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# **DRINKING BEHAVIORS OF LARGE GROUPS: STUDIES DISENTANGLING POPULATION DRINKING IN SWEDEN**

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# Drinking behaviors of large groups: Studies disentangling population drinking in Sweden

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## ABSTRACT

**Background:** The starting point for this thesis was the unexpected development of per capita alcohol consumption and youth drinking in Sweden. There has been an observed decline for both: in the adult population since 2004 and among youth since 2000. Alcohol has at the same time become cheaper and more available. Given these circumstances, the expectations from previous research would be that consumption increased. The recent development in Sweden provided an opportunity to examine how changes in population drinking are dispersed and furthermore how these overall changes transfer to changes in various sub-groups of the population.

**Objective:** The overall aim of this thesis is to disentangle changes in overall population means to get a better understanding of what happens within a population when consumption changes and also, to some extent, what influences those changes. More specifically, the individual studies focus on; (a) Are temporal changes in the general population's alcohol consumption collective? (b) Is the theory of collectivity of drinking cultures applicable to changes in alcohol consumption also in a population of youth? (c) Is there a transmission of drinking from the adult population to the youth population? (d) Are there differences between generations in alcohol consumption and can these differences be explained by long-term effects of alcohol policy?

**Method:** Studies I & II focused on the dispersion of alcohol consumption within populations and how this changes when there are changes in the overall mean consumption. Means were compared across different sub-groups and across time using both parametric and non-parametric tests. Study III used aggregate time-series analysis to examine the association between changes in per capita alcohol consumption and drinking among youth. Study IV used a fixed-effect regression model and a post-estimation Wald test to examine differences in drinking between cohorts that grew up during periods with different alcohol policies.

**Results:** Studies I & II showed collective displacements of consumption in all sub-groups when the overall mean changed. In absolute terms, the changes were most pronounced among the heaviest drinkers while the relative decrease was inversely related to the initial consumption level. The results from study II further showed that the decline in consumption among the 10 % that drank the most accounted for 37.5 % of the overall decline in youth drinking in Sweden, while the decline among the bottom half that drank the least only accounted for a little more than 14 % of the overall decline. The increasing rate of non-drinkers among youth thus had a marginal effect on the overall level of alcohol consumption among youth. The results from study III showed that there was a positive association between changes in per capita alcohol consumption and changes in youth drinking. This association has however become weaker since 1995 and thus a change in per capita alcohol consumption is not a viable explanation for the decline in youth drinking. Study IV showed that there were significant differences in drinking between cohorts that grew up during periods with different alcohol policies. The cohort that grew up during a more restrictive period had a significantly

lower consumption level than the reference cohorts. However, all cohorts changed their consumption in the same way, albeit from different starting points.

**Discussion and conclusion:** Even though the consumption trends during the past decade were unexpected, based on assumptions drawn from previous research, a main conclusion of this thesis is that changes in drinking are collective, for all consumption segments from light to heavy drinkers and for most population sub-groups. The results from all four studies in this thesis lend support to the theory of collectivity of drinking cultures. With the use of different statistical methods and the availability of high quality data, the results corroborate the theory by providing empirical findings of collective displacements of consumption across time. Furthermore, the findings also complement and expand the theory, by showing that adolescents should be incorporated in the collectivity and that there is a collectivity of drinking that transcends generations. A change in per capita alcohol consumption is, however, not a viable explanation for the observed drop in youth drinking.

## LIST OF SCIENTIFIC PAPERS

- I. Raninen, J., Leifman, H. & Ramstedt, M. (2013) Who is not drinking less in Sweden? An analysis of the decline in consumption for the period 2004-2011. *Alcohol and Alcoholism*, 48:5, 592-597.
- II. Raninen, J., Livingston, M. & Leifman, H. (2014) Declining trends in alcohol consumption among Swedish youth – Does the theory of collectivity of drinking cultures apply? *Alcohol and Alcoholism*, 49:6, 681-686.
- III. Norström, T. & Raninen, J. (2015) Is there a link between per capita alcohol consumption and youth drinking? A time-series analysis for Sweden 1972-2012. *Addiction*, 110:6, 967-974.
- IV. Raninen, J., Härkönen, J. & Landberg, J. (accepted) Long-term effects of changes in Swedish alcohol policy: Can alcohol policies effective during adolescence impact consumption during adulthood? *Addiction*.



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## LIST OF ABBREVIATIONS

CAN	Swedish Council for Information on Alcohol and Other Drugs
ARIMA	Autoregressive Integrated Moving Average
EU	European Union
WHO	World Health Organization
QF	Quantity-Frequency scale
EHD	Episodic Heavy Drinking

# 1 INTRODUCTION

Although alcohol is a source of pleasure, it is also a toxin that ultimately can cause somatic, psychological and social harm to the drinker and those around the drinker. Alcohol consumption underlies a significant proportion of the disease burden in the world and is currently ranked as the fifth largest contributor by the WHO (1). The harm caused by alcohol is also associated with large public expenditures, with the estimated costs in Sweden at around 29 billion SEK annually (2). Against this backdrop, studying the consumption of alcohol within a population to gain insights that can prevent alcohol-related harm has a high societal relevance.

The special role of alcohol within society – as a legal toxin that for most people is an enhancer to life, but for some is a drug that takes over – is what makes the study of alcohol consumption interesting. Alcohol-related harm will not have a central role in this thesis, but does play a role in the motivation of why this thesis came about and the results have implications for those who aim at reducing the harm caused by alcohol.

This thesis studies the consumption of alcohol and aims to disentangle changes in the overall population means, in order to get a better understanding of what happens within a population when consumption changes and also, to some extent, what influences those changes. A major focus is to examine recent changes in population drinking in Sweden and especially to what extent changes are similar across groups with different consumption levels.

## 1.1 THE IMPORTANCE OF COLLECTIVITY IN DRINKING FOR SWEDISH ALCOHOL POLICY – EXPERIENCES AND CHALLENGES

The question of collectivity in population drinking has since the 1970s influenced Swedish alcohol policy and is the motivation for the population level approach to reduce harm (3). To minimize the harm caused by alcohol, Sweden has traditionally pursued strict alcohol policies based on three central pillars: restrictive pricing and restriction of availability and industry interests. However, when Sweden joined the EU in 1995, several of the central control measures were weakened, which resulted in lower prices and increased availability of alcohol. For example, all state alcohol monopolies but one (the retail monopoly) were abolished, private import quotas gradually increased (and were practically abolished in 2004) and alcohol taxes were lowered, all resulting in increased affordability of alcohol (4). Moreover, during this period there was an increase in the opening hours and days of service at Systembolaget (the alcohol retail monopoly).

Prior to these large changes in Swedish alcohol policy, several researchers predicted that the EU membership would result in increased total consumption and concurrently increased harm rates (5, 6). Indeed, the policy changes were accompanied by an estimated ~30 % increase in Swedish per capita consumption between the mid-1990s and mid-2000s (7).

Since then, a few puzzling circumstances have been seen in the Swedish development. Firstly, following estimations of the alcohol–harm relationship based on previous time

periods, we would have expected the rise in total consumption to be associated with a considerable increase in various forms of alcohol-related harm. However, most harm indicators remained fairly stable (see (8) for a further discussion). Secondly, after peaking in 2004, the trend in Swedish per capita consumption has shown a continuous decline (9). Thirdly, consumption among adolescents has declined heavily, from 5,5 and 2,9 liters of 100 % alcohol in 2000 to 1,6 and 1,4 liters in 2014 for boys and girls respectively (10). These distinct changes in population drinking in Sweden is the point of departure for this thesis; they provide an opportunity to examine how changes in population drinking are dispersed and furthermore how these overall changes transfer to changes in various sub-groups of the population.

One explanation proposed for why indicators of harm did not follow consumption was the so-called polarization hypothesis. This gained some merit around the time I started working on this thesis, since some research suggested that consumption trends among the heaviest drinkers were at odds with those among the rest of the population (11).

While this might sound trivial, the polarization hypothesis challenges one of the cornerstones of alcohol epidemiology: the theory of collectivity of drinking cultures. This theory briefly states that changes in a population's alcohol consumption are collective, so that when the overall consumption level changes this is mirrored by roughly equal changes throughout the whole population. This also implies that by changing the population's consumption you would change consumption among the heaviest drinkers who are most affected by harm. This in turn means that lowering the population's consumption is an effective way of reducing alcohol-related harm, an assumption which is fundamental to Swedish alcohol policy. The two first studies (I & II) in this thesis thus focus on what happens within a population when the overall consumption levels change and test the predictions from the theory of collectivity of drinking cultures on temporal data.

In addition, the unforeseen decline in per capita consumption and consumption among adolescents in Sweden had not yet been empirically tested in the research literature and the last two studies in this thesis (III & IV) focus on that. The third study looks at the link between drinking in the general population and adolescent drinking and the fourth study looks at possible long-term effects of alcohol policy as an explanation for differences in drinking between generations.

## 2 AIMS

The overall aim of this thesis is to disentangle overall population means in alcohol consumption in Sweden during the last decades, to increase the knowledge of how alcohol consumption is distributed in the Swedish general population and among youth. A further aim is to examine possible factors influencing change in a population's drinking. In particular, I will focus on the following questions: (a) Are temporal changes in the general population's alcohol consumption collective? (b) Is the theory of collectivity of drinking cultures applicable to changes in alcohol consumption also in a youth population? (c) Is there a transmission of drinking from the adult population to the youth population? (d) Are there differences between generations in alcohol consumption and can these differences be explained by long-term effects of alcohol policy?

Brief descriptions of the four papers included in the thesis are presented below:

Article I: The assumptions drawn from the theory of collectivity of drinking cultures are fundamental for motivating population-based interventions to reduce alcohol consumption. However, one of the major critiques against the theory of collectivity of drinking cultures is that it has not been tested empirically over time but rather cross-sectionally and between cultures (12). The main research question to be addressed in article I is thus if changes in the general adult Swedish population's alcohol consumption have been collective.

Article II: The main research question in article II is whether the theory of collectivity of drinking cultures is applicable for understanding changes in the youth population's alcohol consumption. The question is set against the background of a polarization of consumption, found in a regional sample from the Stockholm city area, as an explanation for the diverging trends in youth drinking and harm. In addition to this, another question addressed is how much of the observed decline in consumption can be attributed to the increasing rate of non-drinkers among youth.

Article III: The marked decline in alcohol consumption among Swedish youth was unexpected and is poorly understood. According to the theory of collectivity of drinking cultures, changes in alcohol consumption tend to be synchronized across various population groups. We may therefore expect that adolescent drinking moves in concert with drinking in the adult population. The main research question addressed in article III is if there is a link between drinking in the adult population and youth drinking and further if this is an explanation for the decline in youth drinking.

Article IV: Since 2005 the per capita alcohol consumption in the Swedish adult population has been gradually declining. This development has been unexpected, since no policy changes in the restrictive direction have been made during this time. On the contrary, the price of alcohol has declined and alcoholic beverages have become more available through a gradual increase in the number of on-premise outlets and through cross-border trade. Previous research clearly shows that we would expect increasing consumption under these

circumstances (13). The main research question in article IV is to examine if there are differences in drinking between generations that grew up during periods of different alcohol policies.

The individual studies will contribute to the overall aim in that studies I & II will examine if changes in per capita alcohol consumption reflect changes in various drinking groups, from light to heavy drinkers. Study III will seek to answer if adolescents are influenced by overall drinking in society and study IV will examine if alcohol policy influences during adolescence can translate into long-term effects, so that drinking differs between generations.

### 3 PREVIOUS RESEARCH ON CHANGES IN POPULATION DRINKING

Historically, alcohol problems have been regarded as a result of the individual drinker's alcohol consumption, and thus the 'problematic drinker' was what needed to be controlled. Problems and harm pertaining to the consumption of alcohol later became a matter of public health and interventions on the societal level have been used to regulate the levels of alcohol-related harms. One reason for this shift was the empirical observation of an association between the level of total consumption in a society and the rate of harm (14). How much we drink, how drinking is dispersed between different sub-groups of the population, what societal effects alcohol consumption renders and how to govern population drinking have since been the focal point of much research.

Swedish alcohol policy must in an international comparative perspective be regarded as restrictive and, to a large extent, characterized by efforts directed at the whole population with an emphasis on restrictions of availability and high taxation of alcoholic beverages in order to keep consumption at low levels. At the core of Swedish alcohol policy lies the total consumption model. This is built on three fundamental assumptions; 1) that there is a link between changes in per capita alcohol consumption and levels of harm, 2) that changes in the overall mean per capita consumption tend to be reflected by changes in all consumption segments of the population, and 3) that population-level interventions have the possibility to change per capita alcohol consumption. Therefore, alcohol-related harm can be prevented by population-level interventions since these can lower the per capita alcohol consumption which in turn leads to consumption declines among all drinkers, including the heaviest drinkers.

The presentation of the previous research on changes in population drinking has been categorized into the three following themes:

- I. Population drinking and harm
- II. Collective changes of population drinking
- III. Determinants of changes in drinking

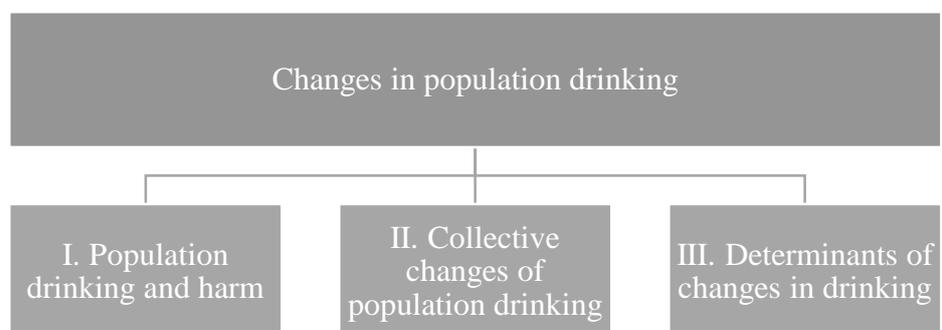


Figure 1. Schematic description of the thematic categorization used for organizing previous research.

The four studies included in this thesis mostly pertain to theme II, collective changes in drinking, and thus the following chapter will emphasize the literature within the second theme, while only giving a brief overview of the other two themes.

### **3.1 POPULATION DRINKING AND HARM**

Alcohol consumption was framed as a public health matter in the mid-1970s when a group of researchers on behalf of the WHO investigated the link between alcohol consumption and harm at the population level (14). Since then, studies have documented temporal associations between changes in a population's drinking and a wide range of harmful effects (for a review, see (15)), such as rates of liver cirrhosis (16), all-cause mortality (17, 18), rates of suicide (19-21), drunk driving (22), traffic and other fatal accidents (23, 24), and violence (20).

Most studies use per capita alcohol consumption as a proxy for population drinking and thus it can be argued that they are all based on the assumption that drinking is collective. The positive relationship found between measures of per capita consumption and harm is assumed to reflect collectivity in that the per capita measure also functions as a good indicator of consumption among heavy drinkers (25). This is especially true for outcomes with an exponential risk function (26).

The population-level approach to prevention is also motivated by the so-called 'prevention paradox' (27), which states that population-level measures are more effective in reducing levels of harm than a high-risk approach targeting only those with the highest risk of harm. This is due simply to the fact that even though the majority of people have a lower risk of harm, they are more numerous than the high-risk group and therefore account for the majority of harm. Thus interventions targeting the whole population have greater potential for reducing rates of harm (28). While the population-level approach has its roots mainly in somatic diseases such as cardiovascular disease (27), it has been shown to be applicable to alcohol-related problems as well (29-31).

### **3.2 COLLECTIVE CHANGES IN DRINKING**

Skog's work with the collectivity theory originated from the single distribution theory. This work by Ledermann provided a mathematical description of the association between mean consumption and the variance in a population. This also allowed estimation of the prevalence of heavy drinkers in a population once the mean consumption was known (32).

#### **3.2.1 The theory of collectivity of drinking cultures**

The theory of collectivity of drinking cultures has been very influential in forming alcohol policies, since it offers an explanation for the link between population drinking and measures of harm. The theory basically states that alcohol consumption is a social phenomenon and that there is mutual influence between individuals. This would mean that individual drinking behavior is not determined as an isolated entity, but rather as part of a larger collective network, implying that changes in consumption levels are collective. The empirical basis for this came from cross-sectional surveys from several countries and the results demonstrated

that in countries with higher mean consumption the entire distribution was shifted upwards, so that light drinkers in a high-consuming sample drank the same amounts as heavy drinkers in a low-consuming sample. Furthermore, the results showed that there was a relationship between the average consumption in a population and the consumption level of selected drinking groups, and also that there was a relationship between the mean consumption in the samples and the prevalence of heavy drinkers, where the proportion of heavy drinkers increased as the mean consumption in the samples increased (25). This also means that lowering the population's mean consumption will be an effective way of reducing alcohol-related harm, since drinking among the heaviest drinkers should then also decline.

### *3.2.1.1 Collective change: why does it originate and what is collective?*

A collective change or displacement of consumption is due to occur through social interaction between drinkers, but is sparked by stimuli from exogenous factors, such as a change in the price of alcohol. The effect of these influences should, according to Skog, be multiplicative rather than additive (25). Changes in consumption should be relative and one argument put forward to explain this is that a change is perceived in the same way by different individuals (25). A person drinking 4 liters of pure alcohol per year will perceive a 1 liter increase in the same way as a person drinking 12 liters of pure alcohol per year will perceive a 3 liter increase. In both cases, this represents a 25 % increase in their drinking.

One major critique against the theory of collectivity of drinking cultures is that it is a theory about changes in alcohol consumption and yet its empirical basis is drawn from cross-sectional data, implying that the assumptions about change are based on cross-cultural differences in mean volume, prevalence of heavy drinking and drinking volume in different percentiles. Data across time would have been a more adequate empirical base to test a theory about change. In addition, it has been argued that the theory is not specific enough in its predictions on change to make possible the deduction of a testable hypothesis from it (12). Another problem brought forward more recently is that the theory only covers current drinkers and the social interaction between them and thus excludes and might overlook the group of non-drinkers and their possible influence on behaviors in the drinking part of the population (33).

The theory of collectivity of drinking cultures is not, however, a law of nature and it can be difficult to know where to draw the line regarding what should be considered a collective change. Skog argues that changes should be multiplicative and therefore changes in the groups with the highest consumption should be the largest in absolute terms, since these groups have a higher initial consumption level. In groups with lower initial consumption, the relative changes can be expected to be the largest, since a low initial consumption makes it easier to get a large relative change (25).

There are also exceptions when collective displacements of consumption are not expected and the theory, like most theories, only represents an idealized version of reality that serves to help our interpretation of empirical observations. Exceptions from collective displacement

could be caused by what Skog calls “barriers of diffusion.” Since collective displacements are supposed to work through social interaction, these processes might be hindered by groups not being in contact with one another or by exogenous factors having a differential impact on groups. This has been observed for example when there was a rapid increase in income for some groups in a society, causing these groups to increase their consumption levels while consumption in other groups remained stable (34, 35). Another example is when Sweden abolished the rationing system in 1955, making alcohol more affordable for heavy drinkers and resulting in a more skewed consumption distribution (36).

### **3.2.2 The polarization debate**

The notion of polarization originated from the observed mismatch between trends in per capita consumption and rates of harm (37, 38), which did not follow what could be predicted from previous research. Measures of per capita consumption in the UK and Australia suggested declining consumption and thus it would be expected from the previously documented link between consumption and harm that rates of alcohol-related harm would also be declining. Instead, increases in various measures of alcohol-related harm were found and thus it was hypothesized that consumption had become polarized, so that the majority was drinking less and contributing to an overall decline of consumption, while heavy drinkers were instead drinking more. Empirical evidence of this was found in a study of consumption trends among school students from the Stockholm city area; an overall decline of mean consumption and a decline of consumption among the majority of students, while consumption among the heaviest drinking groups (approximately the 5 % drinking most) increased (11). This finding challenged the fundamental assumption in the theory of collectivity of drinking cultures, in that it demonstrated that changes in consumption were not uniform for the entire population.

Several recent studies have, however, demonstrated collective changes of consumption, in adult populations in Sweden (39), Germany (40), in Finland, Norway and the US (41) as well as in youth population in Sweden (42) and Norway (43).

## **3.3 DETERMINANTS OF CHANGES IN DRINKING**

A large share of the studies in this area covers effects on consumption caused by changes in price/taxes and availability of alcohol. These two measures also present the strongest evidence regarding effectiveness in governing a population’s alcohol consumption. Generally, there is a marked association between population drinking, on the one hand, and the cost and availability of alcohol, on the other. That is, when alcohol becomes more expensive or less readily available, consumption declines, and when alcohol becomes more available or cheaper, consumption instead increases (13). A meta-analysis of 91 studies found a mean elasticity of -0.51 between the price of or tax on alcohol and the general consumption level. The effect size of changes in price or taxes on consumption was found to be large (44). Changes in price or taxes have also been found to have an effect on rates of alcohol-related harm, likely because of the effects on consumption (45).

However, price sensitivity or elasticity has been found to be of differing magnitude for different socio-economic groups. Findings from modelling studies on the impact of minimum unit pricing on consumption showed that lower socio-economic groups are most sensitive to changes in price in the form of implementation of a minimum unit price (46).

Physical availability of alcohol has also been found to have an effect on the level of consumption. When Finland in 1969 allowed medium-strength beer to be sold in grocery stores, the number of outlets increased dramatically from 132 monopoly stores to over 17 000 grocery stores. This was accompanied by a 46 % increase in total alcohol consumption and a 125 % increase in beer consumption (47). A similar result was found in Sweden, when medium-strength beer for a period (1965-1977) was introduced in grocery stores; overall alcohol consumption rose by 15 % and sales of medium-strength beer were 195 % higher for the period 1965-1977 as compared with 1961-1964 (48). When Sweden abolished the rationing system, consumption increased by 25 % in just two years' time, between 1954 and 1956 (36). Furthermore, it has been shown that one additional day of service (Saturday openings) at the Swedish monopoly stores increased total consumption by about 4 % (49). In summary, the physical availability and the cost of alcohol are strong determinants of the level of consumption in a population (13).

More recently, several studies using an age-period-cohort design have been published. These studies disentangle population drinking to examine the effects of age, period and cohort on drinking. Age represents how drinking varies through life, while period represents the impact on consumption exerted by exogenous factors varying over time (for example changes in price). Cohort represents commonalities between groups belonging to the same generation and thus sharing the same exposure to events during upbringing.

Two studies from the UK and US found similar results regarding age and cohort effects. In both studies, the volume of alcohol consumed was found to peak in the mid-twenties and then gradually decline with increasing age. The highest consumption levels were found for cohorts born between the mid-1970s and mid-1980s. The period effects were somewhat different, with consumption declining for both males and females in the US since the 1980s, while in the UK, male consumption was stable between 1985 and 2009 and an increasing consumption was found for females during the same period (50, 51). A Finnish study found a different age pattern of drinking, with light drinking peaking at around 30 years of age, while heavy drinking increased up until 50 years of age before starting to decline. This study also found that the number of heavy drinking occasions increased in recent cohorts, while the number of light drinking occasions decreased (52). In Sweden, the peak for volume consumed was found at around 40 years of age for males (around 50 years for females). Those born in the early 1980s were found to be a heavy drinking cohort, as in the UK and US. In Sweden, however, those born in the 1940s and 1950s were found to drink the most. The volume consumed increased steadily between 1979 and 2005 to thereafter level off (53). Common for all of these studies is the descriptive nature of the results, which therefore either

only describe differences between age and cohort groups or period trends in consumption or use post-hoc explanations to interpret the results.

## **4 DATA AND METHODS**

Most results in this thesis are based on analysis of self-reported data on alcohol consumption. In studies I and IV, the focus is on consumption in the Swedish adult population and data is drawn from the so-called Monitoring survey. In studies II and III, data on alcohol consumption among youth come from the national school surveys on alcohol and drug habits performed by the Swedish Council for information on Alcohol and other Drugs. In study III, information on registered sales was also used as a proxy for consumption in the general adult population and was supplemented with measures on unrecorded alcohol consumption from the Monitoring survey. The following sections describe the data sources and the methods used for analysis.

### **4.1 DATA**

#### **4.1.1 The Monitoring survey**

The Monitoring survey is a running survey including questions about both self-reported drinking habits and purchases of alcohol. Data is collected through Computer Assisted Telephone Interviews (CATI), which have been conducted monthly since 2001. A representative sample of the general Swedish population aged 16-80 years (17-84 years since July 2012) is randomly drawn every month. An organization specialized in performing telephone surveys is contracted to perform the interviews and sampling. The sampling procedure is performed in two stages: First a sample is drawn from official Swedish registers, and the names are matched with telephone numbers. Interviews are then conducted until 1 500 respondents have been interviewed each month, resulting in a repeated cross-sectional sample of 18 000 respondents each year. Up to thirty contact attempts are made before the case is recorded as a non-response. The monthly non-response rates have ranged between 40 and 60 percent during the study period, tending to increase over time (54).

The consumption estimate is calculated from a beverage-specific quantity and frequency scale for the past 30 days. The frequency questions are formulated in the same way for each beverage: "How often have you consumed spirits/wine/beer during the past 30 days?" The response alternatives are "more or less every day", "4-5 times a week", "2-3 times a week", "once a week", "about 2-3 times", "about once" and "never." The response alternatives for the quantity questions are specific to each beverage and are customized to correspond to the different standard containers in which the beverages are sold. The answers are then summarized into a measure of overall drinking during the past 30 days. To obtain a measure of liters of pure alcohol, the volume measure is multiplied by the average alcohol percentage of the respective beverages. Such information is obtained annually and is derived from sales data provided by the Swedish alcohol retail monopoly. The coverage rate of consumption when compared with per capita consumption has remained stable at around 40 percent (9).

### **4.1.2 The CAN school survey**

Data on youth alcohol consumption was retrieved from a database collected by the Swedish Council for Information on Alcohol and other Drugs (CAN). CAN has conducted school surveys of alcohol consumption among year 9 students (15-16 years of age) annually since 1971. Since 2004 they also conduct surveys with year 11 students (17-18 years of age). The surveys of year 11 students were the focus in paper II and those of the year 9 students in paper III. The samples are nationally representative of students in the two grades. The samples are drawn using a stratified sampling procedure to ensure that all regions in Sweden are represented. Statistics Sweden performs the sampling process. School class rather than pupil is used as the unit when drawing the sample, i.e. if a class is drawn then all students in that class fill in the questionnaire. The response rates in year 9 vary between 90 and 83 %, for year 11 between 86 and 80 % (10).

The survey is an anonymous, paper and pen questionnaire completed in the classroom. The alcohol questions have covered: 1) Quantity and frequency over the last twelve months. These questions are asked separately for each beverage type and then summarized into a measure of overall drinking in liters of 100 % alcohol during the last twelve months. 2) Episodic heavy drinking, measured through the question: “How often do you drink alcohol corresponding to at least half a bottle of spirits or one bottle of wine or four large bottles of strong cider or four cans of strong beer during one drinking session?” The response categories were “a few times per week”, “a few times per month”, “about once a month”, “a few times per year”, “more seldom” and “never.”

### **4.1.3 Registered sales and per capita consumption**

In study III, registered sales data from the Swedish alcohol retail monopoly expressed as liters of 100 % alcohol per inhabitant aged 15 years and above were used as a proxy for per capita alcohol consumption. For the period 1995–2012, survey estimates of unrecorded consumption were also added to this measure, since the fraction of the total consumption made up of unrecorded consumption increased after Sweden joined the EU in 1995 (55).

## **4.2 ANALYSIS**

### **4.2.1 The distribution of consumption**

Two of the papers in this thesis focused on how alcohol consumption was distributed in the population and if there was a redistribution of consumption when the overall population mean consumption changed. In study I, the aim was to examine if changes in the general adult population’s consumption had been collective. This was done by dividing the yearly samples from the Monitoring survey into 20 equally large groups, each containing 5 % of the sample, from low to high consumption. Then each group’s mean consumption was calculated for each year. The group means were compared both in terms of absolute changes in consumption—measured in milliliters of 100 % alcohol consumed during the last 30 days—and in terms of relative changes. To obtain the relative measure, the natural logarithm of alcohol

consumption was used. By breaking the data down into these smaller sub-groups, it was possible to study how consumption was dispersed in the population and how consumption had changed in different segments of the population, from low to high consumers.

A similar approach was used in study II, where the aim was to examine the distribution of consumption in the youth population. Here the yearly samples were divided into deciles, i.e., each group made up 10 % of the sample. The group means were then calculated and compared for each year. In addition, the results were also decomposed to calculate how much the change in each group contributed to the change in the overall mean.

The difference in group sizes in the two studies depended on the difference in sample sizes. In study I, the yearly samples were roughly 18 000 and in study II they were around 5 000. The much larger samples in study I thus allowed for a finer division of the respondents.

In study I, a Whitney-Mann test was used to assess if the changes in consumption in the different consumption groups significantly differed between the survey years. In study II, linear and logistic regressions were used. In both studies, the consumption measure was log-transformed using the natural logarithm to obtain a more normally distributed measure.

#### **4.2.2 Aggregate time-series analysis**

In study III, ARIMA time-series analysis was used to examine the relationship between per capita consumption in the general population and youth drinking. The models were fitted on differenced data, which meant that the models estimated the association between changes in the dependent and independent variables, rather than the correlation between the two raw series. This limited the risk of obtaining a spurious relationship due to common trends in the two variables stemming from mutual influences on the two from confounding variables. Furthermore, both variables were log-transformed to estimate the elasticity of the relationship.

#### **4.2.3 Cohort analysis**

In study IV, the aim was to examine if there were differences in drinking between cohorts or generations, and if these could be due to long-term effects of changes in Swedish alcohol policy. The analysis started out by identifying significant periods in Swedish alcohol policy and classifying these periods as either restrictive or liberal. Cohorts were then created by matching the respondents in the Monitoring survey to the corresponding policy period in which they grew up. Mean alcohol consumption in a cohort that grew up during a restrictive time period was compared with consumption in two cohorts that grew up during periods with more liberal alcohol policies. This was done using a fixed effects regression model with alcohol consumption as the dependent variable and survey year, sex and a dummy variable for alcohol policy as independent variables. Differences in trends over the survey years between the two cohort groups were tested using a post-estimation Wald test.

### **4.3 STRENGTHS AND LIMITATIONS**

All studies included in this thesis are based on survey data and thus have the same problems common to all studies using survey data. These include sampling issues and validity of self-reported information. Self-reported information on alcohol consumption tends to underreport actual intake. Several reasons for this are plausible, for instance distorting memory effects can make it hard to accurately remember everything that was drunk, especially if the reference period is long (56). Respondents might also adjust their consumption to adhere to societal norms, usually referred to as problems with social desirability.

The focus on changes in drinking over time should make the issue of underreporting less salient, because problems with the data should be the same for all years and all respondents, thus allowing comparisons across time. The consumption questions have not been altered, and responses in both surveys have been collected with the same method throughout the entire study period. Self-reported information on drinking habits is also imperative when there is a need to break down the overall population means to perform sub-group analyses.

Further, surveys also suffer from problems originating from sampling issues and selection bias caused by response rates differing between sub-groups. In the school surveys, this was less of an issue since the students filled out the questionnaire in the classroom and the individual response rates were consistently high. The Monitoring survey on the other hand has an increasing non-response rate which also has led to older age-groups being somewhat overrepresented in the sample, which should be kept in mind when interpreting the results. However, the coverage rate, i.e. self-reported consumption volume compared with per capita consumption, has been stable in the Monitoring survey and a methodological study showed that the increasing non-response rate was not likely to yield a significant bias towards a lower coverage rate of heavy drinkers (57). Both surveys also apply post-stratification weights to correct for sampling and response-rate bias.

A major strength for both surveys is the large sample size which make the surveys fairly unique, even in an international comparison. The CAN school survey is the world's longest running survey on alcohol and drug habits among youth and the Monitoring survey with its vast number of interviewed respondents is one of the largest databases on drinking habits. Another strength is the consistency of the data collection; the same mode of collection has been used in both surveys throughout the period when the surveys have been running. The large samples provide a solid basis for statistical analyses and also allow for disaggregating the data without losing statistical power.

### **4.4 ETHICAL CONSIDERATIONS**

Both surveys were anonymous and it was voluntary for the respondents to participate. This information was provided to the respondents before they participated and informed consent was given by the respondents before any information is gathered. In the school survey, students received printed information on the front of the questionnaire where they are also informed that if they did not wish to participate they could hand in a blank questionnaire

sealed in the envelope that they were provided with. In the Monitoring survey, respondents received this information from the interviewer before the interview commenced. It is also worth pointing out that this thesis was based on already collected data and any ethical problems related to data collection were not enhanced by the use of the data. All studies included in this thesis were approved by the regional ethics committee in Stockholm (Protocol: 2014/155-31/5).



## 5 RESULTS

### 5.1 COLLECTIVE DISPLACEMENT OF CONSUMPTION

The results from study I showed that the mean self-reported consumption in the Swedish adult population declined by 13 % between 2004 and 2011. This overall decline was mirrored by a significant decline in all consumption segments, except among the heaviest drinkers. Among the top 5 % consumption declined by 4 %, but this was not statistically significant. As can be seen in Figure 2, the relative decrease was inversely related to the initial consumption level.

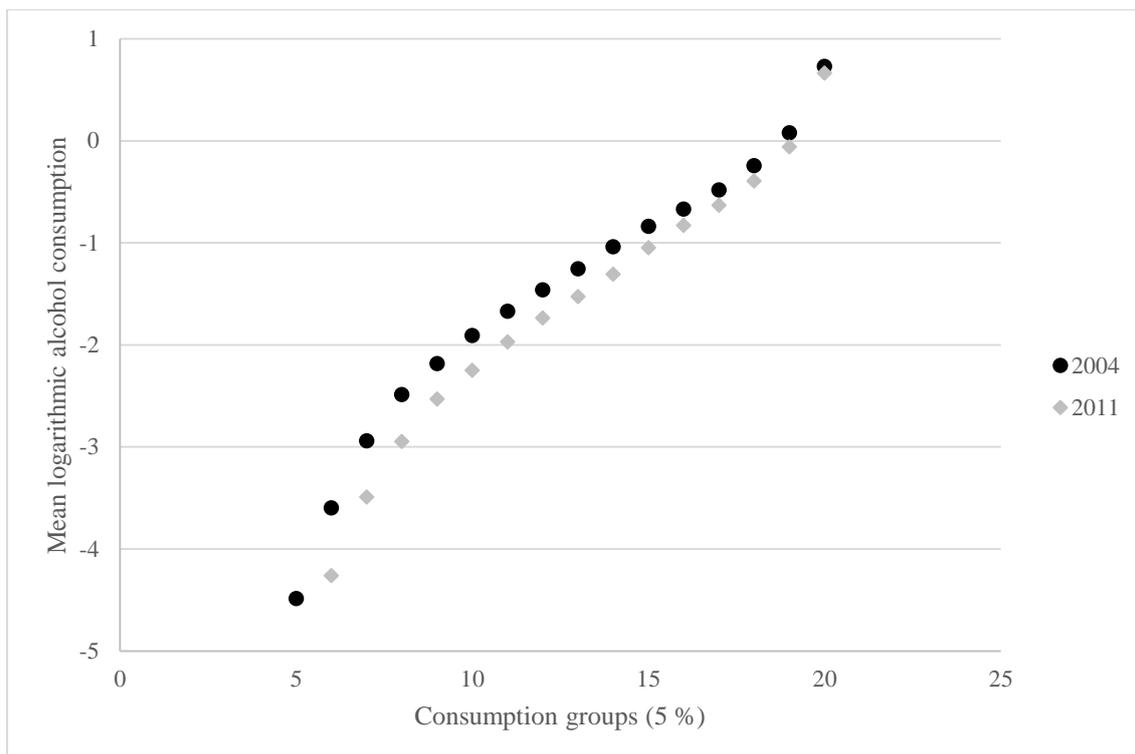


Figure 2. Mean consumption in different consumption groups for the overall population, 2004–2011.

These results were found in both men and women with a decline in mean consumption mirrored by declines in all consumption segments, from low to high. However, when the analyses were stratified by age, a different result was found. For those under 50 years of age the results were similar as for the entire population, but for those over 50 years of age there was no decline in consumption and all consumption groups had a stable consumption development.

The results from study II showed a collective displacement of consumption in the youth population. The overall mean consumption among year 11 students in Sweden declined by 19 % between 2004 and 2012. Consumption declined significantly among both boys and girls and these changes were, as displayed in Figure 3, also reflected at all consumption levels.

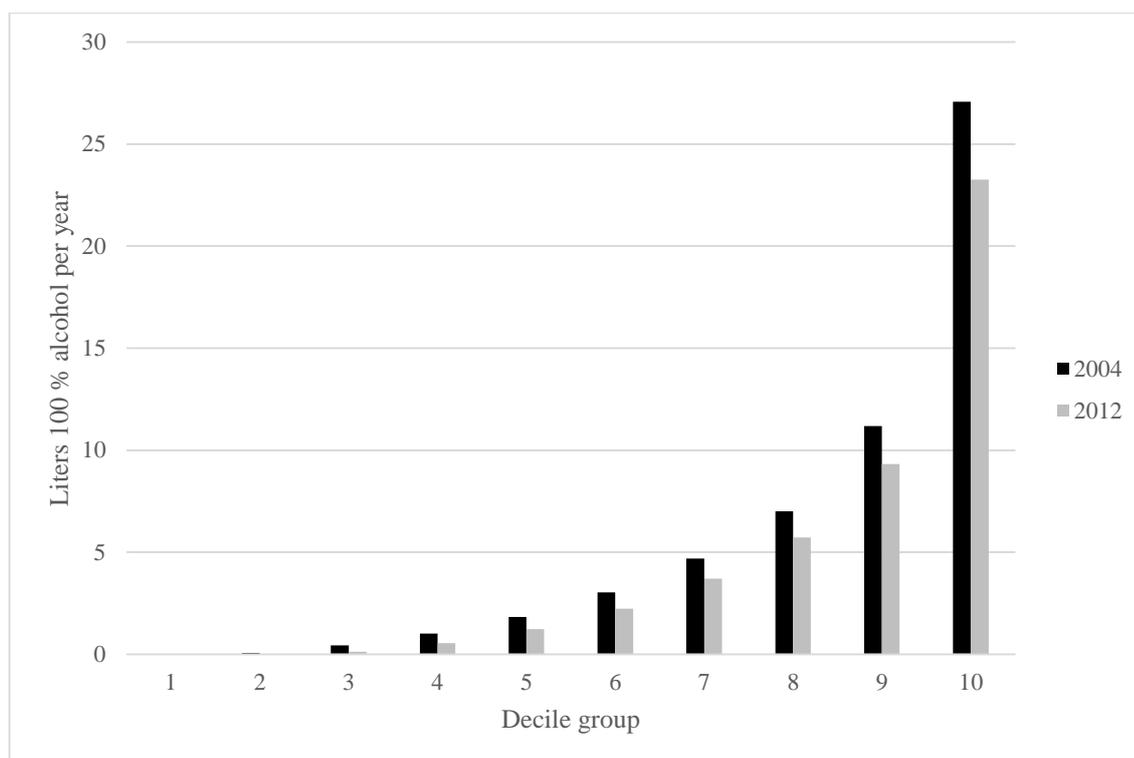


Figure 3. Average alcohol consumption 2004 and 2012 in liters 100 % alcohol per year in decile groups among year 11 students.

Table 1 presents the analyses of how consumption changed in the different decile groups. In relative terms the decline was greatest in the lower decile groups, i.e., those with the lowest levels of alcohol consumption. In absolute figures, the opposite pattern was found; the higher decile groups lowered their consumption considerably more, with the top 10 % of consumers in 2012 consuming on average 3.82 l of pure alcohol less per year than the top 10 % did in 2004. Even though this change is very small in relative terms (14.1 %), the decline in this group accounted for 37.5 % of the overall decline in youth drinking in Sweden, while the decline in the bottom half only accounted for a little more than 14 % of the overall decline.

**Table 1.** Absolute and relative change in deciles between 2004 and 2012.

Decile	Absolute change 2004-2012	Relative decrease 2004-2012	Contribution to overall consumption decrease
1	NA	0.00 %	0.00 %
2	-0.07	97.66 %	0.69 %
3	-0.31	72.50 %	3.07 %
4	-0.46	45.53 %	4.55 %
5	-0.59	32.23 %	5.80 %
6	-0.80	26.29 %	7.86 %
7	-0.98	20.99 %	9.66 %
8	-1.28	18.31 %	12.59 %
9	-1.86	16.61 %	18.24 %
10	-3.82	14.11 %	37.54 %

The results from studies I & II thus support the notion of collective displacements of consumption; when the overall mean consumption changes this is accompanied by synchronized changes in consumption in all sub-groups, from light to heavy consumers.

## 5.2 FACTORS IMPACTING POPULATION DRINKING

Studies III & IV focused on factors that could affect the drinking habits of a population. In study III the aim was to examine if there is a link between adult population drinking and youth drinking. Study IV examined if the strictness of the alcohol policy during adolescence affected drinking during adulthood.

The results from the ARIMA modelling in study III showed that there was a link between per capita consumption in the general adult population and youth drinking for the period 1972-1994. The estimated elasticity of the association showed that a 1 % change in per capita measure rendered a 1.52 % change in youth drinking. For the period 1995-2012, no association between the two measures was found, even when adding an estimate of unrecorded consumption. The results further showed that there was a strong synchronization between changes in boys' and girls' drinking.

However, additional analyses not included in the original article showed that when incorporating a measure of unrecorded consumption for the period 1995-2012 there was an association between per capita consumption and youth drinking for the entire period 1972-2012. While there is a statistically significant association between the two measures for the entire period, it should be noted that during the period 2000-2005 there was a clear disconnect between the two, with youth drinking declining and per capita consumption increasing sharply. Since then, both measures have seen a decline, but youth drinking has continued to decline more rapidly than per capita alcohol consumption in the general adult population (se figure 4).

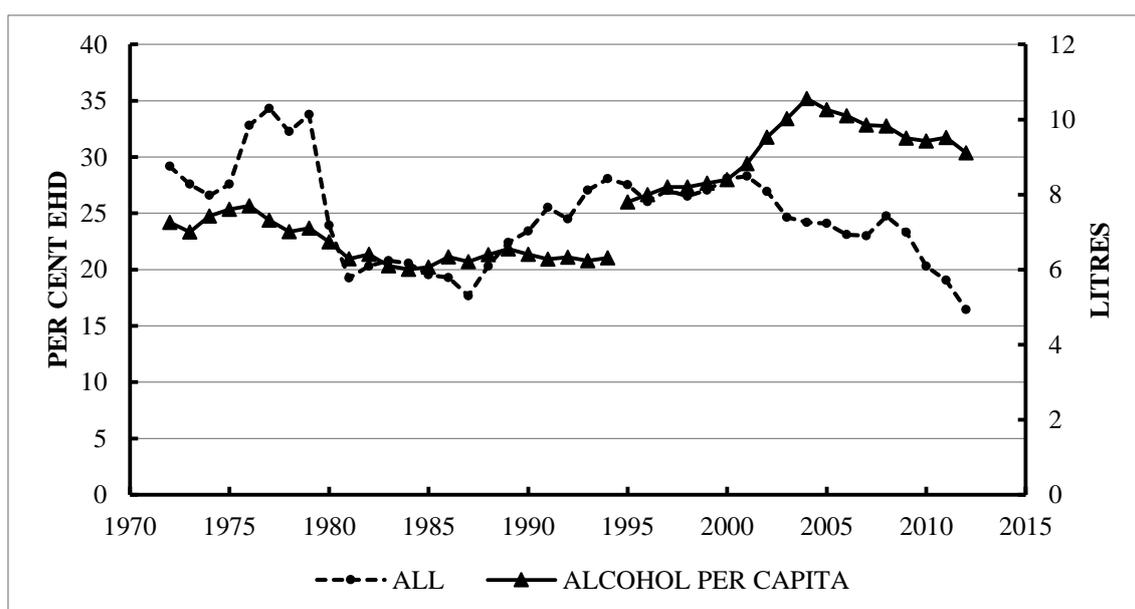


Figure 4. Trends in per capita alcohol consumption (sales data 1972-1994 and sales+unrecorded 1995-2012) and adolescent heavy episodic drinking.

The synchronization of changes in drinking in the adult and youth populations indicates that changes in the two populations' drinking are collective and that youths are also affected by collective shifts in consumption.

The results from study IV showed that there was a significant difference in drinking between cohorts. The cohorts that grew up during periods with liberal alcohol policies drank more than the cohort that grew up during a more restrictive policy period (see Table 2). The analyses further showed that there was no differential impact of these policy periods between men and women, i.e., both sexes were affected in the same way by growing up during periods with a certain alcohol policy. The results from the post-estimation Wald test also showed that both cohort groups had the same consumption development during the period 2002-2013. This indicates that there is a synchronization in changes between the two cohort groups albeit from different starting points, where the cohort growing up during a restrictive policy period has a lower consumption level to start with.

**Table 2.** Results of fixed effects model for mean 30-day alcohol volume.

	Coeff.	95 % Conf. Interval	
Liberal policy	1.000	-	-
Restrictive policy	-0.039*	-0.334	-0.314
Female	-0.324*	-0.050	-0.027
Male	1.000	-	-
Restrictive policy×Female	0.008	-0.008	0.023
<b>Survey year</b>			
2002	1.000	-	-
2003	-0.046*	-0.064	-0.028
2004	-0.061*	-0.081	-0.042
2005	-0.086*	-0.104	-0.068
2006	-0.075*	-0.093	-0.056
2007	-0.090*	-0.108	-0.071
2008	-0.085*	-0.103	-0.066
2009	-0.100*	-0.119	-0.082
2010	-0.125*	-0.144	-0.107
2011	-0.122*	-0.140	-0.104
2012	-0.111*	-0.130	-0.093
2013	-0.109*	-0.128	-0.090

\*p < 0.001

## 6 DISCUSSION

Since the turn of the millennium, the mean alcohol consumption among youth has more than halved, and since 2004, consumption in the adult population has dropped by roughly 15 %. These marked changes in population drinking provide an excellent opportunity for more refined analyses of the underlying consumption dynamics and for assessing whether they are in accord with one of the most influential theories in alcohol epidemiology, i.e., the theory of collectivity of drinking cultures.

### 6.1 MAIN FINDINGS

The interplay between the different studies and how they all relate to the theory of collectivity of drinking cultures are displayed in figure 5.

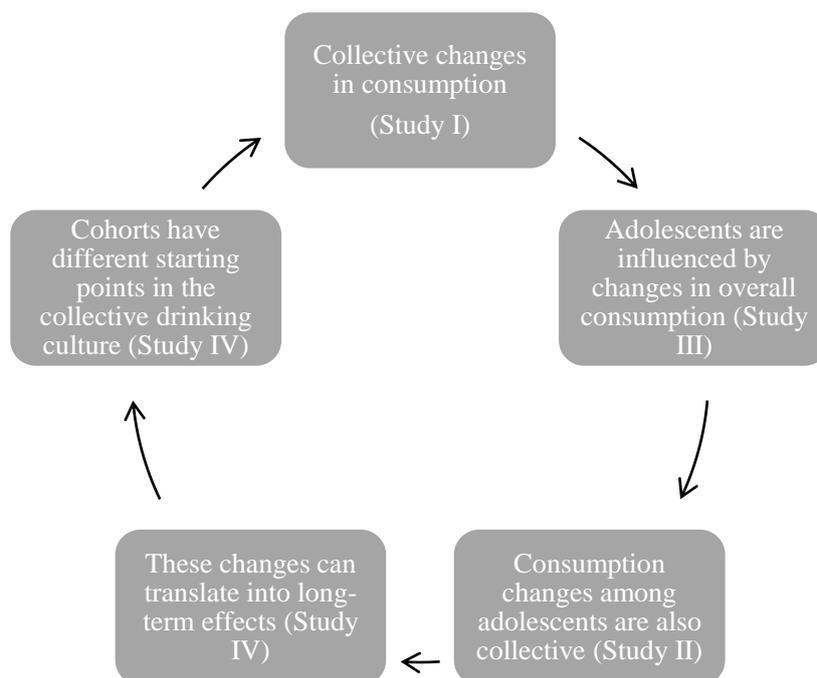


Figure 5. Schematic description of the interplay between the individual study findings.

Study I examined the temporal dimensions of changes in a population's drinking and the results support the notion that changes in the overall per capita alcohol consumption are reflected at all levels of consumption, from light to heavy drinkers. Collective shifts in consumption have also been shown in recent studies of the adult populations in Finland, Norway and the US (41), Sweden (39) and Germany (40). One fact that further supports the notion that there has been a collective decline in alcohol consumption in Sweden during the last decade is that alcohol-related mortality has also declined sharply (58). As previously stated, the link between population drinking and harm was what originally motivated the public health approach to prevent alcohol-related harm, and a collectivity of drinking has been one of the keys in explaining why this link exists (25). However, some differences in the consumption development between different age groups do raise questions that need further investigation and will be presented below.

The results from study III provide some support for a link between adult and youth drinking in Sweden over the last four decades, i.e., that changes in drinking in the general population tend to be followed by changes in youth drinking. It is important from a policy perspective to know that adolescents are also included in the collectivity of drinking and that general population strategies to reduce consumption can thus also be expected to have an effect on drinking among youth. These findings complement previous cross-sectional findings of a positive association between the level of adult consumption and youth drinking (59, 60) and a temporal association between per capita consumption and age of initiation to drinking among youth (61). A previous study has also demonstrated a link between per capita beer consumption and youth drinking (62).

Interestingly, the link between population drinking and youth drinking seems to have become weaker and no association was found for the period 1995-2012. Changes in the adult population can thus not be regarded as a viable explanation for the unexpected consumption development among youth during recent decades. That consumption among adolescents also started to decline before the recent drop in consumption among adults further points to the fact that other factors than influences from adult drinking have become more important for changes in youth drinking.

The results from study II show that the collectivity theory is applicable also for changes in adolescent alcohol consumption, in that changes in the overall mean are collective across all consumption categories for year 11 students. Furthermore, the results show that even though the heaviest drinkers changed their consumption the least in relative numbers, their contribution to the overall decline was by far the most pronounced. A novel finding from this study is also the marginal effect on mean consumption of increasing abstention rates in the youth population during the past decade. The findings that changes in drinking among youth have been collective contradict the results from a regional sample from the Stockholm city area, where a polarization of consumption was suggested in that consumption trends among the heaviest drinkers seemed to increase while overall consumption was declining (11). A collective displacement of youth consumption has, however, been found also in contemporary studies of year 9 students in Sweden (42) and Norway (43).

In study IV, it was shown that there are differences in volume of drinking between cohorts that grew up during periods that differed with respect to the strictness of alcohol policies. However, these cohort differences only seemed to affect the basic level of consumption, not the impact of other exogenous factors, so that when overall consumption changed, cohorts changed in the same direction. In this sense, these results also corroborate the idea that changes in drinking are collective. The apparent cohort differences in consumption also fit well with differences found in a previous study of alcohol-related mortality in Sweden (63). The cohorts found to have the highest alcohol-related mortality are roughly the same as those found to have the highest consumption volume.

As a major claim made here is that changes in drinking are collective, one central question becomes what a collective change in drinking is. The theory of collectivity of drinking

cultures offers no definitive answer to this question, which is also pivotal in the critique directed towards the collectivity theory (12). A common interpretation is that changes should be relative and of approximately the same magnitude across drinking groups. However, if one follows the arguments made by Skog that determinants of drinking have a multiplicative impact, this provides some further guidance (25). It is implied that changes in absolute terms should be highest among those that drink the most, whereas they should, in relative terms, be largest among lighter drinkers. This latter scenario fits well with the observed pattern of changes in studies I & II, while the first, with equally large relative changes, does not.

Another factor for why it can be expected that the smallest relative changes are found among the heaviest drinkers is what can be called a ceiling effect or saturation (25). This means that the heaviest drinking group is made up of drinkers who are more or less dependent on alcohol and thus are less susceptible to changes in the general population's consumption level (25). This in turn would cause this group to be more inert in its response to general changes, which would explain why the smallest relative changes are observed in this group.

The theory of collectivity of drinking cultures is precisely that, a theory, and not a deterministic law of nature that allows for precise predictions. The predictions derived from a theory are valid for an ideal world where all other factors are held constant and thus the theory serves best as an aid to interpret and understand empirical observations. When it is stated here that changes are collective, it refers to the basic assumption that an overall change is echoed by changes in the same direction, i.e. no sub-groups have a trajectory that is at odds with that of the overall trends. This implies that it is plausible to 'corral' the drinking behavior of entire populations, even the heaviest drinkers.

### **6.1.1 Limitations**

All four studies included in this thesis are based on survey data with their well-known limitations. In addition to what was said in the method section and in light of the results, the possible impact of differential response bias is worth mentioning. The Monitoring survey has seen declining response rates over the years, especially among younger age groups. This could explain some of the differential trends between younger and older age groups observed in study I.

The possible impact of differential participation on the results should also be kept in mind when interpreting the results from study II; the results should only be seen as representative for year 11 students, not for all 17-18 year olds. In Sweden, compulsory school ends after year nine. After that, school is no longer mandatory and around 15 % of adolescents do not continue. It is likely that those who do not continue studying drink more than others (64).

Another limitation common for both studies I & II is that they only include a measure of volume, not patterns of drinking. Drinking patterns play an important role, especially for the association with harm. For instance, the findings from the ECAS-study showed that although per capita alcohol consumption "stands out as a crucial determinant of alcohol-related harm, its impact appears to be amplified or mitigated depending on the drinking culture and its

drinking patterns.“ (26). Thus, we do not know if a similar pattern of collectivity had been revealed if we, for instance, had measured binge drinking frequency.

One of the greatest strengths of study III is also a possible limitation; the number of observed time points is somewhat lower than what is recommended in the literature (65, 66), which limits the power in the analysis, especially if causal inferences are to be made. Since the availability of long time series is scarce within the field of alcohol studies, it is often the case that shorter series are used as explorative tools (65). Even though the time series in study III is short, it is the longest one available on youth drinking and thus provides a valuable opportunity to examine the link between per capita consumption and youth drinking. The direction of the association is not decided by the data, but rather from an inference of the improbable case that changes in per capita consumption would be driven by changes in drinking among youth. It should however be noted that the association found in the additional analyses presented in the results section for the entire period (1972-2012) most likely are a result of the close association found for the first period (1972-1995).

One weakness of the fourth study is the relatively short time period covered by the data. This shortens the observation time for each cohort at each surveyed time point and narrows the age span covered in each cohort. It also limits the number of cohorts available for analysis.

### **6.1.2 Future directions**

An intriguing paradox, which is not addressed in my thesis, is why consumption has declined in Sweden when alcohol at the same time has become cheaper and more readily available. To gain further insights into this, one direction is to build on the findings from study IV and examine how differences between cohorts interplay with consumption trends. This approach could also be extended to include a more thorough examination of the role of demographic changes on consumption. Like in most other developed countries, the population in Sweden is getting older. Given the results from study I, which showed that older age groups have not reduced their consumption during the past few years to the same extent as younger age groups, it would be of interest to study what impact this has on consumption.

Future studies should also focus on differences in drinking, and changes in drinking, between socio-economic groups. It is well documented that lower socio-economic groups have higher rates of alcohol-related mortality (67). A recent study also showed that the development of alcohol-related mortality in Sweden has been uniform across educational groups. However, the lowest educational group in Sweden has become smaller during the same period (68). Analyses of how this redistribution between socio-economic groups may affect trends in consumption and mortality would have the potential to further develop our understanding.

Furthermore, it should be acknowledged that even though there was a weakening of Swedish alcohol policy after the EU membership in one sense, this also sparked a movement in which the Swedish government made a serious attempt to switch the prevention perspective from national to local (4). As a part of this transformation, the Swedish government launched an action plan and allocated over 900 million SEK (equivalent to 100 million euros) for the

period 2001-2005 and over 1.8 billion SEK for the period 2006-2010 to strengthen prevention and treatment of alcohol-related problems at all levels in society (69). This counteraction of the liberalization has led to implementation of several prevention programs in, for example, schools and primary care as well as several campaigns aimed at reducing harm and increasing awareness. The evidence for the effectiveness of these is not unanimous, with some studies showing positive effects (70, 71), while others report no effects (72, 73). However, it is plausible that our understanding of the effects from this transformation are far from complete at the moment due to the lack of comprehensive impact studies.

The consumption decline is especially puzzling in regards to adolescents. The decline in consumption observed since 2000 among school students is dramatic and still very much unexplained. The results from study III showed that there was a clear disconnect between youth drinking and per capita consumption between 2000 and 2005, when youth drinking started to decline while per capita consumption increased sharply. Influences from the drinking culture of society at large can thus not be regarded as a plausible explanation for why youth drinking was declining. A recent study also showed that there is no association between changes in the proportion of immigrants from non-drinking cultures in this age group and the changes in consumption among youth (74). Another explanation often brought forward for why alcohol consumption is declining among youth is the increased time spent online by this group (42, 74, 75). Here, the research literature is somewhat divided and results point variously towards a negative and positive association between time spent online and alcohol consumption (76-78).

Other noteworthy trends among young people that are contemporary with the declining trend in drinking are decreasing rates of criminal offences (79) and increasing prevalence of mental ill-health (80, 81). While the first trend is in line with trends in alcohol consumption – corroborating that youth today are increasingly well-behaved and law-abiding – it is harder to piece the puzzle of mental ill-health, since alcohol use is typically found to be a risk factor for mental disorders (82) and there is a high comorbidity of psychiatric disorders and substance abuse (83). Thus, it would be expected that reduced alcohol consumption among youth would also correspond to improved mental health. Further research is needed to illuminate the relationship between these two trends.

However, considering that youth drinking is declining in many countries and in several parts of the world (84, 85), it seems that there is a factor common for several countries that pushes youth drinking down, pointing to the need for collaborative studies with an international perspective.

The role of non-drinkers in the theory of collectivity of drinking cultures should also be examined. The large increase in the number of non-drinkers observed in study II is potentially a contributory factor to the decline in consumption, if their abstinence has influenced the intake among drinkers. Given that a large share of the variation in per capita consumption between countries can be attributed to differences in drinking participation, there have also been recent calls for integrating non-drinkers in the collectivity theory (33).

### **6.1.3 Contribution and relevance**

Studies I & II provide an empirical test of the theory of collectivity of drinking cultures based on temporal changes in the adult population and in the youth population. Even though this is a theory about changes in a population's alcohol consumption, the empirical evidence for the collectivity of drinking cultures originally came from cross-cultural data. In study II, a novel finding was also the marginal effect of increasing rates of abstainers on the overall declining trend, which was instead mostly due to reduced consumption among the heaviest drinkers.

Study III showed that there is a temporal association between changes in the adult and youth populations' drinking and thus that population level efforts aiming at reducing consumption can also be expected to have an effect on youth drinking. The results further add to our understanding in the form of a 'null finding' in that a change in adult drinking is not a viable explanation for the more recent decline in youth drinking, since there was no association between the two measures for the later period 1995-2012.

Study IV built on several recent studies examining cohort effects and could, with a novel approach to constructing the cohorts, show that there are consumption differences between cohorts which can be regarded as long-term effects of changes in alcohol policy. The results imply that differences in alcohol policy during adolescence can translate into long-term effects, creating generations with different drinking habits. This study further adds to the understanding of collective drinking cultures in that it shows that cohorts with different drinking habits change their consumption in concert, albeit from different starting points.

### **6.1.4 Implications**

The fact that all the results corroborate the idea that changes in drinking are collective means that a population-level approach to lower per capita consumption has several beneficial effects; 1) it will cause reduced drinking in the entire population, including heavy drinkers and youth, 2) it can yield future benefits through creating cohorts with lower consumption levels, 3) the above factors should result in decreased alcohol-related harm.

## **6.2 CONCLUDING REMARKS**

The results from all four studies in this thesis lend support to the theory of collectivity of drinking cultures. With the use of different statistical methods and the availability of high quality data, the results corroborate the theory by providing empirical findings of collective displacements of consumption across time. Furthermore, the findings also complement and expand the theory, by showing that adolescents should be incorporated in the collectivity and that there is a collectivity of drinking that transcends generations.

## 7 POPULÄRVETENSKAPLIG SAMMANFATTNING

Alkoholens roll i samhället, ett lagligt och socialt accepterat berusningsmedel, gör att bilden av den blir splittrad. För vissa är den en källa till njutning, för andra är det en drog som skadar. Enligt WHO är alkohol den femte högst rankade bidragande orsaken till den totala sjukdomsördan i världen. De skador som orsakas av alkohol är också möjliga att helt förebygga; om ingen drack alkohol skulle ingen heller drabbas av alkoholrelaterade skador. I Sverige har politiken länge varit uppbyggd kring generellt förebyggande insatser, som ska minska tillgången på alkohol och hålla konsumtionen nere genom höga skatter. Det tydligaste exemplet är att vi har ett monopol i form av Systembolaget som ska minska tillgången. Ett grundläggande argument för denna typ av generella insatser även påverkar alkoholskadornas omfattning. Tanken om alkohol som ett samhällsproblem, snarare än ett problem för den enskilda ”problemdrickaren”, har sin grund i en rapport från WHO som kom i mitten på sjuttioalet. Där kunde en rad av dåtidens mest framstående forskare konstatera att det fanns ett starkt samband mellan hur mycket vi dricker i genomsnitt per person och år och hur stora skadeverkningarna blir på samhällsnivå. Sambandet förklaras bland annat med det ”kollektiva drickandet”, en teori som bygger på att vi alla i samhället påverkar och påverkas av varandras dryckesvanor och att det därför finns en synkronisering i hur vi dricker.

Denna avhandling tar avstamp i teorin om det kollektiva drickandet och studerar hur förändringar i befolkningens genomsnittliga alkoholkonsumtion återspeglas bland olika grupper, till exempel bland dem som dricker måttliga mängder alkohol och dem som dricker stora mängder alkohol.

De senaste åren har alkoholkonsumtionen i Sverige sjunkit, i den vuxna befolkningen med ca 15 procent sedan 2004 och bland unga har den mer än halverats sedan år 2000. De första två studierna i den här avhandlingen visar att nedgångarna varit kollektiva på så vis att alla, från låg- till högkonsumenter, har minskat sin konsumtion under den här tiden.

Den tredje studien visar att det finns en koppling under de senaste fyra decennierna mellan hur mycket vuxna dricker och hur mycket unga dricker. Men kopplingen har blivit svagare sedan mitten av nittioalet och förändringar av vuxnas konsumtion kan inte ses som en rimlig förklaring till att unga idag dricker mindre.

Den fjärde studien visar på att det finns generationsskillnader i alkoholkonsumtion. De generationer som växte upp under perioder med mer restriktiv alkoholpolitik dricker mindre än andra. Utvecklingen under de senaste åren är däremot samma för alla generationer. Det pekar på att generationsskillnaderna inte är tillräckligt starka för att motverka andra nutida påverkansfaktorer, som exempelvis förändringar i pris.

Sammantaget så styrker resultaten från samtliga studier antagandet om det kollektiva drickandet, eftersom att övergripande förändringar återspeglas i alla undergrupper. Förutom att resultaten ger en empirisk grund för antagandet, så utvecklar resultaten teorin eftersom de visar på att förändringar bland unga även är kollektiva. Att unga också kan inkluderas i det kollektiva drickandet och att det kollektiva drickandet spänner över generationer. I

förlängningen betyder det här att generellt förebyggande insatser som minskar den genomsnittliga konsumtionen i befolkningen också har möjligheten att ”valla” hela befolkningen i samma riktning så att samtliga sänker sin konsumtion, även dem som dricker allra mest. Det innebär att generellt förebyggande insatser även borde ha en skademinskande effekt.

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