however, the majority of the results show that a higher MLDA is associated with a lower rate of alcohol consumption.

## Chapter 2: Logic model of adolescent alcohol consumption

In order to provide a thorough public health analysis of the effects, incurred by the amended Belgian MLDA legislation, a logic model of underage drinking is presented Birckmayer, Boothroyd, Fisher D. A., and Holder (2008), cf. Figure 1. Intermediate variables depicted in this figure have either been identified as empirically associated with underage alcohol consumption and its related consequences, as well as to other intermediate variables, or, in the absence of empirical study results, have a theoretical rationale for inclusion in the model.

At the very basis of this model is the dynamic economic relationship between supply and demand: desire for alcohol creates demand, which stimulates supply through the expectation of profit. Suppliers in turn attempt to stimulate demand to increase their profits. The intermediate variables that are identified in this interaction between supply and demand are: drinking beliefs, drinking context, external influences, availability, marketing, community norms, legislation and enforcement. In order to provide a valuable review of the public health implications of a change in the drinking age legislation, it is imperative to first understand the intricacies of how supply, demand and other variables interact with the outcome as well as with each other, and together lead to specific drinking behavior. Drinking beliefs are the most fundamental aspect related to the demand for alcohol and refer to attitudes, expectancies, subjective availability and normative beliefs towards alcohol. Availability of alcohol, consisting of price, social- and retail availability, is the key component representing the supply side in the model. Without some form of alcohol availability, there can be no consumption nor related health consequences. Since profit is a main driver for retail availability, attempts to increase demand happen through marketing, which is therefore included in the model. Drinking context refers to the conceptualization of where and with whom alcohol is consumed and is relevant to policy makers for developing accurate programs. External influences refer to all family, school and peer related influences that may have an impact on drinking behavior. Community norms on the other hand, refer to the historically grown values and standards regarding the acceptability of alcohol use within the community. These norms in turn can be formally codified into legislation, policies or regulations, which in turn can affect availability, promotion or alcohol consumption and its related health consequences. Much of the potential effect of the MLDA legislation is directly affected by enforcement.

Figure 1 Causal model of underage drinking. Based on Birkmayer et al. (2008)



## Conclusion

In this chapter a logic model is introduced to gain insight in the drinking behavior of underage people. The model is based on the interaction between supply and demand and will serve as the basis for a valid and meaningful evaluation. Intermediate variables depicted in this figure have either been identified as empirically associated with underage alcohol consumption and its related consequences, as well as to other intermediate variables, or, in the absence of empirical study results, have a theoretical rationale for inclusion in the model. The intermediate variables that are identified in this interaction between supply and demand are: drinking beliefs, drinking context, external influences, availability, marketing, community norms, legislation and enforcement.

## Chapter 3: Trends in alcohol consumption

The analyses carried out in this chapter were set out to investigate four research questions. Firstly, it was investigated whether or not the proportion of life-time abstainers, weekly drinkers and binge drinkers evolved differently between adolescents aged under 16 and those older, at the regional and national level. Secondly, the evolution of life-time and weekly consumption of distilled spirits among adolescents under the age of 18 and those older was investigated at the regional and national level. A third research question widened the perspective by investigating trends in life-time and weekly alcohol consumption as well as life-time drunkenness among adolescents aged 11-15 years old in 30 countries. This was done in order to analyze the impact of the minimum legal drinking age, as well as a wider array of policies and alcohol affordability, on the outcome measures. The fourth research question was investigated at the national and international level and concerned the role of socioeconomic status on the different outcome measures.

At the Flemish and Belgian level, statistically significant decreases were found for all outcome measures, indicating that overall alcohol consumption among Flemish and Belgian adolescents has decreased in the 2002-2014 period. Moreover, it was shown that, consistent with the existing literature, age and gender are highly significant predictors of the different outcomes with higher consumption being linked to higher age and being male. Concerning research questions 1 and 2, the analyses at the Flemish and Belgian level showed significant statistical interactions between age and time. This indicates that over the research period, alcohol consumption patterns in the different age groups (under 16 versus older for fermented drinks, under 18 versus older for distilled drinks) have evolved differently, in the sense that the odds of consuming alcohol decreased at a higher pace for those under the respective age limit. This could indicate towards an effect of the law on minimum legal drinking age, although it could also be due to other events (e.g. 2008 financial crisis) or increased alcohol prices.

At the international level, similar relations were found between alcohol consumption, age and gender in the group of 11-15 years old. Moreover, the significant time trend, which was observed in Belgium, was also found in the international sample, indicating that overall, alcohol consumption has decreased in the 2002-2014 period. Therefore, **no specific evidence was found that supports an impact of the Belgian drinking age legislation on adolescent alcohol consumption**. On the other hand, it remains **uncertain** what the Belgian consumption trend would have looked like in the absence of the 2009 minimum legal drinking age legislation. Furthermore, we supplemented the Belgian minimum legal drinking age legislation analysis with an **additional international policy analysis on “what works”** to reduce alcohol consumption in adolescents younger than 16 years old. With regard to the effect of

these alcohol-related policies, mixed results were found. The minimum legal drinking age was found to be non-significant in relation to life-time and weekly alcohol consumption and positively related to life-time drunkenness indicating that countries with higher minimum legal drinking ages typically have a higher proportion of life-time drunkenness. It is important to note that reversed causality could play a role here i.e. that countries which have a higher proportion of life-time drunkenness institute higher minimum legal drinking ages.

When evaluating a wider array of policies that restrict alcohol availability, a significant relation was found between stricter policies and lower odds of weekly alcohol consumption. An important caveat however in the Alcolaw-research is the failure to incorporate enforcement of the above policies into the regression analysis. For example, the most spectacular decreases for all outcome measures are observed in Anglo-Saxon countries. These countries, especially the United Kingdom, have greatly increased their enforcement efforts during the research period. Unfortunately, such information was not systematically available for the complete international sample.

Additional to the availability policies, the effect of marketing restrictions and affordability changes were also measured. Current marketing restrictions were not found to have a significant effect on alcohol outcome measures. **Affordability changes** on the other hand were highly significant with increased affordability being linked to higher odds of alcohol consumption: when alcohol is cheaper, adolescents tend to drink more. Moreover, the results also show that the combination of policy measures (the Total Policy Index represents the mean of the availability index, the affordability index and the marketing restrictions index) can be effective in the reduction of both life time and weekly alcohol consumption.

The fourth research question addressed the role of socioeconomic status on adolescent alcohol consumption. At the Belgian level, three variables were tested (Family affluence, Perceived family wealth and Occupational social class). Adolescents reporting higher parental occupational social status showed higher life-time alcohol consumption and lower life-time drunkenness, while insignificant results were found for all other outcomes. Moreover, none of the interactions with time or age were statistically significant indicating that the impact of parental occupational social status did not change over time nor was it influenced by age patterns. Family affluence was found to be the most stable SES indicator in the sense that it was positively related to all outcome measures and its effect size was high. Higher family affluence was thus typically associated with higher adolescent alcohol consumption. Moreover, a significant time trend was found in weekly alcohol consumption showing that the impact of family affluence increased over time which indicates that socioeconomic differences in weekly drinking (i.e. the difference in weekly drinking between adolescents with low and high family affluence) increased over time. Perceived family wealth was found to be negatively related to life-time alcohol and spirits consumption and positively related to weekly alcohol and spirits consumption, while not being a significant predictor of life-time drunkenness. Moreover, no significant interactions were found between perceived family wealth and time/age indicating that subjective socioeconomic differences in life-time drunkenness remained stable over time and across age groups. At the international level two variables (Family affluence and Perceived family wealth) were tested to estimate the impact of socioeconomic status. No significant time trends were detected for socioeconomic differences in life-time and weekly alcohol consumption. However, statistically significant interactions were found between both SES measures and time in relation to life-time drunkenness, indicating that the impact of both family affluence and perceived family wealth has

increased over time. Concerning alcohol policy, the interaction between Family affluence and policy was significant in relation to both life time and weekly alcohol consumption, in the sense that more stringent policies partially mitigated the effect of socioeconomic status. This finding shows that alcohol policies may contribute in reducing socioeconomic inequalities, i.e. reducing alcohol consumption relatively more in higher socioeconomic status groups characterized by relatively higher levels of alcohol consumption.

## Chapter 4: Trends in alcohol-related health outcomes

The impact of alcohol consumption on health-related and other social outcomes cannot be overstated. Alcohol consumption has long been identified as an important, global risk factor for chronic conditions and injury (WHO, 2014b). Belgium is no exception, with the most recent estimates showing that 5.8% of the population suffered from an alcohol use disorder in 2010 (WHO, 2014a). By measuring both direct (e.g. hospital visits) and indirect (e.g. productivity loss) costs of substance use, a recent study calculated that the overall social cost of substance use accounted for 1.19% of Belgium's GDP (Lievens et al., 2016). The results also showed that 45%, roughly 2.1 billion euro, of the overall economic burden of legal and illegal drug use was caused by the effects of alcohol consumption. So far, alcohol has been identified as a causal component for well over 60 different medical conditions (Rehm et al., 2010). Moreover, it is likely that alcohol-related harms are currently still underestimated while potential benefits are overestimated (Stockwell & Zhao, 2016). Generally, conditions attributable to alcohol consumption are divided into six categories: cancers, cardiovascular diseases, gastrointestinal diseases, infectious diseases, neuropsychiatric conditions, injuries and other (for a full overview of conditions, **Fout! Verwijzingsbron niet gevonden.** in appendix).

The goal of the current study is to investigate whether the legislative change of the minimum legal drinking age in Belgium, after 2009, has had an impact on health. Considering the fact that this change is fairly recent, it should be clear that the current research has to be restricted to the direct, short-term impact on adolescents, since any potential long-term changes in adult chronic conditions will only become tangible in the years to come. As such, this study focuses on the impact of the minimum legal drinking age on adolescent injuries and neuropsychiatric conditions linked to alcohol. Injuries can be either intentional or unintentional. Suicide, homicide and violence have been causally linked to heavy consumption (Cherpitel et al., 2012; Cremonte & Cherpitel, 2014; Macdonald, Erickson, Wells, Hathaway, & Pakula, 2008). Almost all categories of unintentional injuries on the other hand are strongly linked to alcohol consumption due to the effect of the blood alcohol concentration on the psychomotor abilities of people (Taylor, Rehm, Patra, Popova, & Baliunas, 2007). Within the category of neuropsychiatric conditions, Alcohol Abuse Disorders are the main diagnosis of interest for this study.

Statistical analysis of the impact of the minimum drinking age on the incidence of chronic diseases in older age groups is impossible at this point, for the obvious reason that the legislative change was carried out too recently to observe the effect on the adult population. As such, the current analyses aim to explore whether the changed minimum age had an impact on trends in the health of the Belgian, adolescent population, more specifically an effect on neuropsychiatric and acute conditions. In order

to evaluate whether the health of Belgian adolescents was impacted by the legislative change, data was collected on the incidence of hospital-based health service use between 2002 and 2013, linked to the diagnostic codes presented in section 1 of this chapter. The Belgian Federal Public Service (FPS) Health currently has two main, administrative registration systems recording the incidence of hospital-based healthcare use. The first one is called 'Minimum Hospital Data' ('Minimale Ziekenhuisgegevens' [MZG]/ 'Résumé Hospitalier Minimal' [RHM]). The database contains hospital-based data, including medical, nursing-based and administrative data (FPS Health, 2016a). The second registration system is called 'Minimum Psychiatric Data' ('Minimale Psychiatrische Gegevens' [MPG]/ 'Résumé Psychiatrique Minimum' [RPM]) and contains data on healthcare use in psychiatric hospitals. This data system includes alcohol-related mental disorders based on the 'Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition (DSM-IV), which is relevant for the current analyses (FPS Health, 2016b).

In general, **the results of the statistical analysis did not provide evidence that the legislative change of the minimum legal drinking age in Belgium, after 2009, has had an impact on health-related outcomes** (i.e. neuropsychiatric and acute conditions). The decreasing trend that was found in adolescent alcohol consumption, was not found in health-related outcomes. Instead, diverging time trends were found depending on the health-related outcome. The absence of time trends in problematic drinkers could be expected since this is another target group than the one on which the 2009 minimum legal drinking age is targeting on. As one might expect, neuropsychiatric and acute conditions showed different patterns for males and females, and for younger and older adolescents. More in detail: males show higher frequencies as do older respondents (except for accidental injuries). Also, these health-related outcomes showed increasing, decreasing or stable prevalence over time, but no significant trend reversal could be observed after 2009 indicating that the minimum legal drinking age in Belgium did not have an impact on health-related outcomes.

### 1.1. Evaluating MLDA legislation: data availability and recommendations

To establish the effects of the amended minimum legal drinking age on adolescent alcohol consumption, data was collected both from surveys and from policy sources. Within Belgium, three major surveys exist that incorporate questions on alcohol consumption and are specifically aimed at school-aged children: Health Behaviour in School-aged Children (HBSC), VAD-leerlingenbevraging (VADLLB) and Vlaspad (is part of the European School Survey Project on Alcohol and Other Drugs (ESPAD)). Although other sources do exist, such as the Belgian Health Survey and the International Self-Report and Delinquency study, differences in study objectives, methodologies and scope exist. Thus, combining the three previously mentioned studies is, in our opinion, the best approach, as all three of them have a similar scope, are representative and employ similar questionnaires. Despite our best efforts however, we have only been able to collect data from HBSC and VADLLB. As mentioned throughout the report, questionnaires of the different studies were significantly different in the past (most notably in 2001/2002, at the onset of the current study period) but have converged significantly over the years. At this point, all studies incorporate at least a question on age of drinking initiation, drinking frequency, drinking quantity and binge drinking/drunkenness, which are the minimal requirements to accurately investigate "drinking behavior".

The information necessary to include national policy measures in international alcohol research are all currently collected, either through GISAH, Eurostat or EUCAM. However, we found that the WHO is very reluctant to give up GISAH information beyond what is available on their website ([http://www.who.int/substance\\_abuse/activities/gisah/en/](http://www.who.int/substance_abuse/activities/gisah/en/)). This made the current research significantly more difficult, as we had to resort to past reports, which are often incomplete or have a lower level of detail than that required for the study. It is unclear to us if anything can be done about this for future research.

To establish the effects of the amended minimum legal drinking age on adolescent health consequences, data was collected both at the Belgian level, through the Belgian Federal Public Service Health (<https://www.health.belgium.be/en>) and at the European level, through the EU Injury Database ([https://ec.europa.eu/health/data\\_collection/databases/idb\\_en](https://ec.europa.eu/health/data_collection/databases/idb_en)). The data at the Belgian level was found to be of high quality and sufficient to insure a basic level of statistical analysis. The addition of more detailed information on socio-economic status or other relevant external influences could be useful to provide a more in-depth analysis. The EU Injury Database also provided valuable data, however was rendered useless because Belgium does not provide data to Eurosafe, the network organizing the database (<http://www.eurosafe.eu.com/home>).

Finally, we decided after thorough research with the Federal Police and the Department of Justice that the data on youth criminality collected by both authorities, does not have the level of detail required to analyze the impact of legislation on youth criminal offenses. The protocol to an offence does not include to measure the level of alcohol use.

## Chapter 5: Study of the knowledge and application of the 2009 legislation by young people and sellers

One major aim of this part of the study is examining and testing the knowledge of the 2009 law by young people and different groups of sellers. The survey of the youngsters is operated through a quantitative methodology (n=1154) and also aims to evaluate the prevalence rates and the severity index of alcohol use by young people permitting to identify drinking profiles (by age, gender, cultural background, type of school, neighbourhood...). These profiles are confronted with knowledge of the law and parental attitudes in order to see if and how they influence the drinking habits.

The secondary goals are to evaluate the experience with selling alcohol to underage customers for sellers and their relationships with the enforcements actors as well as to identify the measures that sellers have already implemented to comply with the legal age limits on alcohol sales (tips and tricks to comply and difficulties to non-comply) (Gosselt, Van Hoof, & De Jong, 2012). To study the experiences of the sellers, interviews were executed.

### 1.1. Survey with youngsters: discussion

Across these results, **age** comes forth as a critical variable: older youths, over 16 year olds, consume more alcohol and perceive less parental supervision (specifically control and attitudes towards alcohol at home). For example, Two (older) profiles are **high consumers** that attract our attention in this study. Could these youngsters be at risk of developing an alcoholic trajectory or could the High explosive



drinkers correspond to practices of binge drinking? In that sense, this problematic consumption could be problematic but limited to adolescence (Moffit 1983).

Moreover, older youths seem to know the law about alcohol consumption (in authorized as well as non-authorized situations) better in comparison to younger (<16). However, age also seems significant only for application of the legal norms into their own norms for drinking regarding authorized situation. These results seem to highlight the **importance of personal values** in the application of the law: even if youths evaluated more or less correctly the legal aspects of the alcohol consumption (knowledge), we observe contrasts between the law's perspective and their own perspective or values (application). When the perspective of the law met their own perspective, authorizing the consumption of alcohol, results are congruent: youths knew the law rather well and seemed to approve these norms through their own values and application in their daily life. But when the law did not authorize the situation presented in the vignettes, this prohibition doesn't seem to be sufficient to make that legal norm translate or integrate into internal system of informal norms. Indeed, when a legal norm comes to confirm internal values for the youth, the application follows the legal norm. So, the **passive knowledge of the law doesn't seem to play a major role** in the integration of the norms into an individual normative system. Application seems to be more associated to alcohol use than knowledge (passive comprehension) of the law, specifically among our problematic drinking profiles.

Also, the perception of youngsters is more important and differentiates more in terms of drinking profiles than (passive) knowledge of the law. In addition, the type of alcohol used in the vignettes seems important to study more closely. Indeed, the results show little differences concerning the perception of the youngsters when the vignettes stages buying beer for young people of 15 years (not legal) or beers for young people of 17 years (legal) for profiles of 16 years and more. Regarding the second vignette, on buying vodka (not legal), the results are more distinct according to the profiles: the Higher consumers are the only group of young people stating that buying vodka is permissible". It thus appears that youths' **approval** of a situation is **following their reality, whether or not the situation at hand is legal or not**. For example if a youngster is 16 years old and can buy beer, he/she approves the vignettes staging other youngsters in situations with beer even if the age is below 16 years old. In the same reasoning, if a youngster consumes spirits as part of a High consumer profile and the vignette stages vodka, the youngster tends to approve of the situation even if the age indicated is below 18.

Throughout several results from our sample, **family environment** is revealed as an important environment for tasting and getting alcohol. This impact is particularly strong in the (young) category of Low family drinkers. We see also that parental control and supervision seem to be associated with less alcohol use but also that **parental control and supervision** tend to decrease with age. Moreover, specific attitudes and rules towards alcohol at home seem related to abstainer profiles. Finally, we observe that parents adopt more authoritarian styles for girls and more permissive parental style for boys.

Regarding the two profiles that drink more heavily, we identify fewer rules towards alcohol at home. These youths report also less parental control, rules and interdictions by parents, in general. We observed a distinction between the ones drinking because they experience stress: they report a higher parental supervision, making their parents more aware –according to the adolescents- of their activities in comparison with the explosive drinkers.

When combining this comparison of parental attitudes with the characteristics we discussed of the profiles, this analysis seems to indicate that rules towards alcohol are more present and acceptable when the children are younger, who are largely represented amongst the Abstainer profile. General parental control on the activities of children seems to protect young people from a more problematic drinking profile – for as much as the attempt to control the activities is perceived and reported as such by the youngsters.

In conclusion, the close analysis of the profiles crossed with the parental attitudes seems to indicate that parental rules regarding alcohol exert **more of influence on younger teens**, where many Abstainers have been identified, but are not sufficient when the youngsters get older. We do state this with caution as we didn't generate the longitudinal data that are needed to confirm this statement. Indeed, Van der Vorst et al. (2006) as well as Koning and colleagues (Koning, Eijnden, Engels, Verdurmen, & A M Vollebergh, 2010) observed before that stricter parental attitudes do preserve youngsters from an early onset of drinking. For limiting the drinking pattern, parental control seems important, even for older youths. At the same time a tension seems to appear between this goal and the specific period of adolescence where the thrive for autonomy is an important element (Cuin, 2011). This search for autonomy can push the youngsters into taking distance from parental norms. In other research, it has also been attested that parents become less restrictive, allowing more autonomy as their children age (Zehe & Colder, 2014). Indeed, Handren and colleagues have showed that parents weight more on younger adolescents of 13 to 16 than on older youngsters of 17-18 who rely more on personal perceptions of harms (Handren, Donaldson, & Crano, 2016).

### 1.3 Interviews with sellers: discussion

**Knowledge** of the law entails more than just answering questions (correctly). The logic of the law is rarely mastered - even if the basics are well known- as sellers most often don't fully grasp the logic. Close readings of the interviews clearly show that an overwhelming majority of the sellers do have **internal values** that urge them to condemn some youthful drinking, but not always according to the same modalities as the law. This set of internal values, that seemed to be broadly shared, see drinking beer (and, in Liège, *blanc cerise/ blanc coca/ blanc passion*, as well as péket sometimes) as a cultural and social practice surrounded by norms.

According to some of the interviewees, adolescents should learn how to drink, learn their limits, learn how much to drink and in what social settings to drink. This means, according to the interviews, they should start with less heavy alcoholic drinks, typically pilsner beer – if needed something sweeter as youngsters seem to have sweet tooth. Accompanying this process by adults is presented as indispensable to manage the consequences and risks of drinking. Hence especially drinking spirits amongst youngsters is strongly condemned. From their set of values, which sellers present as largely supported, they are often in favour of a prohibiting law, even if they warn for the risk of creating a forbidden fruit effect, based on the percentage of alcohol. Although the current law is not based on percentages, most sellers think the current legislation could be maintained. They value the gradual access, which corresponds to the moral values we discussed.

However, regarding the law and its' provisions, sellers massively don't understand the reason behind the distinction based on the fabrication process. The most cited example is that strong special beers can be sold or offered, while lighter dosed shots or mixers can't. This lack of understanding the motives of the legislator provokes cynical remarks and renders the applicability for the sellers very difficult.

According to the respondents, not only the adherence to the law could be improved by switching to a percentage as discrimination element, it is also presented as a means of facilitating the application of the law.

Another problematic element concerns the responsibility of the sellers. In some settings, for instance in crowded premises, when customers order in group, sellers find it questionable to put full responsibility on the sellers themselves, as though they try to be thorough, problems may arise. Sellers question their ability to comply with the law all the time. Younger sellers experience more difficulties to comply with the law, e.g. when age verification is asked for. Younger sellers have more difficulties to enforce the law, e.g. asking to verify the age. They don't feel comfortable to verify and they seem to be more subjected to negotiations and insisting behaviour of youngsters. Both the discourse on the ability of sellers to master compliance to the law as well as the specific difficulties experienced by younger sellers, corroborate with the findings of Gosselt, Van Hoof & De Jong (2012).

Some initiatives have been taken by the sellers to respect the law. First, some places integrate the law of 2009 in their internal rules and internal policy. According to sellers, the encouragement to respect the law, by repetitions, personal encouragements, and communication on the subject makes that sellers are more aware of the norms and more confident when verifying the age. Some sellers make indeed many efforts, even if certain contexts make the control more difficult, like the presence of a self-scan. Second, bracelets are used sometimes to move the verification from the bar to the entrance, but is not a waterproof technique according to the sellers, nor is it applicable for locations where there is no 'closed' entrance. A third strategy, that is presented as much more effective, is to ban (distilled) alcohol or to ban youngsters all together. As youngsters are presented as not being able to buy many expensive drinks and therefore drinking before going out, or on the parking lot, many sellers are not happy with having a lot of youngsters in their establishment.

The question remains if selling alcohol to under age persons can be regarded as "deviant practices" or rather as cultural practices. In that sense, the study on "obedient behaviour" completes the understanding of the interactions between internal values that weight on the application of the law. Levin-Rozalis (2007) remarks that obedience or disobedience are both social acts, influenced by social representations of the social group the sellers belongs to. Gosselt, Van Hoof and De Jong (2012), more specifically analysing the practice of legal age limits in the Netherlands, demonstrate that compliance with age limits on selling alcohol depends on the knowledge of the law, but also on the ability and motivation to comply. Like we also observed, other literature also point to elements of the context of selling that influence the ability and motivation to comply, like the affluence in the shop/bar and the characteristics of the seller as well as the buyer (Britt, Toomey, Dunsmuir, & Wagenaar, 2006; Gosselt et al., 2012). These elements, like we saw are being put forward by the sellers as neutralization techniques explaining their inability to comply with the law. Although the knowledge of the law is all in all satisfactory, as Gosselt, Van Hoof & De Jong (2012) already observed, this knowledge is not sufficient: being willing and motivated to comply is also crucial. The researchers identified three factors that can also be found in this research: first, individual norms and values on the matter affect the initiative an individual seller will take to increase compliance. To Gosselt, Van Hoof & De Jong (Gosselt et al., 2012) the individual motivation is more important than that on the level of the store. Second, the awareness of a legal basis of the law is important too. Third, the perception of surveillance of application of the law, internal as well as external, influences the compliance. In our results, we observe a link between the first and the second factor. **Indeed, many sellers present individual**

**motivations and an awareness of the law. However, it appears that their personal motivations** (for example how to limit excessive alcohol consumption in order to decrease trouble in their bars) **make them to question the law more rather than fully comply to it.**

This discourse can of course be read as a series of neutralisation techniques (Sykes & Matza, 1957) on why sellers don't or shouldn't apply the law. Neutralisation techniques are anchored in the 'system of beliefs and attitudes' (Sykes & Matza, 1957) and are internal processes by which someone posing deviant behaviour manages his/her guilt. There is discussion to whether these neutralisations techniques are present before or after the perpetration of deviant behaviour and therefore can explain the deviancy (Maruna & Copes, 2005).

Even if the issue is complex and the realities observed very diverse in our study, the five basic techniques of neutralization can be observed. First and primarily, we observe a system of denial of responsibility (Maruna & Copes, 2005; Sykes & Matza, 1957). For many sellers, the application of the law is beyond their control. The circumstances, certainly in crowded bars or clubs, or at festivals, makes it impossible according to their discourse to verify who will drink the beverage, or even who will drink. For younger sellers, the small age gap between them and young costumers as well as the impression of lacking authority diminishes their responsibility. Also, sellers point to the environment, their own education, the education of their children and observations regarding a 'going out and beer culture' in Belgium to put forward different norms axed on learning to drink and to avoid excesses. As the literature on corporate crime shows (Benson, 1985a; Lascoumes & Nagels, 2015), the place in hierarchy is sometimes used to deny (part of the) responsibility: owners or managers are said to insist more on making profit, than on abiding this law on legal drinking age. On the other hand, sellers where management is said to insist heavily and repeatedly on respecting the law, do say to be more inclined to control age of buyers.

The denial of injury refers to the discourse arguing that the (long term) injury of youthful drinking is not their fault or doesn't cause much harm (Maruna & Copes, 2005; Sykes & Matza, 1957). Indeed, especially as most sellers explain to try to contain drinking within certain limits, for everybody, making sure everyone can get home safely or doesn't get sick (in order also to avoid cleaning up vomit), sellers create a discourse on actively preventing harm. They also often explain not to sell to very young youngsters, though as we saw that what is perceived as 'very young' varies, sometimes referring to consequences on the cerebral development.

As youngsters order the drinks, or make up schemes and strategies to obtain their beer of their shot, the denial of the victim (Maruna & Copes, 2005; Sykes & Matza, 1957) by stating they participate in the offense is easily sustainable. Still, surprisingly few sellers do put the liability on the youngsters (if they do mostly they also refer to the parents). The discourse follows more a logic of seeing injury mainly because of excesses, and, above all, to insist on the positive sides of drinking reasonably in a social context.

The technique of condemnation of the condemners (Maruna & Copes, 2005; Sykes & Matza, 1957) can also be observed. Reciting literally Sykes and Matza (Sykes & Matza, 1957), we observe a discourse that the legislator is hypocrite, in the sense that sellers often don't understand the motivation to discriminate beer from mixed drinks, even if they do approve of introducing drinks gradually. Suspicions of heavy lobby by the beer industry, and formulating a law that is judged by some as impossible to apply in practice, make that they distance themselves from the law. Other norms have,

according to them, more priority (namely to limit excesses). Just as observed by other scholars regarding organizational deviancy (Benson, 1985b; Lascoumes, 1985; Willott, Griffin, & Torrance, 2001), controllers of the law are presented as problematic. Stories arise on enforcement that is not correct or just, on controllers hesitating on the interpretation of the law and of using off limit proceedings.

The last technique of neutralisation is putting forward higher loyalties overpowering the norm of the law. Maintaining work and employment as in organisational deviancy (Lascoumes & Nagels, 2015; Willott et al., 2001) plays a certain role, but more than a reference to employment, we observed a reference to Belgian culture and integration of youngsters in the social norms of going out, having a good time with friends and family.

But even more than those two elements, it's the **enforcement of the law**, or the perceived lack of enforcement that sellers put forward as problematic. On the one hand, some sellers have the impression controls don't exist on this law, or, at least that some types of sellers are not (sufficiently) controlled. They often refer to the lack of application by the competition to argue why they feel the actual context of enforcement of the law is problematic, especially in a context where alcohol is very accessible, both in price and in direct availability, at all hours of the day. Mystery shopping, largely unknown except for shops, could help to raise awareness and, if results are made public, could target the impression that some types of sellers continuously break the law. This perception is put forward as a main reason for the lack of motivation to apply the law in a strict way – and limit the discourse on 'otherness' whereby night shops and some local franchises of supermarkets are systematically presented as not respecting the law.

## Chapter 6: Feasibility study on test purchasing research ("mystery shopping")

In this work package a feasibility study on test purchasing was performed based on the methods of VAD<sup>1</sup> and STAP<sup>2</sup> and other international models of research on the compliance with the legal age limits of the 2009 legislation targeting young people below 16 years and 18 years old (Gosselt et al., 2007).

### 1.1. Results

The feasibility study indicates that test purchasing is a method of great value, applicable for different purposes. The procedure is widely used for research ends to investigate the outcomes of interventions. Test purchasing research is helpful to check the needs for supporting sellers in order to increase the compliance with the law.

The method can also be employed for prevention strategies. Hereby test purchasing visits can raise awareness in a community regarding the serving and selling of alcohol to underage buyers. Recent studies show that test purchasing employed to check the compliance with the legal age limits, combined with a multicomponent prevention strategy is the most effective method to decrease underage buying attempts (Mulder & de Greeff, 2013b). This multicomponent strategy may contain

---

<sup>1</sup> VAD is a non-profit association and the partner organisation of the Flemish government dealing with the prevention of problems related to alcohol and other drugs.

<sup>2</sup> STAP is the Dutch Institute for Alcohol Policy. STAP is a national, independent non for profit organisation dealing with alcohol policy.

training of staff members, feedback letters, enforcement communication and stakeholder partnerships.

Moreover, it can initiate an open dialogue or serve as a starting point to outline new prevention campaigns or strategies or the development of a constructive alcohol policy. To wag the finger at young people can never be the intention of test purchasing, rather its purpose is keeping the finger on the pulse about alcohol consumption in a local community.

Finally, test purchasing is until now regarded as the most effective enforcement strategy (Gosselt et al., 2007). If applied on a regular basis, it can reduce non-compliance considerably. Furthermore, it is a time-saving method for enforcement actors.

### 1.3.1 Well-defined goals

Test purchasing practices from a prevention point of view have to be strictly delineated from mystery shopping applied for enforcement purposes. Both methods have to be coordinated by another authority. To prevent sellers to become suspicious regarding the intention of prevention workers, it is very important to communicate clearly about these intentions. All stakeholders must be aware of the two different goals.

### 1.3.2 Legal clarification

Up till now, there is no legal ground to use test purchasing for enforcement strategies and the legal competences are unclear. Therefore, the clarification of the legal conditions, sanctions and responsibilities is crucial (Mulder & de Greeff, 2013; Willner et al., 2000). The 2009 law points out that *it is forbidden to sell, serve or offer alcohol to people younger than 16 years old. Liquor cannot be sold, served or offered to people younger than 18 years old. Age identification may be requested from anyone who wants to purchase alcohol or liquor.* However, what the legislation doesn't clarify is who can be penalised. For example, when test purchasing visits are performed in a supermarket to observe non-compliance, it is not clear whether the shop manager or the cashier is being prosecuted when there is a successful purchase attempt.

Furthermore, we recommend the creation of a legal basis for criminal proceedings after successful test purchasing. Questions like putting the test purchaser as a witness in a court trial, have to be considered thoughtfully. In order to impose a sanction, there must be strong evidence that the seller made a mistake. After each test purchase which is followed by a sale, it is preferable that a witness statement is taken from the volunteer. The anonymous supervisors who accompany the test purchaser in the premise, can also provide the evidence of a sale.

We strongly recommend to clarify the legal specifications of the 2009 legislation, for example on who is responsible, what are the obligations for the sellers, which mandates does every stakeholder have, what kind of penalties can be given...

The case of the National Lottery can be an inspiring good practice to explore, as the legislation is similar to the 2009 alcohol legislation.

### 1.3.3 A well elaborated protocol

As the literature review reveals, the application of test purchasing has to be thoughtfully considered. At all times, the detailed and conscientious observance of a well-developed standard protocol is of great importance, taking into account all the different aspects it brings along.

In order to gain supplementary information, a checklist is one of the important aspects of this protocol, which has to be filled in directly after the test purchase attempt outside the premise. This checklist includes gender and (estimated) age of the test purchaser and the seller, presence of other customers, day of the week, the presence of sign warnings against sales to underage buyers, the type of neighbourhood, the maintenance and kind of (on- or off-premise) establishment (Gosselt et al., 2007). When a purchaser is not unmistakably under the age limit, gathering evidence becomes difficult. Therefore, enforcement officers have to describe the appearance of the test purchaser in detail before or right after the test purchase takes place. On top of this, the vendor may not be provoked to sell, for instance by insisting.

### 1.3.4 Accompanying the young person

Before sending a test purchaser to the premise, it could be recommendable to perform a risk assessment of the premises that have to be visited. Related to this, the literature points out that test purchasers should be accompanied by two supervisors in the premises to prevent the situation getting out of hand. This supervision can also be performed by the parents of the test purchasers. Related to this precautionary measure, test purchasers have to be impressed on the heart that the test purchasing procedure can be aborted at any time.

### 1.3.5 Reference age

To enhance compliance with the law and to simplify the age identification, we recommend the use of a reference age which is approximately five years above the legal age limits. Sellers are obliged to ask for an ID to anyone who's looking younger than this reference age, which broadens the margin for sellers to estimate the legal age of their customers.

## Chapter 7: A practice-based perspective on the 2009 legislation by prevention workers and health promoters

We wanted to examine how professional actors working with the changed law on alcohol consider the influence of this legal framework on their work. In this WP, the qualitative method of the Nominal Group Technique was used to take into consideration the views and opinions of prevention and health promotion professionals and key actors concerning the 2009 law. We used this technique to generate ideas, to identify and to rank problems or issues of importance (Vander Laenen, 2009). The central question in these NGT's was: **In your profession, which advantages and disadvantages of the current Belgian alcohol legislation do you consider?**

The results can be conceptualised in different themes:

### 1.1 Societal standards and enforcement

As the prevalence data show, the consumption of alcohol is part of everyday life. Still, the 2009 alcohol legislation is limited to regulating the alcohol consumption of adolescents. In general the different NGT

groups think that the legal framework is insufficient to change moral standards towards alcohol. In our society, pubs and beer are part of everyday life and consuming alcohol is presumed to be inextricably bound with any special occasion. The majority of the participants think that alcohol consumption is a societal problem, rather than a typical juvenile topic, as the legislation insinuates. Tackling this problem requires more than a legislation. The law, though providing us with a clear consciousness, is more stringent than the societal attitudes.

The law is considered to be “pro forma”, because there nearly is no enforcement. Participants state that compliance with the law is hard. In general, the lack of clarity was considered to be a meaningful disadvantage of the 2009 legislation. Participants state that this makes the legislation difficult to comply with and that sellers aren’t well supported to enhance compliance. Nevertheless, apart from the Flemish prevention workers and the French speaking GP’s, the majority thinks that it is an advantage that sellers are legally liable instead of consumers. Flemish prevention workers and the French speaking GP’s would consider to penalise the consumption as well as the selling. So far, no studies on the influence of penalising the underage alcohol consumption on underage drinking have been carried out.

The French speaking GP group states that it should be obligatory to systematically carry out identification checks. There is a consensus in all NGT on the necessity of more systematic controls by enforcement actors, which is supported by the literature. Wagenaar (2005) investigated the effect of police enforcement checks on the compliance rate in both on-premise and off-premise alcohol establishments. The findings showed a clear deterrent effect of enforcement checks, but only in the establishments that were visited by the police. In general, the observed reduction in likelihood of underage alcohol sales decayed entirely within 3 months in off-premise and from 17% to 8,2% in on-premise establishments. The findings suggest that the common practice of one enforcement check per year is not sufficient to create substantial decreases in alcohol sales to youth (Wagenaar, Toomey, & Erickson, 2005).

## 1.2 Distinction in type of alcohol and age limits: the forbidden fruit theory

Most of the French speaking and Flemish participants, with the exception of the Flemish prevention workers, argue that prohibiting the consumption of alcohol until a certain age, increases the attractiveness of alcoholic beverages. Furthermore, all the NGT participants think the distinction in the law to purchase different types of alcohol according to two different ages of onset, also causes this increase in appeal. This is what the French speaking participants call the mechanism of the “forbidden fruit”, pointing at the increased appeal of alcohol by forbidding it.

Apart from this possible forbidden fruit mechanism, the distinction in age and alcohol types is unclear and confusing for both seller and purchaser, NGT participants say. Furthermore, discerning the different types on the one hand gives the false impression that beer or wine are innocent types of alcohol and that there are no harms related to those kinds of beverages from a certain age. On the other hand, by distinguishing beer or wine and liquor, whereas liquor can be purchased from the age of 18, heightens the status of the latter to be the beverage of “grown-ups”. The distinction is absurd and complicates the application of the law, according to the French speaking GP’s. Both the Flemish and the French speaking groups consider this an important drawback of the legislation.



### 1.3 Parents: crucial partners in managing youngster's responsible alcohol consumption through parental monitoring

All the participants of the eight NGT's think it is necessary to start an open and constructive dialogue about alcohol consumption with on the one hand underage buyers and adolescents and on the other hand the parents. Young people aren't always aware of the risks and harmful effects of alcohol consumption. Besides this, there is still a lack of knowledge of the law, especially with parents who often experience unsteadiness to act or to make well-grounded decisions, as participants report during NGT's. However, the study of Jackson (2002) strongly suggested that there is a potential of parents to improve the capacity of substance use prevention, presumably linked to parenting practice and parenting style (Jackson, 2002).

Both the French speaking and the Flemish NGT groups highly consider the educational approach. The NGT group of both parts of the country think paying attention to attitude modification towards alcohol has to be the main goal of the legislation. A change in mentality is necessary, a participant says, but it requires the involvement of all the different stakeholders, like parents, sellers, fabricants, distributors, marketers and policy makers. It is preferable to invest in a responsible reference framework, instead of problematizing the behaviour towards alcohol. Parents play an important role in this matter. Simply focussing on the application of the law, without more adherence to motivation leads to private drinking, which, without any adult monitoring, can lead to problematic alcohol use.

The French speaking participants think there are educational opportunities within the private context of the family to learn to deal with alcohol progressively. The subsequence of integrating beer and wine and then spirits according to specific traditions or habits, may be an alternative for the societal attitude of considering the omnipresence of alcoholic beverages at any occasion to be normal. Some of the French speaking participants argue that the legislation doesn't permit parents to guide their children to a responsible consumption before the official age of onset, as the serving of alcohol to underage is forbidden and can be penalised. The French speaking school counsellors and general practitioners think this is a considerable disadvantage of the current law. Within the French speaking group of general practitioners and drug prevention workers, the participants state that the law should not intervene in family matters, as the legislation itself doesn't provide supervision of the first consumptions. The NGT participants believe that introducing children to alcohol use as part of family dinners or events, serves to inoculate them from involvement in problematic drinking later in life.

Kaynak et al. (2017) conducted a literature review on the associations between parental alcohol provision and their underage child's alcohol use and alcohol-related problems. They found that parental provision of alcohol and a place to consume (besides offering sips, allowing and supervision of adolescent's use, hosting an event, or furnishing alcohol), increased the alcohol use and sometimes alcohol-related problems. They concluded that parental provision leads to behavioural (i.e. the practice of drinking) as well as normative (the behaviour is approved by his parents (Jackson, 2002)) experiences, leading to the opposite effect as the intended belief, namely towards unsupervised drinking, more rapidly than it would have been without parental provision.

### 1.4 Minimum legal age on drinking alcohol

Literature reveals that, although there are overall consequences of alcohol use, both for adults and for young people, adolescents are at risk in a specific way when it comes to alcohol consumption.

Youngsters are more vulnerable than adults (Anderson & Baumberg, 2006). Apart from the fact that they are physically seemingly smaller, which results in a higher alcohol percentage and turns them more susceptible for short-term risks like intoxication and blackouts, unprotected sexual behaviour, suicide, depression, skip class, fighting, vandalism and problematic friendships, they aren't experienced in drinking and often lack a point of reference with regard to the amount of alcohol consumption (Anderson & Baumberg, 2006). Moreover, their brains aren't fully developed yet, which makes them vulnerable for brain damage like learning disorders and memory problems.

The French speaking participants are in favour of a distinction in quantity and context (festivities, special occasions,...) or a difference in legislation according to alcohol percentage in the end product. In general, French speaking NGT participants, and the specialised services in drug addictions and youth prevention workers in particular, are advocates of the progressiveness of the age thresholds, providing youngsters the opportunity to experiment gradually with alcohol consumption. Instead of lifting the age of onset, these participants would leave the progressiveness thresholds, be it on another basis.

The Flemish school actors, prevention workers and general practitioners state that no distinction should be made between different types of alcohol, as alcohol is harmful, even in small amounts. These groups support the idea of raising the legal age limits to 18 for all types of alcohol. Different Flemish NGT groups moreover draw a parallel with smoking. The prohibition of smoking in public areas caused a mentality shift in society, which is considered to be an inspiring case for alcohol when it comes to behavioural modification.

## 1.5 Availability

The French speaking GP group thinks that raising the prices of alcoholic beverages, could also provide a part of the solution. Indeed, research shows that raising the prices has a clear effect on the alcohol consumption and the detrimental effects of it. The consumption decreases, specifically in the group of young adolescents and heavily drinkers and reduces alcohol-related harm. Moreover, higher prices reduces heavy drinking, f.i. binge-drinking (WHO, 2014b).

The free availability can be observed at numerous places, but specifically in gas stations and night shops. Among the NGT groups of the Flemish school actors and specialised prevention workers and the French GP's, there is a consensus on limiting the alcoholic beverages supply in these premises, since participants find it too easy for underage buyers to purchase a bottle of liquor. The participants think this unlimited offer is a real problem, which brings us back to the earlier discussion on the risks of private drinking which isn't mentored by any adult.

## 1.6 Raising awareness and prevention

There is a consensus among the different NGT participants that raising awareness with youngsters, as well as parents and the rest of society, next to interventions for behaviour modification are indicated. A higher awareness and consciousness about the harmful aspects of alcohol consumption can be obtained by informing youngsters about health-related themes, for example through a media campaign (De Ruyver et al., 2009). This informing doesn't automatically imply a behavioural change among youngsters. The change in behaviour is based on being well-informed, but this is not sufficient, the literature shows. Other interventions, like developing personal and communicative competencies are important, for example assertiveness, conflict and stress management, problem solving capacities and a positive self-esteem (VAD, 2009). The prevention literature points out that, especially for young

people who already used alcohol, a moralistic approach of discussing the advantages and disadvantages of alcohol consumption in a terrifying way, has little effect or can even be counterproductive (Vander Laenen, 2008; Werch & Owen, 2002).

According to several participants however, this moralistic communication strategy is often used when it comes to alcohol consumption. As a consequence, paternalistic messages are being mocked by youngsters. Prevention literature shows that the most effective prevention programs focus on interaction and active participation. These programs are far more effective in reducing substance use than more didactically oriented programmes consisting of lectures or documentaries (Botvin & Griffin, 2003; Kumpfer & Alder, 2003 in De Ruyver et al., 2009). When it comes to risk communication, it is better to give a neutral message, based on scientific research, the most Flemish participants state.

In this respect, the alcohol legislation nowadays has a twofold contradictory effect. On the one hand, the law, and more specific the distinction in age and types of alcoholic beverages, is confusing. On the other hand, the law provides a reference framework to refer to. It provides a guideline to have open and comfortable discussions on the topic of alcohol consumption. The law initiates a wider discussion on the casualness of adult drinking. In doing so, the societal attitudes come to be an issue of argumentation, gaining more consciousness on this in the meantime. However, the Flemish GP's state that there is little openness to discuss the topic of alcohol consumption with their young patients, apart from pointing out that the combination of alcohol consumption and taking medication is to be avoided. According to them, there is little public support to discuss alcohol consumption and its related problems. Moreover they themselves lack the confidence to enter in a dialogue with young people on this topic (Vanmeerbeek et al., 2015).

In the Flemish NGT's special attention went to prevention in a school context. Nowadays primary schools are paying much more attention to prevention messages than they used to, which has a positive effect on the more realistic perception of alcohol according to the participants. School based programmes, which can be delivered as school lessons, are the most common used prevention programmes in Europe. Unplugged (Kreeft et al., 2009) is the program which is most currently used and it appears to be most the effective up till now (Agabio et al., 2015). The participants think it's a good start that prevention related to alcohol is part of the curricula nowadays. However, literature illustrates that although school prevention programmes can reach a wide range of children, the impact can be disappointing when this is not combined with other interventions on personal competencies, as discussed earlier (De Ruyver et al., 2009; Vander Laenen, 2008). School-based education programmes often show positive effects on alcohol knowledge, but few effects on drinking behaviour (Shope, Copeland, Maharg, & Dielman, 1996; Shope, Dielman, Butchart, Campanelli, & Kloska, 1992).

Among the different NGT groups, there is a consensus on the necessity of funding and resources for prevention initiatives. There is a need for structural resources, rather than ad hoc projects. If you want to avoid that people need treatment or care, the focus must be on prevention (Vander Laenen, 2012).

## 1.7 Marketing and promotion

Several participants find it rather remarkable that alcohol promotion, marketing and the publicity of alcohol is still allowed. A recent study showed that young children form memory associations between alcohol and parties before they ever drink alcohol themselves (Van Der Vorst et al., 2013). Marketing and alcohol advertising and sponsoring currently are not covered by the legislation. This lack of

regulation gives marketers the chance to develop up to date marketing strategies specifically aimed at young people. As it comes to changing societal attitudes and behaviour towards alcohol consumption, this is like swimming against the tide.

## Conclusion of chapter 7

In general, the stated advantages and disadvantages between the different NGT groups are more or less alike. However, the normative reference frame differs between the Flemish and the French speaking groups, which can explain the different solutions and policy recommendations that were stated.

The Flemish participants seem to preferably reflect on a micro- and meso-level when it comes to the disadvantages and the advantages of the alcohol legislation. They focus on the individual, rather than on the societal perspectives. The advantages and drawbacks which mainly influence the daily life of early consumers within the context of peers, family and school are considered. The focus is on the employability of the law as such. Their reflections illustrate the wish to act according to the letter of the law, which is the centre of interest. The Flemish participants are therefore in favour of heightening the age limits. Their reflections have a pragmatic and protective foundation and the expectations towards the legislation are high as to altering the societal mentality towards alcohol.

The French speaking groups prefer to rather respect the spirit of the law. The considerations of these groups illustrate a reflection on the macro-level of the alcohol legislation. Hereby, the social mechanisms that come along, have an influence on or are caused by the legislation, are taken into account. They presume the primal function of the legislation is to serve society. The law is not seen as a hierarchical concept which simply has to be obeyed, but rather a product of society which in its turn functions as an important guideline. The priority of the French speaking NGT groups doesn't lie in postponing the age of onset nor in changing the societal norms, but rather in supporting youngsters in behavioural modification through an educational approach. In this way, youngsters can become responsible consumers in a society where consuming alcohol is standard.

## Chapter 8: Focus on enforcement

Legal age restrictions without enforcement at different levels (federal, regional and local) are not sufficient (Gosselt et al., 2007) and so different levels (federal, regional and local) should pay attention to enforcement. The aim of this minimal work package was to collect new data from stakeholders (N= 16) involved in enforcement at different levels: federal, regional and local.

All stakeholders indicate that the law is insufficiently clear for sellers and other stakeholders. Even more, existing barriers make it difficult to comply with the alcohol law. Almost all respondents emphasize that when showing the identity card would become a habit in Belgium, this would make the application of the law much easier.

We can conclude from this small group of respondents that they are in favour of carrying out more controls or test purchasing (mystery shopping). Although they are already performed and difficulties do sometimes arise, the majority argues that this is the most important measure to enforce the application of the law.

On a local level, this enforcement should go hand in hand with prevention. In local communities some examples are already in place where different stakeholders work together on this issue. Some respondents would like to see more conformity and reluctance from the local authority to give licenses to sell alcohol.

Some discussion was found on the topic of sanctions and fines. Some respondents argue that the fines should also be targeting the underage buyers. Others think it is more efficient and ethical to address the sellers.

Different actors state that one of the difficulties in the compliance with the law is that parents do not always check up on the alcohol consumption habits of their children and are sometimes ignorant about how to react on their children's alcohol consumption.

Furthermore, some stakeholders believe that the marketing and availability of alcohol should be restricted and the prices of alcohol should increase.

- Agabio, R., Trincas, G., Floris, F., Mura, G., Sancassiani, F., & Angermeyer, M. C. (2015). A Systematic Review of School-Based Alcohol and other Drug Prevention Programs. *Clin Pract Epidemiol Ment Health*, 11(Suppl 1 M6), 102-112. doi:10.2174/1745017901511010102
- Anderson, P., Møller, L., & Galea, G. (2012). *Alcohol in the European Union*. Retrieved from Geneva, Switzerland:
- Babor, T., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., & Graham, K. (2010). *Alcohol: No Ordinary Commodity. Research and Public Policy* (2nd ed.): Oxford and London: Oxford University Press.
- Bako, G., Mackenzie, W. C., & Smith, E. S. (1976). The effect of legislated lowering of the drinking age on fatal highway accidents among young drivers in Alberta, 1970-1972. *Can J Public Health*, 67(2), 161-163.
- Benson, M. (1985a). Denying the guilty mind: Accounting for involvement in a white-collar crime. *Criminology*, 23(4), 583-607. doi:10.1111/j.1745-9125.1985.tb00365.x
- Benson, M. L. (1985b). Denying the guilty Mind: Accounting for Involvement in a White-Collar Crime. *Criminology*, 23(4), 583-607. doi:10.1111/j.1745-9125.1985.tb00365.x
- Birckmayer, J., Boothroyd, R. I., Fisher D. A., & Holder, H. (2008). *Prevention of underage drinking: Logic model documentation*. Pacific Institute for Research and Evaluation (PIRE). Calverton, MD.
- Boes, S., & Stillman, S. (2013). *Does changing the legal drinking age influence youth behaviour?* . IZA Discussion Paper No. 7522. IZA, Bonn.
- Brent, D. A. (1995). Risk factors for adolescent suicide and suicidal behavior: mental and substance abuse disorders, family environmental factors, and life stress. *Suicide Life Threat Behav*, 25 Suppl, 52-63.
- Britt, H., Toomey, T. L., Dunsmuir, W., & Wagenaar, A. C. (2006). Propensity for and Correlates of Alcohol Sales to Underage Youth. *Journal of Alcohol & Drug Education*, 50(2), 25-46.
- Callaghan, R. C., Sanches, M., & Gatley, J. M. (2013). Impacts of the minimum legal drinking age legislation on in-patient morbidity in Canada, 1997-2007: a regression-discontinuity approach. *Addiction*, 108(9), 1590-1600. doi:10.1111/add.12201
- Callaghan, R. C., Sanches, M., Gatley, J. M., & Stockwell, T. (2014). Impacts of drinking-age laws on mortality in Canada, 1980-2009. *Drug Alcohol Depend*, 138, 137-145. doi:10.1016/j.drugalcdep.2014.02.019
- Canadian Center on Substance Abuse. (2015). Retrieved from <http://www.ccsa.ca/Eng/topics/alcohol/Pages/Legal-Drinking-Age-for-Alcohol-in-Canada.aspx>
- Carpenter, C., & Dobkin, C. (2009). The Effect of Alcohol Consumption on Mortality: Regression Discontinuity Evidence from the Minimum Drinking Age. *Am Econ J Appl Econ*, 1(1), 164-182.
- Carpenter, C., & Dobkin, C. (2011a). *The Effects of the Minimum Legal Drinking Age on Morbidity*. National Bureau of Economic Research.
- Carpenter, C., & Dobkin, C. (2011b). The minimum legal drinking age and public health. *J Econ Perspect*, 25(2), 133-156.
- Centre de Recherche et d'Information des, C. (2010). *Les jeunes et l'alcool*. Retrieved from Bruxelles:
- Champion, H. L. O., Foley, K. L., DuRant, R. H., Hensberry, R., Altman, D., & Wolfson, M. (2004). Adolescent sexual victimization, use of alcohol and other substances, and other health risk behaviors. *Journal of Adolescent Health*, 35(4), 321-328. doi:10.1016/j.jadohealth.2003.09.023
- Cherpitel, C. J., Ye, Y., Bond, J., Borges, G., Chou, P., Nilsen, P., . . . Xiang, X. (2012). Multi-level analysis of alcohol-related injury and drinking pattern: emergency department data from 19 countries\*†. *Addiction*, 107(7), 1263-1272. doi:10.1111/j.1360-0443.2012.03793.x
- Conover, E., & Scrimgeour, D. (2013). Health consequences of easier access to alcohol: New Zealand evidence. *J Health Econ*, 32(3), 570-585. doi:10.1016/j.jhealeco.2013.02.006
- Cremonte, M., & Cherpitel, C. J. (2014). Alcohol intake and risk of injury. *Medicina (B Aires)*, 74(4), 287-292.
- Cuin, C.-H. (2011). Esquisse d'une théorie sociologique de l'adolescence. *Revue européenne des sciences sociales. European Journal of Social Sciences*(2), 71-92.

- Dee, T. S., & Evans, W. N. (2003). Teen drinking and educational attainment: Evidence from two-sample instrumental variables estimates. *Journal of Labor Economics*, 21(1), 178-209. doi:10.1086/344127
- Everitt, R., & Jones, P. (2002). Changing the minimum legal drinking age--its effect on a central city emergency department. *N Z Med J*, 115(1146), 9-11.
- Fell, J. C., Fisher, D. A., Voas, R. B., Blackman, K., & Tippetts, A. S. (2008). The relationship of underage drinking laws to reductions in drinking drivers in fatal crashes in the United States. *Accid Anal Prev*, 40(4), 1430-1440. doi:10.1016/j.aap.2008.03.006
- FPS Health. (2016a). Minimum Hospital Data. Retrieved from <http://www.health.belgium.be/nl/gezondheid/organisatie-van-de-gezondheidszorg/ziekenhuizen/registratiesystemen/mpg>
- FPS Health. (2016b). Minimum Psychiatric Data. Retrieved from <http://www.health.belgium.be/nl/gezondheid/organisatie-van-de-gezondheidszorg/ziekenhuizen/registratiesystemen/mpg>
- Giedd, J. N. (2004). Structural magnetic resonance imaging of the adolescent brain. In R. E. Dahl & L. P. Spear (Eds.), *Adolescent Brain Development: Vulnerabilities and Opportunities* (Vol. 1021, pp. 77-85). New York: New York Acad Sciences.
- Gosselt, J. F., Van Hoof, J. J., & De Jong, M. D. (2012). Why should I comply? Sellers' accounts for (non-)compliance with legal age limits for alcohol sales. *Subst Abuse Treat Prev Policy*, 7, 5. doi:10.1186/1747-597X-7-5
- Gosselt, J. F., van Hoof, J. J., de Jong, M. D., & Prinsen, S. (2007). Mystery shopping and alcohol sales: do supermarkets and liquor stores sell alcohol to underage customers? *J Adolesc Health*, 41(3), 302-308. doi:10.1016/j.jadohealth.2007.04.007
- Grabowski, D. C., & Morrissey, M. A. (2001). The effect of state regulations on motor vehicle fatalities for younger and older drivers: a review and analysis. *Milbank Q*, 79(4), 517-545, iii-iv.
- Grant, B. F., & Dawson, D. A. (1997). Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: results from the National Longitudinal Alcohol Epidemiologic Survey. *J Subst Abuse*, 9, 103-110.
- Gruenewald, P. J. (2011). Regulating availability: how access to alcohol affects drinking and problems in youth and adults. *Alcohol Res Health*, 34(2), 248-256.
- Handren, L. M., Donaldson, C. D., & Crano, W. D. (2016). Adolescent Alcohol Use: Protective and Predictive Parent, Peer, and Self-Related Factors. *Prevention Science*, 17(7), 862-871. doi:10.1007/s11121-016-0695-7
- Hedlund, J. H., Ulmer, R. G., & Preusser, D. F. (2001). *Determine why there are fewer young alcohol impaired drivers*. (DOT HS-809-348.). Washington, DC:.
- Hingson, R. W., Heeren, T., & Winter, M. R. (2006). Age at drinking onset and alcohol dependence: age at onset, duration, and severity. *Arch Pediatr Adolesc Med*, 160(7), 739-746. doi:10.1001/archpedi.160.7.739
- Hingson, R. W., Scotch, N., Mangione, T., Meyers, A., Glantz, L., Heeren, T., . . . Pierce, G. (1983). Impact of legislation raising the legal drinking age in Massachusetts from 18 to 20. *Am J Public Health*, 73(2), 163-170.
- Hingson, R. W., & Zha, W. X. (2009). Age of Drinking Onset, Alcohol Use Disorders, Frequent Heavy Drinking, and Unintentionally Injuring Oneself and Others After Drinking. *Pediatrics*, 123(6), 1477-1484. doi:10.1542/peds.2008-2176
- Huckle, T., & Parker, K. (2014). Long-term impact on alcohol-involved crashes of lowering the minimum purchase age in New Zealand. *Am J Public Health*, 104(6), 1087-1091. doi:10.2105/ajph.2013.301734
- Huckle, T., You, R. Q., & Casswell, S. (2011). Increases in quantities consumed in drinking occasions in New Zealand 1995-2004. *Drug Alcohol Rev*, 30(4), 366-371. doi:10.1111/j.1465-3362.2010.00220.x
- Hufford, M. R. (2001). Alcohol and suicidal behavior. *Clinical Psychology Review*, 21(5), 797-811. doi:10.1016/s0272-7358(00)00070-2

- Institute of Medicine National Research Council. (2004). *Reducing Underage Drinking: A Collective Responsibility*. Washington, DC: The National Academies Press.
- Jackson, C. (2002). Perceived legitimacy of parental authority and tobacco and alcohol use during early adolescence. *J Adolesc Health, 31*(5), 425-432.
- Klepp, K. I., Schmid, L. A., & Murray, D. M. (1996). Effects of the increased minimum drinking age law on drinking and driving behavior among adolescents. *Addiction Research & Theory, 4*(3), 237-244.
- Koning, I., Eijnden, R., Engels, R., Verdurmen, J., & A M Vollebergh, W. (2010). Why target early adolescents and parents in alcohol prevention? The mediating effects of self-control, rules and attitudes about alcohol use. *Addiction, 106*, 538-546. doi:10.1111/j.1360-0443.2010.03198.x
- Krauss, M. J., Cavazos-Rehg, P. A., Agrawal, A., Bierut, L. J., & Grucza, R. A. (2015). Long-term effects of minimum legal drinking age laws on marijuana and other illicit drug use in adulthood. *Drug and Alcohol Dependence, 149*, 173-179. doi:10.1016/j.drugalcdep.2015.01.043
- Kreeft, P. V. D., Wiborg, G., Galanti, M. R., Siliquini, R., Bohrn, K., Scatigna, M., . . . The Eu-Dap Study, G. (2009). 'Unplugged': A new European school programme against substance abuse. *Drugs: Education, Prevention and Policy, 16*(2), 167-181. doi:10.1080/09687630701731189
- Kuendig, H., eacute, Plant, M. L., Plant, M. A., Kuntsche, S., Miller, P., & Gmel, G. (2008). Beyond Drinking: Differential Effects of Demographic and Socioeconomic Factors on Alcohol-Related Adverse Consequences across European Countries. *European Addiction Research, 14*(3), 150-160. doi:10.1159/000130419
- Kypri, K., Voas, R. B., Langley, J. D., Stephenson, S. C., Begg, D. J., Tippetts, A. S., & Davie, G. S. (2006). Minimum purchasing age for alcohol and traffic crash injuries among 15- to 19-year-olds in New Zealand. *Am J Public Health, 96*(1), 126-131. doi:10.2105/ajph.2005.073122
- Lascoumes, P. (1985). La Place du penal dans le reglement differentiel des conflits. *L'année sociologique, 35*, 153-165.
- Lascoumes, P., & Nagels, C. (2015). *Sociologie des élites délinquantes: de la criminalité en col blanc à la corruption politique*. Paris: Armand Colin.
- Levin-Rozalis, M. (2007). Playing by the Rules: Social Representations of 'Law' as the Socio-cognitive Mediating Mechanism between Law and Society. *Theory & Psychology, 17*(1), 5-31. doi:10.1177/0959354307073149
- Lievens, D., Vander Laenen, F., Verhaeghe, N., Schils, N., Putman, K., Pauwels, L., . . . Annemans, L. (2016). *The social cost of legal and illegal drugs in Belgium*: Maklu.
- Macdonald, S., Erickson, P., Wells, S., Hathaway, A., & Pakula, B. (2008). Predicting violence among cocaine, cannabis, and alcohol treatment clients. *Addict Behav, 33*(1), 201-205. doi:10.1016/j.addbeh.2007.07.002
- Maruna, S., & Copes, H. (2005). What Have We Learned from Five Decades of Neutralization Research? *Crime and Justice, 32*, 221-320.
- Melis, S., Rosiers, J., & Geirnaert, M. (2014). *VAD-Leerlingenbevraging in het kader van een drugebeleid op school, synthesesrapport schooljaar 2012-2013*. Retrieved from
- Miller, T. R., Levy, D. T., Spicer, R. S., & Taylor, D. M. (2006). Societal costs of underage drinking. *Journal of Studies on Alcohol, 67*(4), 519-528.
- Miller, T. R., Teti, L. O., Lawrence, B. A., & Weiss, H. B. (2010). Alcohol Involvement in Hospital-Admitted Nonfatal Suicide Acts. *Suicide and Life-Threatening Behavior, 40*(5), 492-499.
- Mulder, J., & De Greeff, J. (2013a). *Eyes on Age - A research on alcohol age limit policies in European Member States. Legislation, enforcement and research*. Retrieved from [http://ec.europa.eu/health/sites/health/files/alcohol/docs/eyes\\_on\\_ages\\_report\\_en.pdf](http://ec.europa.eu/health/sites/health/files/alcohol/docs/eyes_on_ages_report_en.pdf)
- Mulder, J., & de Greeff, J. (2013b). *Eyes on ages. A research on alcohol age limit policies in European member states. Legislation, enforcement and research*. Utrecht: Dutch Institute for Alcohol Policy (STAP).
- Norberg, K. E., Bierut, L. J., & Grucza, R. A. (2009). Long-term effects of minimum drinking age laws on past-year alcohol and drug use disorders. *Alcohol Clin Exp Res, 33*(12), 2180-2190. doi:10.1111/j.1530-0277.2009.01056.x



- O'Malley, P. M., & Wagenaar, A. C. (1991). Effects of minimum drinking age laws on alcohol use, related behaviors and traffic crash involvement among American youth: 1976-1987. *J Stud Alcohol*, 52(5), 478-491.
- Pitkänen, T., Lyyra, A.-L., & Pulkkinen, L. (2005). Age of onset of drinking and the use of alcohol in adulthood: a follow-up study from age 8–42 for females and males. *Addiction*, 100(5), 652-661. doi:10.1111/j.1360-0443.2005.01053.x
- Plunk, A. D., Cavazaos-Rehg, P., Bierut, L. J., & Grucza, R. A. (2013). The persistent effects of minimum legal drinking age laws on drinking patterns later in life. *Alcohol Clin Exp Res*, 37(3), 463-469. doi:10.1111/j.1530-0277.2012.01945.x
- Ponicki, W. R., Gruenewald, P. J., & LaScala, E. A. (2007). Joint impacts of minimum legal drinking age and beer taxes on US youth traffic fatalities, 1975 to 2001. *Alcohol Clin Exp Res*, 31(5), 804-813. doi:10.1111/j.1530-0277.2007.00363.x
- Rehm, J., Baliunas, D., Borges, G. L. G., Graham, K., Irving, H., Kehoe, T., . . . Taylor, B. (2010). The relation between different dimensions of alcohol consumption and burden of disease: an overview. *Addiction*, 105(5), 817-843. doi:10.1111/j.1360-0443.2010.02899.x
- Room, R., Babor, T., & Rehm, J. (2005). Alcohol and public health. *Lancet*, 365(9458), 519-530. doi:10.1016/s0140-6736(05)17870-2
- Rooney, J. F., & Schwartz, S. M. (1977). The effect of minimum drinking age laws upon adolescent alcohol use and problems. *Contemp Drug Prob*, 6, 569–583.
- Saffer, H., & Grossman, M. (1987). Beer taxes, the legal drinking age, and youth motor vehicle fatalities. *Journal of Legal Studies*, 16, 351-374.
- Shaffer, D., Garland, A., Gould, M., Fisher, P., & Trautman, P. (1988). Preventing teenage suicide: a critical review. *J Am Acad Child Adolesc Psychiatry*, 27(6), 675-687. doi:10.1097/00004583-198811000-00001
- Shope, J. T., Copeland, L. A., Maharg, R., & Dielman, T. (1996). Effectiveness of a high school alcohol misuse prevention program. *Alcoholism: Clinical and Experimental Research*, 20(5), 791-798.
- Shope, J. T., Dielman, T. E., Butchart, A. T., Campanelli, P. C., & Kloska, D. D. (1992). An elementary school-based alcohol misuse prevention program: a follow-up evaluation. *Journal of Studies on Alcohol*, 53(2), 106-121.
- Shults, R. A., Elder, R. W., Sleet, D. A., Nichols, J. L., Alao, M. O., Carande-Kulis, V. G., . . . Thompson, R. S. (2001). Reviews of evidence regarding interventions to reduce alcohol-impaired driving. *Am J Prev Med*, 21(4 Suppl), 66-88.
- Smart, R. G., & Finley, J. (1976). Changes in drinking age and per capita beer consumption in ten Canadian provinces. *Addict Dis*, 2(3), 393-402.
- Steketee, M., Jonkman, H., Berten, H., & Vettenburg, N. (2013). *Alcohol-use Among Adolescents in Europe: Research and Preventive Actions*. Retrieved from Utrecht: [http://www.verwey-jonker.nl/publicaties/2013/alcohol\\_use\\_among\\_adolescents\\_in\\_europe](http://www.verwey-jonker.nl/publicaties/2013/alcohol_use_among_adolescents_in_europe)
- Stockwell, T., & Zhao, J. (2016). Alcohol's contribution to cancer is underestimated for exactly the same reason that its contribution to cardioprotection is overestimated. *Addiction*, n/a-n/a. doi:10.1111/add.13627
- Subbaraman, M. S., & Kerr, W. C. (2013). State panel estimates of the effects of the minimum legal drinking age on alcohol consumption for 1950 to 2002. *Alcohol Clin Exp Res*, 37 Suppl 1, E291-296. doi:10.1111/j.1530-0277.2012.01929.x
- Swahn, M. H., Bossarte, R. M., & Sullivent, E. E. (2008). Age of alcohol use initiation, suicidal behavior, and peer and dating violence victimization and perpetration among high-risk, seventh-grade adolescents. *Pediatrics*, 121(2), 297-305. doi:10.1542/peds.2006-2348
- Sykes, G. M., & Matza, D. (1957). Techniques of Neutralization: A Theory of Delinquency. *American Sociological Review*, 22(6), 664-670. doi:10.2307/2089195
- Tapert, S., & Schweinsburg, A. (2005). The Human Adolescent Brain and Alcohol Use Disorders. In M. Galanter, C. Lowman, G. Boyd, V. Faden, E. Witt, & D. Lagressa (Eds.), *Recent Developments in Alcoholism* (Vol. 17, pp. 177-197): Springer US.

- Taylor, B., Rehm, J., Patra, J., Popova, S., & Baliunas, D. (2007). Alcohol-attributable morbidity and resulting health care costs in Canada in 2002: recommendations for policy and prevention. *Journal of Studies on Alcohol and Drugs*, 68(1), 36-47.
- Thistlethwaite, D. L., & Campbell, D. T. (1960). Regression-discontinuity analysis - An alternative to the ex-post-facto experiment. *Journal of Educational Psychology*, 51(6), 309-317. doi:10.1037/h0044319
- van der Vorst, H., Engels, R. C., Meeus, W., & Dekovic, M. (2006). The impact of alcohol-specific rules, parental norms about early drinking and parental alcohol use on adolescents' drinking behavior. *J Child Psychol Psychiatry*, 47(12), 1299-1306. doi:10.1111/j.1469-7610.2006.01680.x
- Van Der Vorst, H., Krank, M., Engels, R. C., Pieters, S., Burk, W. J., & Mares, S. H. (2013). The mediating role of alcohol-related memory associations on the relation between perceived parental drinking and the onset of adolescents' alcohol use. *Addiction*, 108(3), 526-533.
- Vander Laenen, F. (2008). *Drugpreventie bij kwetsbare groepen?: jongeren met een gedrags-en emotionele stoornis aan het woord: Boom*.
- Vander Laenen, F. (2012). Belgische overheidsuitgaven voor drugs. *Verslaving*, 8(3), 13-29.
- Vanmeerbeek, M., Remmen, R., Godderis, L., Van Casteren, V., Lambrechts, M.-C., Mairiaux, P., . . . Dom, G. (2015). "Up To Date" Use of psychoactive substances in adults: Prevention and Treatment by general practitioners and Occupational physicians; DATA retrieVal. Retrieved from
- Vingilis, E., & Smart, R. G. (1981). Effects of raising the legal drinking age in Ontario. *Br J Addict*, 76(4), 415-424.
- Voas, R. B., Tippetts, A. S., & Fell, J. (1999). The United States Limits Drinking by Youth Under Age 21: Does this Reduce Fatal Crash Involvements? *Annual Proceedings / Association for the Advancement of Automotive Medicine*, 43, 265-278.
- Voas, R. B., Tippetts, A. S., & Fell, J. C. (2003). Assessing the effectiveness of minimum legal drinking age and zero tolerance laws in the United States. *Accid Anal Prev*, 35(4), 579-587.
- Voas, R. B., Tippetts, A. S., Romano, E., Fisher, D. A., & Kelley-Baker, T. (2007). Alcohol involvement in fatal crashes under three crash exposure measures. *Traffic Inj Prev*, 8(2), 107-114. doi:10.1080/15389580601041403
- Wagenaar, A. C., & Toomey, T. L. (2002). Effects of minimum drinking age laws: review and analyses of the literature from 1960 to 2000. *J Stud Alcohol Suppl*(14), 206-225.
- Wagenaar, A. C., Toomey, T. L., & Erickson, D. J. (2005). Preventing youth access to alcohol: outcomes from a multi-community time-series trial. *Addiction*, 100(3), 335-345. doi:10.1111/j.1360-0443.2005.00973.x
- Warren, R. A., Simpson, H. M., Page-Valin, L., & Collard, D. (1977). *Point Zero Eight and Change in the Drinking Age: One Step Forward and Two Steps Backward?* Ottawa, ON.
- Werch, C. E., & Owen, D. M. (2002). Iatrogenic effects of alcohol and drug prevention programs. *Journal of Studies on Alcohol*, 63(5), 581-590.
- WHO. (2014a). *Country profile: Belgium*. Retrieved from [http://www.who.int/substance\\_abuse/publications/global\\_alcohol\\_report/profiles/bel.pdf?ua=1](http://www.who.int/substance_abuse/publications/global_alcohol_report/profiles/bel.pdf?ua=1)
- WHO. (2014b). *Global status report on alcohol and health*. Retrieved from Geneva, Switzerland:
- Willott, S., Griffin, C., & Torrance, M. (2001). Snakes and Ladders: Upper-Middle Class Male Offendred talk about economic Crime. *Criminology*, 39(2), 441-466. doi:10.1111/j.1745-9125.2001.tb00929.x
- Windle, M. (2003). Alcohol use among adolescents and young adults. *Alcohol Res Health*, 27(1), 79-85.
- Zehe, J. M., & Colder, C. R. (2014). A latent growth curve analysis of alcohol-use specific parenting and adolescent alcohol use. *Addictive Behaviors*, 39(12), 1701-1705. doi:10.1016/j.addbeh.2014.05.003